

8092 TELEPROGRAMMER TEST ROUTINES
{Preliminary Reference Manual}

Distributed by
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RECORD OF REVISIONS

REVISION

NOTES

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LOADING PROCEDURE

1. Magnetic Tape Version

- a. LOAD and ◊READY◊ tape on Unit 3.
- b. MASTER CLEAR, set LOAD/CLEAR switch to LOAD, and RUN/STEP switch to RUN.
- c. When the 8092 stops at 1401 or 1403 with the A = 377, MASTER CLEAR and RUN.
- d. When the 8092 stops at 7000 with A = 0, enter A with the desired file number and RUN. {See Table 1}.
- e. The 8092 will stop at 7000 with A equal the file number of the program loaded. To execute the program, MASTER CLEAR and RUN.

2. Paper Tape Version {8096 or 8196}*

- a. Manually ENTER the program in TABLE 2.
- b. MASTER CLEAR, Set P to 6000 and RUN.
- c. When the 8092 stops, place the RUN/STEP switch to center position, load the desired test routine paper tape into the Teletype reader.
- d. Set A and TAG 1 = 0. RUN. Turn on paper tape reader.
- e. When the computer stops, MASTER CLEAR and RUN to execute the program.

3. Cards {NCR reader}

- a. Load test wanted into empty hopper. Load first card up to read station via reg. switch.
- b. Engage MASTER CLEAR/LOAD switch to LOAD position. Engage RUN/STEP switch to RUN position.
- c. When all cards have been read, release RUN/STOP switch to NEUTRAL position and engage MASTER CLEAR/LOAD switch momentarily to MASTER CLEAR position and back to NEUTRAL. See test writeup for execution of program.

* If the system has 8299, load test routine into reader and execute step 1-b.

BALD LIBRARY SYSTEM
C O N T E N T S

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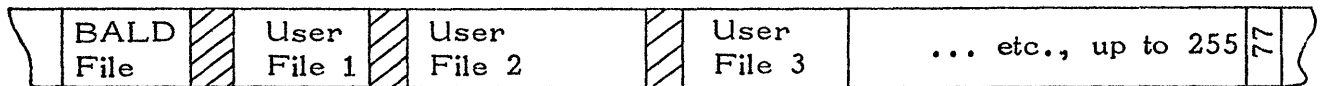
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PART ONE
BINARY LOAD AND DUMP LIBRARY SYSTEM
(BALD)

LIBRARY TAPE LAYOUT



TYPICAL USER FILE



<u>Record 1</u>	<u>Frame</u>	<u>Records, 2 thru n</u>	
XXXXXX	1	01aaaa	
VVVVVV	2	00bbbb	
01aaaa	3	01aaaa	
00bbbb	4	00bbbb	
01aaaa	5	.	(final record may contain fewer than 52 frames)
00bbbb	6	.	
.	7	.	
.	8	.	
.	9	.	
.	10	.	
00bbbb	52 _g	00bbbb	

XXXXXXVVVVVV = origin, a 12-bit address at which word assembly is to start

aaaa bbbb = one 8-bit TeleProgrammer word

Figure 1. A Library Tape

GENERAL DESCRIPTION

BALD is a collection of programs which provide the means to create and maintain a magnetic tape library of user programs for the 8092-B TeleProgrammer. Specifically, BALD programs are capable of:

- (1) Reproducing themselves to form a new skeletal library tape,
- (2) Loading user programs from the library tape into 8092-B TeleProgrammer storage for execution, and
- (3) Writing user-designated areas of 8092-B TeleProgrammer storage onto the library tape in load format.

BALD operation requires one tape transport.

LIBRARY TAPE (figure 1)

The library is made up of files. The initial file contains BALD programs and can be followed by up to 255 additional files each representing a user program or part thereof. User files are comprised of 52₇ character records, except for the last record which may be shorter to match exact program length.

A one-character record of value 77₈ follows the final user file to signal end-of-library. The entire library is written at low density (200 frames/inch) with odd parity.

TELEPROGRAMMER STORAGE REQUIREMENTS

BALD is operable only on the 8092-B TeleProgrammer. The initial record of the BALD file is read to core storage using the 8092-B TeleProgrammer autoloading feature. When executed, instructions contained in this record load remaining BALD programs into high-addressed storage, altering locations 0000₈ through 1377₈ in the process. Following the BALD load operation, storage appears as shown in figure 2.

The Load and Dump programs are self-contained, executing entirely within the area 6000g through 7776g. The copy program is designed to operate with a single tape transport and, consequently, reads the entire BALD file into storage as the first phase of a copy operation. Addresses 0000g through 4377g are destroyed when copying the BALD file.

OPERATIONAL CHARACTERISTICS

BALD Reproduction

The reproduction operation can only be performed immediately following the loading of BALD. The BALD file is read into storage, the 8092-B TeleProgrammer operator is given an opportunity to mount a new tape, and the file is reproduced on the new tape.

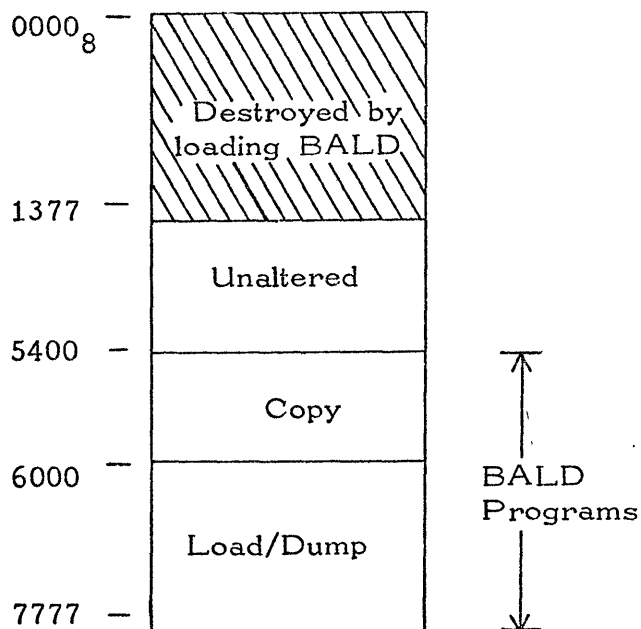


Figure 2. Library System Storage Map

File Write

The area, or any portion of the area, between and including addresses 0000₈ through 5777g can be written as a user file. Bounding addresses are provided by the 8092-B TeleProgrammer operator and the specified area is written as a new file following all other files currently in the library. The given lower bound is automatically recorded as file origin (see figure 1).

Following the write operation, file identity (i.e., the number by which the file may subsequently be called), is returned to the operator. Any number of files may be written without reloading BALD.

File Load

A file number provided by the 8092-B TeleProgrammer operator is used to locate a particular user file. The located file is then loaded into contiguous addresses starting at the origin address specified by the first two frames of record 1.

Any number of files may be loaded without reloading BALD. Only those storage cells actually used to accommodate the object file are altered as a result of loading. Thus, it is possible to load a file between two others previously loaded. (This same characteristic applies to file write operations also.)

Interspersed Write and Load

File write and load operations can be intermixed in any manner.

OPERATING PROCEDURES

Equipment Required

- 1 - 8092-B TeleProgrammer
- 1 - CONTROL DATA 601 Magnetic Tape Transport with 8193 Controller - or -
- 1 - CONTROL DATA 603 Magnetic Tape Transport with 8093 Controller

The tape controller must be connected to the buffer channel of the 8092-B TeleProgrammer.

Terminology and Conventions

TAG	The 4 high-order bits of a 12-bit address
LOCAL ADDRESS	The 8 low-order bits of a 12-bit address
ADDRESS	The concatenation of TAG and LOCAL ADDRESS (i.e., TTTT LLLLLLLL)
START ADDRESS	The address of the <u>first</u> storage location to be written
STOP ADDRESS	The address of the <u>last</u> storage location to be written <u>plus</u> one. The LOCAL portion of a STOP ADDRESS cannot be 377_8 .

All addresses or address subfields are subsequently expressed as octal numbers.

Procedures:

Loading BALD

(1) Mount a BALD library tape and position it at load point. Set unit number to 3 and ready the transport.

(2) MASTER CLEAR, set the LOAD/CLEAR switch to LOAD and RUN.*

(8092-B TeleProgrammer will STOP with P = 1401 or 1403- either is acceptable, and A = 377.)

(3) Set P = 0000 and RUN

(8092-B TeleProgrammer will STOP when BALD has been loaded with P = 7000 and A = 000.)

Reproducing the BALD File

(1) Load BALD

(2) Set P = 6400 and RUN

(8092-B TeleProgrammer will STOP with P = 6564 and A = 377.)

(3) Remove the current library tape, mount the reel which is to be the new skeletal library, position it to load point, ready the tape transport, and RUN.

(When the BALD file has been written to the new tape the 8092-B TeleProgrammer will STOP with P = 7000 and A = 000.)

(4) User file load and write operation can now be performed without reloading BALD.

* Some earlier 8092-B TeleProgrammers may not be capable of performing this autoload function. Where this is the case, the program described in Annex A can simulate steps (2) and (3).

Loading a User File

- (1) Mount the library tape containing the user file and load BALD.
- (2) Set A = user file number (1 through 376 inclusive) and RUN from 7000.

(8092-B TeleProgrammer will STOP when file has been loaded with P = 7000 and A = number of user file loaded.)

- (3) Any number of additional files can be loaded by repeating step (2).

Writing a User File

Presuming that both the BALD LOAD/DUMP program and the information to be written as a user file are intact in storage, perform the following steps:

- (1) Position library tape at load point and ready the transport.

- (2) Set Tag Register 2 = 16
Tag Register 3 = 17
P-Register = 7001
and RUN.

(8092-B TeleProgrammer will STOP with P = 7023 and A = 000.)

- (3) Set Tag Register 1 = START TAG
A-Register = START LOCAL } i.e., START ADDRESS
and RUN.

(8092-B TeleProgrammer will STOP with P = 7035 and A = 000.)

- (4) Set Tag Register 3 = STOP TAG
A-Register = STOP LOCAL } i.e., STOP ADDRESS
and RUN.

(8092-B TeleProgrammer will STOP after user file has been written with P = 7000 and A = number assigned the file.)

- (5) Additional files can be written by clearing the A-register and repeating the above procedure starting at step (1).

NOTE

When it is desired to incorporate changes into a program which has destroyed the BALD LOAD/DUMP program, it will be necessary to reload BALD, reload the user program (presuming the BALD load operation altered it), make the desired changes and then write the new user file representing the changed program.

Error Stops:

<u>(P)</u>	<u>(A)</u>	<u>APPLICABILITY</u>	<u>MEANING/RECOVERY</u>
6424	002	BALD Reproduce	Unit 3 not ready. Ready unit and RUN.
6513	000	BALD Reproduce or BALD Load	Nonrecoverable read or write tape parity error. Start over. If error persists tape transport must be repaired or, if transport is operable, tape must be replaced.
7000	377	User File Read	Designated file was not found on library. Set A = correct file number and RUN.
7103	002	User File Read User File Write	Unit 3 not ready. Ready unit and RUN.
7301	022	User File Read User File Write	Nonrecoverable tape parity error. Start over. If error persists tape transport must be repaired or, if transport is operable, tape must be replaced.
7356	377	User File Write	File being written is too large. No recovery.

PART TWO

8090 COMPUTER UTILITY PROGRAMS WHICH SUPPORT THE
8092-B TELEPROGRAMMER

BALD UTILITY

Function

Create a skeletal BALD library tape containing only the BALD file and/or add programs assembled using TOSAS to a BALD Library.

Equipment

- 1 - 8090/160-A Computer (4k memory is adequate)
- 1 - 603 Tape Transport with 8071/162 Controller
- 1 - Paper tape reader

Operating Procedures:

Load BALD UTILITY

- (1) Master Clear and set the LOAD/CLEAR switch to LOAD.
- (2) Set P = 7000, turn the paper tape reader ON and place the BALD UTILITY tape in the reader.
- (3) RUN
(8090 Computer will STOP with P = 7471 and A = 0000.)
- (4) Set P = 7000 and RUN
(8090 Computer will STOP with P = 7450 and A = 0000.)

Create a Skeletal BALD Library Tape

- (1) Mount a magnetic tape positioning it at load point. Set unit number to 3, density to low, and ready the tape transport.
- (2) Load BALD UTILITY. Leave program tape in reader and reader ON.
- (3) Set JUMP switch 1 and RUN.
(8090 Computer will write the BALD file and STOP with P = 7744, A = 1113.)

- (4) Additional skeletal libraries can be created by repeating step (1), and RUNNING from 7744.

Add User Programs to Existing Library

- (1) Mount the library tape to be updated positioning it at load point. Set unit number to 3, density to low, and ready the tape transport.
- (2) Load BALD UTILITY. Leave program tape in reader and reader ON.
- (3) Set JUMP switch 2, and RUN.
(8090 Computer will STOP with P = 7500 and A = 0000.)
- (4) Remove the BALD UTILITY tape from the reader and place the user program tape (TOSAS binary output) in the reader.
- (5) RUN
(8090 Computer will STOP with P = 7760 and A = user file number assigned the program.)

Additional programs can be added to the library by repeating steps (4) and (5).

NOTE

TOSAS programs to be added to the library using BALD UTILITY must be written with the ØRG pseudo operator as the first source language statement.

Error Steps:

<u>(P)</u>	<u>(A)</u>	<u>MEANING/RECOVERY</u>
7140	XXXX	TOSAS output paper tape (user program) was either read incorrectly or is punched incorrectly. Start library update procedure over. (Any programs already placed on the library need not be reprocessed.) If error persists obtain Customer Engineering help to clean reader. If error still persists, it will be necessary to obtain a new TOSAS output tape.
7220	XXXX	Same as 7140
7367	XXXX	Same as 7140
7524	0077	User program occupies core above 7000 and cannot be loaded. There is no recovery.
7573	0002	Tape transport 3 is not ready. Ready transport and RUN.
7616	0002	Same as 7573
7660	7777	Nonrecoverable magnetic tape write error during skeletal library creation. Start over using a different tape. If error persists try an alternate transport (if available) or obtain Customer Engineering help.
7675	0002	Same as 7573
7720	0002	Same as 7573
7731	0000	Nonrecoverable magnetic tape write error during library update. Start library update procedure over. (Any programs already placed on the library need not be reprocessed.) If error persists try an alternate transport (if available) or obtain Customer Engineering help.

BI-QUAD DUMP/VERIFY

Function

Dump 8090 Computer core to paper tape in a format which can be machine loaded on an 8092-B TeleProgrammer equipped with paper tape reader. Verify tape produced against original content of 8090 Computer core.

Equipment

- 1 - 8092/160-A Computer (4k memory is adequate)
- 1 - Paper tape reader
- 1 - Paper tape punch

Operating Procedures

The following procedures presume that the program to be punched is already resident in 8090 Computer storage. If it is not, it must be entered into storage. TOSAS output tapes can be so entered using the OSAS-A Binary Loader.

- (1) Master Clear and set the LOAD/CLEAR switch to LOAD.
- (2) Set $P = LLLL$, where LLLL is chosen so as not to conflict with the program to be punched. Turn the paper tape reader ON and place the BI-QUAD DUMP/VERIFY program in the reader.
- (3) RUN
(8090 Computer will STOP with $P = LLLL + 71$ and $A = 0000$.)
- (4) Set $P = LLLL$, set $A =$ First Word Address of area to be punched and RUN.
(8090 Computer will STOP with $P = LLLL + 2$.)
- (5) Set $A =$ Last Word Address + 1 of area being punched. Turn on punch and RUN.
(8090 Computer will STOP with $P = LLLL + 16$, $A =$ check sum for BI-Quad tape.)

(6) Place the just punched tape in the reader and RUN.

(If tape is error-free, 8090 Computer will STOP with $P = LLLL + 70$. If tape contains errors, 8090 Computer will STOP with $P = LLLL + 64$ and $A =$ address of storage location which is incorrectly punched. To verify remainder of tape, RUN. 8090 Computer will STOP at $LLLL + 64$ each time a compare error occurs.)

(7) A tape can be repunched by starting at step (4).

Error Stops:

<u>(P)</u>	<u>(A)</u>	<u>MEANING/RECOVERY</u>
$LLLL + 64$	—	Compare error during verify operation. Repunch BI-Quad tape.

ANNEX A
AUTOLOAD SIMULATOR

The program shown below can load the first record of the BALD file if the 8092-B TeleProgrammer in use is not capable of buffer channel autoloading. The program must be keyed into storage manually.

<u>STORAGE LOCATION</u>	<u>CONTENT</u>	<u>TOSAS EQUIVALENT</u>	
4000	020		LDN
1	000		0
2	302		ATT T3
3	204	L1	ABR T2
4	003		L1
5	030		ADN
6	003		3
7	302		ATT T3
4010	020		LDN
11	002		2
12	205	L2	ABX T2
13	012		L2
14	075		EXF
15	013		13
16	024		24
17	270	L3	IBI T2
4020	017		L3
21	020		LDN
22	000		0
23	204	L4	ABR T2
24	023		L4
25	064		UJP
26	000		0

NOTE

Before executing this program, Tag Register 2 must be set to 10₈.

NUMBER: {T25} B0C

TITLE: Confirmation of Bi-Octal Loader Tape

MINIMUM EQUIPMENT NEEDED: 8092, 8299

PURPOSE

This program will check accuracy of a bi-octal dump on paper tape.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 3000

STARTING ADDRESS: 3000

TERMINAL ADDRESS: 3055

Put beginning address of program to be checked into location 3023. Load tag register 2 with the bank where beginning address starts. Put ending address +1 into location 3031. Put the tape to be checked in the reader such that the first non-zero frame is the first frame read. Start the run at 3000.

DESCRIPTION

This program will read each frame of the bi-octal tape and compare with the contents of the respective memory location in the TeleProgrammer.

HALTS

P = 3034 End of test. Tape is correct.

P = 3037 Error on tape at address indicated
by A.

This routine assumes tape to be a bi-quad tape that is being read in.

3000	020	LDN	Set Program Location Tag
3001	006		
3002	302	ATT	
3003	075	EXF	
3004	041		Select Paper Tape Reader
3005	002		
3006	076	INA	
3007	010	LPN	Input Upper Four Bits
3010	017		
3011	001	SHA	
3012	001	SHA	
3013	001	SHA	
3014	001	SHA	
3015	341	STM	
3016	055		
3017	076	INA	
3020	351	RAM	Input Lower Four Bits
3021	055		
3022	235	SBM	Compare with Word in Memory
3023	000		
3024	360	ZJP	
3025	040		
3026	321	LDM	
3027	023		
3030	034	SBN	
3031	155		
3032	361	NZP	
3033	035		
3034	077	HLT	
3035	321	LDM	Error Stop with A=Memory Address
3036	023		
3037	077	HLT	
3040	355	RAO	
3041	023		
3042	361	NZP	
3043	006		
3044	203	TTA	
3045	030	ADN	
3046	001		
3047	202	ATT	
3050	076	INA	
3051	076	INA	
3052	364	UJP	
3053	006		
3054	000		
3055	000		

8092/8130 COMMAND TEST (COM)

The Command Test checks the internal instruction repertoire of the 8092 computer.

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. None

B. LOADING PROCEDURE

1. Load 64 column binary cards

C. PARAMETERS

1. None

II. MESSAGES

A. NORMAL MESSAGES

1. Address	"A" Register	Comments
0316	00X	Parameter for stop or no stop on error. "1" = Stop on error "0" = No stop
0323	00X	Parameter for repeat or no repeat on error. "1" = Repeat on error "0" = No repeat
3463	000	Halt check after 1 pass thru test
3500	077	End of test halt after ten passes thru test

B. ERROR MESSAGES

Address	A Register	Comments
0001	XXX	P+2 failed after LDN instruction executed. Possible adder trouble.
0003	XXX	LDN or ZJP failed. P+2 after ZJP instruction also failed. Possible adder trouble.
0004	XXX	LDN or ZJP instruction failed.
0054	XXX	LDN or NZP instruction failed on bit 7. Possible adder trouble. "A" register should = 200.
0064	200	NZP instruction failed to jump.
0074	200	NZP instruction failed on third try.
0104	200	NJP instruction failed to jump.
0114	200	NJP instruction failed to jump on second try.
0124	200	NJP instruction failed to jump on third try.
0136	XXX	LDN or NZP instruction failed to jump for bit 6.
0151	XXX	SHA instruction failed for shifting bit 6 - bit 7.
0157	100	NJP executed jump on positive number.
0170	XXX	PJP instruction failed to jump on positive number (001) or SHA instruction failed to shift bit 7 - bit 0 (zero).
0236	000	The number (001) was shifted three times, sent to tag 1, and recalled from tag 1. The result was zero. Result should be 010. Tag instruction or SHA instruction failed.

Address	A Register	Comments
0245	XXX	Tag instruction failed or NZP instruction jumped on zero number.
0256	000	SHA instruction failed. The number 020 was shifted 8 times. Result was zero. Should be 020.
0273	XXX	Tag error. 020 was sent to tag 1 (illegal) zero was not returned.
0336	XXX	Clear interrupt lockout return jump (113) did not execute.
0347	XXX	"A" Register contains the failing instruction.
0352	XXX	"A" Register contains expected result.
0355	XXX	"A" Register contains the result.
0363	XXX	"A" Register plus tag register 3 contains the address of the failing instruction.
0411	XXX	ATT or TTA failed. Data transferred to or from tag 2 should be zero.
0461	XXX	TTA or ATT instruction failed. "A" Register should equal 017. Data in "A" is error data from tag #2.
0471	XXX	TTA or ATT instruction failed. "A" Register should equal 017. Data in "A" is error data from tag #2.
0500	XXX	CLA instruction failed to clear the "A" Register.
0547	XXX	Shift error.
0556	XXX	Shift error or tag 2 error.
0565	XXX	Shift error.
0574	XXX	Shift error.

Address	A Register	Comments
0613	000	PJP instruction did not jump on zero number.
0622	200	PJP instruction jumped on negative number (200).
0633	000	UJP instruction did not execute.
0644	000	ZJP instruction failed to jump on zero.
0655	377	NZP instruction failed to jump on non-zero data of 377.
0664	000	UJP instruction failed to execute.
0675	000	ZJP instruction failed to jump on data of zero.
0321	XXX	ATT or TTA instruction error. "A" Register is data received from tag #1. Data expected = 017.
1031	XXX	TTA or ATT instruction failed. Data transferred to and from tag 3 = 017.
1036	XXX	CLA instruction failed.
1113	XXX	BER or ABR instruction failed. "A" Register contains data transferred from buffer entrance register. Data sent to buffer entrance register = 377.
1120	N/A	ABR instruction error. Buffer indicated busy when attempting to load buffer entrance register. Buffer should not be busy.
1140	N/A	ABR instruction error. Buffer indicated busy when attempting to load buffer entrance register. Buffer should not be busy.

Address	A Register	Comments
1145	XXX	ABR or BER instruction error. Zero sent to buffer entrance register. Data returned is in "A" Register.
1222	N/A	ABR instruction error. Buffer indicated busy when attempting to load buffer entrance register. Buffer should not be busy.
1226	XXX	LDM instruction error. Data in A register is data read from memory. Should be = 377.
1247	XXX	SBM instruction error. Data in "A" Register is result of subtracting 377 from 377 and not getting zero.
1272	XXX	SBM instruction error. One was subtracted from 1. Result in "A" Register.
1350	XXX	SBM instruction error. One was subtracted from zero. The result was not 376. "A" Register contains result.
1355 1362	XXX	SBM instruction error. One was subtracted from zero. The result was not 376. "A" Register contains result.
1406	XXX	SBN instruction error. One was subtracted from zero. The result was not 377. A register = result.
1421	XXX	SBN instruction error. Two was subtracted from two. The result was not zero. "A" Register = result.
1432	XXX	SBN instruction error. Four was subtracted from 4. The result was not zero. "A" Register = result.
1445	XXX	SBN instruction error. Seventy was subtracted from seventy. The result was not zero. "A" Register = result.

Address	A Register	Comments
1456	XXX	SBN instruction error. 300 was subtracted from 300. The result is in "A" Register.
1506	XXX	STM instruction failure. Data stored = 377. Data loaded and 377 subtracted from said data = "A" Register.
1536	XXX	STM instruction failure. Data stored = 000. Data loaded = "A" Register.
1600	XXX	STM instruction error. Data stored should have been = 377. A Register contains data loaded.

Buffer Busy Halts

Address	Instruction Attempted
3442	ABR
3446	ABX
3452	IBI

Address	Comments
3456	Buffer indicated busy. If BER and BXR Registers are equal, the compare circuitry failed. If BER and BXR Registers are different, a buffer counter error occurred.

III. DESCRIPTION

The Command Test starts immediately by checking simple instructions and works up to the more difficult ones. The adder is assumed to be working. There are four error stops that are common to some of the instructions. Data displayed in the "A" Register at each stop is:

1. Failing Instruction
2. Expected Result
3. Result
4. Instruction Address (plus Tag Register 3)

The following instructions use the common error stops:

Load Compliment Memory
Load Compliment Indirect
Add Indirect
Add No Address
Add Memory
Replace Add Memory
Replace Add One
Logical Product Indirect
Logical Sum Indirect
Logical Product No Address
Logical Product Memory
Logical Sum No Address
Load Indirect
Subtract Indirect
Store Indirect

All other instructions tested use individual error stops. The program cycles through each instruction a number of times before going on to the next. After one pass through the complete test, the program will halt. Release and activate the run switch and the program will perform the same operations 7 more times and halt with 77 in the "A" Register. This is the end of test halt. The first pass through the test takes approximately 45 seconds. If manual interrupt is activated, a halt will occur and the stop on error parameter may be changed. Release and activate run switch and a second halt will occur. Repeat on error parameter may now be changed. See Section II.A for alteration of parameters. See Section II.B for all error stops.

8092 TEST COM

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		REM	8092 TEST COM	
		REM	8092 SYSTEM COMMAND TEST (INTERNAL INST.)	
		REM	ASSEMBLED 2---26---1968	
			SEE WRITEUP FOR OPERATION AND ERROR HALTS	
	0000	ORG	0	
	0000	BNK0		
		REM	NOP INSTRUCTIONS ARE TO BE USED IN CASE	
		REM	OF PROGRAM CHANGES	
	0000	0020	START	LDN
	0001	0000		0
	0002	0060		ZJP
	0003	0050		FIFTY
	0004	0000		ERR
	0005	0064		ZJP INSTRUCTION ERROR 1
	0006	0000		UJP
	0007	0002		START
	0010	0002		NOP
	0011	0064		NOP
	0012	0312		UJP
				CHANGE
	0020	0020	PRG	20
	0020	0002		NOP
	0021	0077		HLT
		0030	PRG	30
	0030	0002		NOP
	0031	0077		HLT
		0040	PRG	40
	0040	0002		NOP
	0041	0077		HLT
		0042	PRG	42
	0042	0000	COUNTZ	
	0043	0000	PARAM1	0
	0044	0001	PARAMR	1
	0045	0001	PARAMS	1
	0046	0000	INDIR	0
	0047	0000	SAVEA	0
	0050	0020	FIFTY	LDN
	0051	0200		200
	0052	0061		NZP
	0053	0062		A1
	0054	0000		ERR
	0055	0064		NzP INSTRUCTION ERROR 1
	0056	0050		OR LDN ERROR 1
	0057	0002		FIFTY
	0060	0002		NOP
	0061	0002		NOP
	0062	0061	A1	NZP
	0063	0072		A2
	0064	0000		ERR
	0065	0064		NzP INSTRUCTION ERROR 2
	0066	0050		UJP
	0066	0050		FIFTY
	0067	0002		NOP

8092 TEST COM

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0070	0002		NOP	
0071	0002		NOP	
0072	0061	A2	NZP	
0073	0102		A3	
0074	0000		ERR	NZP INSTRUCTION ERROR 3
0075	0064		UJP	
0076	0050		FIFTY	
0077	0002		NOP	
0100	0002		NOP	
0101	0002		NOP	
0102	0063	A3	NJP	
0103	0112		A4	
0104	0000		ERR	NJP INSTRUCTION ERROR 1
0105	0064		UJP	
0106	0050		FIFTY	
0107	0002		NOP	
0110	0002		NOP	
0111	0002		NOP	
0112	0063	A4	NJP	
0113	0122		A5	
0114	0000		ERR	NJP INSTRUCTION ERROR 2
0115	0064		UJP	
0116	0050		FIFTY	
0117	0002		NOP	
0120	0002		NOP	
0121	0002		NOP	
0122	0063	A5	NJP	
0123	0132		A6	
0124	0000		ERR	NJP INSTRUCTION ERROR 3
0125	0064		UJP	
0126	0050		FIFTY	
0127	0002		NOP	
0130	0002		NOP	
0131	0002		NOP	
0132	0020	A6	LDN	
0133	0100		100	
0134	0061		NZP	
0135	0144		A7	
0136	0000		ERR	NZP INSTRUCTION ERROR 4
0137	0064		UJP	OR LDN ERROR 2
0140	0132		A6	
0141	0002		NOP	
0142	0002		NOP	
0143	0002		NOP	
0144	0063	A7	NJP	
0145	0157		A8	
0146	0001		SHA	
0147	0063		NJP	
0150	0165		A9	
0151	0000		ERR	SHA INSTRUCTION ERROR 1
0152	0064		UJP	

8092 TEST COM

0153	0132		A6	
0154	0002		NOP	
0155	0002		NOP	
0156	0002		NOP	
0157	0000	A8	ERR	NJP INSTRUCTION ERROR 4
0160	0064		UJP	
0161	0132		A6	
0162	0002		NOP	
0163	0002		NOP	
0164	0002		NOP	
0165	0001	A9	SHA	
0166	0062		PJP	
0167	0176		C5	
0170	0000		ERR	PJP INSTRUCTION ERROR 1
0171	0064		UJP	OR SHA ERROR 2
0172	0132		A6	
0173	0002		NOP	
0174	0002		NOP	
0175	0002		NOP	
0176	0020	C5	LDN	TAG ONE CHECK
0177	0017		17	
0200	0102		ATT	T1
0201	0020		LDN	
0202	0000		0	
0203	0103		TTA	T1
0204	0063		NJP	
0205	0235		C6	
0206	0001		SHA	
0207	0063		NJP	
0210	0235		C6	
0211	0001		SHA	
0212	0063		NJP	
0213	0235		C6	
0214	0001		SHA	
0215	0063		NJP	
0216	0235		C6	
0217	0001		SHA	
0220	0062		PJP	
0221	0244		C7	
0222	0001		SHA	
0223	0062		PJP	
0224	0244		C7	
0225	0001		SHA	
0226	0062		PJP	
0227	0244		C7	
0230	0001		SHA	
0231	0062		PJP	
0232	0244		C7	
0233	0064		UJP	
0234	0253		C8	
0235	0103	C6	TTA	T1 DATA RECEIVED FROM TAG 1

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8092 TEST COM

{COM-11}

0236	0000		ERR	
0237	0064		UJP	
0240	0176		C5	DATA EXPECTED = 17
0241	0002		NOP	
0242	0002		NOP	
0243	0002		NOP	
0244	0003	C7	TTA	DATA RECEIVED FROM TAG 1
0245	0000		ERR	DATA EXPECTED = 17
0246	0002		NOP	
0247	0002		NOP	
0250	0002		NOP	
0251	0002		NOP	
0252	0002		NOP	
0253	0003	C8	CLA	CLA INST. TEST
0254	0060		ZJP	
0255	0265		C9	
0256	0000		ERR	A REG. DID NOT CLEAR
0257	0064		UJP	
0260	0253		C8	
0261	0002		NOP	
0262	0002		NOP	
0263	0002		NOP	
0264	0002		NOP	
0265	0102	C9	ATT	T1
0266	0020		LDN	
0267	0377		377	
0270	0103		TTA	T1
0271	0060		ZJP	
0272	0301		E1	
0273	0000		ERR	TAG 1 ERROR, TAG 1 SHOULD
0274	0064		UJP	EQUAL ZERO
0275	0253		C8	
0276	0002		NOP	
0277	0002		NOP	
0300	0002		NOP	
0301	0020	E1	LDN	
0302	0001		T04	
0303	0102		ATT	T1
0304	0164		UJP	T1
0305	0400		BANK1	
0306	0002		NOP	
0307	0002		NOP	
0310	0002		NOP	
0311	0002		NOP	
0312	0041	CHANGE	STM	SAVE A REGISTER
0313	0047		SAVEA	
0314	0021		LDM	PARAMETER STOPS
0315	0045		PARAMS	
0316	0077		HLT	
0317	0041		STM	
0320	0045		PARAMS	0 = NO SIOP, 1 = STOP ON ERROR

8092 TEST COM

0321	0021		LDM	
0322	0044		PARAMR	
0323	0077		HLT	
0324	0041		STM	
0325	0044		PARAMR	0 = NO REPEAT, 1 = REPEAT CONTINUOUSLY
0326	0061		NZP	AFTER FIRST ERROR
0327	0332		RET1	
0330	0041		STM	
0331	0043		PARAM1	
0332	0021	RET1	LDM	
0333	0047		SAVEA	
0334	0113		CIL	T1
0335	0002		NOP	
0336	0077		HLT	INTERRUPT RETURN JUMP DID NOT WORK
0337	0041	ERROR	STM	
0340	0354		RESULT	
0341	0021		LDM	
0342	0045		PARAMS	
0343	0060		ZJP	
0344	0364		RETURN	-11
0345	0020		LDN	
0346	0000	INST	0	A REG. CONTAINS FAILING INSTRUCTION
0347	0077		HLT	
0350	0020		LDN	
0351	0000	EXPECT	0	A REG. CONTAINS EXPECTED RESULT
0352	0077		HLT	
0353	0020		LDN	
0354	0000	RESULT	0	A REG CONTAINS RESULT
0355	0077		HLT	
0356	0020		LDN	
0357	0000	TAG	0	
0360	0302		ATT	T3
0361	0020		LDN	TAG 3 PLUS A REG.
0362	0000	ADDRES	0	IS THE ADDRESS OF FAILING INSTRUCTION
0363	0077		HLT	
0364	0021		LDM	
0365	0044		PARAMR	
0366	0060		ZJP	
0367	0372		RETURN	-3
0370	0020		LDN	
0371	0001		1	
0372	0041		STM	
0373	0043		PARAM1	
0374	0264		UJP	T2
0375	0000	RETURN	0	
	0400	BANK1	PRG	400
0400	0003		CLA	
0401	0020		LDN	
0402	0000		0	
0403	0202		ATT	T2
0404	0020		LDN	

{COM-12}

8092 TEST COM

{E[T-WO]}

0405	0377		377	
0406	0203		TTA	T2
0407	0160		ZJP	T1
0410	0420		E2	
0411	0000		ERR	
0412	0164		UJP	T1
0413	0400		BANK1	
0414	0002		NOP	
0415	0002		NOP	
0416	0002		NOP	
0417	0002		NOP	
0420	0020	E2	LDN	
0421	0017		17	
0422	0202		ATT	T2
0423	0003		CLA	
0424	0161		NZP	T1
0425	0500		E3	
0426	0203		TTA	T2
0427	0163		NJP	T1
0430	0460		E4	
0431	0001		SHA	
0432	0163		NJP	T1
0433	0460		E4	
0434	0001		SHA	
0435	0163		NJP	T1
0436	0460		E4	
0437	0001		SHA	
0440	0163		NJP	T1
0441	0460		E4	
0442	0001		SHA	
0443	0162		PJP	T1
0444	0470		E5	
0445	0001		SHA	
0446	0162		PJP	T1
0447	0470		E5	
0450	0001		SHA	
0451	0162		PJP	T1
0452	0470		E5	
0453	0001		SHA	
0454	0162		PJP	T1
0455	0470		E5	
0456	0164		UJP	T1
0457	0507		B1	
0460	0203	E4	TTA	T2
0461	0000		ERR	
0462	0164		UJP	T1
0463	0420		E2	
0464	0002		NOP	
0465	0002		NOP	
0466	0002		NOP	
0467	0002		NOP	

TAG 2 ERROR. TAG 2 SHOULD
EQUAL TO ZERODATA REC. FROM TAG 2 = A REG.
DATA EXPECTED = 17

8092 TEST COM

0470	0203	E5	TTA	T2	DATA REC. FROM TAG 2 = A REG. DATA EXPECTED = 17
0471	0000		ERR		
0472	0164		UJP	T1	
0473	0420		E2		
0474	0002		NOP		
0475	0002		NOP		
0476	0002		NOP		
0477	0002		NOP		
0500	0000	E3	ERR		CLA INST. ERROR
0501	0264		UJP	T2	
0502	0423		E2	+3	
0503	0002		NOP		
0504	0002		NOP		
0505	0002		NOP		
0506	0002		NOP		
0507	0020	B1	LDN		SHA INSTRUCTION TEST
0510	0001		1		
0511	0001		SHA		
0512	0001		SHA		
0513	0001		SHA		
0514	0202		ATT	T2	
0515	0203		TTA	T2	
0516	0160		ZJP	T1	
0517	0547		B2		
0520	0001		SHA		
0521	0202		ATT	T2	
0522	0203		TTA	T2	
0523	0161		NZP	T1	
0524	0556		B3		
0525	0020		LDN		
0526	0020		20		
0527	0001		SHA		
0530	0001		SHA		
0531	0001		SHA		
0532	0001		SHA		
0533	0001		SHA		
0534	0001		SHA		
0535	0001		SHA		
0536	0001		SHA		
0537	0160		ZJP	T1	
0540	0565		B4		
0541	0202		ATT	T2	
0542	0203		TTA	T2	
0543	0161		NZP	T1	
0544	0574		B5		
0545	0164		UJP	T1	
0546	0603		B9		
0547	0000	B2	ERR		SHIFT ERROR 1
0550	0164		UJP	T1	
0551	0507		B1		
0552	0002		NOP		

{HT-W03}

8092 TEST COM

0553	0002		NOP		
0554	0002		NOP		
0555	0002		NOP		
0556	0000	B3	ERR		TAG ERROR OR NZP INST ERROR.
0557	0164		UJP	T1	
0560	0507		B1		
0561	0002		NOP		
0562	0002		NOP		
0563	0002		NOP		
0564	0002		NOP		
0565	0000	B4	ERR		SHIFT ERROR 3
0566	0164		UJP	T1	
0567	0507		B1		
0570	0002		NOP		
0571	0002		NOP		
0572	0002		NOP		
0573	0002		NOP		
0574	0000	B5	ERR		SHIFT ERROR 4
0575	0164		UJP	T1	
0576	0507		B1		
0577	0002		NOP		
0600	0002		NOP		
0601	0002		NOP		
0602	0002		NOP		
0603	0020	B9	LDN		
0604	0200		200		
0605	0162		PJP	T1	
0606	0622		C1		
0607	0020		LDN		
0610	0000		0		
0611	0162		PJP	T1	
0612	0631		C2		
0613	0000		ERR		PJP INSTRUCTION ERROR 3
0614	0164		UJP	T1	
0615	0607		B9	+4	
0616	0002		NOP		
0617	0002		NOP		
0620	0002		NOP		
0621	0002		NOP		
0622	0000	C1	ERR		PJP INSTRUCTION ERROR 2
0623	0164		UJP	T1	
0624	0603		B9		
0625	0002		NOP		
0626	0002		NOP		
0627	0002		NOP		
0630	0002		NOP		
0631	0164	C2	UJP	T1	
0632	0656		C3		
0633	0000		ERR		UJP INSTRUCTION ERROR 1
0634	0002		NOP		
0635	0002		NOP		

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8092 TEST COM

{COM-1F}

0636	0002		NOP		
0637	0002		NOP		
0640	0020		LDN		
0641	0000		0		
0642	0160		ZJP	T1	
0643	0631		C2		
0644	0000		ERR		ZJP INST. ERROR 2
0645	0002		NOP		
0646	0002		NOP		
0647	0002		NOP		
0650	0002		NOP		
0651	0020		LDN		
0652	0377		377		
0653	0161		NZP	T1	
0654	0631		C2		
0655	0000		ERR		NZP INST. ERROR 5
0656	0164	C3	UJP	T1	UJP INSTRUCTION ERROR NUMBER 2
0657	0671		C4		
0660	0002		NOP		
0661	0002		NOP		
0662	0002		NOP		
0663	0002		NOP		
0664	0000		ERR		
0665	0002		NOP		
0666	0002		NOP		
0667	0002		NOP		
0670	0002		NOP		
0671	0020	C4	LDN		
0672	0000		0		
0673	0160		ZJP	T1	
0674	0704		C5A		
0675	0000		ERR		ZJP INST. ERROR 3
0676	0164		UJP	T1	
0677	0671		C4		
0700	0002		NOP		
0701	0002		NOP		
0702	0002		NOP		
0703	0002		NOP		
0704	0020	C5A	LDN		
0705	0002		T10		
0706	0202		ATT	T2	
0707	0264		UJP	T2	
0710	1000		BANK2		
	1000	PRG	1000		
1000	0020	BANK2	LDN		TAG 3 CHECK
1001	0017		17		
1002	0302		ATT	T3	
1003	0003		CLA		
1004	0261		NZP	T2	
1005	1036		E7		
1006	0303		TTA	T3	

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1007	0001		SHA		
1010	0001		SHA		
1011	0001		SHA		
1012	0001		SHA		
1013	0262		PJP	T2	
1014	1030		E8		
1015	0001		SHA		
1016	0262		PJP	T2	
1017	1030		E8		
1020	0001		SHA		
1021	0262		PJP	T2	
1022	1030		E8		
1023	0001		SHA		
1024	0262		PJP	T2	
1025	1030		E8		
1026	0264		UJP	T2	
1027	1043		E9		
1030	0303	E8	TTA	T3	TAG 3 ERROR
1031	0000		ERR		ACTUAL DATA ≠ A REG.
1032	0264		UJP	T2	EXPECTED DATA = 17
1033	1000		BANK2		
1034	0002		NOP		
1035	0002		NOP		
1036	0000	E7	ERR		CLA INST. FAILED
1037	0264		UJP	T2	
1040	1000		BANK2		
1041	0002		NOP		
1042	0002		NOP		
1043	0103	E9	TTA	T1	
1044	0001		SHA		
1045	0102		ATT	T1	
1046	0261		NZP	T2	REPEAT TAG ROUTINE
1047	1000		BANK2		FOUR TIMES
1050	0020		LDN		
1051	0001		1		
1052	0102		ATT	T1	
1053	0020	F3	LDN		
1054	0377		377		
1055	0204		ABR	T2	
1056	1120		F1		BUSY JP
1057	0003		CLA		
1060	0006		BER		
1061	0262		PJP	T2	
1062	1112		F2		
1063	0001		SHA		
1064	0262		PJP	T2	
1065	1112		F2		
1066	0001		SHA		
1067	0262		PJP	T2	
1070	1112		F2		
1071	0001		SHA		

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{BT-WO}

1072	0262		PJP	T2	
1073	1112		F2		
1074	0001		SHA		
1075	0262		PJP	T2	
1076	1112		F2		
1077	0001		SHA		
1100	0262		PJP	T2	
1101	1112		F2		
1102	0001		SHA		
1103	0262		PJP	T2	
1104	1112		F2		
1105	0001		SHA		
1106	0262		PJP	T2	
1107	1112		F2		
1110	0264		UJP	T2	
1111	1125		F4		
1112	0006	F2	BER		BER = RESULT AFTER ABR INST. EXECUTION
1113	0000		ERR		A REG. = RESULT OF BER INST.
		REM			ECECUTION
1114	0264		UJP	T2	DATA IN A REG. AND BER
		REM			SHOULD = 377
1115	1060		F3	+5	
1116	0002		NOP		
1117	0002		NOP		
1120	0000	F1	ERR		BUFFER INDICATED BUSY,
1121	0264		UJP	T2	SHOULD NOT BE
1122	1053		F3		
1123	0002		NOP		
1124	0002		NOP		
1125	0020	F4	LDN		
1126	0000		0		
1127	0204		ABR	T2	
1130	1140		F5		
1131	0020		LDN		
1132	0377		377		
1133	0006		BER		
1134	0261		NZP	T2	
1135	1145		F6		
1136	0264		UJP	T2	
1137	1152		F7		
1140	0000	F5	ERR		BUFFER INDICATED BUSY.
1141	0264		UJP	T2	IT SHOULD NOT BE BUSY
1142	1125		F4		
1143	0002		NOP		
1144	0002		NOP		
1145	0000	F6	ERR		A REG. = RESULT AFTER BER
		REM			INST. EXECUTION. SHOULD
		REM			BE ZERO.
1146	0264		UJP	T2	
1147	1133		F4	+6	
1150	0002		NOP		

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1151	0002		NOP		
1152	0103	F7	TTA	T1	REPEAT ROUTINE 4 TIMES
1153	0001		SHA		
1154	0102		ATT	T1	
1155	0261		NZP	T2	
1156	1053		F3		
1157	0020		LDN		
1160	0001		1		
1161	0102		ATT	T1	
1162	0221		LDM	T2	LDM INST CHECK (377).
1163	1132		F4	+5	
1164	0204		ABR	T2	
1165	1222		F8		
1166	0262		PJP	T2	
1167	1225		F9		
1170	0001		SHA		
1171	0262		PJP	T2	
1172	1225		F9		
1173	0001		SHA		
1174	0262		PJP	T2	
1175	1225		F9		
1176	0001		SHA		
1177	0262		PJP	T2	
1200	1225		F9		
1201	0001		SHA		
1202	0262		PJP	T2	
1203	1225		F9		
1204	0001		SHA		
1205	0262		PJP	T2	
1206	1225		F9		
1207	0001		SHA		
1210	0262		PJP	T2	
1211	1225		F9		
1212	0001		SHA		
1213	0262		PJP	T2	
1214	1225		F9		
1215	0001		SHA		
1216	0262		PJP	T2	
1217	1225		F9		
1220	0264		UJP	T2	
1221	1231		G1		
1222	0000	F8	ERR		BUFFER SAYS BUSY-SHOULD NOT
1223	0264		UJP	T2	BE BUSY
1224	1162		F7	+10	
1225	0006	F9	BER		DATA READ FROM MEMORY =
1226	0000		ERR		A REG. CONTENT.
1227	0264		UJP	T2	SHOULD BE 377
1230	1162		F7	+10	
1231	0103	G1	TTA	T1	
1232	0001		SHA		
1233	0102		ATT	T1	

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8092 TEST COM

1234	0261		NZP	T2	REPEAT ROUTINE
1235	1162		F7	+10	FOUR MORE TIMES
1236	0020		LDN		
1237	0001		1		
1240	0102		ATT	T1	
1241	0020	G3	LDN		SBM INST. TEST
1242	0377		377		
1243	0235		SBM	T2	
1244	1132		F4	+5	
1245	0260		ZJP	T2	
1246	1254		G2		
1247	0000		ERR		DATA IN A REG IS RESULT OF
1250	0264		UJP	T2	SUBTRACT ERROR WHEN SUBT.
1251	1241		G3		377 FROM 377
1252	0002		NOP		
1253	0002		NOP		
1254	0103	G2	TTA	T1	
1255	0001		SHA		REPEAT ROUTINE 4
1256	0102		ATT	T1	MORE TIMES.
1257	0261		NZP	T2	
1260	1241		G3		
1261	0020		LDN		
1262	0001		1		
1263	0102		ATT	T1	
1264	0020		LDN		
1265	0001	G4	1		
1266	0235		SBM	T2	
1267	1265		G4		
1270	0260		ZJP	T2	
1271	1277		G5		SUB. MEMORY ERROR
1272	0000		ERR		
1273	0264		UJP	T2	
1274	1264		G4	-1	
1275	0002		NOP		
1276	0002		NOP		
1277	0103	G5	TTA	T1	
1300	0001		SHA		
1301	0102		ATT	T1	REPEAT PROCESS FOUR TIMES
1302	0261		NZP	T2	
1303	1264		G4	-1	
1304	0020		LDN		
1305	0001		1		
1306	0102		ATT	T1	
1307	0003	G6	CLA		
1310	0235		SBM	T2	
1311	1265		G4		
1312	0262		PJP	T2	
1313	1350		G7		
1314	0001		SHA		
1315	0262		PJP	T2	
1316	1350		G7		

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8092 TEST COM

1317	0001		SHA		
1320	0262		PJP	T2	
1321	1350		G7		
1322	0001		SHA		
1323	0262		PJP	T2	
1324	1350		G7		
1325	0001		SHA		
1326	0262		PJP	T2	
1327	1350		G7		
1330	0001		SHA		
1331	0262		PJP	T2	
1332	1350		G7		
1333	0001		SHA		
1334	0262		PJP	T2	
1335	1350		G7		
1336	0001		SHA		
1337	0263		NJP	T2	
1340	1362		G8		
1341	0103		TTA	T1	REPEAT ROUTINE 4 TIMES
1342	0001		SHA		
1343	0102		ATT	T1	
1344	0261		NZP	T2	
1345	1307		G6		
1346	0264		UJP	T2	
1347	1367		G9		
1350	0000	G7	ERR		SBM ERROR.
1351	0264		UJP	T2	ONE WAS SUBTRACTED FROM
1352	1307		G6		ZERO. THE RESULT WAS
1353	0002		NOP		
1354	0002		NOP		
1355	0000		ERR		NOT 376. DATA IN A
1356	0264		UJP	T2	REG. = RESULT SHIFTED X TIMES
1357	1307		G6		
1360	0002		NOP		
1361	0002		NOP		
1362	0000	G8	ERR		SBM INST. ERROR. A REG.
1363	0264		UJP	T2	SHOULD = 177
1364	1307		G6		
1365	0002		NOP		
1366	0002		NOP		
1367	0020	G9	LDN		
1370	0001		1		
1371	0102		ATT	T1	
1372	0020		LDN		
1373	0003		T14		
1374	0202		ATT	T2	
1375	0264		UJP	T2	
1376	1400		BANK3		
	1400	PRG	1400		
1400	0020	BANK3	LDN		
1401	0001		1		

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8092 TEST COM

1402	0034		SBN		SBN INSI. TEST
1403	0001		1		
1404	0260		ZJP	T2	
1405	1413		H1		
1406	0000		ERR		
1407	0264		UJP	T2	
1410	1400		BANK3		
1411	0002		NOP		
1412	0002		NOP		
1413	0020	H1	LDN		
1414	0002		2		
1415	0034		SBN		
1416	0002		2		
1417	0260		ZJP	T2	
1420	1424		H2		
1421	0000		ERR		SBN ERROR (BIT 1)
1422	0264		UJP	T2	
1423	1413		H1		
1424	0020	H2	LDN		
1425	0004		4		
1426	0034		SBN		
1427	0004		4		
1430	0260		ZJP	T2	
1431	1437		H3		
1432	0000		ERR		SBN ERROR (BIT 2)
1433	0264		UJP	T2	
1434	1424		H2		
1435	0002		NOP		
1436	0002		NOP		
1437	0020	H3	LDN		
1440	0070		70		
1441	0034		SBN		
1442	0070		70		
1443	0260		ZJP	T2	
1444	1450		H4		
1445	0000		ERR		SBN ERROR (BITS 3,4 OR 5)
1446	0264		UJP	T2	
1447	1437		H3		
1450	0020	H4	LDN		
1451	0300		300		
1452	0034		SBN		
1453	0300		300		
1454	0260		ZJP	T2	
1455	1463		H5		
1456	0000		ERR		SBN ERROR (BITS 6 OR 7)
1457	0264		UJP	T2	
1460	1450		H4		
1461	0002		NOP		
1462	0002		NOP		
1463	0103	H5	TTA	T1	
1464	0001		SHA		

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8092 TEST COM

1465	0102		ATT	T1	
1466	0261		NZP	T2	
1467	1400		BANK3		REPEAT PROCESS 4 TIMES
1470	0020		LDN		
1471	0001		1		
1472	0102		ATT	T1	
1473	0020		LDN		
1474	0377		377		
1475	0241		STM	T2	
1476	1543		H6		(377)
1477	0003		CLA		
1500	0221		LDM	T2	
1501	1543		H6		(377)
1502	0034		SBN		
1503	0377		377		
1504	0260		ZJP	T2	
1505	1513		H7		
1506	0000		ERR		STM INST. ERROR. DATA
1507	0264		UJP	T2	STORED SHOULD HAVE BEEN 377.
1510	1473		H5	*10	A* REGISTER SHOULD = 377 SUBTRACTED
1511	0002		NOP		
1512	0002		NOP		
1513	0103	H7	TTA	T1	FROM DATA STORED
1514	0001		SHA		
1515	0102		ATT	T1	
1516	0261		NZP	T2	
1517	1473		H5	*10	
1520	0020	H8	LDN		
1521	0001		1		
1522	0102		ATT	T1	
1523	0302		ATT	T3	
1524	0020		LDN		
1525	0000		0		STM INSTRUCTION TEST
1526	0241		STM	T2	ZERO BEING TESTED
1527	1603		H9		
1530	0020		LDN		
1531	0377		377		
1532	0221		LDM	T2	
1533	1603		H9		
1534	0260		ZJP	T2	
1535	1544		J1		
1536	0000		ERR		DATA LOADED FROM MEMORY
1537	0264		UJP	T2	WAS NOT ZERO.
1540	1524		H8	*4	
1541	0002		NOP		
1542	0002		NOP		
1543	0000	H6	0		
1544	0103	J1	TTA	T1	REPEAT ROUTINE 8 TIMES
1545	0001		SHA		
1546	0102		ATT	T1	
1547	0261		NZP	T2	

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-E2-W00}

8092 TEST COM

1550	1524		H8	+4	
1551	0303		TTA	T3	
1552	0001		SHA		
1553	0302		ATT	T3	
1554	0261		NZP	T2	
1555	1524		H8	+4	
1556	0020		LDN		
1557	0001		1		
1560	0102		ATT	T1	STM TEST THE NUMBER 377
1561	0302		ATT	T3	
1562	0020	H11	LDN		
1563	0377		377		
1564	0241		STM	T2	
1565	1603		H9		
1566	0003		CLA		
1567	0221		LDM	T2	
1570	1603		H9		
1571	0204	H10	ABR	T2	
1572	1571		H10		
1573	0034		SBN		
1574	0377		377		
1575	0260		ZJP	T2	
1576	1604		H12		DATA STORED WAS 377
1577	0006		BER		DATA LOADED WAS NOT 377
1600	0000		ERR		DATA ERROR IN A REG.
1601	0264		UJP	T2	
1602	1562		H11		
1603	0000	H9	0		
1604	0103	H12	TTA	T1	
1605	0001		SHA		
1606	0102		ATT	T1	REPEAT ROUTINE 8 TIMES
1607	0261		NZP	T2	
1610	1562		H11		
1611	0303		TTA	T3	
1612	0001		SHA		
1613	0302		ATT	T3	
1614	0261		NZP	T2	
1615	1562		H11		
1616	0221	J3	LDM	T2	SET UP ERROR ROUTINE
1617	1651		J3A		
1620	0041		STM		
1621	0346		INST		
1622	0203		TTA	T2	
1623	0041		STM		
1624	0357		TAG		
1625	0020		LDN		
1626	0000		0		
1627	0041		STM		
1630	0351		EXPECT		
1631	0041		STM		
1632	0043		PARAM1		

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8092 TEST COM

{COM-25}

1633	0020		LDN		
1634	1651		J3A		
1635	0041		STM		
1636	0362		ADDRES		
1637	0020		LDN		
1640	1647		J3A	-2	
1641	0041		STM		
1642	0375		RETURN		
1643	0020		LDN		
1644	0001		I		
1645	0102		ATT	T1	
1646	0302		ATT	T3	
1647	0020		LDN		
1650	0125		125		
1651	0030	J3A	ADN		CHECK ADN INSTRUCTION
1652	0252		252		
1653	0061		NZP		JUMP TO ERROR ROUTINE
1654	0337		ERROR		IF NON-ZERO RESULTS
1655	0021		LDM		CHECK FOR REPEAT ON ERROR
1656	0043		PARAM1		
1657	0261		NZP	T2	
1660	1647		J3A	-2	
1661	0103		TTA	T1	
1662	0001		SHA		
1663	0102		ATT	T1	REPEAT 4 TIMES
1664	0261		NZP	T2	
1665	1647		J3A	-2	
1666	0303		TTA	T3	
1667	0001		SHA		
1670	0302		ATT	T3	
1671	0261		NZP	T2	REPEAT 4 MORE TIMES
1672	1647		J3A	-2	
1673	0020		LDN		SET UP ERROR ROUTINE
1674	1705		J4		
1675	0041		STM		
1676	0362		ADDRES		
1677	0020		LDN		
1700	1703		J4	-2	
1701	0041		STM		
1702	0375		RETURN		
1703	0020		LDN		
1704	0070		70		
1705	0030	J4	ADN		CHECK ADN INSTRUCTION
1706	0307		307		
1707	0061		NZP		RESULT NON-ZERO GO TO
1710	0337		ERROR		ERROR ROUTINE
1711	0021		LDM		
1712	0043		PARAM1		
1713	0261		NZP	T2	
1714	1703		J4	-2	
1715	0221		LDM	T2	SET UP ERROR ROUTINE

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{COM-2B}

1716	1737		J5		
1717	0041		STM		
1720	0346		INST		
1721	0020		LDN		
1722	1737		J5		
1723	0041		STM		
1724	0362		ADDRES		
1725	0020		LDN		
1726	1735		J5	-2	
1727	0041		STM		
1730	0375		RETURN		
1731	0020		LDN		
1732	0200		200		
1733	0041		STM		
1734	1745		COUNT		
1735	0020		LDN		
1736	0201		201		
1737	0231	J5	ADM	T2	CHECK ADM INSTRUCTION
1740	1746		COUNT	+1	
1741	0061		NZP		JUMP TO ERROR ROTINE IF
1742	0337		ERROR		RESULT NOT ZERO
1743	0264		UJP	T2	
1744	1747		COUNT	+2	
1745	0000	COUNT	0		
1746	0176		176		
1747	0021		LDM		REPEAT AFTER ERROR IS
1750	0043		PARAM1		PARAM1 IS SET
1751	0261		NZP	T2	
1752	1735		J5	-2	
1753	0221		LDM	T2	REPEAT INSTRUCTION
1754	1745		COUNT		
1755	0030		ADN		
1756	0001		1		
1757	0241		STM	T2	
1760	1745		COUNT		
1761	0261		NZP	T2	
1762	1735		J5	-2	
1763	0020		LDN		
1764	0200		200		
1765	0241		STM	T2	
1766	1745		COUNT		
1767	0020		LDN		
1770	0004		T20		
1771	0202		ATT	T2	
1772	0264		UJP	T2	JUMP TO NEXT BANK
1773	2000		BANK4		
	2000	BANK4	PRG		
2000	0203		TTA	T2	SET UP ERROR ROUTINE
2001	0041		STM		
2002	0357		TAG		
2003	0020		LDN		

8092 TEST COM

2004	2015		J6		
2005	0041		STM		
2006	0362		ADDRES		
2007	0020		LDN		
2010	2013		J6	-2	
2011	0041		STM		
2012	0375		RETURN		
2013	0020		LDN		
2014	0000		0		
2015	0231	J6	ADM	T2	TEST ADM INSTRUCTION
2016	2045		COUNT1		
2017	0061		NZP		
2020	0337		ERROR		
2021	0021		LDM		
2022	0043		PARAM1		LOOP ON INSTRUCTION
2023	0261		NZP	T2	IF PARAMETER SET AND INSTRUCTION
2024	2013		J6	-2	ERRORED ONCE OR MORE
2025	0221		LDM	T2	
2026	2014		J6	-1	
2027	0030		ADN		ADD ONE TO ADDEND 1
2030	0001		1		
2031	0241		STM	T2	
2032	2014		J6	-1	
2033	0221		LDM	T2	
2034	2045		COUNT1		
2035	0030		ADN		ADD 376 TO ADDEND 2
2036	0376		376		REPEAT INSTRUCTION
2037	0241		STM	T2	
2040	2045		COUNT1		
2041	0261		NZP	T2	
2042	2013		J6	-2	
2043	0264		UJP	T2	
2044	2046		COUNT1	+1	
2045	0377	COUNT1	377		
2046	0020		LDN		
2047	2064		J7		
2050	0041		STM		SET UP ERROR ROUTINE
2051	0362		ADDRES		
2052	0221		LDM	T2	
2053	2064		J7		
2054	0041		STM		
2055	0346		INST		
2056	0020		LDN		
2057	2110		J7A		
2060	0041		STM		
2061	0375		RETURN		
2062	0020		LDN		
2063	0001		1		ADDEND 1
2064	0255	J7	RAO	T2	CHECK RAO INSTRUCTION
2065	2063		J7	-1	
2066	0034		SBN		

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8092 TEST COM

2067	0002		2	
2070	0061		NZP	
2071	0337		ERROR	
2072	0021		LDM	CHECK FOR REPEAT ON ERROR
2073	0043		PARAM1	
2074	0261		NZP	T2
2075	2110		J7A	
2076	0221		LDM	T2
2077	2067		J7	+3
2100	0030		ADN	
2101	0001		1	
2102	0241		STM	T2
2103	2067		J7	+3
2104	0261		NZP	T2
2105	2064		J7	
2106	0264		UJP	T2
2107	2120		J7B	
2110	0221	J7A	LDM	T2
2111	2063		J7	-1
2112	0034		SBN	
2113	0001		1	
2114	0241		STM	T2
2115	2063		J7	-1
2116	0264		UJP	T2
2117	2064		J7	
2120	0020	J7B	LDN	RESET ADDENDS
2121	0001		1	
2122	0241		STM	T2
2123	2063		J7	-1
2124	0030		ADN	
2125	0001		1	
2126	0241		STM	T2
2127	2067		J7	+3
2130	0221		LDM	T2
2131	2152		J8	
2132	0041		STM	SET UP ERROR ROUTINE
2133	0346		INST	
2134	0020		LDN	
2135	2152		J8	
2136	0041		STM	
2137	0362		ADDRES	
2140	0221		LDM	T2
2141	2153		J8	+1
2142	0041		STM	
2143	0351		EXPECT	
2144	0020		LDN	
2145	2150		J8	-2
2146	0041		STM	
2147	0375		RETURN	
2150	0020		LDN	
2151	0001		1	

[COM-200]

8092 TEST COM

[COM-29]	2152	0010	J8	LPN		CHECK LPM INST.
	2153	0001		1		
	2154	0060		ZJP		
	2155	0337		ERROR		JUMP TO ERROR ROUTINE
	2156	0021		LDM		IF RESULT EQUAL TO ZERO
	2157	0043		PARAM1		
	2160	0261		NZP	T2	
	2161	2150		J8	-2	
	2162	0255		RAO	T2	UPDATE DATA CELLS
	2163	2153		J8	+1	
	2164	0241		STM	T2	
	2165	2151		J8	-1	
	2166	0261		NZP	T2	
	2167	2140		J8	-12	
	2170	0020		LDN		
	2171	0001		1		
	2172	0241		STM	T2	
	2173	2151		J8	-1	
	2174	0241		STM	T2	
	2175	2153		J8	+1	
	2176	0221		LDM	T2	
	2177	2220		J9		SET UP ERROR ROUTINE
	2200	0041		STM		
	2201	0346		INST		
	2202	0020		LDN		
	2203	2220		J9		
	2204	0041		STM		
	2205	0362		ADDRES		
	2206	0020		LDN		
	2207	2216		J9	-2	
	2210	0041		STM		
	2211	0375		RETURN		
	2212	0221		LDM	T2	
	2213	2217		J9	-1	
2214	0041		STM			
2215	0351		EXPECT			
2216	0020		LDN			
2217	0001		1			
2220	0211	J9	LPM	T2	TEST LPM INSTRUCTION	
2221	2217		J9	-1		
2222	0060		ZJP			
2223	0337		ERROR			
2224	0021		LDM		CHECK FOR REPEAT ON ERROR	
2225	0043		PARAM1			
2226	0261		NZP	T2		
2227	2216		J9	-2		
2230	0255		RAO	T2	UPDATE OLD DATA BY 1 OCTAL	
2231	2217		J9	-1		
2232	0261		NZP	T2		
2233	2212		J9	-6		
2234	0020		LDN			

8092 TEST COM

2235	0001	1		
2236	0241	STM	T2	
2237	2217	J9	-1	REPEAT ROUTINE
2240	0055	RAO		
2241	0042	COUNTZ		
2242	0261	NZP	T2	
2243	2212	J9	-6	
2244	0221	LDM	T2	SET UP ERROR ROUTINE
2245	2266	J10		
2246	0041	STM		
2247	0346	INST		
2250	0020	LDN		
2251	2266	J10		
2252	0041	STM		
2253	0362	ADDRES		
2254	0020	LDN		
2255	2264	J10	-2	
2256	0041	STM		
2257	0375	RETURN		
2260	0020	LDN		
2261	0000	0		
2262	0041	STM		
2263	0351	EXPECT		
2264	0020	LDN		
2265	0000	0		
2266	0014	LSN		CHECK LDN INST.
2267	0000	0		
2270	0061	NZP		
2271	0337	ERROR		JUMP TO ERROR ROUTINE
2272	0021	LDM		IF RESULT NOT ZERO
2273	0043	PARAM1		
2274	0261	NZP	T2	
2275	2264	J10	-2	
2276	0255	RAO	T2	UPDATE DATA CELLS
2277	2265	J10	-1	
2300	0241	STM	T2	
2301	2267	J10	+1	
2302	0261	NZP	T2	
2303	2264	J10	-2	
2304	0055	RAO		
2305	0042	COUNTZ		
2306	0261	NZP	T2	
2307	2264	J10	-2	
2310	0020	LDN		SET UP ERROR ROUTINE
2311	2326	J11		
2312	0041	STM		
2313	0362	ADDRES		
2314	0221	LDM	T2	
2315	2326	J11		
2316	0041	STM		
2317	0346	INST		

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J10

8092 TEST COM

{TE-WO}

2320	0020		LDN		
2321	2324		J11	-2	
2322	0041		STM		
2323	0375		RETURN		
2324	0020		LDN		
2325	0000		0		
2326	0215	J11	LSM	T2	CHECK LSM INST
2327	2325		J11	-1	
2330	0061		NZP		
2331	0337		ERROR		
2332	0021		LDM		REPEAT ON ERROR IF
2333	0043		PARAM1		PARAMETER 1 IS SET
2334	0261		NZP	T2	
2335	2324		J11	-2	
2336	0255		RAO	T2	UPDATE DATA CELL
2337	2325		J11	-1	
2340	0261		NZP	T2	
2341	2324		J11	-2	
2342	0055		RAO		
2343	0042		COUNTZ		
2344	0261		NZP	T2	REPEAT 400 OCTAL TIMES
2345	2324		J11	-2	
2346	0020		LDN		
2347	0005		T24		JUMP TO BANK 5
2350	0202		ATT	T2	
2351	0264		UJP	T2	
2352	2400		BANKS		
	2400	BANKS	PRG		
2400	0020		LDN		SET UP ERROR ROUTINE
2401	2423		J12		
2402	0041		STM		
2403	0362		ADDRES		
2404	0221		LDM	T2	
2405	2423		J12		
2406	0041		STM		
2407	0346		INST		
2410	0020		LDN		
2411	2423		J12		
2412	0041		STM		
2413	0375		RETURN		
2414	0203		TTA	T2	
2415	0041		STM		
2416	0357		TAG		
2417	0020		LDN		
2420	0000		0		
2421	0041		STM		
2422	0351		EXPECT		
2423	0225	J12	LCM	T2	CHECK LCM INSTRUCTION
2424	2426		J12	+3	
2425	0030		ADN		
2426	0000		0		

8092 TEST COM

2427	0061	NZP		
2430	0337	ERROR		
2431	0021	LDM		
2432	0043	PARAM1		REPEAT IF ONE ERROR OCCURED
2433	0261	NZP	T2	AND PROPÉR PARAMETER SELECTED
2434	2423	J12		
2435	0255	RAO	T2	
2436	2426	J12	+3	UPDATE ADDRESSES
2437	0261	NZP	T2	
2440	2423	J12		
2441	0055	RAO		
2442	0042	COUNTZ		REPEAT 256 TIMES
2443	0261	NZP	T2	
2444	2423	J12		
2445	0020	LDN		
2446	2461	J13		SET UP ERROR ROUTINE
2447	0041	STM		
2450	0362	ADDRES		
2451	0221	LDM	T2	
2452	2461	J13		
2453	0041	STM		
2454	0346	INST		
2455	0020	LDN		
2456	2461	J13		
2457	0041	STM		
2460	0375	RETURN		
2461	0222	LDI	T2	CHECK LDI INSTRUCTION
2462	0046	INDIR		* INDIR = BANK5
2463	0235	SBM	T2	
2464	2400	BANK5		
2465	0061	NZP		JUMP IF NON-ZERO = ERROR
2466	0337	ERROR		
2467	0021	LDM		REPEAT IF ERROR OCCURED
2470	0043	PARAM1		
2471	0261	NZP	T2	
2472	2461	J13		
2473	0055	RAO		
2474	0046	INDIR		UPDATE ADDRESSES
2475	0241	STM	T2	
2476	2464	J13	+3	
2477	0034	SBN		
2500	0040	40		
2501	0261	NZP	T2	
2502	2461	J13		
2503	0241	STM	T2	RESTORE ADDRESSES
2504	2464	J13	+3	
2505	0041	STM		
2506	0046	INDIR		
2507	0055	RAO		REPEAT 256 TIMES
2510	0042	COUNTZ		
2511	0261	NZP	T2	

{2E-W02}

J13

8092 TEST COM

	2512	2461		J13	
	2513	0020		LDN	
	2514	2527		J14	SET UP ERROR ROUTINE
	2515	0041		STM	
	2516	0362		ADDRES	
	2517	0221		LDM	T2
	2520	2527		J14	
	2521	0041		STM	
	2522	0346		INST	
	2523	0020		LDN	
	2524	2527		J14	
	2525	0041		STM	
	2526	0375		RETURN	
	2527	0226	J14	LCI	T2
	2530	0046		INDIR	
	2531	0231		ADM	T2
	2532	2400		BANKS	
	2533	0061		NZP	
	2534	0337		ERROR	
	2535	0021		LDM	
	2536	0043		PARAM1	
	2537	0261		NZP	T2
	2540	2527		J14	
	2541	0055		RAO	
	2542	0046		INDIR	UPDATE ADDRESSES
	2543	0241		STM	T2
	2544	2532		J14	+3
	2545	0034		SBN	
	2546	0040		40	
	2547	0261		NZP	T2
	2550	2527		J14	
	2551	0041		STM	RESTORE ADDRESSES
	2552	0046		INDIR	
	2553	0241		STM	T2
	2554	2532		J14	+3
	2555	0055		RAO	
	2556	0042		COUNTZ	
	2557	0261		NZP	T2
	2560	2527		J14	
	2561	0020		LDN	
	2562	2577		J15	SET UP ERROR ROUTINE
	2563	0041		STM	
	2564	0362		ADDRES	
	2565	0221		LDM	T2
	2566	2577		J15	
	2567	0041		STM	
	2570	0346		INST	
	2571	0020		LDN	
	2572	2575		J15	-2
	2573	0041		STM	
	2574	0375		RETURN	

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8092 TEST COM

2575	0226		LCI	T2	
2576	0046		INDIR		
2577	0232	J15	ADI	T2	CHECK ADI INSTRUCTION
2600	0046		INDIR		
2601	0061		NZP		
2602	0337		ERROR		
2603	0021		LDM		
2604	0043		PARAM1		
2605	0261		NZP	T2	
2606	2575		J15	-2	
2607	0055		RAO		
2610	0046		INDIR		
2611	0034		SBN		
2612	0040		40		
2613	0261		NZP	T2	
2614	2575		J15	-2	
2615	0041		STM		
2616	0046		INDIR		
2617	0055		RAO		LPI
2620	0042		COUNTZ		
2621	0261		NZP	T2	
2622	2575		J15	-2	
2623	0020		LDN		
2624	2641		J16		
2625	0041		STM		
2626	0362		ADDRES		
2627	0221		LDM	T2	
2630	2641		J16		
2631	0041		STM		
2632	0346		INST		
2633	0020		LDN		
2634	2637		J16	-2	
2635	0041		STM		
2636	0375		RETURN		
2637	0226		LCI	T2	LPI
2640	0046		INDIR		
2641	0212	J16	LPI	T2	CHECK LPI INSTRUCTION
2642	0046		INDIR		
2643	0061		NZP		ERROR IF NON-ZERO
2644	0337		ERROR		
2645	0021		LDM		CHECK FOR REPEAT
2646	0043		PARAM1		
2647	0261		NZP	T2	
2650	2637		J16	-2	
2651	0055		RAO		UPDATE ADDRESS
2652	0046		INDIR		
2653	0034		SBN		
2654	0200		200		
2655	0261		NZP	T2	
2656	2637		J16	-2	
2657	0041		STM		

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8092 TEST COM

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2660	0046		INDIR	
2661	0055		RAO	REPEAT 130 TIMES
2662	0042		COUNTZ	
2663	0261		NZP	T2
2664	2637		J16	-2
2665	0020		LDN	
2666	0006		T30	
2667	0202		ATT	T2
2670	0264		UJP	T2
2671	3000		BANK6	
	3000		3000	
3000	0203	BANK6	TTA	T2
3001	0041		STM	
3002	0357		TAG	
3003	0020		LDN	SET UP ERROR ROUTINE
3004	3021		J17	
3005	0041		STM	
3006	0362		ADDRES	
3007	0221		LDM	T2
3010	3021		J17	SET UP ERROR ROUTINE
3011	0041		STM	
3012	0346		INST	
3013	0020		LDN	
3014	3017		J17	-2
3015	0041		STM	
3016	0375		RETURN	
3017	0222		LDI	T2
3020	0046		INDIR	
3021	0216	J17	LSI	T2
3022	0046		INDIR	
3023	0061		NZP	JUMP TO ERROR IF NON-ZERO
3024	0337		ERROR	
3025	0021		LDM	CHECK FOR REPEAT ON ERROR
3026	0043		PARAM1	
3027	0261		NZP	T2
3030	3017		J17	-2
3031	0055		RAO	UPDATE ADDRESS
3032	0046		INDIR	
3033	0034		SBN	
3034	0015		15	
3035	0261		NZP	T2
3036	3017		J17	-2
3037	0041		STM	
3040	0046		INDIR	
3041	0055		RAO	REPEAT 256 TIMES
3042	0042		COUNTZ	
3043	0261		NZP	T2
3044	3017		J17	-2
3045	0020		LDN	
3046	3063		J18	SET UP ERROR ROUTINE
3047	0041		STM	

8092 TEST COM

3050	0362		ADDRES		
3051	0221		LDM	T2	
3052	3063		J18		
3053	0041		STM		
3054	0346		INST		
3055	0020		LDN		
3056	3061		J18	-2	
3057	0041		STM		
3060	0375		RETURN		
3061	0222		LDI	T2	
3062	0046		INDIR		
3063	0236	J18	SBI	T2	CHECK SBI INSTRUCTION
3064	0046		INDIR		
3065	0061		NZP		
3066	0337		ERROR		
3067	0021		LDM		REPEAT ON ERROR
3070	0043		PARAM1		
3071	0061		NZP		
3072	3061		J18	-2	
3073	0055		RAO		
3074	0046		INDIR		UPDATE ADDRESS
3075	0034		SBN		
3076	0040		40		
3077	0261		NZP	T2	
3100	3061		J18	-2	
3101	0041		STM		
3102	0046		INDIR		
3103	0055		RAO		REPEAT 256 TIMES
3104	0042		COUNTZ		
3105	0261		NZP	T2	
3106	3061		J18	-2	
3107	0020		LDN		
3110	3131		J19		SET UP NEXT ERROR ROUTINE
3111	0041		STM		
3112	0362		ADDRES		
3113	0221		LDM	T2	
3114	3131		J19		
3115	0041		STM		
3116	0346		INST		
3117	0020		LDN		
3120	3123		J19	-6	
3121	0041		STM		
3122	0375		RETURN		
3123	0221		LDM	T2	
3124	3000		BANK6		
3125	0041		STM		
3126	0046		INDIR		
3127	0025		LCM		
3130	0046		INDIR		
3131	0051	J19	RAM		CHECK R.A.M. INSTRUCTION
3132	0046		INDIR		

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8092 TEST COM

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3133	0061		NZP		
3134	0337		ERROR		
3135	0021		LDM		CHECK FOR REPEAT ON ERROR
3136	0043		PARAM1		
3137	0261		NZP	T2	
3140	3123		J19	-6	
3141	0255		RAO	T2	UPDATE ADDRESS
3142	3124		J19	-5	
3143	0034		SBN		
3144	0100		100		
3145	0261		NZP	T2	
3146	3123		J19	-6	
3147	0241		STM	T2	RESTORE ADDRESS
3150	3124		J19	-5	
3151	0055		RAO		
3152	0042		COUNTZ		REPEAT 256 TIMES
3153	0261		NZP	T2	
3154	3123		J19	-6	
3155	0020		LDN		
3156	3206		J20		
3157	0041		STM		
3160	0362		ADDRES		
3161	0221		LDM	T2	
3162	3206		J20		
3163	0041		STM		
3164	0346		INST		
3165	0020		LDN		
3166	3204		J20	-2	
3167	0041		STM		
3170	0375		RETURN		
3171	0020		LDN		
3172	0016		T70		
3173	0102		ATT	T1	
3174	0030		ADN		
3175	0001		1		STORE ANY DATA
3176	0151		RAM	T1	AT LOCATIONS 7000-----7376
3177	7000	CHECK	BANK16		
3200	0255		RAO	T2	
3201	3177		CHECK		
3202	0261		NZP	T2	
3203	3174		CHECK	-3	
3204	0020		LDN		
3205	0001	UP1	1		
3206	0142	J20	STI	T1	STORE INDIRECT INSTRUCTION CHECK
3207	0046		INDIR		
3210	0003		CLA		
3211	0121		LDM	T1	
3212	7000		BANK16		
3213	0034		SBN		
3214	0001	UP2	1		
3215	0061		NZP		

8092 TEST COM

FROM-BRI

3216	0337		ERROR	
3217	0021		LDM	
3220	0043		PARAM1	UPDATE ADDRESSES
3221	0261		NZP	T2
3222	3204		UP1	-1
3223	0255		RAO	T2
3224	3205		UP1	
3225	0241		STM	T2
3226	3214		UP2	
3227	0041		STM	
3230	0046		INDIR	
3231	0241		STM	T2
3232	3212		UP2	-2
3233	0261		NZP	T2
3234	3204		UP1	-1
3235	0055		RAO	REPEAT ROUTINE 256 TIMES
3236	0042		COUNTZ	
3237	0261		NZP	T2
3240	3204		UP1	-1
3241	0020		LDN	
3242	0007		T34	
3243	0202		ATT	T2
3244	0264		UJP	T2
3245	3400		BANK7	
	3400	PRG	3400	
3400	0002	BANK7	NOP	
3401	0020	N16	LDN	ZERO OUT COUNTERS
3402	0000		0	AND BEGIN BUFFER
3403	0241		STM	COMPARE CIRCUITRY TEST
3404	3412		BER1	
3405	0241		STM	T2
3406	3416		BXR1	
3407	0241		STM	T2
3410	3462		REPEAT	
3411	0020		LDN	
3412	0000	BER1	0	
3413	0204		ABR	T2
3414	3442		N17	BUSY ADDRESS (JUMR)
3415	0020		LDN	
3416	0000	BXR1	0	
3417	0205		ABX	T2
3420	3446		N18	BUSY ADDRESS (JUMR)
3421	0170		IBI	T1
3422	3452		N19	CHECK FOR COMPARE
3423	0170		IBI	T1
3424	3456		N20	CHECK FOR BUFFER BUSY
3425	0255		RAO	T2
3426	3412		BER1	UPDATE COUNTERS
3427	0255		RAO	T2
3430	3416		BXR1	
3431	0261		NZP	T2

8092 TEST COM

3432	3411		BER1	-1	REPEAT OPERATION
3433	0255		RA0	T2	
3434	3462		REPEAT		
3435	0261		NZP	T2	
3436	3411		BER1	-1	
3437	0007		CBC		CLEAR BUFFER CONOMOLS
3440	0264		UJP	T2	
3441	3463		BANK7Z		
3442	0077	N17	HLT		BUFFER BUSY ON ABM INST.
3443	0007		CBC		CLEAR BUFFER CONTROLS
3444	0264		UJP	T2	
3445	3411		BER1	-1	
3446	0077	N18	HLT		BUFFER BUSY ON ABX INST.
3447	0007		CBC		CLEAR BUFFER CONTROLS
3450	0264		UJP	T2	
3451	3415		BXR1	-1	
3452	0077	N19	HLT		BUFFER BUSY ON IBI INST.
3453	0007		CBC		CLEAR BUFFER CONTROLS
3454	0264		UJP	T2	
3455	3421		BXR1	+3	
3456	0077	N20	HLT		BUFFER BUSY INDICATES COMPARE CIRCUITRY FAILED
			REM		IF BER AND BXR = SAME. IF BER AND BXR
			REM		NOT SAME, THIS INDICATES COUNTER ERROR
3457	0007		CBC		
3460	0264		UJP	T2	
3461	3411		BER1	-1	
3462	0000	REPEAT	0		
3463	0077	BANK7Z	HLT		HALT AFTER FIRST PASS THRU TEST
3464	0255		RA0	T2	
3465	3511		BANK7A		
3466	0034		SBN		
3467	0010		10		
3470	0261		NZP	T2	
3471	3503		BANK7B		
3472	0241		STM	T2	
3473	3511		BANK7A		
3474	0020		LDN		
3475	0077		77		
3476	0241		STM	T2	
3477	3463		BANK7Z		
3500	0077		HLT		END OF TEST
3501	0064		UJP		
3502	0000		START		
3503	0020	BANK7B	LDN		
3504	0002		2		
3505	0241		STM	T2	
3506	3463		BANK7Z		
3507	0064		UJP		
3510	0000		START		
3511	0000	BANK7A			
	7000	BANK16 EQU	7000		

{LE-WO}

8092 TEST COM

0001	T04	EQU	1
0002	T10	EQU	2
0003	T14	EQU	3
0004	T20	EQU	4
0005	T24	EQU	5
0006	T30	EQU	6
0007	T34	EQU	7
0010	T40	EQU	10
0011	T44	EQU	11
0012	T50	EQU	12
0013	T54	EQU	13
0014	T60	EQU	14
0015	T64	EQU	15
0016	T70	EQU	16
0017	T74	EQU	17
0100	T1	EQU	100
0200	T2	EQU	200
0300	T3	EQU	300
7777	RANDOM	EQU	7777

{COM-40}

8092 TEST COM

0000	ERR	EQU	0	ERROR STOP
0001	SHA	EQU	1	SHIFT A LEFT ONE BIT
0002	NOP	EQU	2	NO OPERATION
0002	ATT	EQU	2	A TO TAG REGISTER
0003	CLA	EQU	3	CLEAR REGISTER A
0003	TTA	EQU	3	TAG REGISTER TO A
0004	ABR	EQU	4	A TO BUFFER ENTRANCE REGISTER
0005	ABX	EQU	5	A TO BUFFER EXIT REGISTER
0006	BER	EQU	6	CONTENTS OF BER REGISTER TO A
0007	CBC	EQU	7	CLEAR BUFFER CONTROLS
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS
0020	LDN	EQU	20	LOAD A NO ADDRESS
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT
0030	ADN	EQU	30	ADD NO ADDRESS
0031	ADM	EQU	31	ADD MEMORY ADDRESS
0032	ADI	EQU	32	ADD INDIRECT ADDRESS
0034	SBN	EQU	34	SUBTRACT NO ADDRESS
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS
0041	STM	EQU	41	STORE MEMORY ADDRESS
0042	STI	EQU	42	STORE INDIRECT ADDRESS
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS
0055	RAO	EQU	55	REPLACE ADD ONE MEMORY ADDRESS
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A = ZERO
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A = NON#ZERO
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A ARE POSITIVE
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A ARE NEGATIVE
0064	UJP	EQU	64	UNCONDITIONAL JUMR
0070	IBI	EQU	70	INITIATE BUFFER INPUT
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT
0072	INN	EQU	72	INPUT NORMAL
0073	OUT	EQU	73	OUTPUT NORMAL
0074	OTN	EQU	74	OUTPUT, NO ADDRESS
0075	EXF	EQU	75	EXTERNAL FUNCTION
0076	INA	EQU	76	INPUT TO A
0077	HLT	EQU	77	HALT
0000		SUPB		
		END		

{TH-41}

NUMBER: {T20} CP1

TITLE: Test of 170 Card Punch Controller

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 170

PURPOSE

This program will check the punch controller and the control unit.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000

TERMINAL ADDRESS: 647

Section 1: Status test. Put 2 in A and start at 000. When a status condition is simulated, a halt will occur at P = 61. A will contain the status response. Reset run switch to continue.

Section 2: Card check. Put 0 in A and start at 000. Cards will be punched out which are visually inspected and should look like the sample shown. The test will run until a status condition exists.

HALTS

P = 61, 67

Status halt. A contains status code. Reset run switch to continue.

0000	064	UJP
0001	045	
0010	113	CIL
0020	113	CIL
0030	113	CIL
0040	113	CIL
0041	000	
0042	000	
0043	000	
0044	000	
0045	075	EXF
0046	063	
0047	001	
0050	060	ZJP
0051	070	
0052	075	EXF
0053	030	
0054	040	
0055	076	INA
0056	076	
0057	060	ZJP
0060	052	
0061	077	HLT
0062	064	UJP
0063	052	
0064		
0065		
0066		
0067	077	HLT
0070	075	EXF
0071	030	
0072	040	
0073	076	INA
0074	076	INA
0075	061	NZP
0076	067	
0077	020	LDN
0100	001	
0101	102	ATT
0102	075	EXF
0103	030	
0104	002	
0105	173	OUT
0106	000	
0107	250	

0110	0 20	LDN
0111	002	
0112	0 41	STM
0113	0 41	
0114	0 21	LDM
0115	0 42	
0116	0 41	STM
0117	0 43	
0120	0 55	RAO
0121	0 43	
0122	0 61	NZP
0123	1 20	
0124	0 55	RAO
0125	0 41	
0126	0 61	NZP
0127	1 14	
0130	0 20	LDN
0131	0 30	
0132	0 51	RAM
0133	0 42	
0134	0 64	UJP
0135	0 70	

0400	0 00
0401	0 01
0402	0 60
0403	0 00
0404	0 00
0405	0 00
0406	0 00
0407	0 00
0410	0 00
0411	0 00
0412	0 00
0413	0 07
0414	0 25
0415	0 20
0416	0 00
0417	0 02
0420	0 14
0421	0 00
0422	0 00
0423	0 00
0424	0 00
0425	0 00
0426	0 00
0427	0 00
0430	0 00
0431	0 70
0432	0 52
0433	0 40

0434	000
0435	004
0436	003
0437	000
0440	000
0441	000
0442	000
0443	000
0444	000
0445	000
0446	007
0447	000
0450	025
0451	020
0452	000
0453	010
0454	000
0455	060
0456	000
0457	000
0460	000
0461	000
0462	000
0463	000
0464	070
0465	000
0466	052
0467	040
0470	000
0471	020
0472	000
0473	014
0474	000
0475	000
0476	000
0477	000
0500	000
0501	007
0502	000
0503	000
0504	025
0505	020
0506	000
0507	040
0510	000
0511	003
0512	000
0513	000
0514	000
0515	000
0516	000
0517	070

0520	0 00
0521	000
0522	052
0523	040
0524	001
0525	000
0526	000
0527	000
0530	060
0531	000
0532	000
0533	000
0534	007
0535	000
0536	000
0537	000
0540	025
0541	020
0542	002
0543	000
0544	000
0545	000
0546	014
0547	000
0550	000
0551	000
0552	070
0553	000
0554	000
0555	000
0556	052
0557	040
0560	004
0561	000
0562	000
0563	000
0564	003
0565	000
0566	000
0567	007
0570	000
0571	000
0572	000
0573	000
0574	025
0575	020
0576	010
0577	000
0600	000
0601	000
0602	000
0603	060
0604	000
0605	070

0606	000
0607	000
0610	000
0611	000
0612	052
0613	040
0614	020
0615	000
0616	000
0617	000
0620	000
0621	014
0622	007
0623	000
0624	000
0625	000
0626	000
0627	000
0630	025
0631	020
0632	040
0633	000
0634	000
0635	000
0636	000
0637	003
0640	070
0641	000
0642	000
0643	000
0644	000
0645	000
0646	052
0647	040

NUMBER: T21 } CP2

TITLE: Card Punch Program

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 170

PURPOSE

This program will punch out binary cards for use in card reader tests (T17, T18).

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for 5252 cards
002 for 2525 cards
004 for binary with 7 and 9 in column 1
006 for binary without 7 and 9 in column 1

TERMINAL ADDRESS: 1647

HALTS

P = 203
220
235
253

Status halts. A contains status code.

0110	075	EXF
0111	063	
0112	001	
0113	075	EXF
0114	030	
0115	002	
0116	020	LDN
0117	003	
0120	102	ATT
0121	020	LDN
0122	043	
0123	141	STM
0124	000	
0125	020	LDN
0126	070	
0127	141	STM
0130	034	
0131	173	OUT
0132	000	
0133	250	
0134	064	UJP
0135	004	
0136		
0137		
0140	075	EXF
0141	063	
0142	001	
0143	075	EXF
0144	030	
0145	002	
0146	020	LDN
0147	003	
0150	102	ATT
0151	020	LDN
0152	003	
0153	141	STM
0154	000	
0155	020	LDN
0156	030	
0157	141	STM
0160	034	
0161	173	OUT
0162	000	
0163	250	
0164	064	UJP
0165	006	
0166		
0167	000	
0170	075	EXF
0171	030	
0172	040	
0173	076	INA

0000	064	UJP
0001	170	
0002	064	UJP
0003	205	
0004	064	UJP
0005	222	
0006	064	UJP
0007	240	
0010	113	
0020	113	
0030	113	
0040	113	
0050	075	EXF
0051	063	
0052	001	
0053	075	EXF
0054	030	
0055	002	
0056	020	LDN
0057	002	
0060	102	ATT
0061	173	OUT
0062	016	
0063	266	
0064	064	UJP
0065	000	
0066		
0067		
0070	075	EXF
0071	063	
0072	001	
0073	075	EXF
0074	030	
0075	002	
0076	020	LDN
0077	002	
0100	102	ATT
0101	173	OUT
0102	000	
0103	250	
0104	064	UJP
0105	002	
0106		
0107		

0174	041	STM
0175	167	
0176	076	INA
0177	021	LDM
0200	167	
0201	060	ZJP
0202	050	
0203	077	HLT
0204		
0205	075	EXF
0206	030	
0207	040	
0210	076	INA
0211	041	STM
0212	167	
0213	076	INA
0214	021	LDM
0215	167	
0216	060	ZJP
0217	070	
0220	077	HLT
0221		
0222	075	EXF
0223	030	
0224	040	
0225	076	INA
0226	041	STM
0227	167	
0230	076	INA
0231	021	LDM
0232	167	
0233	060	ZJP
0234	110	
0235	077	HLT
0236		
0237		
0240	075	EXF
0241	030	
0242	040	
0243	076	INA
0244	041	STM
0245	167	
0246	076	INA
0247	021	LDM
0250	167	
0251	060	ZJP
0252	140	
0253	077	HLT

1000	0 77
1001	0 77
1002	0 77
1003	0 77
1004	0 77
1005	0 77
1006	0 77
1007	0 77
1010	0 77
1011	0 77
1012	0 77
1013	0 77
1014	0 77
1015	0 60
1016	0 0 0
1017	0 0 0
1020	0 0 0
1021	0 0 0
1022	0 0 0
1023	0 0 0
1024	0 0 0
1025	0 0 0
1026	0 0 0
1027	0 0 0
1030	0 0 0
1031	0 0 0
1032	0 0 0
1033	0 0 0
1034	0 77
1035	0 77
1036	0 77
1037	0 77
1040	0 77
1041	0 77
1042	0 77
1043	0 77
1044	0 77
1045	0 77
1046	0 77
1047	0 77
1050	0 77
1051	0 60
1052	0 0 0
1053	0 0 0
1054	0 0 0
1055	0 0 0
1056	0 0 0
1057	0 0 0
1060	0 0 0
1061	0 0 0
1062	0 0 0

1063	000
1064	000
1065	000
1066	000
1067	000
1070	077
1071	077
1072	077
1073	077
1074	077
1075	077
1076	077
1077	077
1100	077
1101	077
1102	077
1103	077
1104	077
1105	060
1106	000
1107	000
1110	000
1111	000
1112	000
1113	000
1114	000
1115	000
1116	000
1117	000
1120	000
1121	000
1122	000
1123	000
1124	077
1125	077
1126	077
1127	077
1130	077
1131	077
1132	077
1133	077
1134	077
1135	077
1136	077
1137	077
1140	077
1141	060
1142	000
1143	000
1144	000
1145	000
1146	000
1147	000

1150	000
1151	000
1152	000
1153	000
1154	000
1155	000
1156	000
1157	000
1160	077
1161	077
1162	077
1163	077
1164	077
1165	077
1166	077
1167	077
1170	077
1171	077
1172	077
1173	077
1174	077
1175	060
1176	000
1177	000
1200	000
1201	000
1202	000
1203	000
1204	000
1205	000
1206	000
1207	000
1210	000
1211	000
1212	000
1213	000
1214	077
1215	077
1216	077
1217	077
1220	077
1221	077
1222	077
1223	077
1224	077
1225	077
1226	077
1227	077
1230	077
1231	060
1232	000
1233	000
1234	000

1235	000
1236	000
1237	000
1240	000
1241	000
1242	000
1243	000
1244	000
1245	000
1246	000
1247	000
1250	077
1251	077
1252	077
1253	077
1254	077
1255	077
1256	077
1257	077
1260	077
1261	077
1262	077
1263	077
1264	077
1265	060

1400	043
1401	077
1402	040
1403	014
1404	007
1405	077
1406	001
1407	025
1410	025
1411	025
1412	025
1413	025
1414	025
1415	020
1416	051
1417	025
1420	025
1421	015
1422	022
1423	052
1424	052
1425	052
1426	052
1427	052

1430	052
1431	052
1432	052
1433	040
1434	070
1435	063
1436	014
1437	060
1440	061
1441	046
1442	031
1443	025
1444	025
1445	025
1446	025
1447	025
1450	025
1451	020
1452	004
1453	010
1454	043
1455	074
1456	010
1457	021
1460	006
1461	052
1462	052
1463	052
1464	052
1465	052
1466	052
1467	040
1470	074
1471	007
1472	040
1473	063
1474	070
1475	017
1476	001
1477	025
1500	025
1501	025
1502	025
1503	025
1504	025
1505	020
1506	077
1507	070
1510	000
1511	027
1512	077
1513	060

1600	041
1601	066
1602	004
1603	021
1604	002
1605	052
1606	052
1607	052
1610	052
1611	052
1612	052
1613	040
1614	076
1615	007
1616	040
1617	017
1620	074
1621	017
1622	001
1623	025
1624	025
1625	025
1626	025
1627	025
1630	025
1631	020
1632	077
1633	070
1634	000
1635	023
1636	077
1637	060
1640	002
1641	052
1642	052
1643	052
1644	052
1645	052
1646	052
1647	040
1650	

1514	002
1515	052
1516	052
1517	052
1520	052
1521	052
1522	052
1523	040
1524	076
1525	000
1526	037
1527	017
1530	074
1531	000
1532	075
1533	025
1534	025
1535	025
1536	025
1537	025
1540	025
1541	020
1542	025
1543	025
1544	012
1545	006
1546	052
1547	052
1550	026
1551	052
1552	052
1553	052
1554	052
1555	052
1556	052
1557	040
1560	014
1561	063
1562	006
1563	060
1564	031
1565	046
1566	015
1567	025
1570	025
1571	025
1572	025
1573	025
1574	025
1575	020
1576	002
1577	010

8092/8130/C813 CARD READER TEST (CRT)

This NCR Card Reader test checks the ability of the Card Reader to read Hollerith to BCD and/or to read straight binary. Before and after each card is read, status is checked. Errors will be listed on the line printer if the printer is in a ready condition; otherwise, local available registers will list errors. All error stops are listed on the writeup tables 1 and 2. The Hollerith and the binary test are completely separate from each other.

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. P813 HR300 Printer needed
2. Five (5) special cards are needed for the binary test

B. LOADING PROCEDURE

1. Load mode test CRT from 64 column punched binary cards. The initial stop is P = 7700.

C. PARAMETERS

When initially starting test, test will halt at P = 0002. At this point enter selected parameter into the A register.

Binary Test = 000
Hollerith Test = 001

II. MESSAGES

A. NORMAL MESSAGES

1. If cards are being read correctly, program will continue to run until an error occurs or the hopper is empty.

B. ERROR MESSAGES

TABLE ONE
BINARY CARD

<u>P Register</u>	<u>A Register Contents*</u>	<u>Instruction Attempted and Rejected</u>
4172	14,11,6,3	ABR (X04)
	253,250,245,242	ABX (X05)
	252,247,244,241	IBI (X70)

{CRT-1}

TABLE ONE (Cont'd.)

*A Register Defined	Last Card Routine In
14,253,252	#1
11,250,247	#2
6, 245,244	#3
3, 242,251	#4 or #5

Release and activate run switch to continue after any of the above stops.

<u>P Register</u>	<u>A Register</u>	<u>Interpretation</u>
1766	300	Input hopper of card reader indicates an empty condition. Reader status in "A" Register. Release and activate run switch to continue.
1773	200	Pause switch on card reader has been activated. Release and activate run switch to continue. Reader status in "A" Register.
2000	XXX	Status in the "A" Register is improper status from card reader along with or without proper status condition. Release and activate run switch to continue.
2005	100	Late input request status condition from card reader; this should never happen. Check buffer circuit in computer or status circuit in reader. Card status in "A" Register. Release and activate run switch to continue.
4314	23	Data error from card reader. Results of such listed on printer. Release and activate run switch to continue.
6330	20	Card reader jam. Data listed on printer should be the symbol (v) which equals octal 77. Correct error, release and activate run switch to continue.

TABLE ONE (Cont'd.)

<u>P Register</u>	<u>"A" Register</u>	<u>BER</u>	<u>BXR</u>	<u>Interpretation</u>
6440	24	Data Read	N/A	Printer is not ready. The last card read is not one of the five special binary cards needed for this test. Recycle run switch for next word to display in the buffer entrance register. Clear the "A" Register and release and activate run switch to ignore the rest of the error data and read the next card.
6415	21	N/A	N/A	The last card read is not one of the five special test cards. Data read is listed on the printer. Release and activate run switch to continue operation.
6462	25	N/A	N/A	Printer is not ready. Program attempted to read a card, but there was no card movement past the photo cells. Possible jam in reader or hopper empty switch is giving the improper status <u>if</u> the hopper is <u>not empty</u> . Correct error, release and activate run switch to continue.
6663	22	Data Read	Data Expected	Reader column failure. Printer is not ready. Recycle run switch to reload BER and BXR registers with next data word. Clear "A" Register, release and activate run switch to ignore the rest of the data, and program will attempt to read the next card.

TABLE TWO

<u>P Register</u>	<u>A Register</u>	<u>Interpretation</u>
4650	011	Status from card reader indicates late input request. Data read indicated on printer.
4676	XXX	Illegal status from card reader. Status is in the "A" Register.
4463	011	Card reader input hopper is empty. Load proper cards, release and activate run switch.
4754	001	Printer cannot be accessed. Card reader input hopper is empty. Load proper test cards, release and activate run switch.
4761	002	Printer cannot be accessed. Pause switch on reader is on. Release pause switch, release and activate run switch.

<u>P Register</u>	<u>A Register</u>	<u>BER</u>	<u>BXR</u>	<u>Interpretation</u>
5017	003	Data Read	Data Expected	Printer cannot be accessed. Column error on card reader. Release and activate run switch to reload registers with next data word read. Clear "A" Register, release and activate run switch to ignore the rest of the data and continue card read operation.

<u>P Register</u>	<u>A Register</u>	<u>Interpretation</u>
4770	XXX	Printer cannot be accessed. Card reader has responded with illegal status along with or without legal status. Status is in "A" register. Release and activate run switch to continue.

{CRT-4}

TABLE TWO (Cont'd.)

<u>P Register</u>	<u>A Register</u>			<u>Interpretation</u>
4747	XXX			Printer status has gone not ready since last output. Card status is in "A" Register. Release and activate run switch for more error indications.
5127	006			A buffer operation is trying to be performed, but the buffer indicates it is busy. Buffer should not be busy. Release and activate run switch to try again.
5501	007			Buffer is constantly busy after trying ten times to do an input buffer from the card reader; buffer should not be busy. Release and activate run switch to attempt to continue.
<u>P Register</u>	<u>A Register</u>	<u>BER</u>	<u>BXR</u>	<u>Interpretation</u>
5420	077	Data Read	Data Expected	Column read error. Printer is not ready. A column failed to read correctly or there is an improper card in the deck. Error card is the last one read. Release and activate run switch to continue.
5372	000	N/A	N/A	Column read error. Error data listed on printer. Release and activate run switch to continue
4552	10	N/A	N/A	Pause switch on reader has been activated. Release and activate run switch to continue.

III. DESCRIPTION

A. BINARY TEST 1

- STAL 1. Zero out error and card counters
2. Select card reader status
- STAT a. If error, halt and display card status in the "A" Register
- SELECT 3. Check flag5 for card pattern to read
4. Select pattern number X*
5. Set up buffer busy return jump address
6. Set up buffer registers
- BUSY2A-2 a. If buffer busy, jump and halt
7. Select card reader for binary
8. Input on buffer channel
- G1 9. Compare read and expected data as it arrives in memory
a. If error, go to Section A-14
- HA1 10. Repeat Section A-9 until 80 cols are read
- R1 11. Reset counters
- S1 12. Check error flag for errors
a. If errors, go to Section A-18
13. Repeat steps 1-13 until errors are detected or card reader input hopper becomes empty. **
- G2 14. Update flag1 error counter
a. If less than 9 errors, return to Section A-10
15. Reset Card1 column counters
16. Check for all 5 patterns checked
a. If all patterns checked, see Section A-22
- SPE1 17. Check Card2 pattern. See Section B-7
- PRT1 18. Store card image expected data in the printer output area
a. If printer ready, go to Section A-19
b. Load buffer entrance register with data read and buffer exit register with expected data. Load "A" Register with 22 and halt.
*At this point, there is a card reader error and the printer status says not ready. Manually clear the "A" Register and program will resume back at Section A-1
c. Repeat Section A-18b until all words examined
d. Go to Section A-1
- PRINTZ 19. Output expected and received data
20. Halt and display 23 octal in "A" Register

* Initially pattern 1 will be selected

** Input hopper empty status is an error halt condition

- 21. Go to Section A-1
- SPE2 22. Reset error counters
- 23. Check for 77 octal in all columns read
 - a. If no compare, go to Section A-28
- 24. Check for printer ready and not busy
 - a. If not ready, go to A-35
- 25. Output Statement A

STATEMENT A

READER FAILURE, NO CARD MOVEMENT. JAM

COLS. 1 - 40 DATA READ 77 77 77 77 77 77

COLS. 41 - 80 DATA READ 77 77 77 77 77 77

- SPE4A1-6 26. Enter "A" Register with 20 octal and halt
- 27. Go to Section A-1
- SPE3 28. If printer is not ready, go to Section A-32
- 29. Output Statement B

STATEMENT B

BAD CARD IN DECK

COLS. 1 - 40 DATA READ

COLS. 41 - 80 DATA READ

- 30. Enter "A" Register with 21 octal and halt
- 31. Go to Section A-1
- SPE6A 32. Load buffer exit register with data read and load "A" Register with 24 octal and halt
- 33. Repeat Section A-32 with successive words until all words are examined or if the "A" Register is manually cleared, go to Section A-34
- 34. Go to Section A-1
- SPE7 35. Load "A" Register with 25 and halt
 - *This indicates printer not ready and a card jam in card reader
- 36. Go to Section A-1

B. BINARY TEST 2

- STAI 1. Do steps 1, 2, and 3 of Section A
2. Select card pattern #2
- READ22+3 3. Set up buffer busy return jump addresses
4. Set up buffer
5. Select reader for binary
- G7-2 6. Input data
- G-9 7. Compare data as it arrives in memory
a. If error, go to Section B-13
- H-2 8. Update counters
9. Repeat Section B 7-9 until 80 cols are read
- READ23-5 10. Restore counters
- S-2 11. Check for read errors
- PRT2 a. If errors, store card image expected in printer
output area and do steps 18, 19, 20 or 18A, 18B,
and 18C, 18D, Section A
12. Go to section B-1
- G-8 13. Update error Flag2
a. If less than 9 errors, go to Section B-7
- RE2+5 14. Reset Section B counters
15. Check to see if all five patterns have been checked.
16. If all five patterns checked, go to Section B-18
17. Check card pattern #3 Section C-7
18. Do Section A, steps 22, 23, 28, 32, and 33 or 22, 23,
24, 35 or 22, 23, 24, 25, and 26.
19. Go to Section B-1

C. BINARY TEST 3

- STAI 1. Do steps 1, 2, 3 of Section A
2. Select card pattern #3
- READ23 3. Set up buffer busy and return jump address
4. Set up buffer
5. Select reader for binary
- G13-2 6. Input data
- G-14-2 7. Compare data as it arrives in memory
a. If error, go to Section C-14
- G10A 8. Update counters
9. Repeat Section C 7-9 until 80 cols are checked
- READ24-15 10. Restore counters
- S-3 11. Check for read errors
- PRT3 12. If errors, store expected card image in printer output
area and do Section A, steps 18, 19, 20, or 18A, 18B,
-18C and 18D

- 13. Go to Section C-1
- G17 14. Update Error Flag 3
 - a. If less than 9 errors, go to Section C-7
- RE3+6 15. Reset Section C counters
- 16. Check to see that all five patterns have been checked
- 17. If all patterns checked, go to Section C-19
- 18. Check card pattern #4, Section D-7
- 19. Do Section A, steps 22, 23, 28, 32 and 33 or 22, 23, 24 and 35 or 22, 23, 24, 25 and 26
- 20. Go to Section C-1

D. BINARY TEST 4 & 5

- STA1 1. Do Section A, steps 1, 2 and 3
- 2. Select routine Read24
- READ24 3. Set up buffer busy return address
- 4. Set up buffer registers
- 5. Select binary read
- G18-3 6. Input data
- G21-1 7. Compare data as it arrives in memory
 - a. If error, go to Section D-16
- 8. Check for pattern 4 or 5 selected
 - a. If 5, go to Section D-29
- 9. Repeat steps 7 and 7A until 79 cols have been checked
- G22E 10. Wait for buffer to terminate
- 11. Check character lin col. #80
 - a. If error, go to Section D-18
- G22C 12. Check character 2 in col. #80
 - a. If error, go to Section D-26
- G22A1 13. Restore counters
- S-1 14. Check for read errors card 4
 - a. If errors, store card image expected in printer output area and do Section A, steps 18, 19, 20 or 18A, 18B, 18C and 18D.
- 15. Go to Section D-1
- G22 16. Update Flag45 error counter
 - a. If more than 3 errors, go to Section D-22
- 17. Go to Section D-7
- G22A 18. Update Flag 45 error counter
 - a. If more than 3 errors, go to Section D-22
- 19. Go to Section D-12
- G22B 20. Update Flag 45 error counter
 - a. If more than 3 errors, go to Section D-22
- 21. Go to Section D-13
- 22. Reset error counter to zero
 - a. Check for card pattern 4 or 5 selected. If 5, go to Section D-36

- RED1A-2 12. Repeat Section D-11 until 80 cols. have been checked
- 13. Reset counters and go to Section E-1
- 14. Mask status for errors
- EMPTY 15. Do Section E-24 if hopper empty
- PAUSE1 16. Do Section E-28 if pause switch activated
- LATE 17. Do Section E-33 if late input request
- BAD 18. Check printer status
 - a. If not ready, go to Section E-45
- 19. Output TABLE 6

TABLE 6

ILLEGAL STATUS FROM CARD READER. STATUS IS IN "A" REGISTER OF COMPUTER

- RECK1-3 20. Load card reader status into "A" Register and halt
- RESET1 21. Reset counters
- 22. Clear card reader
- 23. Go to Section E-1
- 24. Go to Section E-38 if printer not ready
- EMPTY+6 25. Print TABL 1

TABL 1

CARD READER INPUT HOPPER EMPTY. LOAD HOLLERITH TEST CARDS AND PUSH REG. BUTTON

- CHECK1+6 26. Load 11 into "A" Register and halt
- 27. Go to Section E-1
- 28. Go to Section E-39 if printer not ready
- PAUSE1+6 29. Output TABL 2

TABL 2

CLEAR PAUSE SWITCH ON READER

- 30. Reset counters
- CHECK2+10 31. Load "A" Register with 10 and halt
- 32. Go to Section E-1
- 33. If printer status says not ready, go to Section E-40
- LATE+6 34. Output TABL 3

TABL 3

STATUS FROM CARD READER INDICATES LATE INPUT REQUEST

- RE45A 23. Set Flag for pattern 5
 24. Reset card counters
 25. Check to see that all five card patterns have been checked
 a. If all patterns checked, go to Section D-27
 26. Check card pattern #5. Go to Section D-7
 27. Do Section A, steps 22, 23, 28, 32, and 33 or 22, 23, 24 and 35 or 22, 23, 24, 25 and 26.
 28. Go to Section D-1
- H3A 29. Change data compare character for next compare operation
 30. Update card column counters
 31. Repeat Section D, steps 7, 8, 29, 30 until 80 cols. have been checked
 32. Restore counters to original settings
- S5 33. Check for errors
 a. If errors, store expected card image in printer output area
 34. Do Section A, steps 18, 19 and 20 or 18A, 18B, 18C, and 18D
 35. Go to Section D-1
- RE45 36. Set flag for pattern 4
 37. Reset counters and compare checkers
 38. Check for all five patterns completed
 a. If completed, go to Section D-27
 b. If not, go to Section D-40
 39. Go to Section D-1
 40. Go to Section A-1

E. HOLLERITH TEST

- STATUS 1. Select status
 2. If not ready, go to Section E-14
- READ1 3. Set input buffer area to zero
- REPEAT 4. Generate random number
- DELAY1 5. Delay a random amount before reading a card
- READ 6. Check for first card flag
 7. If first card, go to Section E-55
- COMPAR 8. Set up Buffer Registers
- 5F+2 9. Select for Hollerith read
- 5G 10. Input card on buffer channel
 a. If buffer busy, go to Section E-58
- COMPA1 11. Check incoming data as it arrives in memory
 a. If error, go to Section E-46

TRY2 35. Wait for printer busy status to drop, then output TABL4

TABLE 4

DATA READ

TABLE 5

DATA EXPECTED

TRY3 36. Wait for busy to drop, output TABLE 5 and halt

37. Go to Section E-1

HLT1 38. Load 1 to "A" Register and halt

a. This indicates input hopper empty and printer not ready

b. Go to Section E-21

HLT2 39. Load 2 into "A" Register and halt

a. This indicates pause switch has been activated and the printer is not ready

b. Go to Section E-21

HLT3 40. Load "BER" Register with data expected and "BXR" Register with data received. Load 3 into "A" Register and halt. If buffer busy upon loading, BER and BXR Registers, go to Section E-43 or E-44 respectively.

a. This error stop is for late input request status from card reader and printer not ready

41. Repeat Section E-40 until all data has been examined

a. If the "A" Register is manually cleared, the rest of the data will be bypassed

42. Go to Section E-1

BUSY1 43. Repeat loading of buffer entrance register ten times. If still busy after tenth try, load 6 to "A" Register and halt.

a. Clear buffer controls and go to Section E-40

BUSY2 44. Repeat loading of buffer exit register ten times. If still busy after ten trys, load 6 into "A" Register and halt. Go to Section E-43a

HALT4+4 45. Printer is not ready. Illegal status from card reader in "A" Register. Program halt.

a. Go to Section E-21

ERRORX 46. Wait for buffer to terminate

LATE1 47. Special check for late input request

48. If late input request, go to Section E-33

49. If printer not ready, go to Section E-53

RETURN+5 50. Print TABLE 4

RIED3 51. Wait for busy to drop. If busy does not drop, go to Section E-53

52. Output TABLE 5

- RED1A
- a. Load zero into "A" Register and halt
 - b. Reset counters and go to Section E-1

TABLE 4

DATA READ

TABLE 5

DATA EXPECTED.

- RED2
53. Load BER and BXR Registers with read and expected data respectively. Load 77 into "A" Register and halt. Repeat Section E-53 with successive data words until all words checked unless "A" is manually cleared at halt.
- RED3A
54. Reset counters. Go to Section E-52b
- READ+4
55. Set up BER and BXR Registers
 56. Input one card and use as compare card
 57. Go to Section E-1
 58. Repeat Section E-10 ten times
- HALT7
59. If still busy, load 7 into the "A" Register and halt
 60. Clear buffer Controls and do Section E-10

CRT ED. 0 CONSISTS OF A 8130 SYSTEM.

REM CRT ED. 0 CONSISTS OF A 8130 SYSTEM
 REM BINARY AND HOLLERITH CARD READER TEST.
 REM THE BINARY PORTION OF THE TEST MUST USE
 REM THE FIVE SPECIAL TEST CARDS PROVIDED.
 REM THE HOLLERITH TEST CAN USE ANY CARD YOU CHOOSE
 REM THE FIRST CARD READ WILL BE THE IMMAGE
 REM ALL OTHER CARDS ARE CHECKED AGINST.
 REM SEE TEST WRITE UP FOR ERROR HALTS.

BNK0
 ORG

0

LDM

TEST

ZERO FOR TEST 1 NONZERO FOR TEST 2

HLT

STM

TEST

BINARY TEST

ZJP

TEST1

HOLLERITH TEST

UJP

TEST2

LDN

TEST1

3

ATT

100

UJP

STA1

LDN

TEST2

11

ATT

100

LDN

12

ATT

200

LDN

13

ATT

300

UJP

100

STATUS

TEST

REM
 PRG

100

TABLE1

51

R

25

E

21

A

24

D

25

E

51

R

60

F

26

F

21

A

31

I

43

L

64

U

51

R

{CRT-14}

0000 0000
 0000 0021
 0001 0031
 0002 0077
 0003 0041
 0004 0031
 0005 0060
 0006 0011
 0007 0064
 0010 0016
 0011 0020
 0012 0003
 0013 0102
 0014 0164
 0015 1700
 0016 0020
 0017 0011
 0020 0102
 0021 0020
 0022 0012
 0023 0202
 0024 0020
 0025 0013
 0026 0302
 0027 0164
 0030 4400
 0031 0000
 0100 0100
 0100 0051
 0101 0025
 0102 0021
 0103 0024
 0104 0025
 0105 0051
 0106 0060
 0107 0026
 0110 0021
 0111 0031
 0112 0043
 0113 0064
 0114 0051

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

{CRT-15}

0115	0025	25	E
0116	0073	73	,
0117	0060	60	
0120	0045	45	N
0121	0046	46	O
0122	0060	60	
0123	0023	23	C
0124	0021	21	A
0125	0051	51	R
0126	0024	24	D
0127	0060	60	
0130	0044	44	M
0131	0046	46	O
0132	0065	65	V
0133	0025	25	E
0134	0044	44	M
0135	0025	25	E
0136	0045	45	N
0137	0063	63	T
0140	0033	33	.
0141	0060	60	
0142	0041	41	J
0143	0021	21	A
0144	0044	44	M
0145	0060	60	BLANK
0146	0101	101	
0147	0022	22	B
0150	0021	21	A
0151	0024	24	D
0152	0060	60	
0153	0023	23	C
0154	0021	21	A
0155	0051	51	R
0156	0024	24	D
0157	0060	60	
0160	0031	31	I
0161	0045	45	N
0162	0060	60	
0163	0024	24	D
0164	0025	25	E
0165	0023	23	C
0166	0042	42	K
0167	0101	101	
0170	0051	51	R
0171	0025	25	E
0172	0021	21	A
0173	0024	24	D
0174	0025	25	E
0175	0051	51	R
0176	0060	60	
0177	0023	23	C

TBL17A

TBL17B

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

0200	0046	46	O
0201	0043	43	L
0202	0033	33	.
0203	0060	60	
0204	0026	26	F
0205	0021	21	A
0206	0031	31	I
0207	0043	43	L
0210	0064	64	U
0211	0051	51	R
0212	0025	25	E
0213	0101	101	
0214	0023	23	C
0215	0046	46	O
0216	0043	43	L
0217	0062	62	S
0220	0033	33	.
0221	0060	60	
0222	0001	1	1
0223	0060	60	
0224	0075	75	
0225	0004	4	
0226	0000	0	40
0227	0060	60	
0230	0024	24	D
0231	0021	21	A
0232	0063	63	T
0233	0021	21	A
0234	0060	60	
0235	0051	51	R
0236	0025	25	E
0237	0021	21	A
0240	0024	24	D
0241	0060	60	BLANK
0242	0060	60	BLANK
0243	0060	60	BLANK
0244	0060	60	BLANK
0245	0060	60	BLANK
0246	0060	60	BLANK
0247	0060	60	BLANK
0250	0023	23	C
0251	0046	46	O
0252	0043	43	L
0253	0062	62	S
0254	0033	33	.
0255	0060	60	
0256	0004	4	41
0257	0001	1	
0260	0075	75	
0261	0010	10	80
0262	0000	0	

TABL̄2

TABL̄4

CRT-163

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

{CRT-17}

0263	0060	60	
0264	0024	24	D
0265	0021	21	A
0266	0063	63	T
0267	0021	21	A
0270	0060	60	
0271	0051	51	R
0272	0025	25	E
0273	0021	21	A
0274	0024	24	D
0275	0060	60	BLANK
0276	0060	60	BLANK
0277	0060	60	BLANK
0300	0060	60	BLANK
0301	0060	60	BLANK
0302	0060	60	BLANK
0303	0060	60	BLANK
0304	0023	23	C
0305	0046	46	O
0306	0043	43	L
0307	0062	62	S
0310	0033	33	.
0311	0060	60	
0312	0001	1	1
0313	0060	60	
0314	0075	75	
0315	0004	4	
0316	0000	0	40
0317	0060	60	
0320	0024	24	D
0321	0021	21	A
0322	0063	63	T
0323	0021	21	A
0324	0060	60	
0325	0025	25	E
0326	0067	67	X
0327	0047	47	P
0330	0025	25	E
0331	0023	23	C
0332	0063	63	T
0333	0025	25	E
0334	0024	24	D
0335	0060	60	BLANK
0336	0060	60	BLANK
0337	0060	60	BLANK
0340	0023	23	C
0341	0046	46	O
0342	0043	43	L
0343	0062	62	S
0344	0033	33	.
0345	0060	60	

TABL6

TABL8

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

[CRT-1BJ

0346	0004	4	4]
0347	0001	1	
0350	0075	75	
0351	0010	10	
0352	0000	0	80
0353	0060	60	
0354	0024	24	D
0355	0021	21	A
0356	0063	63	T
0357	0021	21	A
0360	0060	60	
0361	0025	25	E
0362	0067	67	X
0363	0047	47	P
0364	0025	25	E
0365	0023	23	C
0366	0063	63	T
0367	0025	25	E
0370	0024	24	D
0371	0060	60	BLANK
0372	0060	60	BLANK
0373	0060	60	BLANK

	0442	442	
	0442	0024	TABL4
	0443	0021	21
	0444	0063	63
	0445	0021	21
	0446	0060	60
	0447	0051	51
	0450	0025	25
	0451	0021	21
	0452	0024	24
	0453	0060	60
	0454	0060	60
	0455	0060	60
	0456	0060	60
	0457	0060	60
	0460	0060	60
	0461	0000	TABL4A BLR
	0601	0101	101
	0603	0603	PRG
	0603	0024	TABL5
	0604	0021	21
	0605	0063	63
	0606	0021	21
	0607	0060	60
	0610	0025	25
	0611	0067	67
	0612	0047	47
	0613	0025	25

CARD INPUT AREA
LINE ADVANCE

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

{CRT-19}

0614	0023	23	C
0615	0063	63	T
0616	0025	25	E
0617	0024	24	D
0620	0060	60	BLANK
0621	0060	60	BLANK
0622	0021	21	A
0623	0022	22	B
0624	0023	23	C
0625	0024	24	D
0626	0025	25	E
0627	0026	26	F
0630	0027	27	G
0631	0030	30	H
0632	0031	31	I
0633	0041	41	J
0634	0042	42	K
0635	0043	43	L
0636	0044	44	M
0637	0045	45	N
0640	0046	46	O
0641	0047	47	P
0642	0050	50	Q
0643	0051	51	R
0644	0062	62	S
0645	0063	63	T
0646	0064	64	U
0647	0065	65	V
0650	0066	66	W
0651	0067	67	X
0652	0070	70	Y
0653	0071	71	Z
0654	0001	1	1
0655	0002	2	2
0656	0003	3	3
0657	0004	4	4
0660	0005	5	5
0661	0006	6	6
0662	0007	7	7
0663	0010	10	8
0664	0011	11	9
0665	0000	0	0
0666	0012	12	=
0667	0013	13	=
0670	0014	14	
0671	0015	15	
0672	0016	16	
0673	0017	17	
0674	0020	20	+
0675	0032	32	
0676	0033	33	.

TABL5A

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

0677	0034	34)
0700	0035	35	
0701	0036	36	
0702	0037	37	
0703	0040	40	-
0704	0053	53	\$
0705	0054	54	*
0706	0055	55	
0707	0056	56	
0710	0057	57	
0711	0061	61	/
0712	0072	72	
0713	0073	73	,
0714	0074	74	(
0715	0075	75	
0716	0076	76	=
0717	0077	77	
0720	0060	60	BLANK
0721	0021	21	A
0722	0022	22	B
0723	0023	23	C
0724	0024	24	D
0725	0025	25	E
0726	0026	26	F
0727	0027	27	G
0730	0030	30	H
0731	0031	31	I
0732	0041	41	J
0733	0042	42	K
0734	0043	43	L
0735	0044	44	M
0736	0045	45	N
0737	0046	46	O
0740	0047	47	P
0741	0050	50	Q
0742	0154	154	LINE SKIPS

{CRT-20}

1000	1000	1000	PRG	
1000	0000	240	BLR	
	1250	1250	REM	
1250	0020		PRG	
			LDN	
			REM	ERROR CHECKING FOR BINARY CARDS
1251	0002	2		
1252	0102	100	ATT	
1253	0020		LDN	
1254	0003	3		
1255	0202	200	ATT	
1256	0255	200	RAO	
1257	1665	FLAG1		COL. ERROR COUNTER
1260	0034	SBN		CARD NO. 1

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

1261	0011		11	
1262	0160	ZJP	100	
1263	1271		RE1	
1264	0020	LDN		
1265	0006		6	
1266	0102	ATT	100	
1267	0164	UJP	100	RETURN: UPDATE COUNTERS
1270	3363		G5A	AND CONTINUE CARD CHECK
1271	0020	RE1		
1272	0014	LDN	14	
1273	0102	ATT	100	
1274	0020	LDN		
1275	0006		6	
1276	0202	ATT	200	
1277	0020	LDN		
		REM		IF MORE THEN 9 ERRORS, RESET CARD 1
		REM		COUNTERS AND CHECK NEXT IMMAE
1300	0000		0	
1301	0241	STM	200	
1302	3347		G3	
1303	0020	LDN		
1304	0000		0	
1305	0241	STM	200	
1306	3356		G4	
1307	0020	LDN		
1310	0000		0	
1311	0241	STM	200	
1312	3360		G5	
1313	0020	LDN		
1314	0003		3	
1315	0202	ATT	200	
1316	0255	RAO	200	CHECK ALL FIVE PATTERNS
1317	1672		FLAG6	PATTERN COUNTER
1320	0034	SBN		
1321	0005		5	
1322	0160	ZJP	100	7#S CHECK + PRINT ROUTINE
1323	6200		SPE2	
1324	0020	SPE1		NEXT CARD TO CHECK
1325	0007		7	
1326	0102	ATT	100	
1327	0020	LDN		
1330	0002		2	
1331	0241	STM	200	
1332	1671		FLAG5	
1333	0164	UJP	100	
1334	3472		G7	CHECK NEXT CARD IMMAE
1335	0020	G8		
1336	0002	LDN		
1337	0102	ATT	100	
1340	0020	LDN		
1341	0003		3	

{CRT-21}

CRT ED. 0 CONSISTS OF A #130 SYSTEM

1342	0202		ATT	200	
1343	0255		RAO	200	
1344	1666		FLAG2		COL. ERROR COUNTER
					CARD NO. 2
1345	0034		SBN		
1346	0011			11	
1347	0160		ZJP	100	
1350	1356			RE2	
1351	0020		LDN		
1352	0007			7	
1353	0102		ATT	100	
1354	0164		UJP	100	
1355	3516			G11A	RETURN, UPDATE COUNTERS
1356	0020	RE2	LDN		CONTINUE CARD CHECK
1357	0014			14	
1360	0102		ATT	100	
1361	0020		LDN		
1362	0007			7	
1363	0202		ATT	200	
1364	0020		LDN		
		REM			IF MORE THEN 9 ERRORS, RESET CARD 2
		REM			COUNTERS AND CHECK NEXT IMAGE
1365	0000			0	
1366	0241		STM	200	
1367	3502			G9	
1370	0241		STM	200	
1371	3511			G10	
1372	0241		STM	200	
1373	3513			G11	
1374	0020		LDN		
1375	0005			5	
1376	0241		STM	200	
1377	3525			H2	
1400	0020		LDN		
1401	0003			3	
1402	0202		ATT	200	
1403	0255		RAO	200	
1404	1672		FLAG6		CHECK ALL FIVE PATTERNS
1405	0034		SBN		
1406	0005			5	
1407	0160		ZJP	100	7*5 CHECK + PRINT ROUTINE
1410	6200			SPE2	
1411	0020		LDN		
1412	0007			7	
1413	0102		ATT	100	
1414	0020		LDN		
1415	0003			3	
1416	0241		STM	200	
1417	1671			FLAG5	
1420	0164		UJP	100	
1421	3620			G13	CHECK NEXT IMAGE

{CRT-22}

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

1422	0020	G17	LDN		
1423	0003			3	
1424	0102		ATT	100	
1425	0020		LDN		
1426	0003			3	
1427	0202		ATT	200	
1430	0255		RAO	200	
1431	1667				
1432	0034				COL. 3 ERROR COUNTER
1433	0011		SBN		CARD NO. 3
1434	0160			1	
1435	1443		ZJP	100	
1436	0020		LDN	RE3	
1437	0007			7	
1440	0102		ATT	100	
1441	0164		UJP	100	RETURN, UPDATE COUNTERS
1442	3644			G16A	CONTINUE CARD CHECK
1443	0020	RE3	LDN		
1444	0014			14	
1445	0102		ATT	100	
1446	0020		LDN		
1447	0007			7	
1450	0202		ATT	200	
1451	0020		LDN		
		REM			IF MORE THEN 9 ERRORS, RESET CARD 3
		REM			COUNTERS AND CHECK NEXT IMAGE
1452	0000			0	
1453	0241		STM	200	
1454	3630			G14	
1455	0020		LDN		
1456	0000			0	
1457	0241		STM	200	
1460	3637			G15	
1461	0020		LDN		
1462	0000			0	
1463	0241		STM	200	
1464	3641			G16	
1465	0020		LDN		
1466	0003			3	
1467	0202		ATT	200	
1470	0255		RAO	200	
1471	1672			FLAG6	CHECK ALL FIVE PATTERNS
1472	0034		SBN		
1473	0005			5	
1474	0160		ZJP	100	7#S CHECK + PRINT ROUTINE
1475	6200			SPE2	
1476	0020		LDN		
1477	0007			7	
1500	0102		ATT	100	
1501	0020		LDN		
1502	0004			4	

{CRT-23}

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

CRT-243

1503	0241		STM	200	
1504	1671			FLAGS	
1505	0164		UJP	100	
1506	3737			G18	CHECK NEXT IMAGE
1507	0020	G22	LDN		
1510	0003			3	
1511	0102		ATT	100	
1512	0020		LDN		
1513	0003			3	
1514	0202		ATT	200	
1515	0255		RAO	200	COL. ERROR COUNTER
1516	1673			FLAG45	CARD 4 OR 5
1517	0034		SBN		
1520	0004			4	
1521	0160		ZJP	100	
1522	1530			RE45	
1523	0020		LDN		
1524	0007			7	
1525	0102		ATT	100	
1526	0164		UJP	100	RETURN, UPDATE COUNTERS
1527	3763			G21A	AND CONTINUE CARD CHECK
1530	0241	RE45	STM	200	
1531	1673			FLAG45	
1532	0020		LDN		
1533	0003			3	
1534	0102		ATT	100	
1535	0020		LDN		
1536	0010			10	
1537	0202		ATT	200	
1540	0221		LDM	200	CARD 4 OR 5 CHECK
1541	4136			H3	
1542	0161		NZP	100	
1543	1617			RE45A	
1544	0020		LDN		
1545	0001			1	
1546	0241		STM	200	
1547	4136			H3	
1550	0020		LDN		
1551	0007			7	
1552	0202		ATT	200	
1553	0020		LDN		
		REM			IF MORE THEN 4 ERRORS, RESET CARD 4
		REM			COUNTERS AND CHECK NEXT IMAGE
1554	0000			0	
1555	0241		STM	200	
1556	3756			G20	
1557	0241		STM	200	
1560	3760			G21	
1561	0241		STM	200	
1562	3747			G19	
1563	0020		LDN		

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

{CRT25}

1564	0010		10	
1565	0102	ATT	100	
1566	0020	LDN		
1567	0001		1	
1570	0141	STM	100	
1571	4060		H4	
1572	0020	LDN		
1573	0014		14	
1574	0102	ATT	100	
1575	0020	LDN		
1576	0003		3	
1577	0202	ATT	200	
1600	0255	RAO	200	CHECK ALL FIVE PATTERNS
1601	1672		FLAG6	
1602	0034	SBN		
1603	0005		5	
1604	0160	ZJP	100	7.5 CHECK AND PRINT ROUTINE
1605	6200		SPE2	
1606	0020	LDN		
1607	0006		6	
1610	0102	ATT	100	
1611	0020	LDN		
1612	0001		1	
1613	0241	STM	200	
1614	1671		FLAG5	
1615	0164	UJP	100	
1616	3337		G1	CHECK NEXT CARD IMAGE
1617	0020	LDN		
1620	0014		14	
1621	0102	ATT	100	
1622	0020	LDN		
1623	0000		0	
1624	0241	STM	200	
1625	4136		H3	
1626	0020	LDN		
1627	0007		7	
1630	0202	ATT	200	
1631	0020	LDN		
		REM		IF MORE THEN 4 ERRORS, RESET CARD 5
		REM		COUNTERS AND CHECK NEXT IMAGE
1632	0000		0	
1633	0241	STM	200	
1634	3747		G19	
1635	0241	STM	200	
1636	3760		G21	
1637	0020	LDN		
1640	0040		40	
1641	0241	STM	200	
1642	3756		G20	
1643	0020	LDN		
1644	0003		3	

RE45A

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

1645	0202		ATT	200	
1646	0255		RAO	200	CHECK ALL FIVE PATTERNS
1647	1672			FLAG6	
1650	0034		SBN		
1651	0005			5	
1652	0160		ZJP	100	7#S CHECK + PRINT ROUTINE
1653	6200			SPE2	
1654	0020		LDN		
1655	0007			7	
1656	0102		ATT	100	
1657	0020		LDN		
1660	0005			5	
1661	0241		STM	200	
1662	1671			FLAG5	
1663	0164		UJP	100	
1664	3737			G18	CHECK NEXT CARD IMAGE
1665	0000	FLAG1			
1666	0000	FLAG2			
1667	0000	FLAG3			
1670	0000	FLAG4			
1671	0001	FLAG5		1	
1672	0000	FLAG6			
1673	0000	FLAG45			
	1700		REM		
			PRG	1700	
			REM		BINARY CARD STATUS ROUTINE
1700	0020	STAI	LDN		
1701	0003			3	
1702	0202		ATT	200	
1703	0020		LDN		
1704	0000			0	
			REM		ZERO OUT ERROR COUNTERS
			REM		AND CARD COUNTER.
1705	0241		STM	200	
1706	1665			FLAG1	
1707	0241		STM	200	
1710	1666			FLAG2	
1711	0241		STM	200	
1712	1667			FLAG3	
1713	0241		STM	200	
1714	1670			FLAG4	
1715	0241		STM	200	
1716	1672			FLAG6	
1717	0241		STM	200	
1720	1673			FLAG45	
1721	0020		LDN		
1722	0004			4	
1723	0102		ATT	100	
1724	0075		EXF		
		REM			CARD STATUS ROUTINE
1725	0045			45	

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CRT ED. 0 CONSISTS OF A 8130 SYSTEM

1726	0040			40
1727	0076		INA	
1730	0241		STM	200
1731	1763			STAT
1732	0160		ZJP	100
1733	2013			SELECT READ ROUTINE NO.
1734	0221		LDM	200
1735	1763			STAT
1736	0014		LSN	
1737	0100			100
1740	0160		ZJP	100
1741	2003			LATEA
1742	0020		LDN	
1743	0003			3
1744	0102		ATT	100
1745	0221		LDM	200
1746	1763			STAT
1747	0014		LSN	
1750	0200			200
1751	0160		ZJP	100
1752	1771			PAUSE2
1753	0221		LDM	200
1754	1763			STAT
1755	0014		LSN	
1756	0300			300
1757	0160		ZJP	100
1760	1764			EMPTY1
1761	0164		UJP	100
1762	1776			BAD1
1763	0000	STAT		

REM
REM
REM
REM
REM

STATUS ROUTINES OTHER THEN READY
BIT 7 = LATE INPUT REQUEST
BIT 6 = PAUSE SWITCH ACTIVATED
BIT 6 AND 7 = HOPPER EMPTY
ANY OTHER BIT CONFIGURATION IS ILLEGAL

1764	0221	EMPTY1	LDM	200
1765	1763			STAT
1766	0077		HLT	
1767	0164		UJP	100
1770	1700			STA1
1771	0221	PAUSE2	LDM	200
1772	1763			STAT
1773	0077		HLT	
1774	0164		UJP	100
1775	1700			STA1
1776	0221	BAD1	LDM	200
1777	1763			STAT
2000	0077		HLT	
2001	0164		UJP	100
2002	1700			STA1
2003	0221	LATEA	LDM	200

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CRT ED. 0 CONSISTS OF A 8130 SYSTEM

2004	1763			STAT	
2005	0077		HLT		
2006	0020		LDN		
2007	0003			3	
2010	0102		ATT	100	
2011	0164		UJP	100	
2012	1700			STA1	
2013	0020	SELECT	LDN		
		REM			CARD PATTERN SELECT ROUTINE
2014	0004			4	
2015	0102		ATT	100	
2016	0221		LDM	200	
2017	1671			FLAGS	CARD COUNTER
2020	0034		SBN		
2021	0004			4	
2022	0163		NJP	100	
2023	2031			SEL1	
2024	0020		LDN		
2025	0007			7	
2026	0102		ATT	100	
2027	0164		UJP	100	
2030	3701			READ24	
		REM			JUMP TO PROPER BINARY CARD ROUTINE
2031	0030	SEL1	ADN		
2032	0004			4	
2033	0034		SBN		
2034	0003			3	
2035	0163		NJP	100	
2036	2044			SEL2	
2037	0020		LDN		
2040	0007			7	
2041	0102		ATT	100	
2042	0164		UJP	100	
2043	3562			READ23	
2044	0030	SEL2	ADN		
2045	0003			3	
2046	0034		SBN		
2047	0002			2	
2050	0163		NJP	100	
2051	2057			SEL3	
2052	0020		LDN		
2053	0007			7	
2054	0102		ATT	100	
2055	0164		UJP	100	
2056	3434			READ22	
2057	0020	SEL3	LDN		
2060	0006			6	
2061	0102		ATT	100	
2062	0164		UJP	100	
2063	3301			READ21	
2064	0020	G22A	LDN		SPECIAL ERROR CK

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CRT EO. 0 CONSISTS OF A R130 SYSTEM

2065	0003		REM		3	CARD PATTERN NUMBER FOUR
2066	0202			ATT	200	
2067	0020			LDN		
2070	0010				10	
2071	0102			ATT	100	
2072	0255			RAO	200	
2073	1673				FLAG45	
2074	0034			SBN		
2075	0004				4	
2076	0161			NZP	100	
2077	4025				G22C	
2100	0241			STM	200	
2101	1673				FLAG45	
2102	0264			UJP	200	
2103	1530				RE45	
2104	0020	G22B		LDN		
			REM			SPECIAL ERROR CHECK CARD PATTERN NUMBER FOUR
2105	0003				3	
2106	0202			ATT	200	
2107	0020			LDN		
2110	0010				10	
2111	0102			ATT	100	
2112	0255			RAO	200	
2113	1673				FLAG45	
2114	0034			SBN		
2115	0004				4	
2116	0161			NZP	100	
2117	4036				G22A1	
2120	0241			STM	200	
2121	1673				FLAG45	
2122	0264			UJP	200	
2123	1530				RE45	
	2200		REM			
2200	0020	H4B	PRG	LDN	2200	
2201	0003				3	SPECIAL ERROR CK ROUTINE CARD PATTERN NUMBER FIVE
2202	0202		REM	ATT	200	
2203	0020			LDN		
2204	0010				10	
2205	0102			ATT	100	
2206	0221			LDM	200	
2207	1673				FLAG45	
2210	0160			ZJP	100	
2211	4130				H4A	
2212	0034			SBN		
2213	0004				4	
2214	0161			NZP	100	
2215	4130				H4A	
2216	0020			LDN		

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

2217	0002			2	
2220	0202		ATT	200	
2221	0221		LDM	200	
2222	1000			INPUT	
2223	0034		SBN		
2224	0040			40	
2225	0161		NZP	100	
2226	4130			H4A	
2227	0020		LDN		
2230	0003			3	
2231	0202		ATT	200	
2232	0020		LDN		
2233	0000			0	
2234	0241		STM	200	
2235	1673			FLAG45	
2236	0164		UJP	100	
2237	4130			H4A	
	2240		REM		
			PRG	2240	
			REM		
			REM		ZERO OUT FIRST FOURTY COLS. FOR PRINT
			REM		OPERATION. THIS S FOR CARD
2240	0020	PRT1	LDN		IMMAGE NUMBER ONE
2241	0004				STORE PROPER DATA
2242	0102			4	
2243	0020		ATT	100	IN OUT AREA
2244	0017		LDN		
2245	0202		ATT	17	
			REM	200	
			REM		PRINT ROUTINES FOR READER
			REM		ERRORS AND/OR IMPROPER
					CARD IMMAGE IN READER
2246	0020		LDN		
2247	0000			0	
2250	0241		STM	200	
2251	7520	PRT1F		TABL17	
2252	0155		RAO	100	
2253	2251			PRT1F	
2254	0155		RAO	100	
2255	2324			PRT1A	
2256	0034		SBN		
2257	0120			120	
2260	0161		NZP	100	
2261	2240			PRT1	
2262	0141		STM	100	
2263	2324			PRT1A	
2264	0020		LDN		
2265	0120			120	
2266	0141		STM	100	
2267	2251			PRT1F	
2270	0020		LDN		
2271	0014			14	

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CRT ED. 0 CONSISTS OF A 8130 SYSTEM

2272	0302		ATT	300	
2273	0321	PRT1E	LDM	300	
2274	6001	PRT1C	+1	TABL21	
		REM			DATA FOR PRINT OPERATION (SECOND
		REM			HALFOF CARD NUMBER ONE)
2275	0241		STM	200	
2276	7640	PRT1B		TABL19	
2277	0155		RAO	100	
2300	2276			PRT1B	
2301	0155		RAO	100	
2302	2274			PRT1C	
2303	0034		SBN		
2304	0121			121	
2305	0161		NZP	100	
2306	2273			PRT1E	
2307	0020		LDN		
2310	0001			1	
2311	0141		STM	100	
2312	2274			PRT1C	
2313	0020		LDN		
2314	0240			240	
2315	0141		STM	100	
2316	2276			PRT1B	
2317	0020		LDN		
2320	0010			10	
2321	0102		ATT	100	
2322	0164		UJP	100	
2323	4200			PRINTZ	
2324	0000	PRT1A			
2325	0020	PRT2	LDN		
2326	0017			17	
2327	0202		ATT	200	SET UP OUTPUT AREA FOR PRINT
		REM			CARD NUMBER 2
2330	0020		LDN		
2331	0000			0	
2332	0241		STM	200	
2333	7520			TABL17	
2334	0020		LDN		
2335	0005			5	
2336	0241		STM	200	
2337	7521		+1	TABL17	
2340	0020	PRT2B	LDN		
2341	0077			77	
2342	0241		STM	200	
2343	7522	PRT2A	+2	TABL17	
2344	0155		RAO	100	
2345	2343			PRT2A	
2346	0034		SBN		
2347	0360			360	
2350	0161		NZP	100	
2351	2340			PRT2B	

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CRT ED. 0 CONSISTS OF A 8130 SYSTEM

{CRT-32}

2352	0020		LDN		
2353	0122			122	
2354	0141		STM	100	
2355	2343			PRT2A	
2356	0020		LDN		
2357	0010			10	
2360	0102		ATT	100	
2361	0164		UJP	100	
2362	4317		XAL		SPECIAL CHECK FOR CARD NUM. 2
2363	0020	PRT3	LDN		
2364	0016			16	
2365	0202		ATT	200	SET UP OUTPUT AREA FOR PRINT CARD NUMBER 3
		REM			
2366	0020		LDN		
2367	0017			17	
2370	0302		ATT	300	
2371	0221		LDM	200	
2372	7000	PRT3B		TABL23	
2373	0341		STM	300	
2374	7520	PRT3A		TABL17	
2375	0155		RAO	100	
2376	2372			PRT3B	
2377	0155		RAO	100	
2400	2374			PRT3A	
2401	0034		SBN		
2402	0360			360	
2403	0161		NZP	100	
2404	2363			PRT3	
2405	0141		STM	100	
2406	2372			PRT3B	
2407	0020		LDN		
2410	0120			120	
2411	0141		STM	100	
2412	2374			PRT3A	
2413	0020		LDN		
2414	0010			10	
2415	0102		ATT	100	
2416	0164		UJP	100	
2417	4200			PRINTZ	
2420	0020	PRT5	LDN		
2421	0017			17	
2422	0202		ATT	200	SET UP OUTPUT AREA FOR PRINT CARD NUMBER 4
		REM			
2423	0020		LDN		
2424	0040			40	
2425	0241		STM	200	
2426	7520			TABL17	
2427	0020		LDN		
2430	0001			1	
2431	0241		STM	200	
2432	7521		*1	TABL17	

CRT ED. 0 CONSISTS OF A 8130 SYSTEM

2433	0020	PRT45B	LDN		
2434	0000			0	
2435	0241		STM	200	
2436	7522	PRT45A	+2	TABL17	
2437	0155		RAO	100	
2440	2436			PRT45A	
2441	0034		SBN		
2442	0360			360	
2443	0161		NZP	100	
2444	2433			PRT45B	
2445	0020		LDN		
2446	0120			120	
2447	0141		STM	100	
2450	2436			PRT45A	
2451	0020		LDN		
2452	0010			10	
2453	0102		ATT	100	
2454	0164		UJP	100	
2455	4200			PRINTZ	
2456	0020	PRT45	LDN		
2457	0017			17	
2460	0202		ATT	200	SET UP OUTPUT AREA FOR PRINT CARD NUMBER 5
		REM			
2461	0020		LDN		
2462	0000			0	
2463	0241		STM	200	
2464	7520	PRT5A		TABL17	
2465	0155		RAO	100	
2466	2464			PRT5A	
2467	0034		SBN		
2470	0356			356	
2471	0161		NZP	100	
2472	2456			PRT45	
2473	0020		LDN		
2474	0120			120	
2475	0141		STM	100	
2476	2464			PRT5A	
2477	0020		LDN		
2500	0040			40	
2501	0241		STM	200	
2502	7756		+236	TABL17	
2503	0020		LDN		
2504	0001			1	
2505	0241		STM	200	
2506	7757		+237	TABL17	
2507	0020		LDN		
2510	0010			10	
2511	0102		ATT	100	
2512	0164		UJP	100	
2513	4200			PRINTZ	
		REM			

{CRT-33}

	2610	PRG	2610	
2610	0023	TARLT	23	C
2611	0021		21	A
2612	0051		51	R
2613	0024		24	D
2614	0060		60	
2615	0051		51	R
2616	0025		25	E
2617	0021		21	A
2620	0024		24	D
2621	0025		25	E
2622	0051		51	R
2623	0060		60	
2624	0031		31	I
2625	0045		45	N
2626	0047		47	P
2627	0064		64	U
2630	0063		63	T
2631	0060		60	
2632	0062		62	S
2633	0063		63	T
2634	0021		21	A
2635	0023		23	C
2636	0042		42	K
2637	0025		25	E
2640	0051		51	R

{CRT-34}

{CRT-35}

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{CRT-3B}

{CRT-37}

2641	0060	60	
2642	0031	31	I
2643	0062	62	S
2644	0060	60	
2645	0025	25	E
2646	0044	44	M
2647	0047	47	P
2650	0063	63	T
2651	0070	70	Y
2652	0060	60	
2653	0043	43	L
2654	0046	46	O
2655	0021	21	A
2656	0024	24	D
2657	0060	60	
2660	0030	30	H
2661	0046	46	O
2662	0043	43	L
2663	0043	43	L
2664	0025	25	E
2665	0051	51	R
2666	0031	31	I
2667	0063	63	T
2670	0030	30	H
2671	0060	60	
2672	0063	63	T
2673	0025	25	E
2674	0062	62	S
2675	0063	63	T
2676	0060	60	
2677	0023	23	C
2700	0021	21	A
2701	0051	51	R
2702	0024	24	D
2703	0062	62	S
2704	0060	60	
2705	0031	31	I
2706	0045	45	N
2707	0063	63	T
2710	0046	46	O
2711	0060	60	
2712	0051	51	R
2713	0025	25	E
2714	0021	21	A
2715	0024	24	D
2716	0025	25	E
2717	0051	51	R
2720	0060	60	
2721	0021	21	A
2722	0045	45	N

2723	0024	24	D
2724	0060	60	
2725	0047	47	P
2726	0064	64	U
2727	0062	62	S
2730	0030	30	H
2731	0060	60	
2732	0051	51	R
2733	0025	25	E
2734	0027	27	G
2735	0033	33	.
2736	0060	60	
2737	0022	22	B
2740	0064	64	U
2741	0063	63	T
2742	0063	63	T
2743	0046	46	O
2744	0045	45	N
2745	0177	177	

REM
PRG

3000

{CRT-3B}

3000	0023	23	C
3001	0043	43	L
3002	0025	25	E
3003	0021	21	A
3004	0051	51	R
3005	0060	60	
3006	0047	47	P
3007	0021	21	A
3010	0064	64	U
3011	0062	62	S
3012	0025	25	E
3013	0060	60	
3014	0062	62	S
3015	0066	66	W
3016	0031	31	I
3017	0063	63	T
3020	0023	23	C
3021	0030	30	H
3022	0060	60	
3023	0046	46	O
3024	0045	45	N
3025	0060	60	
3026	0051	51	R
3027	0025	25	E
3030	0021	21	A
3031	0024	24	D
3032	0025	25	E
3033	0051	51	R
3034	0177	177	
3035	0062	62	S

TABL2

TABL3

3036	0063	63	T
3037	0021	21	A
3040	0063	63	T
3041	0064	64	U
3042	0062	62	S
3043	0060	60	
3044	0026	26	F
3045	0051	51	R
3046	0046	46	O
3047	0044	44	M
3050	0060	60	
3051	0023	23	C
3052	0021	21	A
3053	0051	51	R
3054	0024	24	D
3055	0060	60	
3056	0051	51	R
3057	0025	25	E
3060	0021	21	A
3061	0024	24	D
3062	0025	25	E
3063	0051	51	R
3064	0060	60	
3065	0031	31	I
3066	0045	45	N
3067	0024	24	D
3070	0031	31	I
3071	0023	23	C
3072	0021	21	A
3073	0063	63	T
3074	0025	25	E
3075	0062	62	S
3076	0060	60	
3077	0043	43	L
3100	0021	21	A
3101	0063	63	T
3102	0025	25	E
3103	0060	60	
3104	0031	31	I
3105	0045	45	N
3106	0047	47	P
3107	0064	64	U
3110	0063	63	T
3111	0060	60	
3112	0051	51	R
3113	0025	25	E
3114	0050	50	Q
3115	0064	64	U
3116	0025	25	E
3117	0062	62	S
3120	0063	63	T

{CRT-39}

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3121	0112		112	
		REM		
		PRG		
3123	3123	TARL6	3123	
3124	0031		31	I
3125	0043		43	L
3126	0025		43	L
3127	0027		25	E
3130	0021		27	G
3131	0043		21	A
3132	0060		43	L
3133	0062		60	
3134	0063		62	S
3135	0021		63	T
3136	0063		21	A
3137	0064		63	T
3140	0062		64	U
3141	0060		62	S
3142	0026		60	
3143	0051		26	F
3144	0046		51	R
3145	0044		46	O
3146	0060		44	M
3147	0023		60	
3150	0021		23	C
3151	0051		21	A
3152	0024		51	R
3153	0060		24	D
3154	0051		60	
3155	0025		51	R
3156	0021		25	E
3157	0024		21	A
3160	0025		24	D
3161	0051		25	E
3162	0033		51	R
3163	0062		33	.
3164	0063		62	S
3165	0021		63	T
3166	0063		21	A
3167	0064		63	T
3170	0062		64	U
3171	0060		62	S
3172	0031		60	
3173	0062		31	I
3174	0060		62	S
3175	0031		60	
3176	0045		31	I
3177	0060		45	N
3200	0063		60	
3201	0030		63	T
3202	0025		30	H
			25	E

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3331	4144			BUSY1B	
3332	0075		EXF		
		REM		45	SELECT CARD READER
3333	0045			5	
3334	0005		IBI	100	
3335	0170	REM			INITIATE BUFFER INPUT OPERATION
3336	4146			BUSY1C	
3337	0020	G1	LDN		SET TAG 1
3340	0006			6	
3341	0102		ATT	100	
3342	0020		LDN		
3343	0014			14	
3344	0202		ATT	200	
3345	0006		BER		
		REM			CHECK TO SEE THAT DATA HAS BEEN
		REM			READ BEFORE COMPARING TO
		REM			EXPECTED DATA
3346	0034		SBN		
3347	0000	G3		0	
3350	0160		ZJP	100	
3351	3337			G1	
3352	0020		LDN		
3353	0002			2	
3354	0102		ATT	100	SET TAG 1
3355	0221		LDM	200	
3356	6000	G4		TABL21	
		REM			CHECK INCOMING DATA FOR ERRORS
3357	0335		SBM	300	
3360	1000	G5		INPUT	
3361	0161		NZP	100	JUMP TO ERROR ROUTINE
3362	1250			G2	
3363	0020	G5A	LDN		
3364	0007			7	
3365	0102		ATT	100	SET TAGS 1+2
3366	0020		LDN		
3367	0006			6	
3370	0202		ATT	200	
3371	0255		RAO	200	
3372	3347			G3	
		REM			CHECK FOR 80 COLS.
3373	0034		SBN		
3374	0120			120	
3375	0163		NJP	100	
3376	3404			HA1	
3377	0020		LDN		
3400	0006			6	
3401	0202		ATT	200	
3402	0255		RAO	200	
		REM			UPDATE COUNTERS
3403	3356			G4	

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3404	0020	HA1	LDN		
3405	0006			6	
3406	0202		ATT	200	
3407	0255		RAO	200	
3410	3360			G5	
3411	0034		SBN		
3412	0240			240	
3413	0261		NZP	200	
3414	3337			G1	
3415	0020		LDN		
3416	0015			15	
3417	0102		ATT	100	
3420	0020	R1	LDN		
		REM			RESTORE COUNTERS TO ORIGINAL SETTING
3421	0000			0	
3422	0241	R2	STM	200	
3423	3347			G3	
3424	0241		STM	200	
3425	3356			G4	
3426	0241		STM	200	
3427	3360			G5	
3430	0255		RAO	200	
3431	3300			G6	
3432	0164		UJP	100	
3433	6500			S1	
3434	0020	READ22	LDN		TABLE 22 ROUTINE
3435	0010			10	LACED CARD CHECK
3436	0202		ATT	200	
3437	0020		LDN		
3440	0007		7		RETURN ADDRESS TAG
3441	0241		STM	200	
3442	4174			BUSY2A	
3443	0020		LDN		
3444	3434	READ22			ADDRESS TO RETURN TO
3445	0241		STM	200	
3446	4177			BUSY2B	
3447	0020		LDN		
3450	0010			10	
3451	0102		ATT	100	
3452	0020		LDN		
3453	0002			2	
3454	0302		ATT	300	
3455	0020		LDN		
3456	0000			0	
3457	0104		ABR	100	
3460	4150			BUSY1E	
3461	0020		LDN		
3462	0240			240	
3463	0105		ABX	100	
3464	4152			BUSY1F	
3465	0075		EXF		

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3466	0045		REM		45	SELECT CARD READER
3467	0005				5	
3470	0170			IBI	100	
3471	4154		REM			INITIATE BUFFER INPUT OPERATION
3472	0020	G7		LDN	BUSY16	
3473	0007				7	
3474	0102			ATT	100	
3475	0020			LDN		
3476	0015				15	
3477	0202			ATT	200	
3500	0006			BER		
			REM			CHECK TO SEE THAT DATA HAS BEEN
			REM			READ BEFORE COMPARING TO
			REM			EXPECTED DATA
3501	0034			SBN		
3502	0000	G9			0	
3503	0160			ZJP	100	
3504	3472				G7	
3505	0020			LDN		
3506	0002				2	
3507	0102			ATT	100	
3510	0020			LDN		
3511	0000	G10			0	NUMBERS 0, 5, 77
3512	0335			SBM	300	
			REM			CHECK INCOMING DATA FOR ERRORS
3513	1000	G11				INPUT
3514	0161			NZP	100	ERROR ROUTINE
3515	1335				G8	
3516	0020	G11A		LDN		
3517	0015				15	
3520	0102			ATT	100	
3521	0020			LDN		
3522	0007				7	
3523	0202			ATT	200	
3524	0020			LDN		
3525	0005	H2			5	
3526	0241			STM	200	
3527	3511				G10	
3530	0020			LDN		
3531	0077				77	
3532	0241			STM	200	
3533	3525				H2	
3534	0255			RAO	200	
			REM			UPDATE COUNTERS
3535	3513				G11	
3536	0255			RAO	200	
3537	3502				G9	
			REM			CHECK FOR 80 COLS.
3540	0034			SBN		

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3541	0240			240	
3542	0261		NZP	200	
3543	3472			G7	
3544	0020		LDN		
		REM			RESTORE COUNTERS TO ORIGINAL SETTING
3545	0000			0	
3546	0241		STM	200	
3547	3502			G9	
3550	0241		STM	200	
3551	3511			G10	
3552	0241		STM	200	
3553	3513			G11	
3554	0020		LDN		
3555	0005			5	
3556	0241		STM	200	
3557	3525			H2	
3560	0164		UJP	100	
3561	6517			S2	
3562	0020	READ23	LDN		
3563	0010			10	READ ROUTINE NUMBER 3
3564	0202		ATT	200	
3565	0020		LDN		
3566	0007			7	
3567	0241		SYM	200	
3570	4174		BUSY2A		SET UP RETURN TAG AND ADDRESS
3571	0020		LDN		
3572	3562			READ23	
3573	0241		STM	200	
3574	4177			BUSY2B	
3575	0020		LDN		
3576	0010			10	
3577	0102		ATT	100	
3600	0020		LDN		
3601	0002			2	
3602	0302		ATT	300	
3603	0020		LDN		
3604	0000			0	
3605	0104		ABR	100	
3606	4156			BUSY1H	
3607	0020		LDN		
3610	0240			240	
3611	0105		ABX	100	
3612	4160			BUSY1J	
3613	0075		EXF		
		REM			SELECT CARD READER
3614	0045			45	
3615	0005			5	
3616	0170		IBI	100	
		REM			INITIATE BUFFER INPUT OPERATION
3617	4162			BUSY1K	
3620	0020	G13	LDN		

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3621	0007			7	
3622	0102		ATT	100	
3623	0020		LDN		
3624	0016			16	
3625	0202		ATT	200	
3626	0006		BER		
		REM			CHECK TO SEE THAT DATA HAS BEEN
		REM			READ BEFORE COMPARING TO
		REM			EXPECTED DATA
3627	0034		SBN		
3630	0000	G14		0	
3631	0160		ZJP	100	
3632	3620			G13	
3633	0020		LDN		
3634	0003			3	
3635	0102		ATT	100	
3636	0221		LDM	200	
3637	7000	G15		TABL23	
		REM			CHECK INCOMING DATA FOR ERRORS
3640	0335		SBM	300	
3641	1000	G16		INPUT	
3642	0161		NZP	100	ERROR ROUTINE
3643	1422			G17	
3644	0020	G16A	LDN		
3645	0007			7	
3646	0102		ATT	100	
3647	0020		LDN		
3650	0007			7	
3651	0202		ATT	200	
3652	0255		RAO	200	
		REM			UPDATE COUNTERS
3653	3637			G15	
3654	0255		RAO	200	
3655	3641			G16	
3656	0255		RAO	200	
3657	3630			G14	
3660	0034		SBN		
3661	0240			240	
3662	0161		NZP	100	
3663	3620			G13	
3664	0020		LDN		
3665	0000			0	
		REM			RESTORE COUNTERS TO ORIGINAL SETTING
3666	0241		STM	200	
3667	3630			G14	
3670	0241		STM	200	
3671	3637			G15	
3672	0241		STM	200	
3673	3641			G16	
3674	0020		LDN		
3675	0015			15	

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3676	0102		ATT	100	
3677	0164		UJP	100	
3700	6536			S3	
3701	0020	READ24	LDN		
3702	0010			10	READ ROUTINES 4 AND 5
3703	0202		ATT	200	
3704	0020		LDN		
3705	0007			7	
3706	0241		STM	200	
3707	4174			BUSY2A	
3710	0020		LDN		
3711	3701			READ24	
3712	0241		STM	200	
3713	4177			BUSY2B	
3714	0020		LDN		
3715	0010			10	
3716	0102		ATT	100	
3717	0020		LDN		
3720	0002			2	
3721	0302		ATT	300	
3722	0020		LDN		
3723	0000			0	
3724	0104		ABR	100	
3725	4164			BUSY1L	
3726	0020		LDN		
3727	0240			240	
3730	0105		ABX	100	
3731	4166			BUSY1M	
3732	0075		EXF		
		REM			SELECT CARD READER
3733	0045			45	
3734	0005			5	
3735	0170		IBI	100	
		REM			INITIATE BUFFER INPUT OPERATION
3736	4170			BUSY1N	
3737	0020	G18	LDN		
3740	0007			7	
3741	0102		ATT	100	
3742	0020		LDN		
3743	0017			17	
3744	0202		ATT	200	
3745	0006		BER		
		REM			CHECK TO SEE THAT DATA HAS BEEN
		REM			READ BEFORE COMPARING TO
		REM			EXPECTED DATA
3746	0034		SBN		
3747	0000	G19		0	
3750	0160		ZJP	100	
3751	3737			G18	
3752	0020		LDN		
3753	0003			3	

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3754	0102		ATT	100	
3755	0020		LDN		
3756	0000	G20	REM	0	NUMBERS 0, 1, 40 CHECK INCOMING DATA FOR ERRORS
3757	0335		SBM	300	
3760	1000	G21		INPUT	
3761	0161		NZP	100	
3762	1507			G22	ERROR ROUTINE
3763	0020	G21A	LDN		
3764	0010			10	
3765	0202		ATT	200	
3766	0020		LDN		
3767	0010			10	
3770	0102		ATT	100	
3771	0121		LDM	100	
3772	4136			H3	
3773	0160		ZJP	100	
3774	4054			H3A	
3775	0020		LDN		READ ROUTINE NUMBER 4
3776	0007			7	
3777	0102		ATT	100	
4000	0155		RAO	100	
		REM			UPDATE COUNTERS
4001	3760			G21	
4002	0155		RAO	100	
4003	3747			G19	
4004	0034		SBN		
4005	0236			236	
4006	0161		NZP	100	
4007	3737			G18	
4010	0020		LDN		
4011	0240			240	
4012	0205	G22E	ABX	200	
4013	4012			G22E	
4014	0020		LDN		
4015	0004			4	
4016	0102		ATT	100	
4017	0321		LDM	300	
4020	1236		+236	INPUT	
4021	0034		SBN		
4022	0040			40	
4023	0161		NZP	100	
		REM			GO TO SPECIAL ERROR ROUTINE
4024	2064			G22A	
4025	0020	G22C	LDN		
4026	0004			4	
4027	0102		ATT	100	
4030	0321		LDM	300	
4031	1237		+237	INPUT	
4032	0034		SBN		
4033	0001			1	

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4034	0161		NZP	100	
		REM			
4035	2104			G22B	GO TO SPECIAL ERROR ROUTINE
4036	0020	G22A1	LDN		
4037	0007			7	
4040	0202		ATT	200	
4041	0020		LDN		
4042	0000			0	
		REM			RESTORE COUNTERS TO ORIGINAL SETTING
4043	0241		STM	200	
4044	3760			G21	
4045	0241		STM	200	
4046	3747			G19	
4047	0020		LDN		
4050	0015			15	
4051	0102		ATT	100	
4052	0164		UJP	100	
4053	6555			S4	
4054	0020	H3A	LDN		READ ROUTINE NUMBER 5
4055	0007			7	
4056	0202		ATT	200	
4057	0020		LDN		
4060	0001	H4		1	
4061	0241		STM	200	
4062	3756			G20	
4063	0020		LDN		
4064	0000			0	
4065	0141		STM	100	
4066	4060			H4	
4067	0020		LDN		
4070	0007			7	
4071	0102		ATT	100	
4072	0155		RAO	100	
4073	3760			G21	
4074	0155		RAO	100	
4075	3747			G19	
4076	0034		SBN		
4077	0240			240	
4100	0161		NZP	100	
4101	3737			G18	
4102	0020		LDN		
4103	0000			0	
		REM			RESTORE COUNTERS TO ORIGINAL SETTING
4104	0141		STM	100	
4105	3760			G21	
4106	0141		STM	100	
4107	3747			G19	
4110	0020		LDN		
4111	0040			40	
4112	0141		STM	100	
4113	3756			G20	

4114	0020		LDN		
4115	0010			10	
4116	0102		ATT	100	
4117	0020		LDN		
4120	0001			1	
4121	0141		STM	100	
4122	4060			H4	
4123	0020		LDN		
4124	0004			4	
4125	0102		ATT	100	
4126	0164		UJP	100	
		REM			GO TO SPECIAL ERROR ROUTINE
4127	2200			H4B	
4130	0020	H4A	LDN		
4131	0015			15	
4132	0102		ATT	100	
4133	0164		UJP	100	
4134	6574			S5	
4135	0000	H1			
4136	0001	H3		1	
		REM			
	4142	PRG		4142	
4142	0030	BUSYIA	ADN		BUFFER IS BUSY AND
4143	0001			1	SHOULDN'T BE
4144	0030	BUSYIB	ADN		
4145	0001			1	ROUTINE DETERMINES
4146	0030	BUSYIC	ADN		WHERE BUSY
4147	0001			1	INDICATION OCCURED
4150	0030	BUSYIE	ADN		
4151	0001			1	
4152	0030	BUSYIF	ADN		
4153	0001			1	
4154	0030	BUSYIG	ADN		
4155	0001			1	
4156	0030	BUSYIH	ADN		
4157	0001			1	
4160	0030	BUSYIJ	ADN		
4161	0001			1	
4162	0030	BUSYIK	ADN		
4163	0001			1	
4164	0030	BUSYIL	ADN		
4165	0001			1	
4166	0030	BUSYIM	ADN		
4167	0001			1	
4170	0030	BUSYIN	ADN		
4171	0001			1	
4172	0077		HLT		
4173	0020		LDN		RETRY ROUTINE
4174	0000	BUSY?A		0	JUST COMPLETED
4175	0102		ATT	100	
4176	0164		UJP	100	

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Address	Operation	Mode	Address of Return	Description
4177	BUSY2B		0	ADDRESS OF RETURN
		REM PRG	4200	
4200	PRINTZ	LDN		
4201			15	
4202		ATT	100	
4203		EXF		
4204			7	
4205			0	
4206		INA		
4207		NZP	100	
4210			B1	
4211		OUT		
4212				TABL11B OPERATION TITLE
4213		+24		TABL11B
4214		LDN		
4215			10	
4216		ATT	100	
4217	B1A	INA		
4220		NZP	100	
4221			B1A	
4222		OUT		
4223				TABL12 DATA READ
4224		+34		TABL12 COLS. 1 ---- 40
4225		LDN		
4226			2	ACTUAL ERROR DATA
4227		ATT	300	
4230		OUT	300	
4231				INPUT
4232		+120		INPUT
4233		OTN		
4234			101	
4235	B1C	INA		
4236		NZP	100	
4237			B1C	
4240		OUT		
4241				TABL16 DATA EXPECTED
4242		+34		TABL16 COLS. = 1 = 40
4243		LDN		
4244			17	
4245		ATT	300	
4246		OUT	300	
4247				TABL17 ACTUAL GOOD DATA
4250		+120		TABL17
4251		OTN		
4252			101	
4253	B1F	INA		
4254		NZP	100	
4255			B1F	
4256		OUT		
4257				TABL14 DATA READ

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4260	0304		+34	TABL14 COLS. 41 = 80
4261	0020		LDN	
4262	0002			2
4263	0302		ATT	300
4264	0373		OUT	300
4265	1120		+120	INPUT
4266	1240		+240	INPUT ACTUAL ERROR DATA
4267	0074		OTN	
4270	0101			101
4271	0076	B1H	INA	
4272	0161		NZP	100
4273	4271			B1H
4274	0073		OUT	
4275	0340			TABL18 DATA EXPECTED
4276	0374		+34	TABL18 COLS. 41 = 80
4277	0020		LDN	
4300	0017			17
4301	0302		ATT	300
4302	0373		OUT	300
4303	7640			TABL19 ACTUAL DATA EXPECTED
4304	7760		+120	TABL19
4305	0074		OTN	
4306	0101			101
4307	0020		LDN	
4310	0003	PRTY		3
4311	0102		ATT	100
4312	0020		LDN	TO STATUS
4313	0023			23
4314	0077		HLT	
4315	0164		UJP	100
4316	1700			STA1
4317	0020	XA1	LDN	
		REM		SPECIAL CHECK FOR LACED CARD
		REM		IF ONE ERROR IS FOUND, ROUTINE WILL GO TO PRINT
4320	0010			10
4321	0202		ATT	200
4322	0020		LDN	
4323	0010			10
4324	0102		ATT	100
4325	0321		LDM	300
4326	1000	XX		INPUT
4327	0034		SBN	
4330	0077			77
		REM		CHECK FOR 77 ON TOTAL CARD
4331	0261		NZP	200
4332	4354			XB
4333	0155	XE	RAO	100
4334	4326			XX
4335	0034		SBN	
4336	0240		240	
4337	0161		NZP	100

4340	4317			XA1	
4341	0141		STM	100	
4342	4326			XX	
4343	0141		STM	100	
4344	4370			XC	
4345	0020		LDN		
4346	0014			14	
4347	0102		ATT	100	
4350	0020		LDN		
4351	0000			0	
4352	0164		UJP	100	
4353	6200			SPE2	
4354	0255	XB	RAO	200	
4355	4370			XC	
		REM			ALLOW TWO ERRORS FOR COL. 1
		REM			COL. 1 = 0 AND 5
4356	0034		SBN		
4357	0003		3		
4360	0261		NZP	200	
4361	4333			XE	
4362	0241		STM	200	
4363	4370			XC	
4364	0241		STM	200	
4365	4326			XX	
4366	0264		UJP	200	
4367	4200			PRINTZ	
4370	0000	XC			
		REM			
		PRG			
	4400			4400	
4400	0075	STATUS	EXF		CARD READER
4401	0045			45	
4402	0040			40	
4403	0076		INA		
4404	0341		STM	300	
4405	5700			TEMP1	
4406	0001		SHA		
4407	0001		SHA		
4410	0360		ZJP	300	DELAY ROUTINE
		REM			EXIT IF READER IS READY
4411	5504			READ1	
4412	0014		LSN		
4413	0003			3	
4414	0160		ZJP	100	
4415	4432			EMPTY *	
4416	0001		SHA		
4417	0321		LDM	300	
4420	5700			TEMP1	
4421	0001		SHA		
4422	0014		LSN		
4423	0001			1	
4424	0160		ZJP	100	

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4425	4510		PAUSE1	*
4426	0163		100	
4427	4567	NJP	LATE	*
4430	0164		100	
4431	4652	UJP	BAD	*
		REM		
		REM		
			STATUS ROUTINES OTHER THEN READY FOR HOLLERITH TYPE CARDS	
4432	0075	EMPTY	EXF	
4433	0007		7	
4434	0000		0	
4435	0076		INA	
4436	0161		NZP	
4437	4751		100	
4440	0020		HLT1	
4441	0005		LDN	
4442	0102		5	
4443	0173		ATT	
4444	2610		100	
4445	2746		OUT	
4446	0020		100	
4447	0011		TABL1	
4450	0102		TABL1	
4451	0020		11	
4452	0000		ATT	
4453	0341		LDN	
4454	5701		0	
4455	0075	CHECK1	STM	
4456	0045		300	
4457	0040		TIME1	
4460	0076		45	
4461	0020		40	
4462	0011		INA	
			LDN	
		REM	11	
				INPUT HOPPER EMPTY
4463	0077		HLT	
4464	0164		UJP	
4465	4400		100	
		REM	STATUS	
				THIS PORTION NOT USED

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4466	0002		NOP	
4467	0002		NOP	
4470	0002		NOP	
4471	0002		NOP	
4472	0002		NOP	
4473	0002		NOP	
4474	0002		NOP	
4475	0002		NOP	
4476	0002		NOP	
4477	0002		NOP	
4500	0002		NOP	
4501	0002		NOP	
4502	0002		NOP	
4503	0002		NOP	
4504	0002		NOP	
4505	0002		NOP	
4506	0002		NOP	
4507	0002		NOP	
		REM		THIS PORTION NOT USED
4510	0075	PAUSE1	EXF	
4511	0007			7
4512	0000			0
4513	0076		INA	
4514	0161		NZP	100
4515	4756			HLT2
4516	0020		LDN	
4517	0006			6
4520	0102		ATT	100
4521	0173		OUT	100
		REM		PAUSE SWITCH ON
4522	3000			TABL2
4523	3035	+35		TABL2
4524	0020		LDN	
4525	0011			11
4526	0102		ATT	100
4527	0020		LDN	
4530	0000			0
		REM		RESET COUNTERS
4531	0341		STM	300
4532	5704			TIME4
4533	0341		STM	300
4534	5705			TIMES
4535	0341		STM	300
4536	5706			TIME6
4537	0075	CHECK2	EXF	
4540	0045			45
4541	0040			40
4542	0076		INA	
4543	0014		LSN	
4544	0200			200

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4545	0161	NZP	100
4546	4400		STATUS
4547	0020	LDN	
4550	0010	10	
4551	0077	HLT	
4552	0164	UJP	T1
4553	4510	PAUSE1	
4554	0002	NOP	
4555	0002	NOP	
4556	0002	NOP	
4557	0002	NOP	
4560	0002	NOP	
4561	0002	NOP	
4562	0002	NOP	
4563	0002	NOP	
4564	0002	NOP	
4565	0002	NOP	
4566	0002	NOP	
4567	0075	EXF	

LATE

REM
REM
REM

LATE INPUT REQUEST ROUTINE
OUTPUT ERROR CONDITIONS
TO PRINTER

4570	0007		7
4571	0000		0
4572	0076	INA	
4573	0161	NZP	100
4574	4772		HLT3
4575	0020	LDN	
4576	0006		6
4577	0102	ATT	100
4600	0173	OUT	100
4601	3035		TABL3
4602	3122	+65	TABL3
4603	0020	LDN	
4604	0011		11
4605	0102	ATT	100
4606	0075	EXF	
4607	0007		7
4610	0000		0
4611	0076	INA	
4612	0161	NZP	100
4613	4700		RECK1
4614	0020	LDN	
4615	0001		1
4616	0102	ATT	100
4617	0173	OUT	100
4620	0442		TABL4
4621	0602	+140	TABL4
4622	0020	LDN	
4623	0011		11
4624	0102	ATT	100

TRY2

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4625	0075	TRY3	EXF		
4626	0007			7	
4627	0000			0	
4630	0076		INA		
4631	0161		NZP	100	
4632	4722			RECK2	
4633	0020		LDN		
4634	0001			1	
4635	0102		ATT	100	
4636	0173		OUT	100	
4637	0603			TABL5	
4640	0743		+140	TABL5	
4641	0020		LDN		
4642	0011			11	
4643	0102		ATT	100	
4644	0075		EXF		
4645	0045			45	
4646	0000			0	
		REM			CLEAR CARD READER
4647	0077		HLT		
4650	0164		UJP	100	
4651	4400			STATUS	
4652	0075	BAD	EXF		
		REM			INPUT STATUS FROM CARD READER
4653	0007			7	
4654	0000			0	
4655	0076		INA		
4656	0161		NZP	100	
4657	4763			HLT4	
4660	0020		LDN		
4661	0006			6	
4662	0102		ATT	100	
4663	0173		OUT	100	
4664	3123			TABL6	
4665	3233		+110	TABL6	
4666	0020		LDN		
4667	0011			11	
4670	0102		ATT	100	
4671	0102		ATT	100	
4672	0102		ATT	100	
4673	0321		LDM	300	
4674	5700			TEMP1	
4675	0077		HLT		
4676	0264		UJP	200	
4677	5053			RESET1	
		REM			TIME OUT IF PRINTER GOES NOT READY
		REM			AFTER FIRST PRINT
4700	0355	RECK1	RAO	300	
4701	5707			BECKZ	
4702	0161		NZP	100	
4703	4606			TRY2	

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{CRT-58}

4704	0355		RAO	300	
4705	5710			RECKY	
4706	0161		NZP	100	
4707	4606			TRY2	
4710	0355		RAO	300	
4711	5711			RECKX	
4712	0034		SBN	10	
4713	0010			10	
4714	0161		NZP	100	
4715	4606			TRY2	
4716	0341		STM	300	
4717	5711			RECKX	
4720	0164		UJP	100	
4721	4742			HLT5	
4722	0355	RECK?	RAO	300	
		REM			
		REM			TIME OUT IF PRINTER GOES NOT READY AFTER SECOND PRINT
4723	5712			RECKZ2	
4724	0161		NZP	100	
4725	4625			TRY3	
4726	0355		RAO	300	
4727	5713			RECKY2	
4730	0161		NZP	100	
4731	4625			TRY3	
4732	0355		RAO	300	
4733	5714			RECKX2	
4734	0034		SBN	10	
4735	0010			10	
4736	0161		NZP	100	
4737	4625			TRY3	
4740	0164		UJP	100	
4741	4742			HLT5	
4742	0075	HLT5	EXF		
4743	0007			7	
4744	0000			0	
4745	0076		INA		
		REM			PRINTER NOT READY. RECICLE FOR MORE ERRORS
4746	0077		HLT		
4747	0264		UJP	200	
4750	4772			HLT3	
4751	0020	HLT1	LDN		
4752	0001			1	
4753	0077		HLT		
		REM			INPUT HOPPER EMPTY
4754	0264		UJP	200	
4755	5053			RESET1	
4756	0020	HLT2	LDN		
4757	0002			2	
4760	0077		HLT		
		REM			READER PAUSE SWITCH ON.
4761	0264		UJP	200	

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4762	5053			RESET1	
4763	0075	HLT4	EXF		
4764	0045			45	
4765	0040			40	
4766	0076		INA		
4767	0077		HLT		
4770	0264		REM		ILLEGAL STATUS FROM READER.
4771	5053		UJP	200	
4772	0103	HLT3	TTA	RESET1	
4773	0020	BUFFY	LDN	100	
4774	0001			1	
4775	0302		ATT	300	
4776	0321		LDM	300	
4777	0461	BUFF1		TABL4A	
5000	0204		ABR	200	
5001	5076			BUSY1	
5002	0020	BUFFY1	LDN		
5003	0001			1	
5004	0302		ATT	300	
5005	0321		LDM	300	
5006	0622	BUFF2		TABL5A	
5007	0205		ABX	200	
5010	5111			BUSY2	
5011	0020		LDN		
5012	0013			13	
5013	0302		ATT	300	
5014	0020		LDN		
5015	0003			3	
		REM			COLUMN ERROR.
		REM			BER = DATA READ. BXR = DATA EXPECTED
		REM			CLEAR A REG. TO IGNOR THE REST OF THE CARD
5016	0077		HLT		
5017	0260		ZJP	200	
5020	5033			NEXT1	
5021	0255		REM		UPDATE DATA CHECKING
5022	4777		RAO	200	
5023	0255			BUFF1	
5024	5006		RAO	200	
5025	0355			BUFF2	
5026	5717		RAO	300	
5027	0034			BUFFX	
5030	0120		SBN		
				120	
		REM			CHECK FOR 80 COLS.
5031	0161		NZP	100	
5032	4773			BUFFY	
5033	0221	NEXT1	LDM	200	
5034	4777			BUFF1	
5035	0335		SBM	300	
5036	5717			BUFFX	

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5037	0241		STM	200	
5040	4777			BUFF1	
5041	0221		LDM	200	
5042	5006			BUFF2	
5043	0335		SBM	300	
5044	5717			BUFFX	
5045	0241		STM	200	
5046	5006			BUFF2	
5047	0020		LDN		
5050	0000			0	
5051	0341		STM	300	
5052	5717			BUFFX	
5053	0020	RESET1	LDN		
		REM			RESET COUNTERS
5054	0000			0	
5055	0341		STM	300	
5056	5711			RECKX	
5057	0341		STM	300	
5060	5714			RECKX2	
5061	0341		STM	300	
5062	5703			TIME3	
5063	0341		STM	300	
5064	5706			TIME6	
5065	0341		STM	300	
5066	5730			X	
5067	0341		STM	300	
5070	5731			Y	
5071	0075		EXF		
5072	0045			45	
5073	0000			0	
		REM			CLEAR CARD READER
5074	0164		UJP	100	
5075	4400			STATUS	
5076	0020	BUSY1	LDN		
5077	0013			13	
5100	0302		ATT	300	
5101	0355		RAO	300	
5102	5733			BUS1	
5103	0034		SBN		
5104	0010		10		
5105	0161		NZP	100	
5106	4773			BUFFY	
5107	0264		UJP	200	
5110	5124			HLT6	
5111	0020	BUSY2	LDN		
5112	0013			13	
5113	0302		ATT	300	
5114	0355		RAO	300	
5115	5734			BUS2	
5116	0034		SBN		
5117	0010		10		

{CRT-EL}

5120	0261		NZP	200	
5121	5002			BUFFY1	
5122	0264		UJP	200	
5123	5124			HLT6	
5124	0020	HLT6	LDN		
5125	0006			6	
		REM			BUFFER BUSY AFTER TEN TRYS.
		REM			SHOULD NOT BE BUSY.
5126	0077		HLT		
5127	0007		CBC		
5130	0164		UJP	100	
5131	4773			BUFFY	
5132	0321	READ	LDM	300	
5133	5720			CHANGE	
5134	0261		NZP	200	
5135	5172			COMPAR	
5136	0020		LDN		
5137	0001			1	
5140	0341		STM	300	
5141	5720			CHANGE	
5142	0020		LDN		
5143	0001			1	
5144	0302		ATT	300	
5145	0020		LDN		
		REM			READ FIRST CARD AND USE FOR CARD IMAGE.
5146	0622			622	FWA COMPARE CARD
5147	0204	5A	ABR	200	
5150	5147			5A	
5151	0020		LDN		
5152	0742			742	LWA + 1 COMPARE CARD
5153	0205	5B	ABX	200	
5154	5153			5B	
5155	0075		EXF		
5156	0045			45	
5157	0000			0	
5160	0270	5C	IBI	200	
5161	5160			5C	
5162	0204	5H	ABR	200	
5163	5162			5H	
5164	0007		CBC		
5165	0020		LDN		
5166	0013			13	
5167	0302		ATT	300	
5170	0164		UJP	100	
5171	4400			STATUS	
5172	0020	COMPAR	LDN		
		REM			CARD COMPARE ROUTINE
5173	0001			1	
5174	0302		ATT	300	
5175	0020		LDN		
5176	0461			461	FWA INPUT DATA

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5177	0204	5E	ABR	200	
5200	5177			5E	
5201	0020		LDN		
5202	0601			601	LWA + 1 INPUT DATA
5203	0205	5F	ABX	200	
5204	5203			5F	
5205	0075		EXF		
		REM			SELECT READER
5206	0045			45	
5207	0000			0	
5210	0270	5G	IBI	200	
5211	5226			BUSY3	
5212	0020		LDN		
5213	0013			13	
5214	0102		ATT	100	
5215	0020		LDN		
5216	0000			0	
5217	0141		STM	100	
5220	5735			IBICK	
5221	0020		LDN		
5222	0012			12	
5223	0202		ATT	200	
5224	0264		UJP	200	
5225	5250			COMP1	
5226	0020	BUSY3	LDN		
5227	0013			13	
5230	0102		ATT	100	
5231	0155		RAO	100	
5232	5735			IBICK	
5233	0034		SBN		
5234	0010			10	
5235	0261		NZP	200	
5236	5210			5G	
5237	0020		LDN		
5240	0000			0	
5241	0141		STM	100	
5242	5735			IBICK	
5243	0002		NOP		
5244	0002		NOP		
5245	0002		NOP		
5246	0164		UJP	100	
5247	5476		HLT7		BUFFER BUSY ERROR HLT (IBI)
5250	0006	COMP1	BER		
		REM			COMPARE INCOMING DATA FOR ERRORS
5251	0006	START1	BER		
5252	0034		SBN		
5253	0061	UP3		61	
5254	0260		ZJP	200	
5255	5251			START1	
5256	0263		NJP	200	
5257	5251			START1	

5260	0321		LDM	300	
5261	0461	UP1		TABL4A	
5262	0335		SBM	300	
5263	0622	UP2		TABL5A	
		REM			UPDATE COUNTERS
5264	0261		NZP	200	
5265	5324			ERRORX	
5266	0255		RAO	200	
5267	5263			UP2	
5270	0255		RAO	200	
5271	5261			UP1	
5272	0255		RAO	200	
5273	5253			UP3	
5274	0034		SBN		
5275	0201			201	
5276	0261		NZP	200	
5277	5251			START1	
5300	0020	RED1A	LDN		
		REM			RESET COUNTERS
5301	0061			61	
5302	0241		STM	200	
5303	5253			UP3	
5304	0020		LDN		
5305	0011			11	
5306	0102		ATT	100	
5307	0020		LDN		
5310	0013			13	
5311	0302		ATT	300	
5312	0321		LDM	300	
5313	5715			TABL4Z	
5314	0241		STM	200	
5315	5261			UP1	
5316	0321		LDM	300	
5317	5716			TABL5Z	
5320	0241		STM	200	
5321	5263			UP2	
5322	0164		UJP	100	
5323	4400			STATUS	
5324	0020	ERRORX	LDN		
		REM			ERROR ROUTINE
5325	0210			210	
5326	0205	RED1	ABX	200	
5327	5326			RED1	
5330	0020		LDN		
5331	0013			13	
5332	0302		ATT	300	
5333	0364		UJP	300	
		REM			JUMP TO CHECK FOR LATE INPUT REQUEST
5334	5576			LATE1	
5335	0161	RETURN	NZP	100	
5336	5377		RED2		PRINTER NOT READY

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5337	0020		LDN		
5340	0001			1	
5341	0102		ATT	100	
5342	0173		OUT	100	
5343	0442			TABL4	
		REM			PRINT DATA READ AND EXPECTED
5344	0602		+140	TABL4	
5345	0020	GREEN	LDN		
5346	0011			11	
5347	0102		ATT	100	
5350	0020		LDN		
5351	0013			13	
5352	0302		ATT	300	
5353	0075		EXF		
5354	0007			7	
5355	0000			0	
5356	0076		INA		
5357	0361		NZP	300	
5360	5464			RED3	PRINTER NOT READY
5361	0020		LDN		
5362	0001			1	
5363	0102		ATT	100	
5364	0173		OUT	100	
5365	0603			TABL5	
5366	0743		+140	TABL5	
5367	0020		LDN		
5370	0000			0	
		REM			ERROR HALT. SEE PRINTER FOR RESULTS
5371	0077		HLT		
5372	0020		LDN		
5373	0011			11	
5374	0102		ATT	100	
5375	0264		UJP	200	
5376	5300			RED1A	
5377	0020	RED2	LDN		
		REM			STORE READ AND EXPECTED DATA IN BUFFER REGISTERS
5400	0001			1	
5401	0302		ATT	300	
5402	0020		LDN		
5403	0013			13	
5404	0202		ATT	200	
5405	0321		LDM	300	
5406	0461	UP1A		TABL4A	
5407	0204	RED2A	ABR	200	
5410	5407			RED2A	
5411	0321		LDM	300	
5412	0622	UP2A		TABL5A	
5413	0205	RED2B	ABX	200	
5414	5413			RED2B	
5415	0020		LDN		
5416	0077			77	

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5417	0077		HLT		
5420	0260		ZJP	200	
		REM			UPDATE COUNTERS
5421	5442			RED3A	
5422	0255		RAO	200	
5423	5406			UP1A	
5424	0255		RAO	200	
5425	5412			UP2A	
5426	0020		LDN		
5427	0012			12	
5430	0202		ATT	200	
5431	0020		LDN		
5432	0013			13	
5433	0302		ATT	300	
5434	0355		RAO	300	
5435	5721			UP3A	
5436	0034		SBN		
5437	0120			120	
5440	0361		NZP	300	
5441	5377			RED2	
5442	0020	RED3A	LDN		
		REM			RESET COUNTERS
5443	0013			13	
5444	0302		ATT	300	
5445	0321		LDM	300	
5446	5715			TABL4Z	
5447	0241		STM	200	
5450	5406			UP1A	
5451	0321		LDM	300	
5452	5716			TABL5Z	
5453	0241		STM	200	
5454	5412			UP2A	
5455	0020		LDN		
5456	0012			12	
5457	0202		ATT	200	
5460	0264		UJP	200	
5461	5300			RED1A	
5462	0000	RED3B			
5463	0000	RED3R1			
		REM			PRINTER WENT NOT READY AFTER FIRST OUTPUT
5464	0355	RED3	RAO	300	
5465	5462			RED3B	
5466	0261		NZP	200	
5467	5345			GREEN	
5470	0355		RAO	300	
5471	5463			RED3B1	
5472	0261		NZP	200	
5473	5345			GREEN	
5474	0364		UJP	300	
5475	5377			RED2	
5476	0020	HLT7	LDN		

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5477	0007			7	
5500	0077		HLT		
5501	0007		CBC		
5502	0264		UJP	200	
5503	5172			COMPAR	
5504	0020	READ1	LDN		ZERO OUT INPUT AREA
5505	0001			1	
5506	0102		ATT	100	
5507	0020		LDN		
5510	0000			0	
5511	0141		STM	100	
5512	0461	UPDATE		TABL4A	
5513	0355		RAO	300	
5514	5512			UPDATE	
5515	0034		SBN		
5516	0120			120	
5517	0361		NZP	300	
5520	5504			READ1	
5521	0321		LDM	300	
5522	5715			TABL4Z	
5523	0341		STM	300	
5524	5512			UPDATE	
5525	0020		LDN		DELAY ROUTINE
5526	0017		T74		RANDOM TIMES
5527	0102		ATT	T1	BETWEEN CARD
5530	0121		LDM	T1	PICKING
5531	7777		RANDOM		
5532	0030	REPEAT	REM		GENERATE RANDOM NUMBERS
5533	0037		ADN		
			37		
			REM		ZERO WILL NOT BE USED
5534	0360		ZJP	T3	
5535	5532		REPEAT		
5536	0141		STM	T1	
5537	7777		RANDOM		
5540	0001		SHA		
5541	0151		RAM	T1	
5542	7777		RANDOM		
5543	0010		LPN		
5544	0177		177		
5545	0341		STM	T3	
5546	5724		XAB1		
5547	0355	DELAY1	RAO	T3	
5550	5722		XA		
			REM		DELAY A RANDOM AMOUNT
5551	0034		SBN		
5552	0177		177		
5553	0361		NZP	T3	
5554	5547		DELAY1		
5555	0341		STM	T3	
5556	5722		XA		

5557	0355		RAO	T3	
5560	5723		XAB		
5561	0335		SBM	T3	
5562	5724		XAB1		
5563	0361		NZP	T3	
5564	5547		DELAY1		
5565	0341		STM	T3	
5566	5723		XAB		
5567	0020		LDN		
5570	0011		T44		
5571	0102		ATT	T1	
		REM			UPDATE RANDOM CONSTANT
5572	0355		RAO	T3	
5573	5533		REPEAT	+1	
5574	0264		UJP	T2	
5575	5132		READ		
5576	0020	LATEI	LDN		
5577	0011			T1	
5600	0102		ATT	100	
5601	0007		CBC		
5602	0075		EXF		
		REM			SPECIAL CHECK FOR LATE INPUT REQUEST
5603	0045			45	
5604	0040			40	
5605	0076		INA		
5606	0014		LSN		
5607	0100			100	
5610	0160		ZJP	100	
5611	4567			LATE	
5612	0075	LATE?	EXF		
5613	0007			7	
5614	0000			0	
5615	0076		INA		
5616	0264		UJP	200	
5617	5335			RETURN	
	5700			5700	
		PRG			
5700	0000	TEMP1			
5701	0000	TIME1			
5702	0000	TIME2			
5703	0000	TIME3			
5704	0000	TIME4			
5705	0000	TIME5			
5706	0000	TIME6			
5707	0000	RECKZ			
5710	0000	RECKY			
5711	0000	RECKX			
5712	0000	RECKZ2			
5713	0000	RECKY2			
5714	0000	RECKX2			
5715	0461	TABL4Z		TABL4A	
5716	0622	TABL5Z		TABL5A	

{CRT-B7}

5717 0000 BUFFX
 5720 0000 CHANGE
 5721 0000 UP3A
 5722 0000 XA
 5723 0000 XAB
 5724 0000 XAB1
 5725 0000 XAB2
 5726 0000 XAB3
 5727 0000 XAB4
 5730 0000 X
 5731 0000 Y
 5732 0000 Z
 5733 0000 BUS1
 5734 0000 BUS2
 5735 0000 IBICK

REM
 PRG

6000

{CRT-LAB}

6000	0000	TABL21	0
6001	0000		0
6002	0000		0
6003	0000		0
6004	0000		0
6005	0000		0
6006	0000		0
6007	0000		0
6010	0000		0
6011	0000		0
6012	0001		1
6013	0000		0
6014	0002		2
6015	0000		0
6016	0004		4
6017	0000		0
6020	0010		10
6021	0000		0
6022	0020		20
6023	0000		0
6024	0040		40
6025	0040		40
6026	0000		0
6027	0020		20
6030	0000		0
6031	0010		10
6032	0000		0
6033	0004		4
6034	0000		0
6035	0002		2
6036	0000		0
6037	0001		1
6040	0000		0
6041	0000		0

VARIOUS DATA
 INFORMATION STARTS
 IN COL. NO. 45

{CRT-69}

6042	0001				1
6043	0000				0
6044	0001				1
6045	0040				40
6046	0000				0
6047	0040				40
6050	0000				0
6051	0000				0
6052	0002				2
6053	0000				0
6054	0002				2
6055	0020				20
6056	0000				0
6057	0020				20
6060	0000				0
6061	0000				0
6062	0004				4
6063	0000				0
6064	0004				4
6065	0010				10
6066	0000				0
6067	0010				10
6070	0000				0
6071	0000				0
6072	0010				10
6073	0000				0
6074	0010				10
6075	0004				4
6076	0000				0
6077	0004				4
6100	0000				0
6101	0000				0
6102	0020				20
6103	0000				0
6104	0020				20
6105	0002				2
6106	0000				0
6107	0002				2
6110	0000				0
6111	0000				0
6112	0040				40
6113	0000				0
6114	0040				40
6115	0001				1
6116	0000				0
6117	0001				1
6120	0000				0
	6200	REM			6200
		PRG			
		REM			
6200	0241	SPE2	STM		200
					ZERO OUT FRROR COUNTERS

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{CRT-70}

6201	1665		FLAG1	
6202	0241	STM	200	
6203	1666		FLAG2	
6204	0241	STM	200	
6205	1667		FLAG3	
6206	0241	STM	200	
6207	1670		FLAG4	
6210	0241	STM	200	
6211	1673		FLAG45	
6212	0241	STM	200	
6213	1672		FLAG6	
6214	0020	SPE2B LDN		
6215	0014		14	
6216	0102	ATT	100	
6217	0020	LDN		
6220	0014		14	
6221	0202	ATT	200	
6222	0020	LDN		
6223	0002		2	
6224	0302	ATT	300	
6225	0321	LDM	300	
6226	1000	SPE2A	INPUT	
6227	0034	SBN		
6230	0077		77	
6231	0161	NZP	100	TO PRINT IMPROPER
6232	6340		SPE3	CARD IMAGE ROUTINE
6233	0255	RAO	200	
6234	6226		SPE2A	
6235	0034	SBN		
6236	0240		240	
6237	0261	NZP	200	
6240	6214		SPE2B	
6241	0241	STM	200	
6242	6226		SPE2A	
6243	0075	EXF		
6244	0007		7	
6245	0000		0	
6246	0020	LDN		
6247	0015		15	
6250	0102	ATT	100	
6251	0076	INA		
6252	0161	NZP	100	
6253	6460		SPE7	HLT. ROUTINE
6254	0073	OUT		PRINTER NOT READY
		REM		CARD MOVEMENT FAILURE
6255	0100		TABL11	
6256	0147	+47	TABL11	
6257	0020	LDN		
6260	0014		14	
6261	0102	ATT	100	
		REM		OUTPUT INDICATED TABLES TO PRINTER

[CRT-71]

6262	0076	SPE4	INA	
6263	0161		NZP	100
6264	6262			SPE4
6265	0073		OUT	
6266	0214			TABL12
6267	0242		+26	TABL12
6270	0074	SPE4A	OTN	
6271	0077			77
6272	0255		RAO	200
6273	6336			SPE4A1
6274	0034		SBN	
6275	0117			117
6276	0161		NZP	100
6277	6270			SPE4A
6300	0241		STM	200
6301	6336			SPE4A1 *
6302	0074		OTN	
6303	0101			101
6304	0076	SPE5	INA	
6305	0161		NZP	100
6306	6304			SPE5
6307	0073		OUT	
6310	0250			TABL14
6311	0276		+26	TABL14
6312	0074	SPE5A	OTN	
6313	0077			77
6314	0255		RAO	200
6315	6337			SPE5A1 *
6316	0034		SBN	
6317	0117			117
6320	0161		NZP	100
6321	6312			SPE5A
6322	0241		STM	200
6323	6337			SPE5A1 *
6324	0074		OTN	
6325	0101			101
6326	0020		LDN	
6327	0020			20
6330	0077		HLT	
6331	0020		LDN	
6332	0003			3
6333	0102		ATT	100
6334	0164		UJP	100
6335	1700			STA1
6336	0000	SPE4A1		
6337	0000	SPE5A1		
		REM		READER ERROR
6340	0020	SPE3	LDN	
6341	0015			15
6342	0102		ATT	100
		REM		OUTPUT INDICATED TABLES TO PRINTER

{CRT-72}

6343	0075		EXF	
6344	0007			7
6345	0000			0
6346	0076		INA	
6347	0161		NZP	100
6350	6423		SPE6	HALT ROUTINE PRINTER NOT RDY
6351	0073		OUT	
6352	0147			TBL11A
6353	0170	+21		TBL11A
6354	0020		LDN	
6355	0014			14
6356	0102		ATT	100
6357	0076	SPE3A	INA	
6360	0161		NZP	100
6361	6357			SPE3A
6362	0073		OUT	
6363	0214			TABL12
6364	0242	+26		TABL12
6365	0020		LDN	
6366	0002			2
6367	0302		ATT	300
6370	0373		OUT	300
6371	1000			INPUT
6372	1120	+120		INPUT
6373	0074		OTN	
6374	0101			101
6375	0076	SPE3B	INA	
6376	0161		NZP	100
6377	6375			SPE3B
6400	0073		OUT	
6401	0250			TABL14
6402	0276	+26		TABL14
6403	0020		LDN	
6404	0002			2
6405	0302		ATT	300
6406	0373		OUT	300
6407	1120	+120		INPUT
6410	1240	+240		INPUT
6411	0074		OTN	
6412	0101			101
6413	0020		LDN	
6414	0021			21
6415	0077		HLT	
6416	0020		LDN	
6417	0003			3
6420	0102		ATT	100
6421	0164		UJP	100
6422	1700			STA1
6423	0020	SPE6	LDN	
6424	0002			2
6425	0202		ATT	200

{CRT-73}

6426	0021	SPE6A	LDM	
		REM		
		REM		
		REM		
6427	1000	SPE6C		INPUT
6430	0105		ABX	100
6431	6426			SPE6A
6432	0020		LDN	
6433	0000			0
6434	0105		ABX	100
6435	6426			SPE6A
6436	0020		LDN	
6437	0024			24
6440	0077		HLT	
6441	0160		ZJP	100
6442	6451			SPE6B
6443	0155		RAO	100
6444	6427			SPE6C
6445	0034		SBN	
6446	0240			240
6447	0161		NZP	100
6450	6426			SPE6A
6451	0141	SPE6B	STM	100
6452	6427			SPE6C
6453	0020		LDN	
6454	0003			3
6455	0102		ATT	100
6456	0164		UJP	100
6457	1700			STA1
6460	0020	SPE7	LDN	
6461	0025			25
6462	0077		HLT	
6463	0020		LDN	
6464	0003			3
6465	0102		ATT	100
6466	0164		UJP	100
6467	1700			STA1
		REM		
		PRG		
6500	6500			6500
6500	0020	S1	LDN	
		REM		
		REM		
		REM		
6501	0004			4
6502	0102		ATT	100
6503	0020		LDN	
6504	0003			3
6505	0202		ATT	200
6506	0221		LDM	200
6507	1665			FLAG1
6510	0161		NZP	100

PRINTER NOT READY
LOAD BER AND BXR REGISTERS WITH
EXPECTED AND READ DATA

S1, S2, S3, S4, S5, ARE ROUTINES FOR CHECKING
FOR LESS THEN 5 ERRORS
BINARY CARDS ONLY

{CRT-24}

6511	2240		PRT1	PRINT ERROR 1
6512	0020		LDN	
6513	0003			3
6514	0102		ATT	100
6515	0164		UJP	100
6516	1700			STA1
6517	0020	S2	LDN	
6520	0004			4
6521	0102		ATT	100
6522	0020		LDN	
6523	0003			3
6524	0202		ATT	200
6525	0221		LDM	200
6526	1666			FLAG2
6527	0161		NZP	100
6530	2325		PRT2	PRINT ERROR 2
6531	0020		LDN	
6532	0003			3
6533	0102		ATT	100
6534	0164		UJP	100
6535	1700			STA1
6536	0020	S3	LDN	
6537	0004			4
6540	0102		ATT	100
6541	0020		LDN	
6542	0003			3
6543	0202		ATT	200
6544	0221		LDM	200
6545	1667			FLAG3
6546	0161		NZP	100
6547	2363		PRT3	PRINT 3 ERROR
6550	0020		LDN	
6551	0003			3
6552	0102		ATT	100
6553	0164		UJP	100
6554	1700			STA1
6555	0020	S4	LDN	
6556	0005			5
6557	0102		ATT	100
6560	0020		LDN	
6561	0003			3
6562	0202		ATT	200
6563	0221		LDM	200
6564	1673			FLAG45
6565	0161		NZP	100
6566	2456		PRT45	PRINT 45 ERROR
6567	0020		LDN	
6570	0003			3
6571	0102		ATT	100
6572	0164		UJP	100
6573	1700			STA1

{CRT-75}

6574	0020	S5	LDN		
6575	0005			5	
6576	0102		ATT	100	
6577	0020		LDN		
6600	0003			3	
6601	0202		ATT	200	
6602	0221		LDM	200	
6603	1673			FLAG45	
6604	0161		NZP	100	
6605	2420			PRT5	PRINT ERROR 5
6606	0020		LDN		
6607	0003			3	
6610	0102		ATT	100	
6611	0164		UJP	100	
6612	1700			STA1	
	6640		REM		
			PRG	6640	
6640	0020	B1	LDN		
6641	0002			2	PRINTER NOT READY
6642	0202		ATT	200	SET UP BER AND BXR REGISTERS
6643	0020		LDN		WITH EXPECTED AND READ DATA
6644	0015			15	
6645	0102		ATT	100	
6646	0221		LDM	200	
6647	1000	B2A		INPUT	
6650	0104	B2	ABR	100	
6651	6650			B2	
6652	0020		LDN		
6653	0017			17	
6654	0302		ATT	300	
6655	0321		LDM	300	
6656	7521	B3A	+1	TABL17	
6657	0105	B3	ABX	100	
6660	6657			B3	
6661	0020		LDN		
6662	0022			22	
6663	0077		HLT		
6664	0160		ZJP	100	
6665	6701			B4	
6666	0020		LDN		
6667	0015			15	
6670	0102		ATT	100	
6671	0155		RAO	100	
6672	6656			B3A	
6673	0155		RAO	100	
6674	6647			B2A	
6675	0034		SBN		
6676	0240			240	
6677	0161		NZP	100	
6700	6640			B1	
6701	0020	B4	LDN		

6702	7521	+1	TABL17
6703	0141	STM	100
6704	6656		B3A
6705	0020	LDN	
6706	0000		0
6707	0141	STM	100
6710	6647		B2A
6711	0020	LDN	
6712	0003		3
6713	0102	ATT	100
6714	0164	UJP	100
6715	1700		STA1

	7000	REM	7000	
	0000	PRG	0	VARIOUS DATA
TABL23	0005		5	7 + 9 PUNCH COL NO. 1
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0000		0	
	0052		52	
	0052		52	
	0000		0	
	0000		0	
	0025		25	
	0025		25	
	0000		0	
	0000		0	
	0052		52	
	0052		52	
	0000		0	
	0000		0	
	0025		25	
	0025		25	
	0000		0	
	0000		0	
	0070		70	
	0007		7	
	0000		0	
	0000		0	
	0007		7	

{CRT-7P}

7045	0070	70
7046	0000	0
7047	0000	0
7050	0070	70
7051	0007	7
7052	0000	0
7053	0000	0
7054	0007	7
7055	0070	70
7056	0000	0
7057	0000	0
7060	0070	70
7061	0007	7
7062	0000	0
7063	0000	0
7064	0007	7
7065	0070	70
7066	0000	0
7067	0000	0
7070	0000	0
7071	0000	0
7072	0007	7
7073	0070	70
7074	0070	70
7075	0007	7
7076	0007	7
7077	0070	70
7100	0070	70
7101	0007	7
7102	0007	7
7103	0070	70
7104	0070	70
7105	0007	7
7106	0007	7
7107	0070	70
7110	0070	70
7111	0007	7
7112	0000	0
7113	0000	0
7114	0000	0
7115	0000	0
7116	0000	0
7117	0000	0
7120	0000	0
7121	0000	0
7122	0000	0
7123	0000	0
7124	0000	0
7125	0000	0
7126	0073	73
7127	0067	67

{CRT-77}

{CRT-78}

7130	0052	52
7131	0025	25
7132	0052	52
7133	0025	25
7134	0001	1
7135	0040	40
7136	0000	0
7137	0000	0
7140	0000	0
7141	0000	0
7142	0001	1
7143	0040	40
7144	0002	2
7145	0020	20
7146	0004	4
7147	0010	10
7150	0010	10
7151	0004	4
7152	0020	20
7153	0002	2
7154	0040	40
7155	0001	1
7156	0000	0
7157	0000	0
7160	0001	1
7161	0040	40
7162	0000	0
7163	0000	0
7164	0002	2
7165	0020	20
7166	0000	0
7167	0000	0
7170	0004	4
7171	0010	10
7172	0000	0
7173	0000	0
7174	0010	10
7175	0004	4
7176	0000	0
7177	0000	0
7200	0020	20
7201	0002	2
7202	0000	0
7203	0000	0
7204	0040	40
7205	0001	1
7206	0001	1
7207	0040	40
7210	0000	0
7211	0000	0
7212	0000	0

7213	0000		0
7214	0002		2
7215	0020		20
7216	0000		0
7217	0000		0
7220	0000		0
7221	0000		0
7222	0004		4
7223	0010		10
7224	0000		0
7225	0000		0
7226	0000		0
7227	0000		0
7230	0010		10
7231	0004		4
7232	0000		0
7233	0000		0
7234	0000		0
7235	0000		0
7236	0020		20
7237	0002		2
	7520	REM	
		PRG	7520
7520	0000	TABL17 BLR	120
7640	0000	TABL19 BLR	120

{CRT-79}

{CRT-803}

0001	T04	EQU	1	
0002	T10	EQU	2	
0003	T14	EQU	3	
0004	T20	EQU	4	
0005	T24	EQU	5	
0006	T30	EQU	6	
0007	T34	EQU	7	
0010	T40	EQU	10	
0011	T44	EQU	11	
0012	T50	EQU	12	
0013	T54	EQU	13	
0014	T60	EQU	14	
0015	T64	EQU	15	
0016	T70	EQU	16	
0017	T74	EQU	17	
0100	T1	EQU	100	
0200	T2	EQU	200	
0300	T3	EQU	300	
7777	RANDOM	EQU	7777	
0000	ERR	EQU	0	ERROR STOP
0001	SHA	EQU	1	SHIFT A LEFT ONE BIT
0002	NOP	EQU	2	NO OPERATION
0002	ATT	EQU	2	A TO TAG REGISTER
0003	CLA	EQU	3	CLEAR REGISTER A
0003	TTA	EQU	3	TAG REGISTER TO A
0004	ABR	EQU	4	A TO BUFFER ENTRANCE REGISTER
0005	ABX	EQU	5	A TO BUFFER EXIT REGISTER
0006	BER	EQU	6	CONTENTS OF BER REGISTER TO A
0007	CBC	EQU	7	CLEAR BUFFER CONTROLS
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS
0016	LST	EQU	16	LOGICAL SUM INDIRECT ADDRESS
0020	LUN	EQU	20	LOAD A NO ADDRESS
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT
0030	ADN	EQU	30	ADD NO ADDRESS
0031	ADM	EQU	31	ADD MEMORY ADDRESS
0032	ADI	EQU	32	ADD INDIRECT ADDRESS
0034	SHN	EQU	34	SUBTRACT NO ADDRESS
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS
0041	STM	EQU	41	STORE MEMORY ADDRESS
0042	STI	EQU	42	STORE INDIRECT ADDRESS
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS

0055	RA0	EQU	55	REPLACE ADD ONE MEMORY ADDRESS
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A ZERO
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A NON#ZERO
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A RE POSITIVE
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A RE NEGATIVE
0064	UJP	EQU	64	UNCONDITIONAL JUMP
0070	IBI	EQU	70	INITIATE BUFFER INPUT
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT
0072	INN	EQU	72	INPUT NORMAL
0073	OUT	EQU	73	OUTPUT NORMAL
0074	OTN	EQU	74	OUTPUT, NO ADDRESS
0075	EXF	EQU	75	EXTERNAL FUNCTION
0076	INA	EQU	76	INPUT TO A
0077	HLT	EQU	77	HALT
		SUPB		
0000		END		

-CRT-013-

NUMBER: (T17) CR1

TITLE: Test of 177 Card Reader

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 177

PURPOSE

This program will test the 177 Reader in each mode.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for Section 1
002 for Section 2
004 for Section 3
006 for Section 4

TERMINAL ADDRESS: 265 (destroys locations up to 1637)

Section 1: Single Cycle, H→BCD or binary cards with a 7 and 9-punch in column 1.

- a. H→BCD. Prepare a deck of Hollerith cards with any legal information, all exactly alike. Put 0 in A and start at 000. One card will be read and then a halt will appear at P = 77. Reset run switch and test will continue.
- b. Binary. Prepare a deck of binary cards with any information all exactly alike and with a 7 and 9 punch in column 1. Put a 1 in A and start at 000. When halt appears at P = 77, reset run switch and test will continue.

Section 2: Free Run. Operates like Section 1 but in free run mode and starting address is 002.

Section 3: Single Cycle, Negate. Prepare a deck of binary cards with any information, all exactly alike without a 7 and 9 punch in column 1. Operates like Section 1 but starting address is 004 and no number in A.

Section 4: Free Run, Negate. Just like Section 3 but start at 006.

DESCRIPTION

This program will read and store information from first card, then check all subsequent cards against it.

HALTS

P = 70

Status halt. A = status.

P = 77

End of first card read. Reset
run switch and test will continue.

P = 107

Status halt. A = status.

P = 132

Error in read.

0000	0 64	UJP
0001	212	
0002	0 64	UJP
0003	236	
0004	0 64	UJP
0005	252	
0006	0 64	UJP
0007	260	
0010	113	CIL
0020	113	CIL
0030	113	CIL
0040	113	CIL
0050	075	EXF
0051	0 63	
0052	0 01	
0053	0 20	LDN
0054	0 02	
0055	202	ATT
0056	0 20	LDN
0057	0 03	
0060	302	ATT
0061	075	EXF
0062	0 45	
0063	0 40	
0064	076	INA
0065	076	INA
0066	0 60	ZJP
0067	071	
0070	077	HLT
0071	075	EXF
0072	0 45	
0073	0 02	
0074	272	INN
0075	0 00	
0076	240	
0077	077	HLT
0100	075	EXF
0101	0 45	
0102	0 40	
0103	076	INA
0104	076	INA
0105	0 60	ZJP
0106	110	
0107	077	HLT

0110	020	LDN
0111	000	
0112	041	STM
0113	125	
0114	041	STM
0115	127	
0116	075	EXF
0117	045	
0120	002	
0121	372	INN
0122	000	
0123	240	
0124	221	LDM
0125	000	
0126	335	SBM
0127	000	
0130	060	ZJP
0131	133	
0132	077	HLT
0133	020	LDN
0134	237	
0135	035	SBM
0136	127	
0137	060	ZJP
0140	100	
0141	055	RAO
0142	125	
0143	055	RAO
0144	127	
0145	064	UJP
0146	124	
0147		
0150	020	LDN
0151	002	
0152	041	STM
0153	120	
0154	041	STM
0155	073	
0156	064	UJP
0157	050	
0160	020	LDN
0161	001	
0162	041	STM
0163	120	
0164	020	LDN
0165	002	
0166	041	STM
0167	073	
0170	064	UJP
0171	050	
0172	020	LDN

0173	006	
0174	041	STM
0175	120	
0176	020	LDN
0177	006	
0200	041	STM
0201	073	
0202	064	UJP
0203	050	
0204	020	LDN
0205	005	
0206	041	STM
0207	120	
0210	064	UJP
0211	176	
0212	034	SBN
0213	001	
0214	060	ZJP
0215	222	
0216	020	LDN
0217	117	
0220	041	STM
0221	134	
0222	064	UJP
0223	150	
0224	020	LDN
0225	237	
0226	041	STM
0227	134	
0230	064	UJP
0231	150	
0232	034	SBN
0233	001	
0234	060	ZJP
0235	244	
0236	020	LDN
0237	117	
0240	041	STM
0241	134	
0242	064	UJP
0243	160	
0244	020	LDN
0245	237	
0246	041	STM
0247	134	
0250	064	UJP
0251	160	
0252	020	LDN
0253	237	
0254	041	STM
0255	134	
0256	064	UJP
0257	172	

0260	020	LDN
0261	237	
0262	041	STM
0263	134	
0264	064	UJP
0265	204	

NUMBER: (T18) CR2

TITLE: Test of 177 Card Reader

MINIMUM EQUIPMENT NEEDED:

PURPOSE

This program will test the 177 Reader in every mode.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for Section 1
002 for Section 2
004 for Section 3
006 for Section 4
012 for Section 5
014 for Section 6
016 for Section 7
022 for Section 8

TERMINAL ADDRESS: 1637

Section 1: Status Check. Manually simulate status conditions and a halt will appear at P = 260 with status displayed in A. Reset run switch to continue.

Section 2: Gate Card Check. Use any size deck of Hollerith Cards. When cards are all read, there should be the same number of cards in each stacker.

Section 3: Single Cycle, H → BCD. A deck of Hollerith Cards with information on them as in program from 1400 through 1517 is required.

Section 4: Free Run, H → BCD. Same as Section 3 but start at 006.

Section 5: Single Cycle, Binary. A deck of binary cards with information on them as in program from 1400 to 1637 with a 7 and 9 punch in column 1. Column 2 would contain 6364, etc.

Section 6: Free Run, Binary. Same as Section 5, but start at 014.

Section 7: Single Cycle, Negate. Requires binary cards like in Section 5 except that Column 1 contains no 7 and 9 punch.

Section 8: Free Run, Negate. Same as Section 7, but start at 022.

DESCRIPTION

Each card is read and checked against a stored list according to appropriate mode.

HALTS

P = 70

Status halt. A = status.

P = 113

Error in read.

P = 260

Status halt. A = status, reset run switch.

0000	064	UJP
0001	250	
0002	064	UJP
0003	270	
0004	064	UJP
0005	146	
0006	064	UJP
0007	164	
0010	113	CIL
0011		
0012	064	UJP
0013	176	
0014	064	UJP
0015	214	
0016	064	UJP
0017	226	
0020	113	CIL
0021		
0022	064	UJP
0023	234	
0030	113	CIL
0036	000	
0037	000	
0040	113	CIL
0050	020	LDN
0051	002	
0052	202	ATT
0053	020	LDN
0054	003	
0055	302	ATT
0056	075	EXF
0057	063	
0060	001	
0061	075	EXF
0062	045	
0063	040	
0064	076	INA
0065	076	INA
0066	060	ZJP
0067	071	
0070	077	HLT
0071	075	EXF
0072	045	
0073	002	
0074	020	LDN
0075	002	
0076	041	STM
0077	106	

0100	041	STM
0101	110	
0102	272	INN
0103	000	
0104	240	
0105	221	LDM
0106	002	
0107	335	SBM
0110	002	
0111	060	ZJP
0112	114	
0113	077	HLT
0114	020	LDN
0115	117	
0116	035	SBM
0117	110	
0120	060	ZJP
0121	130	
0122	055	RAO
0123	106	
0124	055	RAO
0125	110	
0126	064	UJP
0127	105	
0130	020	LDN
0131	337	
0132	041	STM
0133	036	
0134	055	RAO
0135	037	
0136	061	NZP
0137	134	
0140	055	RAO
0141	036	
0142	061	NZP
0143	134	
0144	064	UJP
0145	061	
0146	020	LDN
0147	002	
0150	041	STM
0151	073	
0152	020	LDN
0153	130	
0154	041	STM
0155	121	
0156	020	LDN
0157	117	
0160	041	STM
0161	115	
0162	064	UJP
0163	050	
0164	020	LDN
0165	001	
0166	041	STM
0167	073	

0170	020	LDN
0171	074	
0172	041	STM
0173	121	
0174	064	UJP
0175	156	
0176	020	LDN
0177	002	
0200	041	STM
0201	073	
0202	020	LDN
0203	130	
0204	041	STM
0205	121	
0206	020	LDN
0207	237	
0210	041	STM
0211	115	
0212	064	UJP
0213	050	
0214	020	LDN
0215	001	
0216	041	STM
0217	073	
0220	020	LDN
0221	074	
0222	041	STM
0223	121	
0224	064	UJP
0225	206	
0226	020	LDN
0227	006	
0230	041	STM
0231	073	
0232	064	UJP
0233	202	
0234	020	LDN
0235	005	
0236	041	STM
0237	073	
0240	064	UJP
0241	220	
0250	075	EXF
0251	063	
0252	001	
0253	064	UJP
0254	321	
0255	076	INA
0256	060	ZJP
0257	253	

0260	077	HLT
0261	064	UJP
0262	253	
0270	075	EXF
0271	063	
0272	001	
0273	075	EXF
0274	045	
0275	040	
0276	076	INA
0277	076	INA
0300	075	EXF
0301	045	
0302	002	
0303	272	INN
0304	000	
0305	120	
0306	021	LDM
0307	320	
0310	001	SHA
0311	064	UJP
0312	330	
0313	075	EXF
0314	045	
0315	010	
0316	064	UJP
0317	273	
0320	252	
0321	075	EXF
0322	045	
0323	040	
0324	076	INA
0325	064	UJP
0326	255	
0327		
0330	041	STM
0331	320	
0332	063	NJP
0333	273	
0334	064	UJP
0335	313	
0336		
0337		
1400	061	A
1401	062	B
1402	063	C
1403	064	D

1404	065	E
1405	066	F
1406	067	G
1407	070	H
1410	071	I
1411	041	J
1412	042	K
1413	043	L
1414	044	M
1415	045	N
1416	046	O
1417	047	P
1420	050	Q
1421	051	R
1422	022	S
1423	023	T
1424	024	U
1425	025	V
1426	026	W
1427	027	X
1430	030	Y
1431	031	Z
1432	001	1
1433	002	2
1434	003	3
1435	004	4
1436	005	5
1437	006	6
1440	007	7
1441	010	8
1442	011	9
1443	012	10
1444	014	-
1445	034	(
1446	054	*
1447	074	>
1450	021	/
1451	013	=
1452	033	,
1453	053	\$
1454	073	.
1455	060	+
1456	061	A
1457	062	B
1460	063	C
1461	064	D
1462	065	E
1463	066	F
1464	067	G
1465	070	H
1466	071	I
1467	041	J

1470	042	K
1471	043	L
1472	044	M
1473	045	N
1474	046	O
1475	047	P
1476	050	Q
1477	051	R
1500	022	S
1501	023	T
1502	024	U
1503	025	V
1504	026	W
1505	027	X
1506	030	Y
1507	031	Z
1510	001	1
1511	002	2
1512	003	3
1513	004	4
1514	005	5
1515	006	6
1516	007	7
1517	010	8
1520	052	
1521	052	
1522	025	
1523	025	
1524	052	
1525	052	
1526	025	
1527	025	
1530	052	
1531	052	
1532	025	
1533	025	
1534	052	
1535	052	
1536	025	
1537	025	
1540	052	
1541	052	
1542	025	
1543	025	
1544	052	
1545	052	
1546	025	
1547	025	
1550	052	
1551	052	
1552	025	
1553	025	

1554	052
1555	052
1556	025
1557	025
1560	052
1561	052
1562	025
1563	025
1564	052
1565	052
1566	025
1567	025
1570	052
1571	052
1572	025
1573	025
1574	052
1575	052
1576	025
1577	025
1600	052
1601	052
1602	025
1603	025
1604	052
1605	052
1606	025
1607	025
1610	052
1611	052
1612	025
1613	025
1614	052
1615	052
1616	025
1617	025
1620	052
1621	052
1622	025
1623	025
1624	052
1625	052
1626	025
1627	025
1630	052
1631	052
1632	025
1633	025
1634	052
1635	052
1636	025
1637	025

NUMBER: (T19) { CR3 }

TITLE: Timing Test for 177 Card Reader

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 177

PURPOSE

This program will check timing between columns and between cards.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

START ADDRESS: 000

TERMINAL ADDRESS: 376 (destroys locations up through 1117)

Use any deck of Hollerith cards. All cards should end up in secondary stacker except for last one. If 1/2 of cards end up in stacker, then the available time until gate card command is less than 1 1/2 ms.

DESCRIPTION

This program introduces delay between reading columns and between cards to see that an input disconnect does not occur if timing is correct.

HALTS

P = 102

Status halt. Reset run switch.

P = 105

Available time between cards is less than 17 ms.

P = 137

Available time between columns is less than 250 microseconds.

0000	064	UJP
0001	060	
0010	113	CIL
0020	113	CIL
0030	113	CIL
0040	113	CIL
0060	075	EXP
0061	063	
0062	001	
0063	020	LDA
0064	002	
0065	202	ATT
0066	064	UJP
0067	205	
0070	076	INA
0071	076	INA
0072	060	ZJP
0073	110	
0074	034	SBN
0075	010	
0076	060	ZJP
0077	105	
0100	030	ADN
0101	010	
0102	077	HLT
0103	064	UJP
0104	066	
0105	077	HLT
0106	064	UJP
0107	066	
0110	075	EXF
0111	045	
0112	002	
0113	272	INN
0114	000	
0115	012	
0116	020	IDN
0117	367	
0120	041	STM
0121	376	
0122	055	RAO

0123	376	
0124	061	NZP
0125	122	
0126	272	INN
0127	000	
0130	106	
0131	064	UJP
0132	213	
0133	076	INA
0134	076	INA
0135	060	ZJP
0136	142	
0137	077	HLT
0140	064	UJP
0141	131	
0142	075	EXF
0143	045	
0144	002	
0145	020	LDN
0146	327	
0147	041	STM
0150	376	
0151	055	RAO
0152	376	
0153	061	NZP
0154	151	
0155	075	EXF
0156	045	
0157	010	
0160	020	LDN
0161	000	
0162	041	STM
0163	376	
0164	055	RAO
0165	375	
0166	055	RAO
0167	375	
0170	055	RAO
0171	376	
0172	061	NZP
0173	164	
0174	272	INN
0175	000	
0176	120	
0177	075	EXF
0200	045	
0201	010	
0202	064	UJP
0203	066	
0204		

0205	075	EXF
0206	045	
0207	040	
0210	064	UJP
0211	070	
0212		
0213	075	EXF
0214	045	
0215	040	
0216	064	UJP
0217	133	
0220		

0375	0
0376	0

8130/8092/8197 DATA SET CONTROLLER TEST (DS1)

This test can be made to operate in either the Loop Mode with one 8092 and one 8197 or back-to-back with two 8092/8197 Systems. In the Loop Mode, a block of words (000 thru 376) is sent and received simultaneously. When the last word has been received, the data in the receive buffer will be compared with the data sent. In the back-to-back mode, one system will send and the other will receive. When the block has been completed, the system which received last will send to the other.

I. OPERATIONAL PROCEDURE

A.--- RESTRICTIONS

1. Loop Mode

- a. ---The 8197 must be operated in full duplex
- b. The data set can be either full or half duplex. If full duplex, the send and receive lines must be tied together.

2. Back-to-Back Mode (Half Duplex Data Sets)

- a. Both data set controllers can be in either half or full duplex. In full duplex the sending 8092 will also monitor and check its output. If in half duplex, change location 116 to contain 120. The receive side must be started first.

3. Back-to-Back (Full Duplex Data Sets)

- a. Both 8197's and both data sets must be in full duplex. The receive side must be started first.

B. LOADING PROCEDURE

1. Test is loaded from 64 column punched binary cards.

C. PARAMETERS

1. Master clear and enter "A" Register with selected parameter. Selectable parameters are:

000 - Loop Mode Test
200 - Back-to-Back Mode (Receive Side)
100 - Back-to-Back Mode (Send Side)

D. OPTIONAL PARAMETERS

1. Optional Data

- a. To run tests with data other than the standard data (0 -- 376), the following changes should be made:

ADDRESS		DATA	
0155	=	020	
0156	=	XXX	CHARACTER TO BE TRANSFERRED
0164	=	155	

OR

- b. Manually enter desired information into output buffer locations 6000 - 6376 and make the following changes:

0157	=	002
0160	=	002
0163	=	002
0164	=	002

2. Optional Alternate Method of Operation

- a. One system can be made to continuously send to the other for troubleshooting purposes.

Run both systems in loop mode.

1. If half duplex data sets and full duplex data set controllers (8197), change the following locations in one computer only:

ADDRESS		DATA
0125	=	002
0126	=	002
0127	=	002

The computer system without address modification will continue to send to the other.

2. If full duplex data sets and data set controllers, change the following locations in the send system:

ADDRESS		DATA
0116	=	0125

Change the following in the receive system:

ADDRESS		DATA
0125	=	002
0126	=	002
0127	=	002

II. MESSAGES

A. NORMAL MESSAGES

1. Manual interrupt will cause a halt instruction to be placed in location 0337 and the computer will stop after checking the next block of data that is received.
2. In order to make the test run continuously again, enter A 002 in location 0337 and run from P = 340.

B. ERROR MESSAGES

1. A stop will occur at location 0320 when the input buffer is finished and a data error was detected.
 - a. "A" Register = Word count (0-376)
BER Register = Expected data
BXR Register = Received data
 - b. In loop mode if it is noted that there are extra zeros at the beginning of the input buffer, this is an indication that delay y210 is improperly set.
2. Place back in run and the next data word will be checked.
3. To ignore the rest of the data errors, clear "P" Register and set to 0334. Place back in run.

III. DESCRIPTION

There are three portions to this test.

Part A is the Loop Test

Part B is the remote send portion

Part C is the remote receive portion

All three tests will be described in detail below.

A. LOOP TEST

- | | |
|---------|--|
| Send | 1. Select for send operation |
| | 2. Enable interrupt |
| | 3. Reset receive, send, and verify counters |
| Out3 | 4. Generate send pattern |
| | a. Send pattern is numbers 0 - 376 |
| In | 5. Store zeros in receive buffer |
| Wait+1 | 6. Clear interrupt lockout and wait for interrupt |
| | 7. Select status |
| Ckrec-6 | 8. Check for clear to send and send selected |
| | a. Go to number 12 if said status not received |
| Send2 | 9. Load word X |
| Out2 | 10. Output data word |
| | 11. Check for 256 words sent |
| | a. Select stop send if all words sent. Go to 12 |
| Ckrec | 12. Check receive status for word ready and carrier on |
| | 13. Go to step 6 if receive status bits not set |
| Rec | 14. Select to receive data and input into receive buffer |
| | 15. Check for 256 words received |
| | a. Repeat steps 6-15 if more characters to be received |
| Delay | 16. Lockout interrupt, select stop send |
| | 17. Delay to let line settle down |
| | 18. Select resync |
| Verify | 19. Verify data |
| | a. If error, put expected word in buffer entrance register and received word in buffer exit register |
| | b. Halt and display word count in "A" Register. Continue program and "the verify process" will continue until all words are checked. |
| End | 20. Program will halt here after completion of test if manual interrupt switch has been activated |
| End+1 | 21. Check parameter for test to be performed and repeat same test |

B. REMOTE SEND PORTION

- Send1
1. Set send/receive flag for send execution
 2. Do section A steps 1-20
 3. Execute section C

C. REMOTE RECEIVE PORTION

- Recl
1. Clear send/receive flag for receive execution
 2. Execute section A steps 2-20
 3. Execute section B

		REM		DIAGNOSTIC DS1 ED. 0
			ORG	8092/8130/8197/ DATA SET CONTROLLER TEST
	0000	START	0	
	0000		STM	STORE PARAMETER
	0001		PARAM	
	0002		ZJP	IF ZERO, JUMP TO LOOP TEST
	0003		SEND	
	0004		PJP	POSITIVE JUMP TO SEND ROUTINE
	0005		SEND1	
	0006		UJP	NEGATIVE JUMP TO RECEIVE ROUTINE
	0007		RECL	
	0010		LDN	INSERT HALT AT END OF TEST
	0011		77	VIA MANUAL INTERRUPT
	0012		STM	
	0013		END	
	0014		CIL	TI RETURN TO PROGRAM
	0015		0	
	0016		0	
	0017		0	
	0020		HLT	HALT IF INT. 20 OCCURS
	0021		0	
	0022		0	
	0023		0	
	0024		0	
	0025		0	
	0026		0	
	0027		0	
	0030		NOP	
		REM		PROCESS INTERRUPT
	0031		EXF	SELECT STATUS
	0032		36	
	0033		73	
	0034		UJP	
	0035		PASS	
	0036		0	
	0037		0	
	0040		HLT	HALT IF INT. 40 OCCURS
	0041	PASS	INA	
	0042		STM	
	0043		STATUS	STORE STATUS
	0044		LPN	CHECK FOR CLEAR TO SEND
	0045		5	AND WORK REQUEST
	0046		SBN	
	0047		5	
	0050		ZJP	JUMP TO SEND
	0051		SEND2	
	0052	CKREC	LDM	CHECK FOR CARRIER ON AND
	0053		STATUS	WORD READY
	0054		LPN	
	0055		12	
	0056		SBN	

0057	0012		12		
0060	0060		ZJP		JUMP TO RECEIVE
0061	0200		REC		
0062	0013		CIL		
0063	0064	WAIT	UJP		
		REM			WAIT FOR INTERRUPT
0064	0063		WAIT		
0065	0000		0		
0066	0000		0		
0067	0000		0		
0070	0000	PARAM	0		TEST PARAMETER
0071	0000	CONTRD	0		SEND OR RECEIVE CONTROL
0072	0000	VERCNT	0		VERIFY ROUTINE COUNTER
0073	0000	RECCNT	0		RECEIVE COUNTER
0074	0000		0		
0075	0000	IN2	0		LAST DATA WORK INRUT
0076	0000	OUT1	0		SEND COUNTER
0077	0000	STATUS	0		LAST STATUS WORD
0100	0122	SEND2	LDI	T1	GET WORD
0101	0076		OUT1		SEND COUNTER
0102	0041		STM		STORE AT OUTPUT ADDRESS
0103	0105		OUT2		
0104	0074		OTN		OUTPUT DATA
0105	0000	OUT2	0		
0106	0055		RAO		UPDATE COUNTER
0107	0076		OUT1		
0110	0061		NZP		SEND NOT COMPLETED
0111	0052		CKREC		CHECK FOR RECEIVE
0112	0075		EXF		
0113	0036		36		SELECT TO STOP SEND IF SEND COMPLETED
0114	0070		70		
0115	0064		UJP		CHECK RECEIVE FOR REMAINING WORDS
0116	0052		CKREC		
0117	0000		0		
0120	0063	REC1	CLA		
0121	0041		STM		
0122	0071		CONTRD		
0123	0064		UJP		
0124	0130		INTRPT		
0125	0075	SEND	EXF		SELECT SEND
0126	0036		36		
0127	0071		71		
0130	0075	INTRPT	EXF		ENABLE INTERRUPT
0131	0036		36		
0132	0075		75		
0133	0020		LDN		
0134	0014		T60		
0135	0102		ATT	T1	
0136	0020		LDN		
0137	0016		T70		
0140	0202		ATT	T2	

DS1-71

0141	0020		LDN		
0142	0000		0		
		REM			RESET COUNTERS
0143	0041		STM		
0144	0072		VERCNT		VERIFY COUNTER
0145	0041		STM		
0146	0073		RECCNT		RECEIVE COUNTER
0147	0041		STM		
0150	0074		74		
0151	0041		STM		
0152	0075		75		
0153	0041		STM		
0154	0076		OUT1		
0155	0041		STM		
0156	0077		STATUS		
0157	0142	OUT3	STI	T1	STORE PATTERN IN OUTPUT AREA PATTERN IS EQUAL TO 0 THRU 377
		REM			
0160	0076		OUT1		
0161	0055		RAO		
0162	0076		OUT1		
0163	0061		NZP		
0164	0157		OUT3		
0165	0020	IN	LDN		
		REM			ZERO OUT INPUT AREA
0166	0000		0		
0167	0242		STI	T2	
0170	0076		OUT1		
0171	0055		RAO		
0172	0076		OUT1		
0173	0061		NZP		
0174	0165		IN		
0175	0064		UJP		
0176	0062		WAIT	-1	
0177	0000		0		
0200	0075	REC	EXF		SELECT TO RECEIVE DATA
0201	0036		36		
0202	0072		72		
0203	0076		INA		INPUT DATA
0204	0041		STM		
0205	0075		IN2		
0206	0242		STI	T2	
0207	0073		RECCNT		
0210	0055		RAO		
0211	0073		RECCNT		
0212	0061		NZP		
0213	0062		WAIT	-1	
0214	0075		EXF		LOCK OUT INTERRUPT
0215	0036		36		
0216	0074		74		
0217	0075		EXF		SELECT TO STOP SEND
0220	0036		36		

[DS]-B-

{DS1-9}

0221	0070		70		
0222	0055	DELAY	RAO		DELAY1
0223	0074		IN2	-1	
0224	0061		NZP		DELAY TO LET LINE SETTLE DOWN
0225	0222		DELAY		
0226	0055		RAO		DELAY 2
0227	0074		IN2	-1	
0230	0061		NZP		
0231	0226		DELAY	+4	
0232	0075		EXF		SELECT RESYNC
0233	0036		36		
0234	0077		77		
0235	0075		EXF		SELECT STATUS
0236	0036		36		
0237	0073		73		
0240	0076		INA		
0241	0010		LPN		
0242	0010		10		CHECK FOR WORD READY
0243	0060		ZJP		
0244	0300		VARIFY		
0245	0075		EXF		
0246	0036		36		
0247	0072		72		
0250	0076		INA		INPUT DATA AND THROW AWAY
0251	0064		UJP		JUMP TO COMPARE INPUT AND OUTPUT DATA
0252	0300		VARIFY		
	0300		300		
		PRG			VERIFICATION ROUTINE
		REM			
0300	0122	VARIFY	LDI	T1	
0301	0072		VERCNT		
0302	0236		SBI	T2	
0303	0072		VERCNT		
0304	0060		ZJP		
0305	0330		UPDATE		
0306	0122		LDI	T1	PUT SEND WORD IN BER REGISTER
0307	0072		VERCNT		
0310	0004	BUSY1	ABR		
0311	0310		BUSY1		
0312	0222		LDI	T2	PUT RECEIVED WORD IN BXR REGISTER
0313	0072		VERCNT		
0314	0005	BUSY2	ABX		
0315	0314		BUSY2		
0316	0021		LDM		
		REM			A REG. IS EQUAL TO WORD NUMBER INTERROGATEING
		REM			WORDS 0 THRU 376 USED.
0317	0072		VERCNT		
		REM			ERROR HALT. WORD SENT NOT EQUAL TO WORD RECEIVED
0320	0077		HLT		
0321	0064		UJP		
0322	0330		UPDATE		
0323	0000		0		

0324	0000		0	
0325	0000		0	
0326	0000		0	
0327	0000		0	
		REM		UPDATE VERIFY COUNTERS
0330	0055	UPDATE	RAO	
0331	0072		VERCNT	
0332	0061		NZP	
0333	0300		VARIFY	
0334	0075		EXF	LOCKOUT INTERRUPT
0335	0036		36	
0336	0074		74	
0337	0002	END	NOP	
0340	0021		LDM	
0341	0070		PARAM	
0342	0060		ZJP	
0343	0125		SEND	
0344	0021		LDM	
0345	0071		CONTR0	
0346	0061		NZP	
0347	0120		RECI	
0350	0020	SENDI	LDM	
0351	0001		1	
0352	0041		STM	
0353	0071		CONTR0	
0354	0064		UJP	
0355	0125		SEND	

{DS1-10}

0001	T04	EQU	1	
0002	T10	EQU	2	
0003	T14	EQU	3	
0004	T20	EQU	4	
0005	T24	EQU	5	
0006	T30	EQU	6	
0007	T34	EQU	7	
0010	T40	EQU	10	
0011	T44	EQU	11	
0012	T50	EQU	12	
0013	T54	EQU	13	
0014	T60	EQU	14	
0015	T64	EQU	15	
0016	T70	EQU	16	
0017	T74	EQU	17	
0100	T1	EQU	100	
0200	T2	EQU	200	
0300	T3	EQU	300	
7777	RANDOM	EQU	7777	
0000	ERR	EQU	0	ERROR STOP
0001	SHA	EQU	1	SHIFT A LEFT ONE BIT
0002	NOP	EQU	2	NO OPERATION
0002	ATT	EQU	2	A TO TAG REGISTER
0003	CLA	EQU	3	CLEAR REGISTER A
0003	TTA	EQU	3	TAG REGISTER TO A
0004	ABR	EQU	4	A TO BUFFER ENTRANCE REGISTER
0005	ABX	EQU	5	A TO BUFFER EXIT REGISTER
0006	BER	EQU	6	CONTENTS OF BER REGISTER TO A
0007	CBC	EQU	7	CLEAR BUFFER CONTROLS
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS
0020	LDN	EQU	20	LOAD A NO ADDRESS
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT
0030	ADN	EQU	30	ADD NO ADDRESS
0031	ADM	EQU	31	ADD MEMORY ADDRESS
0032	ADI	EQU	32	ADD INDIRECT ADDRESS
0034	SBN	EQU	34	SUBTRACT NO ADDRESS
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS
0041	STM	EQU	41	STORE MEMORY ADDRESS
0042	STI	EQU	42	STORE INDIRECT ADDRESS
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS

0055	RAO	EQU	55	REPLACE ADD ONE MEMORY ADDRESS
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A = ZERO
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A = NON#ZERO
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A ARE POSITIVE
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A ARE NEGATIVE
0064	UJP	EQU	64	UNCONDITIONAL JUMP
0070	IBI	EQU	70	INITIATE BUFFER INPUT
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT
0072	INN	EQU	72	INPUT NORMAL
0073	OUT	EQU	73	OUTPUT NORMAL
0074	OTN	EQU	74	OUTPUT, NO ADDRESS
0075	EXF	EQU	75	EXTERNAL FUNCTION
0076	INA	EQU	76	INPUT TO A
0077	HLT	EQU	77	HALT
		SUPB		
0000		END		

{DSI-12}

8092/8130 SYSTEM INTERRUPT TEST (INT)

This test checks the instruction "Clear Interrupt Lockout" for jumping out of a program sequence and returning to the same address. Interrupts used in conjunction with this instruction are:

MANUAL INTERRUPT	10
BUFFER INTERRUPT	20
EXTERNAL INTERRUPT	30
EXTERNAL INTERRUPT	40

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. Peripheral equipment needed
 - a. 1 - P813 Printer (Buffer Channel)
 - b. 1 - 8197 Data Set Controller)

B. LOADING PROCEDURE

1. Load 64 column punched binary deck.

C. PARAMETERS

1. When initially starting test, enter into the A Register the proper parameter. Parameters are:

000 = INTERRUPT 20 TEST
001 = INTERRUPT 30 or 40 TEST

II. MESSAGES

A. NORMAL MESSAGES

1. Manual interrupt will cause a program halt.

B. ERROR MESSAGES

1. If the interrupt return jump does not execute properly and returns to an improper address, it will cause an error halt. Location 0173 plus tag register #2 is the return address it should have gone to.

2. Error Halts

Address	Comments
0237	Interrupt return jump returned to one or two locations more than it should have
0234	Instruction 113 did not execute an interrupt return jump

3. Stops at the following locations are from buffer busy indications:

Address	Instruction Attempted
0240	ARB (004)
0243	ABX (005)
0246	IBI (070)

4. The current setting of Tag #2 is in address 0236.

III. DESCRIPTION

A. BUFFER INTERRUPT

Update	1. Generate random address and random tag a. Use only addresses 0400 - 7377
Update?	2. Store looping program at generated address
Start	3. Select printer status to see if printer exists
Sixty	4. Set up buffer to input status 10 times a. If buffer busy, error halt
	5. Clear interrupt lockout
	6. Jump to looping routine
0020	7. Buffer interrupt executed
After	8. After looping program to return to update routine

9. Execute clear interrupt lockout return jump
 - a. If return not executed, error halt
 - b. If return to incorrect address, error halt
10. Repeat steps 1-10 unless manual interrupt
 - a. If manual interrupt executed, program halt

E. EXTERNAL INTERRUPT

1. Execute Section A, steps 1 & 2
 2. Select data set for send
 3. Select data set for interrupt on send ready
 4. Clear interrupt lockout and jump to looping program
 5. Interrupt jump executed
 6. Deselect interrupt
 7. Execute Section A, steps 8 & 9
 8. Repeat Section B, steps 1-8
 - a. Halt if manual interrupt
- StartB
- Jump2-2

{INT-4}

```

REM          DIAGNOSTIC INTERRUPT. INT ED. 0
REM          R130 SYSTEM
REM          BUFFER OR EXTERNAL INTERRUPT TEST.
REM          WHEN INITIALLY STARTING
REM          TEST FROM P = 000
REM          ENTER INTO A REG. PROPER
REM          TEST CODE.
REM          INTERRUPT 20 TEST = ZERO
REM          INTERRUPT 30 OR 40 TEST = NON#ZERO
REM          IF PROGRAM STOPS IN OTHER
REM          THEN LISTED LOCATIONS, THE
REM          INTERRUPT RETURN INSTRUCTION (113)
REM          DID NOT EXECUTE PROPERLY.
0000 0000  ORG 0
0000 0041  BNK0
0001 0260  REM STM
0002 0003  BEGIN STARTA +1
0003 0102  CLA
0004 0302  ATT T1
0005 0064  ATT T3
0006 0101  UJP
0007 0002  UPDATE
0010 0002  NOP
0011 0077  NOP
0012 0064  REM HLT
0013 0002  UJP HALT IF MANUAL INTERRUPT
0020 0002  REM BEGIN
0021 0064  PRG RETURN TO BEGINNING
0022 0212  PRG 20
0030 0002  PRG 30
0031 0075  PRG 36
0032 0036  REM 74
0033 0074  UJP
0034 0064  PAUSE
0035 0302  PRG 40
0040 0040  PRG 40
0041 0002  PRG 40
0041 0075  PRG 40
0042 0036  REM EXF
0043 0074  REM 36
0044 0064  UJP 74
0045 0302  PRG 74
0050 0050  PRG PAUSE
          PRG 50
    
```

{5-INT-5}

0050	0000	FIFTY	0	
0051	0000		0	
0052	0000		0	
0053	0000		0	
0054	0000		0	
0055	0000		0	
0056	0000		0	
0057	0000		0	
0060	0020	SIXTY	LDN	SET UP BUFFER TO
0061	0050		50	INPUT STATUS TEN TIMES
0062	0004		ABR	
0063	0240		BUSY1	
0064	0020		LDN	
0065	0060		60	
0066	0005		ABX	
0067	0243		BUSY2	
0070	0021		LDM	
0071	0173		LOC	
0072	0041		STM	
0073	0100		JUMP1	
0074	0070		IBI	
0075	0246		BUSY3	
0076	0013		CIL	
0077	0264		UJP	T2
		REM		JUMP TO RANDOM ADDRESS AND WAIT FOR BUFFER INT.
0100	0000	JUMP1	0	
0101	0020	UPDATE	LDN	GENERATE RANDOM ADDRESS
0102	0017		T74	AND TAG
0103	0302		ATT	T3
0104	0321		LDM	T3
0105	7777		RANDOM	
0106	0030		ADN	
0107	0037		37	
0110	0060		ZJP	
0111	0106		UPDATE	+5
0112	0341		STM	T3
0113	7777		RANDOM	
0114	0001		SHA	
0115	0351		RAM	T3
0116	7777		RANDOM	
0117	0041		STM	
		REM		STORE RANDOM ADDRESS
0120	0173		LOC	
0121	0030		ADN	
0122	0001		1	
0123	0041		STM	
0124	0177		LOC1	
0125	0030		ADN	
0126	0001		1	
0127	0041		STM	
0130	0203		LOC2	

{9-INIT}

0131	0030		ADN		
0132	0001		1		
0133	0041		STM		
0134	0207		LOC3		
0135	0034		SBN		
0136	0003		3		
0137	0001		SHA		
0140	0001		SHA		
0141	0010		LPN		
0142	0016		16		
0143	0061		NZP		
0144	0147		UPDAT1		
0145	0030		ADN		
0146	0001		1		
0147	0041	UPDAT1	STM		
		REM			STORE RANDOM TAG TO BE USED
0150	0236		TAG2		*
0151	0202		ATT	T2	
0152	0003		CLA		
0153	0302		ATT	T3	
0154	0021		LDM		
		REM			CHECK TO SEE THAT THE FOUR RANDOM ADDRESSES BEING
		REM			USED ARE = TO OR LESS THEN THE LAST FOUR
		REM			ADDRESSES IN EACH BANK.
0155	0173		LOC		
0156	0062		PJP		
0157	0170		UPDAT2		
0160	0030		ADN		
0161	0003		3		
0162	0063		NJP		
0163	0170		UPDAT2		
0164	0055		RAO		
		REM			DO NOT USE ADDRESSES GENERATED.
		REM			REGENERATED NEW ADDRESSES
					*
0165	0235		COUNT		
0166	0064		UJP		
0167	0101		UPDATE		
0170	0020	UPDAT2	LDN		
0171	0264		264		(UJP)
0172	0241		STM	T2	
0173	0000	LOC	0		CURRENT RETURN ADDRESS
0174	0021		LDM		BEING USED
0175	0173		LOC		
0176	0241		STM	T2	
0177	0000	LOC1	0		
0200	0020		LDN		
0201	0064		UJP		
0202	0241		STM	T2	
0203	0000	LOC2	0		
0204	0020		LDN		
0205	0237		ERROR1		

{INT-?}

0206	0241		STM	T2	
0207	0000	LOC3	0		
0210	0064		UJP		
0211	0257		STARTA		
0212	0021	ALTER	LDM		SET UP RETURN
0213	0173		LOC		ADDRESS
0214	0041		STM		
0215	0231		ALTER2		
0216	0030		ADN		
0217	0001		1		
0220	0041		STM		
0221	0225		ALTER1		
0222	0020		LDN		
0223	0101		UPDATE		
0224	0241		STM	T2	
0225	0000	ALTER1	0		
0226	0020		LDN		
0227	0064		UJP		
0230	0241		STM	T2	
0231	0000	ALTER2	0		
		REM			RETURN TO RANDOM ADDRESSES
0232	0113		CIL	T1	
0233	0002		NOP		
0234	0077		HLT		NO RETURN AFTER DOING 113 INST.
0235	0000	COUNT			
0236	0000	TAG2	0		CURRENT RANDOM TAG 2 SETTING
0237	0077	ERROR1	HLT		INTERRUPT DID NOT RETURN
		REM			TO PROPER ADDRESS
		REM			INTERRUPT RETURNED TO
		REM			EITHER P + 1 OR P + 2 MORE
		REM			THEN IT SHOULD HAVE.
0240	0077	BUSY1	HLT		BUFFER INDICATES BUSY. SHOULD NOT BE BUSY
0241	0064		UJP		
0242	0060		SIXTY		
0243	0077	BUSY2	HLT		BUFFER INDICATES BUSY. SHOULD NOT BE BUSY
0244	0064		UJP		
0245	0064		SIXTY	+4	
0246	0077	BUSY3	HLT		BUFFER INDICATES BUSY. SHOULD NOT BE BUSY
0247	0064		UJP		
0250	0074		SIXTY	+14	
0251	0075	START	EXF		SELECT P813 PRINTER FOR STATUS
0252	0007		7		
0253	0000		0		
0254	0076		INA		
0255	0064		UJP		
0256	0060		SIXTY		
0257	0020	STARTA	LDN		
0260	0000		0		
		REM			INTERRUPT ROUTINE SELECT
0261	0061		NZP		
0262	0265		STARTB		

{B-INT-B}

0263	0064		UJP	
0264	0251		START	
0265	0021	STARTB	LDM	
0266	0173		LOC	
0267	0041		STM	
0270	0301		JUMP2	
0271	0075		EXF	
		REM		SELECT DATA SET FOR OUTPUT
		REM		OPERATION. USE INTERRUPT
		REM		AND INGNOR OUTPUT OPERATION
0272	0036		36	
0273	0071		71	
0274	0075		EXF	
		REM		SELECT DATA SET FOR INTERRUPT
0275	0036		36	
0276	0075		75	
0277	0013		CIL	
0300	0264		UJP	T2
		REM		JUMP TO RANDOM ADDRESSES AND WAIT FOR EXTERNAL
		REM		INTERRUPT FROM DATA SET CONTROLLER.
0301	0000	JUMP2	0	
0302	0055	PAUSE	RAO	
0303	0314		DELAY	
0304	0061		NZP	
0305	0302		PAUSE	
0306	0055		RAO	
0307	0315		DELAY1	
0310	0061		NZP	
0311	0302		PAUSE	
0312	0064		UJP	
		REM		JUMP TO INTERRUPT RETURN ROUTINE
0313	0212		ALTER	
0314	0000	DELAY		
0315	0000	DELAY1		

[INT-9]

0001	T04	EQU	1	
0002	T10	EQU	2	
0003	T14	EQU	3	
0004	T20	EQU	4	
0005	T24	EQU	5	
0006	T30	EQU	6	
0007	T34	EQU	7	
0010	T40	EQU	10	
0011	T44	EQU	11	
0012	T50	EQU	12	
0013	T54	EQU	13	
0014	T60	EQU	14	
0015	T64	EQU	15	
0016	T70	EQU	16	
0017	T74	EQU	17	
0100	T1	EQU	100	
0200	T2	EQU	200	
0300	T3	EQU	300	
7777	RANDOM	EQU	7777	
0000	ERR	EQU	0	ERROR STOP
0001	SHA	EQU	1	SHIFT A LEFT ONE BIT
0002	NOP	EQU	2	NO OPERATION
0002	ATT	EQU	2	A TO TAG REGISTER
0003	CLA	EQU	3	CLEAR REGISTER A
0003	TTA	EQU	3	TAG REGISTER TO A
0004	ABR	EQU	4	A TO BUFFER ENTRANCE REGISTER
0005	ABX	EQU	5	A TO BUFFER EXIT REGISTER
0006	BER	EQU	6	CONTENTS OF BER REGISTER TO A
0007	CBC	EQU	7	CLEAR BUFFER CONTROLS
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS
0020	LDN	EQU	20	LOAD A NO ADDRESS
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT
0030	ADN	EQU	30	ADD NO ADDRESS
0031	ADM	EQU	31	ADD MEMORY ADDRESS
0032	ADI	EQU	32	ADD INDIRECT ADDRESS
0034	SBN	EQU	34	SUBTRACT NO ADDRESS
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS
0041	STM	EQU	41	STORE MEMORY ADDRESS
0042	STI	EQU	42	STORE INDIRECT ADDRESS
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS

0055	RAO	EQU	55	REPLACE ADD ONE MEMORY	ADDRESS
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A	ZERO
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A	NON#ZERO
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A	RE POSITIVE
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A	RE NEGATIVE
0064	UJP	EQU	64	UNCONDITIONAL JUMP	
0070	IBI	EQU	70	INITIATE BUFFER INPUT	
0071	IHO	EQU	71	INITIATE BUFFER OUTPUT	
0072	INN	EQU	72	INPUT NORMAL	
0073	OUT	EQU	73	OUTPUT NORMAL	
0074	OTN	EQU	74	OUTPUT, NO ADDRESS	
0075	EXF	EQU	75	EXTERNAL FUNCTION	
0076	INA	EQU	76	INPUT TO A	
0077	HLT	EQU	77	HALT	
		SUPB			
0000		END			

{INT-10}

8130/8092/P813 LINE PRINTER TEST (LPT)

This test checks the reliability of the P813 Line Printer to print all characters available in all 136 positions using various printer patterns. It also checks line spacing and format spacing.

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. None

B. LOADING PROCEDURE

1. Load from P = 0000
2. M.C., Load/Clear Switch to Load position, Run/Step Switch to Run position
3. The initial stop is P = 6600
4. Run/Step to neutral position and Load/Clear to neutral position
5. M.C. and Run/Step switch to Run position

C. PARAMETERS

1. At first Halt, enter test parameter. If no parameter is selected, all tests except Test 6 will run. Test parameters are:

TEST 1 Bit 0 = All character test

TEST 2 Bit 1 = All character memory test

TEST 3 Bit 2 = Random character memory test

TEST 4 Bit 3 = Early and/or late hammer test

TEST 5 Bit 4 = Hammer locator plus output same character for all hammers changing characters every line

TEST 6 Bit 5 = Line spacing and channel format tape test

TEST 7 Bit 6 = Suppress paper and overprint test using character H

III. DESCRIPTION

The test is designed to check a P813 Line Printer on an 8130 system. The test will output a series of patterns for visual observation. A detailed description of all tests is given below.

A. Test 1

- | | |
|----------|---|
| Start | 1. Check status |
| | a. Halt if error detected and display status in "A" Register |
| Test1 | 2. Check for test 1 parameter bit |
| Test2Q | a. Go to test 2 (B) if parameter not set |
| Out1+1 | 3. Generate a sequential all character pattern starting with character 00 (External BCD). |
| Test1A | 4. Output 136 character to printer via OTN instruction. |
| Out2+10 | 5. Terminate output and advance paper 1 line. |
| Add35-2 | 6. Generate random number. |
| Out3 | 7. Delay a random amount of time. (Maximum is 500MS). |
| | 8. Repeat 1-7 until 64 lines printed. |
| Add35-7 | 9. Check for 64 lines printed. End printout if said lines printed. |
| Test1C+2 | 10. Advance paper to top of page. |
| Test1C+4 | 11. Check for stop at end of test. |
| Test2Q | 12. Set up return jump from status routine for Test 2. |
| | 13. Jump to status. |

B. Test 2

- | | |
|-----------|--|
| Start | 1. Check status |
| | a. Halt if error and display improper status in "A" Register |
| Test2 | 2. Check for Test 2 parameter bit. |
| Test3Q | a. Go to test 3 (C) if parameter not set |
| Test2A | 3. Output character via OTN instruction |
| | 4. Update output character by 1 |
| Test2B | 5. Repeat steps 3 & 4 until 136 characters have been outputted. |
| | 6. Terminate output and advance paper 1 line |
| Test2E-13 | 7. Update output so that the next line outputted will be the same as previous line except shifted left one character position. |
| | 8. Check for 57 lines printed |
| | a. Repeat items 1-8 until all lines printed |

- Test4E 4. Output X characters
- Test4G+1 5. Reduce output (Test4E) by 1
- Test4I-2 6. Output 136-X characters
- Test4J 7. Increase second output by 1
- * Outputs produce a left shifting pattern one character position per line
- Test 4K 8. Check for 64 lines printed
 - a. Go to statement 12 if 64 lines printed
- Test 4L 9. Terminate output and advance paper 1 line
- 10. Go check status
- 11. Repeat statements 1-8 until all 64 lines printed
- 12. Terminate output and advance paper to top of page
- Test4L-3 13. Check for stop at end of test
- Test5Q 14. Set up return jump from status to test 5
- 15. Jump to status

E. Test 5

- Start 1. Check status
 - a. If error, halt with status in "A" Register
- Test5 2. Check for test 5 parameter
 - a. Go to section F test 6 if parameter not set
- Test5A+3 3. Output Table1A and advance paper

TABLE 1A

The Hammers are vertically located left justified of hammer number indicated

- Test 5B 4. Wait for busy to drop
- Test5B+2 5. Output Table 5B and advance paper

TABLE 5B & TABLE 5C

Every other hammer is indicated by its location number

1	5	9	13	131	135
3	7	11	15	133	

- Test5C+4 6. Wait for busy to drop
- 7. Output Table 5C
- 8. Set up return jump from status to bypass the three tables
- 9. Jump to status
 - a. If error, halt and display status in "A" Register

- Test5F 10. Output same character 136 times
- 11. Update output character by 1
- 12. Terminate print and advance paper 1 line
- Test5H-4 13. Jump to status if all characters not printed and repeat steps 9-12.
- Test5H+3 14. Advance paper to top of page
- 15. Check parameter for stop at end of test
- Test6Q 16. Set up return jump from status for Test 6
- 17. Jump to status

F. Test 6

- 1. Check status
 - a. If error, halt and display status in "A" Register
- Test6 2. Check for Test 6 parameter bit
 - a. Go to Test 7 if parameter bit not set
- Test6Z+9 3. Check for maximum spaces allowed in test
 - a. Maximum = 64
 - b. If maximum exceeded, use 9
- Test6Y 4. Reset line counters
- 5. Set up return jump from status to bypass steps 2, 3 & 4
- Test6A+3 6. Output Table 13

TABLE 13

"This is a line spacing test. There should be XX lines skipped before the next line"

*The above statement is on one printed line. XX will increase by one until the maximum is reached or the set amount of 9

- Test6E 7. Update spacing by 1
- 8. Repeat steps 1, 6, 7, 8 until maximum or set amount of outputs obtained
- 9. Terminate line spacing portion of test
- Test6F 10. Set up return jump from status for Test 6F
- 11. Reset channel testing counters
- Test6J+3 12. Output channel X test
- 13. Update channel test by 1
- 14. Repeat steps 1, 10, 12, 13 until all 7 channels tested
- 15. Terminate test 6F
- Test6X 16. Check for stop at end of Test 6
- Test6S 17. Set up return jump from status for Test 7
- Test6R-2 18. Check status

G. Test 7

1. Check status
 - a. If error, halt and display status in "A" Register
2. Check parameter for Test 7 bit
 - a. Set up return jump from status for Test 1 if parameter bit not set
- Test7A 3. Output the character H to all odd hammers and output blanks to all even hammers
4. Terminate output and suppress spacing
- Test7C 5. Wait for busy to drop
- Test7C+3 6. Output character H to all even hammers and blanks to all odd hammers
7. Terminate output and advance paper 1 line
8. Repeat steps 1-7 until 64 lines printed
- Test7G+3 9. Advance paper to top of page
10. Terminate test
11. Check for stop at end of test
12. Check for stop at end of all tests
- Test7Q 13. Set up return jump from status for test 1
14. Jump to status

REM DIAGNOSTIC LPT ED. 0
 REM 8130 LINE PRINTER DIAGNOSTIC
 REM SEE WRITEUP FOR OPERATIONAL INSTRUCTIONS
 REM AND ERROR STOPS

{LPT-B}

	0000		8NK0		
	0000		ORG	0	
0000	0020	ORIG	LDN		
0001	0001		T04		
0002	0102		ATT	T1	
0003	0164		UJP	T1	
0004	0400		BEGIN		
	0010	PRG	10		
0010	0002		NOP		
0011	0077		HLT		
	0020	PRG	20		
0020	0002		NOP		
0021	0077		HLT		
	0030	PRG	30		
0030	0002		NOP		
0031	0077		HLT		
	0040	PRG	40		
0040	0002		NOP		
0041	0077		HLT		
	0400	PRG	400		
0400	0020	BEGIN	LDN		
0401	0000			0	
0402	0077		HLT		
0403	0141		STM	T1	BITS 0 THRU 6 SELECT TEST
0404	0422			CODE1	TO BE PERFORMED
0405	0020		LDN		
0406	0000			0	
0407	0077		HLT		SELECT TEST OPTIONS
0410	0141		STM	T1	BIT 0= STOP AT END OF TEST
0411	0423			CODE2	BIT 1= STOP AT END OF SECTION
0412	0020	RESET	LDN		
0413	0000			0	
0414	0141		STM	T1	
0415	0520			BUSY1	
0416	0141		STM	T1	
0417	0521			BUSY2	
0420	0164		UJP	T1	
0421	0424			STATUS	
0422	0000	CODE1			
0423	0000	CODE2			
0424	0121	STATUS	LDM	T1	
0425	0422			CODE1	
0426	0161		NZP	T1	
0427	0436			START	
0430	0125		LCM	T1	
0431	0422			CODE1	
0432	0010		LPN		

0433	0137		137	TEST NUMBER 6 (BIT 5) WILL
0434	0141	STM	T1	NOT RUN UNDER ALL TEST
0435	0422		CODE1	RUN MODE
0436	0075	START	EXF	
0437	0007		7	
0440	0000		0	
0441	0076		INA	PRINTER STATUS
0442	0141	STM	T1	BIT 0 = NOT READY
0443	0517		PRTSTA	BIT 1 = BUSY
0444	0160	ZJP	T1	BIT 2 = INTERLOCK NO ACCESS
0445	0550		RUN	BIT 3 = OUT OF PAPER
0446	0163	NJP	T1	
0447	0500		BAD	
0450	0001	SHA		
0451	0163	NJP	T1	
0452	0500		BAD	
0453	0001	SHA		
0454	0163	NJP	T1	
0455	0500		BAD	
0456	0001	SHA		
0457	0163	NJP	T1	
0460	0500		BAD	
0461	0001	SHA		
0462	0163	NJP	T1	
0463	0505		PAPER	
0464	0001	SHA		
0465	0163	NJP	T1	
0466	0512		ACCESS	
0467	0001	SHA		
0470	0163	NJP	T1	
0471	0522		BUSY	
0472	0001	SHA		
0473	0163	NJP	T1	PRINTER STATUS
0474	0543		NOTRDY	ROUTINES
0475	0000	ERR		
0476	0164	UJP	T1	
0477	0436		START	
0500	0121	BAD	LDM	T1 IMPROPER STATUS
0501	0517		PRTSTA	
0502	0077	HLT		
0503	0164	UJP	T1	
0504	0436		START	
0505	0121	PAPER	LDM	T1 OUT OF PAPER
0506	0517		PRTSTA	
0507	0077	HLT		
0510	0164	UJP	T1	
0511	0436		START	
0512	0121	ACCESS	LDM	T1 INTERLOCK BROKEN, NO ACCESS
0513	0517		PRTSTA	
0514	0077	HLT		
0515	0164	UJP	T1	

LPT-9}

0516	0436			START
0517	0000	PRTSTA		
0520	0000	BUSY1		
0521	0000	BUSY2		
0522	0155	BUSY	RAO	T1 DELAY FOR BUSY STATUS
0523	0520			BUSY1
0524	0161		NZP	T1
0525	0436			START
0526	0155		RAO	T1
0527	0521			BUSY2
0530	0034		SBN	
0531	0034			34
0532	0161		NZP	T1
0533	0436			START
0534	0141		STM	T1
0535	0521			BUSY2
0536	0121		LDM	T1
0537	0517			PRTSTA
0540	0077		HLT	PRINTER CONSTANTLY BUSY
0541	0164		UJP	T1
0542	0436			START
0543	0121	NOTRDY	LDM	T1
0544	0517			PRTSTA
0545	0077		HLT	
0546	0164		UJP	T1
0547	0436			START
0550	0020	RUN	LDN	
0551	0000			0
0552	0141		STM	T1
0553	0520			BUSY1
0554	0141		STM	T1
0555	0521			BUSY2
0556	0020		LDN	RETURN JUMP ROUTINE
0557	0001	RJPTG1		T04
0560	0102		ATT	T1
0561	0164		UJP	T1
0562	0700	RJP1		TEST1
0563	0000	TIME13		0
0564	0000	TIME14		0
	0700		PRG	700
0700	0121	TEST1	LDM	T1
0701	0422			CODE1 TEST BITS
0702	0010		LPN	
0703	0001			1
0704	0161		NZP	T1 DO TEST NO 1
0705	0720			TEST1A
0706	0020	TEST2Q	LDN	SET UP RETURN JUMP
0707	0002			T10
0710	0141		STM	T1
0711	0557			RJPTG1
0712	0020		LDN	

LPT-103

{LPT-11}

0713	1060		TEST2
0714	0141	STM	T1
0715	0562		RJP1
0716	0164	UJP	T1
0717	0436		START
0720	0074	TEST1A	OTN
0721	0000	OUT1	0
0722	0155	RAO	T1
0723	0721		OUT1
0724	0034	SBN	100
0725	0100		T1
0726	0161	NZP	T1
0727	0720		TEST1A
0730	0141	STM	T1
0731	0721		OUT1
0732	0155	RAO	T1
0733	0563		TIME13
0734	0034	SBN	
0735	0002		2
0736	0161	NZP	T1
0737	0720		TEST1A
0740	0141	STM	T1
0741	0563		TIME13
0742	0074	TEST1B	OTN
0743	0000	OUT2	0
0744	0155	RAO	T1
0745	0743		OUT2
0746	0034	SBN	
0747	0010		10
0750	0161	NZP	T1
0751	0742		TEST1B
0752	0141	STM	T1
0753	0743		OUT2
0754	0074	OTN	
0755	0101		101
0756	0020	LDN	
0757	0002		T10
0760	0202	ATT	T2
0761	0155	RAO	T1
0762	0564		TIME14
0763	0034	SBN	
0764	0100	100	
0765	0260	ZJP	T2
0766	1037		TEST1C
0767	0020	LDN	
0770	0017		T74
0771	0302	ATT	T3
0772	0321	LDM	T3
0773	7777		RANDOM
0774	0030	ADD35	
0775	0035	ADD36	35

NUMBERS 0-77
CONTINUOUS PATTERN FOR
ONE PAGE

CHECK FOR 64 LINES PRINTED

LPT-123

0776	0160		ZJP	T1	
0777	0774			ADD35	
1000	0341		STM	T3	
1001	7777			RANDOM	RANDOM GENERATOR FOR
1002	0001		SHA		DELAY BETWEEN LINES
1003	0331		ADM	T3	
1004	7777			RANDOM	
1005	0341		STM	T3	
1006	7777			RANDOM	
1007	0010		LPN		
1010	0177			177	
1011	0241		STM	T2	
1012	1030			TIME12	
1013	0155		RAO	T1	
1014	0775			ADD36	
1015	0255	OUT3	RAO	T2	RANDOM DELAY BEFORE CHECKING STATUS
1016	1056			TIME10	
1017	0034		SBN		
1020	0177			177	
1021	0261		NZP	T2	
1022	1015			OUT3	
1023	0241		STM	T2	
1024	1056			TIME10	
1025	0255		RAO	T2	
1026	1057			TIME11	
1027	0034		SBN		
1030	0000	TIME12		0	
1031	0261		NZP	T2	
1032	1015			OUT3	
1033	0241		STM	T2	
1034	1057			TIME11	
1035	0164		UJP	T1	RETURN FOR STATUS CK
1036	0436			START	
1037	0141	TEST1C	STM	T1	
1040	0564			TIME14	
1041	0074		OTN		
1042	0177			177	FORMAT HOMING
1043	0121		LDM	T1	
1044	0423			CODE2	
1045	0010		LPN		
1046	0002			2	
1047	0160		ZJP	T1	
1050	0706			TEST20	
1051	0020		LDN		SELECTIVE STOP
1052	0001			1	
1053	0077		HLT		
1054	0164		UJP	T1	
1055	0706			TEST20	
1056	0000	TIME10			
1057	0000	TIME11			
1060	0020	TEST2	LDN		

{LPT-13}

1061	0001		T04
1062	0102	ATT	T1
1063	0020	LDN	
1064	0002		T10
1065	0202	ATT	T2
1066	0121	LDM	T1 SLIDEING PATTERN
1067	0422		CODE1 NUMBERS 0-77 USED
1070	0010	LPN	
1071	0002		2
1072	0261	NZP	T2
1073	1106		TEST2A DO TEST NUMBER 2
1074	0020	TEST3Q LDN	
1075	0002	T10	SET UP RETURN JUMP
1076	0141	STM	T1
1077	0557		RJPTG1
1100	0020	LDN	
1101	1177		TEST3
1102	0141	STM	T1
1103	0562		RJP1
1104	0164	UJP	T1
1105	0436	START	CHECK STATUS
1106	0074	TEST2A OTN	
1107	0000	OUT4	
1110	0255	RAO	0
1111	1107		T2
1112	0034	SBN	OUT4
1113	0100		100
1114	0260	ZJP	T2
1115	1156		TEST2C
1116	0255	TEST2B RAO	T2
1117	1162		OUT5
1120	0034	SBN	
1121	0210		210
1122	0261	NZP	T2
1123	1106		TEST2A
1124	0241	STM	T2
1125	1162		OUT5
1126	0074	OTN	
1127	0101	101	ADVANCE PAPER 1 LINE
1130	0020	LDN	
1131	0370		370
1132	0251	RAM	T2
1133	1107		OUT4
1134	0255	RAO	T2
1135	1163		OUT6
1136	0034	SBN	
1137	0071		71
1140	0161	NZP	T1
1141	0436	START	RETURN FOR STATUS
1142	0241	STM	T2
1143	1163		OUT6

1144	0076	TEST2F	INA		
1145	0261		NZP	T2	
1146	1144			TEST2F	
1147	0074		OTN		
1150	0177		177		FORMAT HOMEING
1151	0003		CLA		
1152	0241		STM	T2	
1153	1107			OUT4	
1154	0264		UJP	T2	
1155	1164			TEST2D	
1156	0241	TEST2C	STM	T2	
1157	1107			OUT4	
1160	0264		UJP	T2	
1161	1116			TEST2B	
1162	0000	OUT5			CHARACTER COUNTER
1163	0000	OUT6			LINE COUNTER
1164	0121	TEST2D	LDM	T1	CHECK FOR STOP
1165	0423			CODE2	
1166	0010		LPN		
1167	0002			2	
1170	0260		ZJP	T2	
1171	1074			TEST3Q	
1172	0020		LDN		
1173	0002			2	
1174	0077		HLT		SELECTIVE STOP TEST 2
1175	0264		UJP	T2	
1176	1074			TEST3Q	
1177	0020	TEST3	LDN		
1200	0001			T04	
1201	0102		ATT	T1	
1202	0020		LDN		
1203	0002			T10	
1204	0202		ATT	T2	
1205	0121		LDM	T1	
1206	0422			CODE1	
1207	0010		LPN		
1210	0004			4	
1211	0261		NZP	T2	
1212	1225			TEST3A	
1213	0020	TEST4Q	LDN		SET UP RETURN JUMP
1214	0003			T14	
1215	0141		STM	T1	
1216	0557			RJPTG1	
1217	0020		LDN		
1220	1410			TEST4	
1221	0141		STM	T1	
1222	0562			RJP1	
1223	0164		UJP	T1	
1224	0436			START	
1225	0020	TEST3A	LDN		BUILD RANDOM PATTERN
1226	0017			T74	FOR TABL 1E TEST 3

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1227	0302		ATT	T3	
1230	0321		LDM	T3	
1231	7777			RANDOM	
1232	0030	TEST3B	ADN		
1233	0037	TEST3P		37	
1234	0260		ZJP	T2	
1235	1232			TEST3B	
1236	0341		STM	T3	
1237	7777			RANDOM	
1240	0001		SHA		
1241	0331		ADM	T3	
1242	7777			RANDOM	
1243	0341		STM	T3	
1244	7777			RANDOM	
1245	0255		RAO	T2	
1246	1233			TEST3P	
1247	0020		LDN		
1250	0014			T60	TABLIE 6000
1251	0102		ATT	T1	
1252	0321		LDM	T3	
1253	7777			RANDOM	
1254	0010		LPN		
1255	0077			77	
1256	0141		STM	T1	
1257	6000	TEST3C		TABLIE	
1260	0255		RAO	T2	
1261	1257			TEST3C	
1262	0034		SBN		
1263	0210			210	
1264	0261		NZP	T2	
1265	1225			TEST3A	
1266	0020		LDN		
1267	6000			TABLIE	
1270	0241		STM	T2	
1271	1257			TEST3C	
1272	0020	TEST3E	LDN		TEST 3 SHIFTS A
1273	0001			T04	
1274	0102		ATT	T1	
1275	0020		LDN		
1276	0014			T60	RANDOM DATA LINE. ONE
1277	0302		ATT	T3	CHARACTER PER PRINT
1300	0373		OUT	T3	CYCLE.
1301	6000	TEST3F		TABLIE	FIRST OUTPUT CYCLE
1302	6210	TEST3G	*210	TABLIE	
1303	0255		RAO	T2	
1304	1301			TEST3F	
1305	0235		SBM	T2	
1306	1302			TEST3G	
1307	0261		NZP	T2	
1310	1315			TEST3H	
1311	0020		LDN		

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1312	6000			TABL1E	
1313	0241		STM	T2	
1314	1301			TEST3F	
1315	0221	TEST3H	LDM	T2	
1316	1323			TEST3K	
1317	0260		ZJP	T2	
1320	1324			TEST3J	
1321	0373		OUT	T3	SECOND OUTPUT CYCLE
1322	6000			TABL1E	
1323	6000	TEST3K		TABL1E	
1324	0255	TEST3J	RAO	T2	
1325	1323			TEST3K	
1326	0034		SBN		
1327	0210			210	
1330	0261		NZP	T2	
1331	1344			TEST3I	
1332	0241		STM	T2	
1333	1323			TEST3K	
1334	0255		RAO	T2	
1335	1374			LINES3	
1336	0034		SBN		
1337	0100			100	
1340	0261		NZP	T2	
1341	1375			TEST3M	
1342	0264		UJP	T2	
1343	1352			END3	
1344	0255	TEST3I	RAO	T2	
1345	1374			LINES3	
1346	0034		SBN		
1347	0100			100	
1350	0261		NZP	T2	
1351	1375			TEST3M	
1352	0241	END3	STM	T2	
1353	1374			LINES3	
1354	0074		OTN		END OF TEST 3
1355	0177			177	
1356	0020		LDN		
1357	0001			T04	
1360	0102		ATT	T1	
1361	0121		LDM	T1	
1362	0423			CODE2	
1363	0010		LPN		
1364	0002			2	
1365	0260		ZJP	T2	
1366	1213			TEST4Q	
1367	0020		LDN		
1370	0003			3	
1371	0077		HLT		SELECTIVE STOP TEST 3
1372	0264		UJP	T2	
1373	1213			TEST4Q	
1374	0000	LINES3			LINE COUNTER

{LPT-17}

1375	0020	TEST3M	LDN		
1376	0001			T04	
1377	0102		ATT	T1	
1400	0074		OTN		
1401	0101			I01	
1402	0020		LDN		
1403	1272			TEST3E	
1404	0141		STM	T1	
1405	0562			RJP1	
1406	0164		UJP	T1	
1407	0436			START	
1410	0020	TEST4	LDN		
1411	0001			T04	
1412	0102		ATT	T1	
1413	0020		LDN		
1414	0003			T14	
1415	0202		ATT	T2	
1416	0020		LDN		
1417	0014			T60	TABLIE
1420	0302		ATT	T3	
1421	0121		LDM	T1	
1422	0422			CODE1	
1423	0010		LPN		
1424	0010			I0	
1425	0261		NZP	T2	
1426	1441			TEST4A	
1427	0020	TEST5Q	LDN		SET UP RETURN JUMP
1430	0003			T14	
1431	0141		STM	T1	
1432	0557			RJPTG1	
1433	0020		LDN		
1434	1565			TEST5	
1435	0141		STM	T1	
1436	0562			RJP1	
1437	0164		UJP	T1	
1440	0436			START	
1441	0020	TEST4A	LDN		OUTPUT CONSISTS OF
1442	0045			45	THIS DATA SLIDING
1443	0341		STM	T3	NOPQMMMM ECT.
1444	6000			TABLIE	
1445	0020		LDN		
1446	0046			46	
1447	0341		STM	T3	
1450	6001		*1	TABLIE	
1451	0020		LDN		
1452	0047			47	
1453	0341		STM	T3	
1454	6002		*2	TABLIE	
1455	0020		LDN		
1456	0050			50	
1457	0341		STM	T3	

1460	6003		+3	TABL1E	
1461	0020	TEST4B	LDN		
1462	0044			44	
1463	0341		STM	T3	
1464	6004	TEST4C	+4	TABL1E	
1465	0255		RAO	T2	
1466	1464			TEST4C	
1467	0034		SBN		
1470	0210			210	
1471	0261		NZP	T2	
1472	1461			TEST4B	
1473	0030		ADN		
1474	0004			4	
1475	0241		STM	T2	
1476	1464			TEST4C	
1477	0373	TEST4E	OUT	T3	FIRST OUTPUT
1500	6000	TEST4F		TABL1E	
1501	6210	TEST4G	+210	TABL1E	
1502	0255		RAO	T2	
1503	1500			TEST4F	
1504	0235		SBM	T2	
1505	1501			TEST4G	
1506	0261		NZP	T2	
1507	1514			TEST4H	
1510	0020		LDN		
1511	6000			TABL1E	
1512	0241		STM	T2	
1513	1500			TEST4F	
1514	0221	TEST4H	LDM	T2	
1515	1522			TEST4I	
1516	0260		ZJP	T2	
1517	1523			TEST4J	
1520	0373		OUT	T3	SECOND OUTPUT
1521	6000			TABL1E	
1522	6000	TEST4I		TABL1E	
1523	0255	TEST4J	RAO	T2	
1524	1522			TEST4I	
1525	0034		SBN		
1526	0210			210	
1527	0261		NZP	T2	
1530	1533			TEST4K	
1531	0241		STM	T2	
1532	1522			TEST4I	
1533	0255	TEST4K	RAO	T2	
1534	1564			LINES4	
1535	0034		SBN		
1536	0100			100	
1537	0261		NZP	T2	
1540	1560			TEST4L	
1541	0241		STM	T2	
1542	1564			LINES4	

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{LPT-19}

1543	0074		OTN	
1544	0177			177
1545	0121		LDM	T1
1546	0423			CODE2
1547	0010		LPN	
1550	0002			2
1551	0260		ZJP	T2
1552	1427			TEST5Q
1553	0020		LDN	
1554	0004			4
1555	0077		HLT	SELECTIVE STOP TEST 4
1556	0264		UJP	T2
1557	1427			TEST5Q
1560	0074	TEST4L	OTN	ADVANCE PAPER ONE LINE
1561	0101			101
1562	0164		UJP	T1
1563	0436			START
1564	0000	LINES4		0
1565	0020	TEST5	LDN	LINE COUNTER
1566	0001			TEST5 IS AN
1567	0102		T04	OUTPUT OF ALL HAMMERS
1570	0020		ATT	T1
1571	0003		LDN	SAME CHARACTER USING
1572	0202			T14
1573	0121		ATT	T2
1574	0422		LDM	T1
1575	0010		CODE1	CHARACTERS 0-77
1576	0020		LPN	PLUS A HAMMER LOCATER
1577	0261			20
1600	1613		NZP	T2
1601	0020	TEST6Q		TEST5A
1602	0004		LDN	RETURN JUMP
1603	0141			T20
1604	0557		STM	T1
1605	0020			RJPTG1
1606	2123		LDN	
1607	0141			TEST6
1610	0562		STM	T1
1611	0164			RJP1
1612	0436		UJP	T1
1613	0020	TEST5A		START
1614	0012		LDN	
1615	0302			T50
1616	0373		ATT	T3
1617	5000		OUT	T3
1620	5152			TABL1A
1621	0076	TEST5B	+152	TABL1A
1622	0261		INA	
1623	1621		NZP	T2
1624	0373			TEST5B
1625	5152		OUT	T3
				TABL1B

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1626	5363		+211	TABL1B	
1627	0076	TEST5C	INA		
1630	0261		NZP	T2	
1631	1627			TEST5C	
1632	0020		LDN		
1633	0013			T54	
1634	0302		ATT	T3	
1635	0373		OUT	T3	
1636	5400			TABL1C	
1637	5611		+211	TABL1C	
1640	0020		LDN		
1641	1647			TEST5D	
1642	0141		STM	T1	
1643	0562			RJP1	
1644	0164		UJP	T1	
1645	0436			START	
1646	0000	TEST5E			
1647	0020	TEST5D	LDN		
1650	0001			T04	
1651	0102		ATT	T1	
1652	0074	TEST5F	OTN		
1653	0000	TEST5G		0	NUMBERS 0 THRU 77 USED
1654	0255		RAO	T2	
1655	1646			TEST5E	
1656	0034		SBN		
1657	0210			210	
1660	0261		NZP	T2	
1661	1652			TEST5F	
1662	0241		STM	T2	
1663	1646			TEST5E	
1664	0074		OTN		
1665	0101			101	
1666	0255		RAO	T2	
1667	1653			TEST5G	
1670	0034		SBN		
1671	0100			100	
1672	0161		NZP	T1	
1673	0436			START	
1674	0241		STM	T2	
1675	1653			TEST5G	
1676	0076	TEST5H	INA		
1677	0261		NZP	T2	
1700	1676			TEST5H	
1701	0074		OTN		
1702	0177			177	
1703	0121		LDM	T1	
1704	0423			CODE2	
1705	0010		LPN		
1706	0002			2	
1707	0260		ZJP	T2	
1710	1601			TEST60	

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1711	0020		LDN		
1712	0005			5	
1713	0077		HLT		SELECTIVE STOP TEST 5
1714	0264		UJP	T2	
1715	1601			TEST6Q	
1716	0020	TEST6Z	LDN		
1717	0003			T14	TEST SIX IS
1720	0102		ATT	T1	A FORMAT + LINE
1721	0020		LDN		SPACING TEST
1722	0015			T64	
1723	0302		ATT	T3	
1724	0020		LDN		
1725	0004			T20	
1726	0202		ATT	T2	
1727	0121		LDM	T1	
1730	1755			TEST6B	
1731	0163		NJP	T1	
1732	1756			TEST6C	
1733	0034		SBN		
1734	0070			70	
1735	0162		PJP	T1	
1736	1756			TEST6C	
1737	0020	TEST6Y	LDN		
1740	0000			0	
1741	0341		STM	T3	
1742	6526		+52	TBL13	
1743	0020		LDN		
1744	0000			0	ZERO
1745	0341		STM	T3	
1746	6525		+51	TBL13	
1747	0020		LDN		
1750	0101			101	
1751	0341		STM	T3	
1752	6573			LNS	
1753	0164		UJP	T1	
1754	1764			TEST6H	
1755	0012	TEST6B		12	
1756	0020	TEST6C	LDN		
1757	0012			12	
1760	0141		STM	T1	
1761	1755			TEST6B	
1762	0164		UJP	T1	
1763	1737			TEST6Y	
1764	0121	TEST6H	LDM	T1	
1765	1755			TEST6B	
1766	0241		STM	T2	
1767	2175			TEST6K	
1770	0020		LDN		
1771	0001			T04	
1772	0102		ATT	T1	
1773	0020		LDN		

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1774	2005		TEST6A
1775	0141	STM	T1
1776	0562		RJP1
1777	0020	LDN	
2000	0004		T20
2001	0141	STM	T1
2002	0557		RJPTG1
2003	0264	UJP	T2
2004	2005		TEST6A
2005	0020	TEST6A LDN	
2006	0001		T04
2007	0102	ATT	T1
2010	0373	OUT	T3
2011	6454		TBL13
2012	6574	+120	TBL13
2013	0355	RAO	T3
2014	6526	+52	TBL13
2015	0034	SBN	
2016	0012		12
2017	0261	NZP	T2
2020	2037		TEST6E
2021	0020	LDN	
2022	0000		0
2023	0341	STM	T3
2024	6526	+52	TBL13
2025	0355	RAO	T3
2026	6525	+51	TBL13
2027	0034	SBN	
2030	0012		12
2031	0261	NZP	T2
2032	2037		TEST6E
2033	0020	LDN	
2034	0001		1
2035	0341	STM	T3
2036	6525	+51	TBL13
2037	0355	TEST6E RAO	T3
2040	6573		LNS
2041	0221	LDM	T2
2042	2175		TEST6K
2043	0034	SBN	
2044	0001		1
2045	0241	STM	T2
2046	2175		TEST6K
2047	0161	NZP	T1
2050	0436		START
2051	0020	LDN	
2052	0060		60
2053	0341	STM	T3
2054	6525	+51	TBL13
2055	0341	STM	T3
2056	6526	+52	TBL13

LINE SPACING TEST

{LPT-23}

2057	0020	TEST6F	LDN		
2060	0001			T04	
2061	0102		ATT	T1	
2062	0020		LDN		
2063	2057			TEST6F	
2064	0141		STM	T1	
2065	0562			RJP1	
2066	0020		LDN		
2067	0000	TEST6L		0	
2070	0341		STM	T3	
2071	6452		-2	TBL13	
2072	0020		LDN		
2073	0170	TEST6J		170	
2074	0241		STM	T2	
2075	2102			TEST6G	
2076	0373		OUT	T3	CHANNEL TEST
2077	6400			TBL15	
2100	6453		+53	TBL15	
2101	0074		OTN		
2102	0170	TEST6G		170	
2103	0255		RAO	T2	
2104	2073			TEST6J	
2105	0255		RAO	T2	
2106	2067			TEST6L	
2107	0034		SBN		
2110	0010			10	
2111	0161		NZP	T1	
2112	0436			START	
2113	0241		STM	T2	
2114	2067			TEST6L	
2115	0020		LDN		
2116	0170			170	
2117	0241		STM	T2	
2120	2073			TEST6J	
2121	0264		UJP	T2	
2122	2137			TEST6X	
2123	0020	TEST6	LDN		
2124	0001			T04	
2125	0102		ATT	T1	
2126	0020		LDN		
2127	0004			T20	
2130	0202		ATT	T2	
2131	0121		LDM	T1	
2132	0422			CODE1	TEST BITS
2133	0010		LPN		
2134	0040			40	
2135	0261		NZP	T2	
2136	2170			TEST6R	
2137	0121	TEST6X	LDM	T1	
2140	0423			CODE2	
2141	0010		LPN		

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2142	0002		2	
2143	0260	ZJP	T2	
2144	2150		TEST6V	
2145	0020	LDN		
2146	0006		6	
2147	0077	HLT		SELECTIVE STOP TEST 6
2150	0121	TEST6V	LDM	T1
2151	0423			CODE2
2152	0010		LPN	
2153	0001			1
2154	0260	ZJP	T2	
2155	2156			TEST6S
2156	0020	TEST6S	LDN	
2157	0004		T20	
2160	0141		STM	T1
2161	0557			RJPTG1
2162	0020		LDN	
2163	2176		TEST7	
2164	0141		STM	T1
2165	0562			RJP1
2166	0164		UJP	T1
2167	0436			START
2170	0020	TEST6R	LDN	
2171	0003			T14
2172	0202		ATT	T2
2173	0264		UJP	T2
2174	1716			TEST6Z
2175	0000	TEST6K		
2176	0020	TEST7	LDN	
2177	0001		T04	
2200	0102		ATT	T1
2201	0020		LDN	
2202	0004		T20	
2203	0202		ATT	T2
2204	0121		LDM	T1
2205	0422		CODE1	
2206	0010		LPN	
2207	0100			100
2210	0261		NZP	T2
2211	2226		TEST7A	
2212	0264		UJP	T2
2213	2313		TEST7F	
2214	0020	TEST7Q	LDN	
2215	0001		T04	
2216	0141		STM	T1
2217	0557		RJPTG1	
2220	0020		LDN	
2221	0700		TEST1	
2222	0141		STM	T1
2223	0562		RJP1	
2224	0164		UJP	T1

TEST 7 OUTPUTS CHARACTER H
TO ALL ODD HAMMERS, THEN TO
ALL EVEN HAMMERS

LPT-25J

2225	0436		START	
2226	0074	TEST7A	OTN	OUTPUT H TO
2227	0030		30	ODD HAMMERS
2230	0074		OTN	
2231	0060		60	
2232	0255		RAO	T2
2233	2327		TEST7B	
2234	0034		SBN	
2235	0104		104	
2236	0261		NZP	T2
2237	2226		TEST7A	
2240	0241		STM	T2
2241	2327		TEST7B	
2242	0074		OTN	
2243	0100		100	
2244	0076	TEST7C	INA	
2245	0261		NZP	T2
2246	2244		TEST7C	
2247	0074		OTN	OUTPUT H TO EVEN HAMMERS
2250	0060		60	
2251	0074		OTN	
2252	0030		30	
2253	0255		RAO	T2
2254	2327		TEST7B	
2255	0034		SBN	
2256	0104		104	
2257	0261		NZP	T2
2260	2247		TEST7C	+3
2261	0241		STM	T2
2262	2327		TEST7B	
2263	0074		OTN	
2264	0101		101	
2265	0255		RAO	T2
2266	2326		TEST7E	
2267	0034		SBN	
2270	0100		100	
2271	0161		NZP	T1
2272	0436		START	
2273	0241		STM	T2
2274	2326		TEST7E	
2275	0076	TEST7G	INA	
2276	0261		NZP	T2
2277	2275		TEST7G	
2300	0074		OTN	FORMAT HOMING
2301	0177		177	
2302	0121		LDM	T1
2303	0423		CODE2	
2304	0010		LPN	
2305	0002		2	
2306	0260		ZJP	T2
2307	2313		TEST7F	

2310	0020		LDN		
2311	0007		7		
2312	0077		HLT		SELECTIVE STOP TEST SEVEN
2313	0121	TEST7F	LDM	T1	
2314	0423		CODE2		
2315	0010		LPN		
2316	0001		1		
2317	0260		ZJP	T2	
2320	2214		TEST7Q		
2321	0020		LDN		
2322	0077		77		
2323	0077		HLT		SELECTIVE STOP END OF ALL TESTS
2324	0264		UJP	T2	
2325	2214		TEST7Q		
2326	0000	TEST7E			LINE COUNTER
2327	0000	TEST7B			CHARACTER COUNTER
	5000	PRG		5000	TABL 1A
5000	0063	TABL1A		63	T
5001	0030			30	H
5002	0025			25	E
5003	0060			60	BLANK
5004	0030			30	H
5005	0021			21	A
5006	0044			44	M
5007	0044			44	M
5010	0025			25	E
5011	0051			51	R
5012	0062			62	S
5013	0060			60	BLANK
5014	0021			21	A
5015	0051			51	R
5016	0025			25	E
5017	0060			60	BLANK
5020	0065			65	V
5021	0025			25	F
5022	0051			51	R
5023	0063			63	T
5024	0031			31	I
5025	0023			23	C
5026	0021			21	A
5027	0043			43	L
5030	0043			43	L
5031	0070			70	Y
5032	0060			60	BLANK
5033	0043			43	L
5034	0046			46	O
5035	0023			23	C
5036	0021			21	A
5037	0063			63	T
5040	0025			25	E
5041	0024			24	D

{LPT-2B}

{LPT-27}

5042	0060	60	BLANK
5043	0031	31	I
5044	0045	45	N
5045	0060	60	BLANK
5046	0043	43	L
5047	0031	31	I
5050	0045	45	N
5051	0025	25	E
5052	0060	60	BLANK
5053	0066	66	W
5054	0031	31	I
5055	0063	63	T
5056	0030	30	H
5057	0060	60	BLANK
5060	0063	63	T
5061	0030	30	H
5062	0025	25	E
5063	0060	60	BLANK
5064	0026	26	F
5065	0031	31	I
5066	0051	51	R
5067	0062	62	S
5070	0063	63	T
5071	0060	60	BLANK
5072	0024	24	D
5073	0031	31	I
5074	0027	27	G
5075	0031	31	I
5076	0063	63	T
5077	0060	60	BLANK
5100	0043	43	L
5101	0025	25	E
5102	0026	26	F
5103	0063	63	T
5104	0060	60	BLANK
5105	0041	41	J
5106	0064	64	U
5107	0062	62	S
5110	0063	63	T
5111	0031	31	I
5112	0026	26	F
5113	0031	31	I
5114	0025	25	E
5115	0024	24	D
5116	0060	60	BLANK
5117	0046	46	O
5120	0026	26	F
5121	0060	60	BLANK
5122	0030	30	H
5123	0021	21	A
5124	0044	44	M

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5125	0044		44	M
5126	0025		25	E
5127	0051		51	R
5130	0060		60	BLANK
5131	0045		45	N
5132	0064		64	U
5133	0044		44	M
5134	0022		22	B
5135	0025		25	E
5136	0051		51	R
5137	0060		60	BLANK
5140	0031		31	I
5141	0045		45	N
5142	0024		24	D
5143	0031		31	I
5144	0023		23	C
5145	0021		21	A
5146	0063		63	T
5147	0025		25	E
5150	0024		24	D
5151	0101		101	FORMS ADVANCE
	5152	PRG	5152	TABL 18
5152	0001	TABL18	1	
5153	0060		60	BLANK
5154	0060		60	
5155	0060		60	
5156	0005		5	
5157	0060		60	
5160	0060		60	
5161	0060		60	
5162	0011		11	
5163	0060		60	
5164	0060		60	
5165	0060		60	
5166	0001		1	
5167	0003		3	
5170	0060		60	
5171	0060		60	
5172	0001		1	
5173	0007		7	
5174	0060		60	
5175	0060		60	
5176	0002		2	
5177	0001		1	
5200	0060		60	
5201	0060		60	
5202	0002		2	
5203	0005		5	
5204	0060		60	
5205	0060		60	
5206	0002		2	

5207	0011	11
5210	0060	60
5211	0060	60
5212	0003	3
5213	0003	3
5214	0060	60
5215	0060	60
5216	0003	3
5217	0007	7
5220	0060	60
5221	0060	60
5222	0004	4
5223	0001	1
5224	0060	60
5225	0060	60
5226	0004	4
5227	0005	5
5230	0060	60
5231	0060	60
5232	0004	4
5233	0011	11
5234	0060	60
5235	0060	60
5236	0005	5
5237	0003	3
5240	0060	60
5241	0060	60
5242	0005	5
5243	0007	7
5244	0060	60
5245	0060	60
5246	0006	6
5247	0001	1
5250	0060	60
5251	0060	60
5252	0006	6
5253	0005	5
5254	0060	60
5255	0060	60
5256	0006	6
5257	0011	11
5260	0060	60
5261	0060	60
5262	0007	7
5263	0003	3
5264	0060	60
5265	0060	60
5266	0007	7
5267	0007	7
5270	0060	60
5271	0060	60

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5272	0010	10
5273	0001	1
5274	0060	60
5275	0060	60
5276	0010	10
5277	0005	5
5300	0060	60
5301	0060	60
5302	0010	10
5303	0011	11
5304	0060	60
5305	0060	60
5306	0011	11
5307	0003	3
5310	0060	60
5311	0060	60
5312	0011	11
5313	0007	7
5314	0060	60
5315	0060	60
5316	0001	1
5317	0000	0
5320	0001	1
5321	0060	60
5322	0001	1
5323	0000	0
5324	0005	5
5325	0060	60
5326	0001	1
5327	0000	0
5330	0011	11
5331	0060	60
5332	0001	1
5333	0001	1
5334	0003	3
5335	0060	60
5336	0001	1
5337	0001	1
5340	0007	7
5341	0060	60
5342	0001	1
5343	0002	2
5344	0001	1
5345	0060	60
5346	0001	1
5347	0002	2
5350	0005	5
5351	0060	60
5352	0001	1
5353	0002	2
5354	0011	11

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5355	0060		60	
5356	0001		1	
5357	0003		3	
5360	0003		3	
5361	0060		60	
5362	0101		101	ADVANCE PAPER
	5400	PRG	5400	TABL 1C
5400	0060	TABL1C	60	
5401	0060		60	
5402	0003		3	
5403	0060		60	
5404	0060		60	
5405	0060		60	
5406	0007		7	
5407	0060		60	
5410	0060		60	
5411	0060		60	
5412	0001		1	
5413	0001		1	
5414	0060		60	
5415	0060		60	
5416	0001		1	
5417	0005		5	
5420	0060		60	
5421	0060		60	
5422	0001		1	
5423	0011		11	
5424	0060		60	
5425	0060		60	
5426	0002		2	
5427	0003		3	
5430	0060		60	
5431	0060		60	
5432	0002		2	
5433	0007		7	
5434	0060		60	
5435	0060		60	
5436	0003		3	
5437	0001		1	
5440	0060		60	
5441	0060		60	
5442	0003		3	
5443	0005		5	
5444	0060		60	
5445	0060		60	
5446	0003		3	
5447	0011		11	
5450	0060		60	
5451	0060		60	
5452	0004		4	
5453	0003		3	

{LPT-31}

5454	0060	60
5455	0060	60
5456	0004	4
5457	0007	7
5460	0060	60
5461	0060	60
5462	0005	5
5463	0001	1
5464	0060	60
5465	0060	60
5466	0005	5
5467	0005	5
5470	0060	60
5471	0060	60
5472	0005	5
5473	0011	11
5474	0060	60
5475	0060	60
5476	0006	6
5477	0003	3
5500	0060	60
5501	0060	60
5502	0006	6
5503	0007	7
5504	0060	60
5505	0060	60
5506	0007	7
5507	0001	1
5510	0060	60
5511	0060	60
5512	0007	7
5513	0005	5
5514	0060	60
5515	0060	60
5516	0007	7
5517	0011	11
5520	0060	60
5521	0060	60
5522	0010	10
5523	0003	3
5524	0060	60
5525	0060	60
5526	0010	10
5527	0007	7
5530	0060	60
5531	0060	60
5532	0011	11
5533	0001	1
5534	0060	60
5535	0060	60
5536	0011	11

{LPT-32}

LPT-333

5537	0005		5	
5540	0060		60	
5541	0060		60	
5542	0011		11	
5543	0011		11	
5544	0060		60	
5545	0060		60	
5546	0001		1	
5547	0000		0	
5550	0003		3	
5551	0060		60	
5552	0001		1	
5553	0000		0	
5554	0007		7	
5555	0060		60	
5556	0001		1	
5557	0001		1	
5560	0001		1	
5561	0060		60	
5562	0001		1	
5563	0001		1	
5564	0005		5	
5565	0060		60	
5566	0001		1	
5567	0001		1	
5570	0011		11	
5571	0060		60	
5572	0001		1	
5573	0002		2	
5574	0003		3	
5575	0060		60	
5576	0001		1	
5577	0002		2	
5600	0007		7	
5601	0060		60	
5602	0001		1	
5603	0003		3	
5604	0001		1	
5605	0060		60	
5606	0003		3	
5607	0005		5	
5610	0101		101	FORMS ADVANCE
	6000	PRG	6000	
6000	0000	TABL1E BLR	354	
	6400	PRG	6400	
6400	0063	TBL15	63	T
6401	0030		30	H
6402	0031		31	I
6403	0062		62	S
6404	0060		60	
6405	0031		31	I

{LPT-34}

6406	0062	62	S
6407	0060	60	
6410	0021	21	A
6411	0060	60	
6412	0023	23	C
6413	0030	30	H
6414	0021	21	A
6415	0045	45	N
6416	0045	45	N
6417	0025	25	E
6420	0043	43	L
6421	0060	60	
6422	0062	62	S
6423	0047	47	P
6424	0021	21	A
6425	0023	23	C
6426	0031	31	I
6427	0045	45	N
6430	0027	27	G
6431	0060	60	
6432	0063	63	T
6433	0025	25	E
6434	0062	62	S
6435	0063	63	T
6436	0060	60	
6437	0046	46	O
6440	0045	45	N
6441	0060	60	
6442	0023	23	C
6443	0030	30	H
6444	0021	21	A
6445	0045	45	N
6446	0045	45	N
6447	0025	25	E
6450	0043	43	L
6451	0060	60	
6452	0000	0	O
6453	0060	60	
6454	0063	63	T
6455	0030	30	H
6456	0031	31	I
6457	0062	62	S
6460	0060	60	
6461	0031	31	I
6462	0062	62	S
6463	0060	60	
6464	0021	21	A
6465	0060	60	
6466	0062	62	S
6467	0047	47	P
6470	0021	21	A

TBL13

6471	0023	23	C
6472	0031	31	I
6473	0045	45	N
6474	0027	27	G
6475	0060	60	
6476	0063	63	T
6477	0025	25	E
6500	0062	62	S
6501	0063	63	T
6502	0033	33	.
6503	0060	60	
6504	0060	60	
6505	0063	63	T
6506	0030	30	H
6507	0025	25	E
6510	0051	51	R
6511	0025	25	E
6512	0060	60	
6513	0062	62	S
6514	0030	30	H
6515	0046	46	O
6516	0064	64	U
6517	0043	43	L
6520	0024	24	D
6521	0060	60	
6522	0022	22	B
6523	0025	25	E
6524	0060	60	
6525	0060	60	
6526	0060	60	
6527	0060	60	
6530	0043	43	L
6531	0031	31	I
6532	0045	45	N
6533	0025	25	E
6534	0062	62	S
6535	0060	60	
6536	0062	62	S
6537	0042	42	K
6540	0031	31	I
6541	0047	47	P
6542	0047	47	P
6543	0025	25	E
6544	0024	24	D
6545	0060	60	
6546	0022	22	B
6547	0025	25	E
6550	0026	26	F
6551	0046	46	O
6552	0051	51	R
6553	0025	25	E

{LPT-35}

6554	0060			60	
6555	0063			63	T
6556	0030			30	H
6557	0025			25	E
6560	0060			60	
6561	0045			45	N
6562	0025			25	E
6563	0067			67	X
6564	0063			63	T
6565	0060			60	
6566	0043			43	L
6567	0031			31	I
6570	0045			45	N
6571	0025			25	E
6572	0033			33	:
6573	0000	LNS			
	0300		PRG	300	
0300	0000	TBL11	BLR	7	
	0007	INT	EQU	7	
	0000	EXEC	EQU	0	

{LPT-36}

{LPT-37}

0001	T04	EQU	1	
0002	T10	EQU	2	
0003	T14	EQU	3	
0004	T20	EQU	4	
0005	T24	EQU	5	
0006	T30	EQU	6	
0007	T34	EQU	7	
0010	T40	EQU	10	
0011	T44	EQU	11	
0012	T50	EQU	12	
0013	T54	EQU	13	
0014	T60	EQU	14	
0015	T64	EQU	15	
0016	T70	EQU	16	
0017	T74	EQU	17	
0100	T1	EQU	100	
0200	T2	EQU	200	
0300	T3	EQU	300	
7777	RANDOM	EQU	7777	
0000	ERR	EQU	0	ERROR STOP
0001	SHA	EQU	1	SHIFT A LEFT ONE BIT
0002	NOP	EQU	2	NO OPERATION
0002	ATT	EQU	2	A TO TAG REGISTER
0003	CLA	EQU	3	CLEAR REGISTER A
0003	TTA	EQU	3	TAG REGISTER TO A
0004	ABR	EQU	4	A TO BUFFER ENTRANCE REGISTER
0005	ABX	EQU	5	A TO BUFFER EXIT REGISTER
0006	BER	EQU	6	CONTENTS OF BER REGISTER TO A
0007	CHC	EQU	7	CLEAR BUFFER CONTROLS
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS
0020	LDN	EQU	20	LOAD A NO ADDRESS
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT
0030	ADN	EQU	30	ADD NO ADDRESS
0031	ADM	EQU	31	ADD MEMORY ADDRESS
0032	ADI	EQU	32	ADD INDIRECT ADDRESS
0034	SBN	EQU	34	SUBTRACT NO ADDRESS
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS
0041	STM	EQU	41	STORE MEMORY ADDRESS
0042	STI	EQU	42	STORE INDIRECT ADDRESS
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS

0055	RA0	EQU	55	REPLACE ADD ONE MEMORY ADDRESS
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A = ZERO
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A = NON#ZERO
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A ARE POSITIVE
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A ARE NEGATIVE
0064	UJP	EQU	64	UNCONDITIONAL JUMP
0070	IBI	EQU	70	INITIATE BUFFER INPUT
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT
0072	INN	EQU	72	INPUT NORMAL
0073	OUT	EQU	73	OUTPUT NORMAL
0074	OTN	EQU	74	OUTPUT, NO ADDRESS
0075	EXF	EQU	75	EXTERNAL FUNCTION
0076	INA	EQU	76	INPUT TO A
0077	HLT	EQU	77	HALT
		SUPB		
0000		END		COMPLETE ASSEMBLY

{LPT-38}

NUMBER: {T23A} LPI

TITLE: Test of Line Printer 166-2

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 166-2

PURPOSE

This program will test the Line Printer in the synchronous and in the asynchronous mode (for 64 characters drum #46M39).

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: P = 000; A = 0 for 3 sections
P = 000; A = 1 for section 1 only
P = 000; A = 2 for section 2 only
P = 000; A = 3 for section 3 only
P = 366; A = X for section 4
P = 002 for section 5

TERMINAL ADDRESS: 1173 (destroys contents of locations up to 1367)

Section 4: Put a number in A representing the number of spaces (X) desired between lines (e.g., 1 gives single spacing). Start this section at P = 366. The printout will look like Section 1, but with the selected spacing.

NOTE: To restore Section 1 to single spacing, put 20 in location 136.

Section 5: Status check. Start at P = 002. A will display the status code.

HALTS

P = 122	Status halts.
P = 200	A = status
P = 666	Illegal spacing code was entered in A in Section 4. Restart. (Numbers 1 through 7 are legal.)

DESCRIPTION

Sections 1, 2 and 3 will operate in the single spacing format. Section 4 changes Section 1 to operate in other formats depending on number put in A. After Section 4 is used, put a 20 in location 136 to restore Section 1 to single space operation.

0000	064	UJP
0001	050	
0002	075	EXF
0003	063	
0004	001	
0005	064	UJP
0006	011	
0007		
0010	113	CLI
0011	075	EXF
0012	007	
0013	040	
0014	076	INA
0015	076	INA
0016	064	UJP
0017	011	
0020	113	CLI
0021	063	NJP
0022	103	
0023	064	UJP
0024	147	
0025		
0026		
0027		
0030	113	CLI
0031	000	
0032	000	
0033	000	
0034	000	
0035	000	
0036	000	
0037		
0040	113	CLI
0041	055	RAO
0042	032	
0043	034	SBN
0044	100	
0045	013	NOP
0046	064	UJP
0047	021	
0050	041	STM
0051	376	
0052	034	SBN
0053	001	
0054	063	NJP
0055	066	
0056	060	ZJP
0057	066	
0060	034	SBN
0061	001	
0062	060	ZJP
0063	155	
0064	064	UJP

0065	234	
0066	075	EXF
0067	063	
0070	001	
0071	020	LDN
0072	001	
0073	102	ATT
0074	020	LDN
0075	002	
0076	202	ATT
0077	020	
0100	000	
0101	041	STM
0102	032	
0103	020	LDN
0104	200	
0105	041	STM
0106	033	
0107	222	LDI
0110	032	
0111	242	STI
0112	033	
0113	075	EXF
0114	007	
0115	040	
0116	076	INA
0117	076	INA
0120	164	UJP
0121	270	
0122	077	HLT
0123	055	RAO
0124	033	
0125	034	SBN
0126	370	
0127	063	NJP
0130	107	
0131	064	UJP
0132	134	
0133	077	HLT
0134	075	EXF
0135	007	
0136	020	
0137	075	EXF
0140	007	
0141	000	
0142	273	OUT
0143	200	
0144	370	
0145	064	UJP
0146	041	
0147	021	LDM
0150	376	
0151	034	SBN

0152	001	
0153	060	ZJP
0154	066	
0155	020	LDN
0156	000	
0157	041	STM
0160	210	
0161	020	LDN
0162	170	
0163	041	STM
0164	211	
0165	020	LDN
0166	001	
0167	102	ATT
0170	075	EXF
0171	063	
0172	001	
0173	075	EXF
0174	007	
0175	040	
0176	064	UJP
0177	353	
0200	077	HLT
0201	075	EXF
0202	007	
0203	020	
0204	075	EXF
0205	007	
0206	000	
0207	173	OUT
0210	000	
0211	170	
0212	021	LDM
0213	210	
0214	034	SBN
0215	060	
0216	062	PJP
0217	226	
0220	055	RAO
0221	210	
0222	055	RAO
0223	211	
0224	064	UJP
0225	173	
0226	021	LDM
0227	376	
0230	034	SBN
0231	002	
0232	060	ZJP
0233	155	
0234	020	LDN
0235	002	
0236	102	ATT
0237	020	LDN

0324	003	
0325	060	ZJP
0326	234	
0327	064	UJP
0330	066	
0331		
0332		
0333	141	STM
0334	173	
0335	020	LDN
0336	000	
0337	041	STM
0340	310	
0341	020	LDN
0342	073	
0343	041	STM
0344	314	
0345	064	UJP
0346	247	
0347		
0350		
0351		
0352		
0353	076	INA
0354	076	INA
0355	164	UJP
0356	300	
0357	076	INA
0360	010	LPN
0361	032	
0362	060	ZJP
0363	260	
0364	064	UJP
0365	200	
0366	041	STM
0367	031	
0370	020	LDN
0371	001	
0372	102	ATT
0373	164	UJP
0374	250	
0375	000	
0376	000	
0377		
0400	061	A
0401	062	B
0402	063	C
0403	064	D
0404	065	E
0405	066	F
0406	067	G
0407	070	H

0410	071	I
0411	041	J
0412	042	K
0413	043	L
0414	044	M
0415	045	N
0416	046	O
0417	047	P
0420	050	Q
0421	051	R
0422	022	S
0423	023	T
0424	024	U
0425	025	V
0426	026	W
0427	027	X
0430	030	Y
0431	031	Z
0432	000	0
0433	001	1
0434	002	2
0435	003	3
0436	004	4
0437	005	5
0440	006	6
0441	007	7
0442	010	8
0443	011	9
0444	073	.
0445	040	-
0446	060	+
0447	013	=
0450	034	(
0451	074)
0452	021	/
0453	054	*
0454	033	,
0455	014	≠
0456	053	\$
0457	012	0
0460	061	A
0461	062	B
0462	063	C
0463	064	D
0464	065	E
0465	066	F
0466	067	G
0467	070	H
0470	071	I
0471	041	J
0472	042	K

0473	043	L
0474	044	M
0475	045	N
0476	046	O
0477	047	P
0500	050	Q
0501	051	R
0502	022	S
0503	023	T
0504	024	U
0505	025	V
0506	026	W
0507	027	X
0510	030	Y
0511	031	Z
0512	000	0
0513	001	1
0514	002	2
0515	003	3
0516	004	4
0517	005	5
0520	006	6
0521	007	7
0522	010	8
0523	011	9
0524	073	.
0525	040	-
0526	060	+
0527	013	=
0530	034	(
0531	074)
0532	021	/
0533	054	*
0534	033	,
0535	014	≠
0536	053	\$
0537	012	0
0540	031	Z
0541	030	Y
0542	027	X
0543	026	W
0544	025	V
0545	024	U
0546	023	T
0547	022	S
0550	051	R
0551	050	Q
0552	047	P
0553	046	O
0554	045	N
0555	044	M
0556	043	L
0557	042	K

0560	041	J
0561	071	I
0562	070	H
0563	067	G
0564	066	F
0565	065	E
0566	064	D
0567	063	C
0570	061	A
0571	062	B
0572	063	C
0573	064	D
0574	065	E
0575	066	F
0576	067	G
0577	070	H
0600	071	I
0601	041	J
0602	042	K
0603	043	L
0604	044	M
0605	045	N
0606	046	O
0607	047	P
0610	050	Q
0611	051	R
0612	022	S
0613	023	T
0614	024	U
0615	025	V
0616	026	W
0617	027	X
0620	030	Y
0621	031	Z
0622	000	0
0623	001	1
0624	002	2
0625	003	3
0626	004	4
0627	005	5
0630	006	6
0631	007	7
0632	010	8
0633	011	9
0634	073	.
0635	040	-
0636	060	+
0637	013	=
0640	034	(
0641	074)
0642	021	/
0643	054	*

0644	033	,
0645	014	≠
0646	053	\$
0647	012	0
0650	021	LDM
0651	031	
0652	010	LPN
0653	007	
0654	160	ZJP
0655	266	
0656	030	ADN
0657	017	
0660	041	STM
0661	136	
0662	020	LDN
0663	001	
0664	064	UJP
0665	000	
0666	077	HLT
0667		
0670	010	LPN
0671	032	
0672	060	ZJP
0673	123	
0674	064	UJP
0675	122	
0676		
0677		
0700	010	LPN
0701	032	
0702	060	ZJP
0703	201	
0704	064	UJP
0705	200	

1000	001
1001	002
1002	003
1003	004
1004	005
1005	006
1006	007
1007	010
1010	011
1011	073
1012	040
1013	060
1014	013
1015	014
1016	021
1017	037

1020	052
1021	053
1022	054
1023	061
1024	062
1025	063
1026	064
1027	065
1030	066
1031	067
1032	070
1033	071
1034	041
1035	042
1036	043
1037	044
1040	045
1041	046
1042	047
1043	050
1044	051
1045	022
1046	023
1047	024
1050	025
1051	026
1052	027
1053	030
1054	031
1055	034
1056	074
1057	033
1060	076
1061	077
1062	016
1063	000
1064	032
1065	035
1066	036
1067	055
1070	056
1071	057
1072	072
1073	075
1074	001
1075	002
1076	003
1077	004
1100	005
1101	006
1102	007
1103	010

1104	0 11
1105	0 73
1106	0 40
1107	0 60
1110	0 13
1111	0 14
1112	0 21
1113	0 37
1114	0 52
1115	0 53
1116	0 54
1117	0 61
1120	0 62
1121	0 63
1122	0 64
1123	0 65
1124	0 66
1125	0 67
1126	0 70
1127	0 71
1130	0 41
1131	0 42
1132	0 43
1133	0 44
1134	0 45
1135	0 46
1136	0 47
1137	0 50
1140	0 51
1141	0 22
1142	0 23
1143	0 24
1144	0 25
1145	0 26
1146	0 27
1147	0 30
1150	0 31
1151	0 34
1152	0 74
1153	0 33
1154	0 76
1155	0 77
1156	0 16
1157	0 00
1160	0 32
1161	0 35
1162	0 36
1163	0 55
1164	0 56
1165	0 57
1166	0 72
1167	0 75

1170	000
1171	000
1172	000
1173	000

8092 BUFFER CHANNEL TAPE TEST {MTT}

I. OPERATIONAL PROCEDURES

A. RESTRICTIONS

1. None.

B. LOADING PROCEDURE

1. Bald System

- a. Load under normal bald procedures.
See publication number 36823500.

2. SMM92

- a. Parameter call is:
 014 for MTT, Sections A, B and C
 015 for MTT, Sections D, E, F and G
- b. Refer to SMM92 operational procedures for operating instructions up to and including the calling of MT1 or MT2.

C. PARAMETERS

Location 47	Bit 0	Run	Test A
	1	Run	Test B
	2	Run	Test C
	3	Run	Test D
	4	Run	Test E
	5	Run	Test F
	6	Run	Test G

If zero is entered as parameter, depending on sections in core (A, B, C or D, E, F, G), all available tests will be executed.

Location 50 Enter into the lower three bits, the drive unit number (0-3) to be tested.

Location 51 The amount specified in this location will cause program to continue on error until this amount of errors has been reached.
{MTT-1}

I. C. (Continued)

Location 60 Zero = 601 or 608 tape drive
 One = 609 drive

Location 61 Zero = 601 drive
 One = 608 or 609 drive

II. MESSAGES

A. NORMAL MESSAGES

BER Register	A Register	Comments
401	Section Number	End of section stop
402	002	End of test stop
0111	Switch	Interrupt 10 has been executed "Switch" parameter may be changed. Stop 1 Bit 0 = End of section stop Stop 2 Bit 1 = End of test stop and individual test parameter stop on initialization only Stop 3 Bit 2 = Error stop Jump 1 Bit 3 = Repeat section Jump 2 Bit 4 = Repeat condition Jump 3 Bit 5 = Suppress additional error information stops Sense 1 Bit 6 = Not used Sense 2 Bit 7 = Not used

B. ERROR MESSAGES

REGISTERS

BER	A	BXR	Comments
20	Actual Status	Expected Status	Expected Illegal BCD Status
21	Actual Status	Expected Status {MTT-2}	Unexpected Illegal BCD Status

II. B. ERROR MESSAGES (Continued)

<u>REGISTERS</u>			
BER	A	BXR	Comments
22	Actual Status	Expected Status	Expected BCD Status
23	Actual Status	Expected Status	Unexpected BCD Status
24	Actual Status	Expected Status	Expected Prog error and no write ring
25	Actual Status	Expected Status	Unexpected Prog error and no write ring
26	Actual Status	Expected Status	Expected Ready
27	Actual Status	Expected Status	Unexpected Ready
30	Actual Status	Expected Status	Expected Parity Error
31	Actual Status	Expected Status	Unexpected Parity Error
32	Actual Status	Expected Status	Expected Program Error
33	Actual Status	Expected Status	Unexpected Program Error
34	Actual Status	Expected Status	Expected File Mark
35	Actual Status	Expected Status	Unexpected File Mark
36	Actual Status	Expected Status	Expected Load point or End of Tape
37	Actual Status	Expected Status	Unexpected Load point or End of Tape
40	Actual Status	Expected Status	Expected Write Ring
41	Actual Status	Expected Status	Unexpected Write Ring
42	Actual Status	Expected Status	Expected Busy
43	Actual Status	Expected Status	Unexpected Busy
44	N/A	N/A	Expected Buffer Interrupt
45	Actual Status	Last Interrupt ¹	Unexpected Buffer Interrupt

II. B. ERROR MESSAGES (Continued)

<u>REGISTERS</u>			
BER	A	BXR	Comments
46	Actual Status	Expected Status	Expected External Interrupt
47	Actual Status	Last Interrupt ¹	Unexpected External Interrupt
50	Data Read	Data Expected	Data Compare Error
52	Data Read	Data Expected	Backspace Error
54	0	0	This test is on the other mag tape section of tests. Use parameter 14 for Sections A, B, and C or parameter 15 for Sections D,E,F,and G
56	Actual Status	Amount Short	Incorrect write buffer length. Expected amount is 376.
60	Actual Status	N/A	No buffer termination
62	File Mark Read	File Mark Expected	Incorrect File Mark written
64	Section Number	Last Function (Octal Code)	Error stop #2. This stop will always occur unless switch parameter bit 5 is set.
66	Actual Status	N/A	Buffer busy status. Buffer should not be busy.
70	Actual Status	N/A	Tape Drive constantly Busy.
72	I/O Length Expected	I/O Length Processed	Error Stop #3 for Sections D and E only.

¹ Interrupt 20 = 0
 Interrupt 30 = 1
 Interrupt 40 = 200

III. DESCRIPTION

TEST A	Search File into Loadpoint, Binary Write, and Backward Creep Test
TESTA	1. Set unpredictable status bit 5
	2. Expect status of 000
	3. Reset jump addresses
	4. Set odd parity
TESTXX	5. Read status*
TESTA1	6. Rewind
TESTA2	7. Zero counter
	8. Read status*
TESTA3	9. Wait load point
TEST1A	10. Generate binary data
TESTA4	11. Set tags, set function, set last word address (no words)
TESTA5	12. Select write and output buffer channel. Expect buffer interrupt.
	13. Clear external interrupt indicator
	14. Wait not busy
TEST2A	15. Report error if buffer interrupt not received
	16. Read status*
TESTA7	17. Repeat steps 11-16 250 times
	18. Clear interrupt expected conditions
TEST3A	19. Expect busy status
	20. Select search file back
	21. Clear interrupt lockout (external 30)
TESTAA	22. Select interrupt on loadpoint
TESTAB-2	23. Read status*
	24. Wait not busy
TESAA1	25. Report error if interrupt not received
TESTA1	26. Expect loadpoint
	27. Status bit 3 unpredictable
	28. Read status set lockout
	29. Check for interrupt 10 received**
	30. Check switch parameter bit 4 for repeat segment
	31. Repeat steps 1-31 if bit 4 set
TESA1	32. Set even parity
TESAZ1	33. Write file mark
TESA2	34. Clear pointer, expect all status bits, expect file status
	35. Wait not busy
TESA3	36. Read status*

* report error if status incorrect

**if interrupt 10 received, go read switch parameter and halt

III. DESCRIPTION (Continued)

- TESAZ2 37. Set odd parity
- TESA4 38. Select write function
- TESA5 39. Output one word record (52)
- TESA7-2 40. Read status*
- TESA7 41. Search back one record
- TESA8 42. Read status*
- TESA10 43. Select write
- TESA11 44. Output one word record (25)
- TESA12 45. Wait not busy and read status*
- TESA5 46. Repeat steps 38-45 250 times
- 47. Set even parity
- TESA13 48. Write file mark
- TESAX1 49. Wait not busy and read status*
- TESA15 50. Search back one file (repeat once)
- TESA16 51. Wait not busy and read status*
- 52. Search file forward
- 53. Wait not busy and read status*
- TESAX2 54. Select even parity
- 55. Select read forward
- TESAX4 56. Input to A. Save data
- 57. Compare with expected data. Report error if any
- TESA21 58. Wait not busy, expect parity error status, read status*
- 59. Check for interrupt 10**
- 60. Repeat steps 55-58 250 times
- 61. Check for end of test halt
- 62. Halt if bit 0 set, section number to A
- 63. Check repeat parameter, repeat test if bits 3 or 4 set
- 64. End of test section A

TEST B Illegal and Legal BCD Write Check via Normal Channel

- TESTB 1. Reset jump addresses, set even parity
- 2. Expect BCD status bit 0
- TESB1 3. Parity and loadpoint bits 2 and 5 unpredictable
- 4. Read status*
- TESB2 5. Select write
- TESB3 6. Output write no address illegal BCD (zero)
- 7. Output no address legal BCD (76)
- 8. Reset jump address, expected all status bits
- 9. Expect BCD, parity and program error
- TESB4 10. Wait not busy and read status*
- 11. Expect BCD status
- 12. Select write
- 13. Output no address (52)

* report error if status incorrect

** if interrupt 10 received, go read switch parameter and halt

III. DESCRIPTION (Continued)

- TESB7 14. Wait busy and read status*
15. Reset jump address and repeat steps 12-14 50 times
16. Check for interrupt 10**
17. Check for end of section halt
- TESB9A 18. Halt if bit zero set, section number to A
19. Repeat steps 1-18 if repeat parameter bit 4 set
20. End of test section B

TEST C Erase Tape and Search End of File Test

- TESTC 1. Reset jump addresses, set tags, reset pointers
2. Set odd parity
- TESC1 3. Generate all 377 data
- TESC2 4. Set buffer tags, set last word address (376)
5. Select write and output buffer channel
6. Wait not busy, save last word address
- TESC4 7. Report error if last address incorrect
- TESC5 8. Check for non-terminating buffer, report error if
non-terminating and clear buffer
- TESC7 9. Read status*
- TESC7A 10. Repeat steps 1-9 500 times
- TESC10 11. Rewind
12. Clear lockout
13. Select interrupt on loadpoint
- TESC12 14. Expect loadpoint
15. Expect external interrupt
- TESC13 16. Wait not busy and read status*
17. Check for external interrupt received, report error
if not received
- TESC14 18. Check for interrupt 10**
19. Check for repeat parameter bit 4
20. Repeat if bit 4 set
- TESCX7 21. Reset jump addresses
22. Set even parity
23. Reset counter
- TESC15 24. Write file mark
- TESC16 25. Wait not busy, expect file mark, read status*
- TECS18 26. Search back one file, wait not busy
27. Repeat write and backspace file 10 times
28A. Expect file mark status
28. Write file mark
29. Wait not busy, read status*

* report error if status incorrect

** if interrupt 10 received, go read switch parameter and halt

III. DESCRIPTION (Continued)

- TESC25 30. Expect BCD status
31. Write one word record (70), wait not busy, read status*
32. Repeat steps 24, 25, 26 X times where X = ***8
Then repeat steps 28A through 31.
*** X will be 25 the first time, then 50, then 25, then 10
33. Repeat step 32 five times, tape will now contain five one word records and file marks spaced by various lengths of blank tape.
- TESC39 34. Search back file, read status*
35. Repeat step 34 four times
- TESC31 36. Search file forward, wait not busy, read status*
TESC35-4 37. Read forward one word record, wait not busy, read status* Check data read, report errors if any
Repeat steps 36 and 37 four times
- TESC41 38. Check for 608 or 609 drive. If 601 drive go to step 42
- TESC40 39. Read backward one record, wait not busy. Check expected data (file mark or 70). Compare data. Report error if any toggle flag set expected status (file mark or BCD)
- TESC46 40. Read status*
41. Repeat step 39 nine times
- TESC47 42. Rewind drive, wait not busy, read status*
- TESC49 43. Check for interrupt 10
44. Check for repeat section, if bit 4 set repeat steps 24 through 43
- TESC52 45. Reset flags, expect file mark, reset jump addresses
- TESC60— 46. Search forward 3 files**
- TESC72 47. Search back 2 files**
48. Search forward 3 files**
49. Search back 2 files**
50. Search forward 2 files **
51. Read one word record, read status*
52. Search back a file** and forward a file** ten times
53. Search forward file**
54. Search back a file** and forward a file** ten times
55. Search back a file** twice
56. Search back a file** and forward a file** ten times
57. Search back a file**
58. Search back a file** and forward a file** ten times
59. Search back a file** twice

* report error if status incorrect

** Read status after each search function. Report error if incorrect status.

III. DESCRIPTION (continued)

- CEXIT1 60. Expect program error, loadpoint and BCD status, search back one file, wait not busy, read status*
- TESC74 61. Check for end of section halt. Halt if bit 0 set
- TESC75 62. Check for repeat section. Repeat steps 1-60 if bit 3 set.
63. End of section C
- TEST D General Read/Write Test.
- The test consists of writing and reading of variable length and fixed length records on the buffer and normal channel.
- TESTD1 1. Set even parity, set I/O length of 19 words
- TESDB1-4 2. Rewind, wait not busy
- TESD1C 3. Set buffer tags, set buffer output I/O
- TESD2-4 4. Generate BCD data
- TESD2 5. Select write, output buffer channel, wait not busy
- TESD5A 6. Expect BCD status, read status*
- TESD5 7. Check for buffer interrupt. Report error if no interrupt
- TESD6 8. Add 20 to buffer length
9. Repeat steps 5 through 8 nine times
- TESD7 10. Expect loadpoint and BCD status
- TESD7A-4 11. Select rewind, wait not busy, read status*
- TESD9 12. Set I/O length to 19 words, set input tags
13. Set input buffer function
- TESD10-4 14. Select read forward, input buffer channel, wait not busy, read status*
- TESD14-4 15. Compare data read with data generated. Repeat steps 13 through 15 eight times
- TESD15+2 16. Check for 608 or 609 drive. If 601, go to step 22
17. Set read I/O length to 219 words
- TESD16-4 18. Select read backwards, input buffer channel, wait not busy, read status*
- TESD19 19. Rearrange data read backward for compare
- TESD24 20. Compare data, reduce input I/O length by 20
21. Repeat steps 18 through 20 eight times
- TESD27 22. Check for interrupt 10
23. Check repeat condition bit 4. Repeat steps 1 through 22 if bit 4 set
- TESD28 24. Set up 11 word I/O length, set tags
25. Set up normal I/O output.

* report error if status incorrect

III. DESCRIPTION (Continued)

- TESD28A-4 26. Rewind, generate random data, wait not busy
TESD29A 27. Set odd parity, set counter for 11 passes, expect zero status
TESD32-4 28. Select write, output normal channel, wait not busy, read status*
TESD35 29. Add 20 words to I/O length
30. Repeat steps 28 through 29 ten times
TESD36 31. Rewind function
TED36A 32. Set the I/O length to 11 words, set tags, input normal channel, set counter for 11 passes
TED37-4 33. Select read forward, input normal channel, wait not busy, read status*
TED39 34. Compare data, report error if any, increase I/O length by 20 words
35. Repeat steps 33 and 34 eight times
TESD41 36. Check for 608 or 609 drive. If 601, go to step 41
37. Set I/O length for 211 words
TESD42-4 38. Select read backward, input normal channel, wait not busy, read status*
TESD45 39. Rearrange data just read backwards for compare
TESD46 40. Compare data, reduce read buffer by 20, repeat steps 38, 39, 40 eight times
TESD48 41. Rewind drive, wait not busy
TESD50 42. Check for interrupt 10 received
TESD52A 43. Check repeat parameter bit 4 if set, repeat steps 1 through 43
44. Set up output buffer channel, set tags, expect status of zero.
TESD53 45. Select write function
TESD54 46. Output buffer channel, wait not busy, read status*
TESD56 47. Increase output buffer by one, repeat steps 45 through 47 253 times
TESD57 48. Check for 608 or 609 drive. If 601, do step 54
49. Set I/O length to 252 words, set tags, set input normal channel
TESD58 50. Select read backward, input normal channel, wait not busy, read status*
51. Rearrange data that was just read backwards
TESD62 52. Compare data
53. Reduce I/O length by one word, repeat steps 50 through 53 252 times
TESD64 54. Rewind drive, wait not busy
55. Set I/O length to one word

* report error if status incorrect

III. DESCRIPTION (Continued)

- TESD67-4 56. Select read forward, input normal channel, wait not busy, read status*
- TESD70 57. Compare data, report error if any
58. Increase I/O length by one word
59. Repeat steps 56 through 58 two hundred fifty-two times
- TESD71 60. Rewind, wait not busy
61. Check interrupt 10
62. Check repeat parameter bit 4, repeat steps 44 through 61 if bit 4 set
- TESD74 63. Generate shifting bit pattern, set tags, set output buffer channel
64. Set I/O length of 500 words
- TESD76-4 65. Select write function, output buffer channel, wait not busy, read status*
- TESD77 66. Repeat step 65 255 times
- TESD78 67. Rewind function, wait not busy, set input tags, set input buffer channel
- TESD81-4 68. Select read forward, input buffer channel, wait not busy, read status*
- TESD82A 69. Compare data
70. Repeat steps 68 and 69 two hundred fifty-five times
- TESD84 71. Rewind, wait not busy
72. Check for interrupt 10
73. Check repeat parameter bit 4, if set repeat steps 63 through 72
74. Check repeat complete test bit 3, if set repeat steps 1 through 73
75. End of test section D

TEST E Creep Test

- TESTE 1. Rewind, wait not busy, set even parity
2. Set I/O type (output buffer channel), expect file mark status
- TESE5-4 3. Write file mark, wait not busy, read status*, repeat step 3 two times
- TESE13 4. Search file back, wait not busy, read status*
5. Search file back, wait not busy, read status*
- TESE19 6. Set I/O length for 500 words
7. Generate all ones data (377), set tags

* report error if status incorrect

III. DESCRIPTION (Continued)

- TESE20 8. Select write, output buffer channel, wait not busy, read status*
- TESE24 9. Search back one record, wait not busy, read status*
- TESE27 10. Search back one record, expect file mark, wait not busy, read status*
- TESE30 11. Set counter for 20 passes
- TEE30 12. Select write, output buffer channel, wait not busy, read status*
- TESE35-4 13. Search back one record, wait not busy, read status*, repeat steps 12 and 13 twenty times
- TESE41 14. Set up read on buffer channel, set tags
15. Select read forward, wait not busy, read status*
- TESE45 16. Compare data
17. Rewind function, wait not busy, check for interrupt 10
18. Check for repeat bits 3 or 4, repeat steps 1 through 17 if either is set
19. Check for end of section E halt
20. End of test E

TEST F Special End of File Test

1. Set even parity
- TESFJ 2. Write file mark, wait not busy, read status*
3. Select write function, output no address one word (77), wait not busy, read status*
- TESF7 4. Select write, output no address two words (65, 72), wait not busy, read status*
- TESF9 5. Expect file mark, write file mark, wait not busy, read status*
- TESF10 6. Search back one file, wait not busy, read status*
7. Repeat step 6 once
- TESF12 8. Search file forward, wait not busy, read status*
9. Select read forward, input to A, compare data, report error if any, read status*
- TESF16 10. Expect file mark
11. Search file forward, wait not busy, read status*
12. Expect loadpoint, select rewind, wait not busy, read status*
13. Check for interrupt 10
- TESF19 14. Check for repeat parameter bit 4, if set repeat steps 1-13.

* report error if status incorrect

III. DESCRIPTION (Continued)

- TESF20 15. Expect file mark status
16. Write file mark, wait not busy, read status*
17. Expect BCD status
- TESF22-4 18. Select write, output one word record (77), wait not busy, read status*
19. Select write, output one word record (16), wait not busy, read status*
20. Repeat steps 17 through 19 nine times
21. Expect file mark status
22. Write file mark, wait not busy, read status*
23. Expect BCD status
24. Select write, output no address one word record (77), wait not busy, read status*
- TESF29 25. Expect file mark
26. Search back one file, wait not busy, read status*
- TESF30 27. Search back one file, wait not busy, read status*
28. Search file forward, wait not busy, read status*
- TESF32 29. Expect BCD status*
30. Select read forward
- TESF33 31. Input to A, save data, compare data, report error if any, wait not busy, read status*
- TESF35 32. Select read forward, input to A, save data, compare data, report error if any, read status*
33. Repeat steps 30 through 32 eight times
- TESF39 34. Expect file mark status
35. Select read forward, wait not busy, read status*
- TESF40 36. Input to A, wait not busy, read status*
- TESF41 37. Expect BCD status
38. Read forward, input to A, save data, compare data, report error if any
- TEF43A 39. Wait not busy, read status*
- TEF43 40. Expect loadpoint, select rewind
41. Check for interrupt I0, check for end of section F stop, stop if bit 0 set
42. Check for repeat section bit 4, repeat steps 16 through 41 if set
43. End of section F
- TEST G Visual Creep Test
- TESTG 1. Set even parity
2. Expect file mark status

* report error if status incorrect

III. DESCRIPTION (Continued)

- TESG2 3. Write file mark, wait not busy, read status*
- 4. Search file back, wait not busy, read status*
- 5. Repeat steps 3 and 4 nine times
- TESG6 6. Expect BCD status
- 7. Select write, output no address one word record
 of 25, wait not busy, read status*
- TESG9 8. Search back one record, wait not busy, read
 status*
- 9. Repeat steps seven and eight 256 times
- TESG10 10. Check interrupt 10
- 11. Check for end of test stop bit 0
- 12. Check for repeat test bits 3 or 4, if set repeat
 steps 1 through 11
- 13. End of Section G

* report error if status incorrect
{MTT-14}

0044	0064			UJP	
0045	0266			INTCOM	
0046	0200	WTBIT		200	
0047	0000	PARAM			TEST PARAMETER
0050	0000	UNIT			TAPE DRIVE UNIT NUMBER
0051	0000	ERRAMT			AMOUNT OF ERRORS BEFORE ERROR HLT
0052	0000	ERRABX	0		EXPECTED DATA OR STATUS
0053	0000	ERRCD1	0		UPPER 2 BITS OF ERROR CODE
0054	0000	AREG	0		RECEIVED DATA OR STATUS
0055	0000	COMM2			EACH DIGIT IS 1 M.S. DELAY
0056	0000	COMM3			EACH DIGIT IS 256 M. S. DELAY
0057	0000	DATAIO			COMPARE ADDRESS FLAG
0060	0000	MASK1	0		0 = 601 OR 608 DRIVE. 1 = 609 DRIVE
0061	0000	MASK2	0		0 = 601 TAPE DRIVE. 1 = 608 OR 609 TAPE DRIVE
0062	0000	DATTYP	0		1,2,4,10 AND 20 (TYPE OF DATA)
					1 = BCD
		REM			2 = BINARY
		REM			4 = SHIFT
		REM			10 = RANDOM
		REM			20 = ALL ONES (377)
0063	0000	ERRCOD			LAST ERROR CODE
0064	0000	LAST	0		TERMINATING ADDRESS AFTER
			REM		READ OR WRITE OPERATION
0065	0000	LWA	0		LAST WORD ADDRESS
0066	0000	RANDM1			RANDOM DATA
0067	0000	SAVITG	0		TAG 2 ON INTERRUPT
0070	2366	RETURN	JUMP		CURRENT RETURN JUMP ADDRESS
0071	0000	TAG3A			TAG ADDRESS FOR BER LOADING OR NORMAL I/O
0072	0000	TAG3B			TAG ADDRESS FOR BXR LOADING
0073	0000	TOGGLE			PRESENT STATUS BITS CHECKING
0074	0000	VAR	0		VARIABLE FOR RANDOM GENERATOR
0075	0000	AMNT1		0	
0076	0000	TEMP1	BSS	0	
0076	0000	COMM1		0	COUNTER
0077	0000	IOTYP		0	READ OR WRITE AND BUFFER OR NORMAL CHANNEL
0100	0000	AMNT2		0	
0101	0000	TEMP	BSS	0	
0101	0000	IOTYP1		0	0 = READ. 1 = WRITE
0102	0041	SMMQX		STM	SAVE ADDRESS
0103	0122			EXIT20	
0104	0103			TTA	T1
0105	0041			STM	
0106	0116			EXIT21	
0107	0020	SMMQA		LDN	
0110	0006			T30	GO CHECK FOR INTERRUPT 10 RECEIVED
0111	0102			ATT	T1
0112	0202			ATT	T2
0113	0264			UJP	T2
0114	3133			SMMQ1A	
0115	0020			LDN	
0116	0000	EXIT21		0	
0117	0102			ATT	T1
0120	0202			ATT	T2
0121	0264			UJP	T2
0122	0000	EXIT20		0	RETURN TO PROGRAM
	0124		PRG	124	
0124	0000	SMMFLG			USED IN CONJUNCTION WITH MANUAL INTERRUPT
0125	0000	SMMINT		0	1 = INTERRUPT 10 RECEIVED
		REM			
		REM			A. NEGATIVE ZERO = END OF TEST

U

17

0126	0041	SMMQ	STM		
0127	0125		SMMINT		FLAG INTERRUPT 10 RECEIVED
0130	0021		LDM		
0131	0016		SAVEA		
0132	0113		CIL	T1	RETURN WHERE INTERRUPTED
0133	0020		LDN		SET SMM FLAG AND GIVE CONTROL TO SMM
0134	0017		T74		
0135	0202		ATT	T2	
0136	0264		UJP	T2	
0137	7777		CTRL		GO TO SMM
0140	0000	TEMP2	0		
0141	0000	TEMP3	0		
0142	0000	UNIT2X	0		
	0144		PRG	144	
		REM			NORMAL I/O ROUTINE (ONE BANK OR LESS)
0144	0041	NORM1	STM		SAVE ADDRESS
0145	0162		EXIT6		
0146	0103		TTA	T1	SAVE TAG
0147	0041		STM		
0150	0157		EXIT7		
0151	0020		LDN		
0152	0003		IBNKTG		
0153	0202		ATT	T2	
0154	0264		UJP	T2	
0155	1421		NORM2		GO EXECUTE ONE BANK I/O
0156	0020	NORM1A	LDN		
0157	0000	EXIT7	0		
0160	0202		ATT	T2	
0161	0264		UJP	T2	
0162	0000	EXIT6	0		RETURN JUMP
0163	0041	BUFF1	STM		SAVE ADDRESS
0164	0201		EXIT8		
0165	0103		TTA	T1	SAVE TAG
0166	0041		STM		
0167	0176		EXIT9		
0170	0020		LDN		
0171	0003		BUFTAG		
0172	0202		ATT	T2	
0173	0264		UJP	T2	GO EXECUTE BUFFER I/O
0174	1443		BUFF2		
0175	0020	BUFF1A	LDN		
0176	0000	EXIT9	0		
0177	0202		ATT	T2	LOAD TAG AND RETURN
0200	0264		UJP	T2	
0201	0000	EXIT8	0		
		REM			SELECT FUNCTION ROUTINE
0202	0041	SELECT	STM		STORE FUNCTION CODE
0203	0005		LFUNCT		
0204	0055		RAO		UPDATE ADDRESS POINTER
0205	0070		RETURN		
0206	0122		LDI	T1	
0207	0070		RETURN		
0210	0041		STM		SET UP RETURN ADDRESS
0211	0226		EXIT		
0212	0103		TTA	T1	

B. POSITIVE ZERO = PARAMETER CHANGE (SWITCH)
 C. NON-ZERO = LOAD NEXT OVERLAY (SECTION)
 1. AMOUNT SPECIFIED IN SMMFLG IS
 THE OVERLAY NUMBER

0213	0041		STM		SAVE TAG
0214	0223		EXIT1		GO TO SELECT ROUTINE
0215	0020		LDN		
0216	0003		SELTAG		SET TAG FOR JUMP
0217	0202		ATT	T2	
0220	0264		UJP	T2	
0221	1400		SEL1		
0222	0020	SEL2	LDN		RETURN JUMP
0223	0000	EXIT1	0		
0224	0202		ATT	T2	
0225	0264		UJP	T2	
0226	0000	EXIT	0		
0227	0041	GEN	STM		
0230	0245		EXIT10		SAVE TAG AND ADDRESS
0231	0103		TTA	T1	
0232	0041		STM		
0233	0242		EXIT11		
0234	0020		LDN		SET NEW BANK TAG
0235	0002		GENTAG		
0236	0202		ATT	T2	
0237	0264		UJP	T2	GO TO GENERATE DATA ROUTINE
0240	1000		GEN1		
0241	0020	GENA	LDN		
0242	0000	EXIT11	0		
0243	0202		ATT	T2	
0244	0264		UJP	T2	RETURN JUMP
0245	0000	EXIT10	0		
		REM			
		REM			COMPARE DATA ROUTINE
		REM			
0246	0041	COMP1	STM		
0247	0265		EXIT12		SAVE ADDRESS
0250	0103		TTA	T1	
0251	0041		STM		SAVE TAG
0252	0261		EXIT13		
0253	0020		LDN		
0254	0003		COMTAG		
0255	0202		ATT	T2	
0256	0264		UJP	T2	GO TO COMPARE DATA
0257	1511		COMP2		
0260	0020	COMP1A	LDN		
0261	0000	EXIT13	0		
0262	0102		ATT	T1	
0263	0202		ATT	T2	
0264	0264		UJP	T2	RETURN JUMP
0265	0000	EXIT12	0		
	0003	COMTAG	EQU	3	
0266	0041	INTCOM	STM		
0267	0101		TEMP		
0270	0203		TTA	T2	
0271	0041		STM		
0272	0067		SAVITG		
0273	0020		LDN		
0274	0001		T04		
0275	0202		ATT	T2	
0276	0264		UJP	T2	
0277	0563		INTC01		
0300	0055	STATUS	RAO		UPDATE ADDRESS POINTER
0301	0070		RETURN		
0302	0020		LDN		

0410	0103	TTA	T1		000190
0411	0241	STM	T2		
0412	0442	RET2			000210
0413	0003	CLA		SET STATUS FUNCTION	
0414	0041	STM			000230
0415	0005	LFUNCT			
0416	0203	TTA	T2		
0417	0102	ATT	T1		
0420	0020	LDN			000250
0421	0424	STATA		RETURN ADDRESS	
0422	0064	RJP			
0423	0210	SELECT	6		
0424	0076	INA			000290
0425	0041	STM			000300
0426	0003	ASTAT			000310
0427	0041	STM			
0430	0054	AREG			
0431	0015	LSM			000340
0432	0004	ESTAT			000350
0433	0011	LPM			
0434	0007	MASK			000330
0435	0041	STM			000360
0436	0101	TEMP			000370
0437	0261	NZP	T2		000380
0440	0453	ERROR		FIND ERROR	000390
0441	0020	LDN			000400
0442	0000	0			000410
0443	0102	ATT	T1	SET TAGS	
0444	0202	ATT	T2		000420
0445	0021	LDM			
0446	0076	TEMP1			
0447	0041	STM			
0450	0005	LFUNCT			
0451	0264	UJP	T2	RETURN TO ROUTINE	000430
0452	0000	0			000440
0453	0020	LDN		RESET STATUS SEQUENCE FLAGS	
0454	0551	BITX			
0455	0041	STM			
0456	0056	COMM3			
0457	0020	LDN			
0460	0020	CODE1		RESET ERROR CODES	
0461	0241	STM	T2		
0462	0520	STAT5			
0463	0021	LDM		FETCH INCORRECT STATUS	
0464	0101	TEMP			
0465	0212	LPI	T2	MASK FOR PARTICULAR BIT OR BITS	
0466	0056	COMM3			
0467	0041	STM		SAVE ERROR BITS	
0470	0073	TOGGLE			
0471	0216	LSI	T2		
0472	0056	COMM3			
0473	0260	ZJP	T2	GO REPORT ERROR	
0474	0511	STARIT			
0475	0055	RAO			
0476	0056	COMM3		UPDATE POINTERS	
0477	0020	LDN		UPDATE ERROR CODE	
0500	0002	2			
0501	0251	RAM	T2		
0502	0520	STAT5			
0503	0034	SBN			

0504	0044		CODE10	2		
0505	0261		NZP	T2	GO CHECK NEXT STATUS BIT OR BITS	
0506	0463		STAT1			
0507	0264		UJP	T2	RETURN TO PROGRAM	
0510	0441		RET?	=1		
0511	0021	STABIT	LDM		REMOVE DETECTED STATUS BITS FROM ERROR FILE	
0512	0101		TEMP			
0513	0216		LSI	T2		
0514	0056		COMM3			
0515	0041		STM			
0516	0101		TEMP			
0517	0020		LDN		STORE ERROR CODE IN DISPLAY ROUTINE	
0520	0020	STAT5	CODE1			
0521	0041		STM			
0522	0063		ERRCOD			
0523	0021	PROCES	LDM		RESTORE LAST FUNCTION	
0524	0076		TEMP1			
0525	0041		STM			
0526	0005		LFUNCT			
0527	0021		LDM			
0530	0004		ESTAT			002320
0531	0041		STM		SAVE EXPECTED STATUS FOR DISPLAY	
0532	0052		ERRABX			
0533	0011		LPM		DETERMINE EXPECTED ERROR OR NOT CONDITION	002330
0534	0073		TOGGLE			002340
0535	0261		NZP	T2		002350
0536	0543		EXP			002360
0537	0020	NONEXP	LDN			
0540	0001		1			002400
0541	0051		RAM		ADJUST ERROR CODE FOR PROPER CONDITION	002410
0542	0063		ERRCOD			002420
0543	0203	EXP	TTA	T2		
0544	0102		ATT	T1		
0545	0020		LDN			
0546	0475		STAT2			
0547	0064		UJP		GO REPORT STATUS ERROR	
0550	0333		ERPORT			
0551	0015	BITX	15		ILLEGAL BCD	
0552	0110		110		PROGRAM ERROR AND NO WRITE WRING	
0553	0001		1		BCD	
0554	0002		2		NOT READY	
0555	0004		4		PARITY ERROR	
0556	0010		10		PROGRAM ERROR	
0557	0020		20		FILE MARK	
0560	0040		40		LOAD POINT OR END OF TAPE MARK	
0561	0100		100		NO WRITE RING	
0562	0200		200		BUSY	
0563	0021	INTCO1	LDM			
0564	0101		TEMP			
0565	0260		ZJP	T2	INT10 RESERVED FOR SMM	
0566	0573		CONTIN		0 = INTERRUPT 20	
0567	0262		PJP	T2		
0570	0573		CONTIN		2 = INTERRUPT 40	
0571	0020		LDN			
0572	0002		2			
0573	0041	CONTIN	STM		SAVE LAST INTERRUPT INDICATOR	
0574	0006		LINT			
0575	0030		ADN			
0576	0616		BIAS		FIX TRANSFER ADDRESS	
0577	0241		STM	T2		

0600	0602		INTJP		
0601	0221		LDM	T2	
0602	0000	INTJP	0		
0603	0241		STM	T2	
0604	0606		INTJP1		
0605	0264		UJP	T2	
0606	0000	INTJP1	0		
0607	0021	INTRET	LDM		
0610	0067		SAVITG		
0611	0202		ATT	T2	
0612	0021		LDM		RESTORE DATA SAVED ON INTERRUPT
0613	0016		SAVEA		
0614	0113		CIL	T1	RETURN WHERE INTERRUPTED
0615	0077		HLT		*****TEMP HLT NO RETURN AFTER INTERRUPT
0616	0621	BIAS	INT20J		INTERRUPT ADDRESSES
0617	0632		INT30J		
0620	0722		INT40J		
0621	0021	INT20J	LDM		
0622	0731		EXPEC2		CHECK FOR INTERRUPT EXPECTED
0623	0260		ZJP	T2	ZERO = INTERRUPT NOT EXPECTED
0624	0646		INT20K		
0625	0003		CLA		
0626	0041		STM		
0627	0731		EXPEC2		
0630	0264		UJP	T2	
0631	0607		INTRET		
0632	0021	INT30J	LDM		
0633	0730		EXPECX		INTERRUPT EXPECTED
0634	0260		ZJP	T2	ZERO = INTERRUPT NOT EXPECTED
0635	0654		INT34		
0636	0003	INT304	CLA		
0637	0041		STM		
0640	0730		EXPECX		
0641	0103		TTA	T1	
0642	0041		STM		
0643	0056		COMM3		
0644	0264		UJP	T2	
0645	0677		DROPIT		
0646	0020	INT20K	LDN		
0647	0045		CODE11	1	
0650	0041		STM		SET UP ERROR CODE FOR UNEXPECTED INTERRUPT
0651	0063		ERRCOD		
0652	0264		UJP	T2	
0653	0660		INT34		
0654	0020	INT34	LDN		SET UP ERROR CODE FOR UNEXPECTED INT 30 OR 40
0655	0047		CODE12	1	
0656	0041		STM		
0657	0063		ERRCOD		
0660	0021	INT234	LDM		SET UP ERROR DATA FOR DISPLAY
0661	0006		LINT		LAST INTERRUPT INDICATOR TO ABX REGISTER
0662	0041		STM		
0663	0052		ERRABX		
0664	0021		LDM		LAST STATUS TO A REGISTER
0665	0003		ASTAT		
0666	0041		STM		
0667	0054		AREG		
0670	0103		TTA	T1	SAVE TAG ONE
0671	0041		STM		
0672	0056		COMM3		
0673	0020		LDN		

0674	0677		DROPIT		
0675	0064		RJP		
0676	0333		ERPORT		GO REPORT ERROR CONDITION
0677	0021	DROPIT	LDM		IF EXTERNAL INTERRUPT, GO DROP SAME.
0700	0006		LINT		
0701	0260		ZJP	T2	
0702	0715		DROP1		
0703	0020		LDN		
0704	0002		SLO		GO DROP EXTERNAL INTERRUPT
0705	0041		STM		
0706	0005		LFUNCT		
0707	0203		TTA	T2	
0710	0102		ATT	T1	
0711	0020		LDN		
0712	0715		DROP1		RETURN ADDRESS
0713	0064		RJP		
0714	0210		SELECT	6	
0715	0021	DROP1	LDM		
0716	0056		COMM3		
0717	0102		ATT	T1	
0720	0264		UJP	T2	
0721	0607		INTRET		
0722	0021	INT40J	LDM		INTERRUPT EXPECTED
0723	0730		EXPECX		
0724	0261		NZP	T2	
0725	0636		INT304		
0726	0264		UJP	T2	
0727	0654		INT34		
0730	0000	EXPECX			
0731	0000	EXPEC2			
	1000	PRG	1000		

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*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *

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1000	0020	GEN1	LDN		
1001	0014		OUTAG		
1002	0302		ATT	T3	
1003	0020		LDN		RESET INITIAL BCD NUMBER GENERATIO
1004	0001		1		
1005	0241		STM	T2	
1006	1044		BCD1		
1007	0021		LDM		CHECK FOR TYPE OF GENERATOR
1010	0062		DATYP		BIT 0 = BCD
1011	0034		SBN		BIT 1 = BINARY (8BITS)
1012	0020		20		BIT 2 = SHIFTING 13
1013	0263		NJP	T2	BIT 3 = RANDOM
1014	1017		NEXT1		BIT 4 = ALL ONES (377)
1015	0264		UJP	T2	
1016	1175		GENONE		GO GENERATE ALL ONES
1017	0030	NEXT1	ADN		
1020	0010		10		
1021	0263		NJP	T2	
1022	1025		NEXT2		
1023	0264		UJP	T2	GO GENERATE RANDOM DATA
1024	1223		RAND1		
1025	0030	NEXT2	ADN		
1026	0004		4		

1027	0263		NJP	T2	
1030	1033		NEXT3		
1031	0264		UJP	T2	
1032	1135		SHIFT1		GO GENERATE SHIFTING 13
1033	0030	NEXT3	ADN		
1034	0002		2		
1035	0262		PJP	T2	GO GENERATE BINARY DATA
1036	1105		BINARY		
1037	0020	BCD1A	LDN		GENERATE BCD DATA
1040	0004		4		
1041	0241		STM	T2	
1042	1064		BCD3		
1043	0020		LDN		
1044	0001	BCD1	1		
1045	0341		STM	T3	
1046	6000		OUTPUT		
1047	0255	BCD2	RAO	T2	AD ONE TO BCD DATA WORD
1050	1044		BCD1		
1051	0010		LPN		
1052	0077		77		USE 1---77 DATA WORDS ONLY
1053	0241		STM	T2	
1054	1044		BCD1		
1055	0260		ZJP	T2	IF ZERO GENERATE ANOTHER WORD
1056	1047		BCD2		
1057	0055		RAO		
1060	1046		BCD2	-1	
1061	0261		NZP	T2	
1062	1043		BCD1	-1	
1063	0020		LDN		STORE BOUNDRY ADDRESS DATA
1064	0004	BCD3	4		
1065	0341		STM	T3	
1066	0377		377		
1067	0251		RAM	T2	UPDATE DATA FOR NEXT BOUNDRY ADDRESS
1070	1064		BCD3		
1071	0303		TTA	T3	CHECK FOR BOTH BANKSCOMPLETE
1072	0034		SBN		
1073	0015		OUTTAG	1	
1074	0060		ZJP		
1075	0241		GENA		RETURN
1076	0020		LDN		
1077	0015		OUTTAG	1	
1100	0302		ATT	T3	
1101	0255		RAO	T2	
1102	1044		BCD1		
1103	0264		UJP	T2	
1104	1043		BCD1	-1	GO GENERATE SOME MORE DATA
1105	0020	BINARY	LDN		GENERATE BINARY DATA
1106	0000	BIN1	0		0----377
1107	0341		STM	T3	
1110	6000	BIN2	OUTPUT		STORE IN OUTPUT AREA
1111	0255		RAO	T2	
1112	1106		BIN1		
1113	0241		STM	T2	
1114	1110		BIN2		
1115	0261		NZP	T2	
1116	1105		BIN1	-1	
1117	0020		LDN		STORE DATA AT BOUNDRY ADDRESS
1120	0377		377		
1121	0341		STM	T3	
1122	0377		377		

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1123	0303	TTA	T3	
1124	0034	SBN		CHECK FOR ALL BANKS FILLED
1125	0013	T54		
1126	0060	ZJP		
1127	0241	GENA		RETURN
1130	0020	LDN		
1131	0013	T54		SET NEXT BANK TAG
1132	0302	ATT	T3	
1133	0264	UJP	T2	
1134	1105	BIN1	-1	
1135	0020	LDN		STORE SHIFTING DATA (13) IN OUTPUT AREA
1136	0013	13		
1137	0241	STM	T2	
1140	1142	SHIFT2		
1141	0020	LDN		
1142	0013	13		
1143	0341	STM	T3	
1144	6000	OUTPUT		OUTPUT AREA
1145	0001	SHA		
1146	0241	STM	T2	SHIFT DATA WORD
1147	1142	SHIFT2		
1150	0255	RAO	T2	
1151	1144	SHIFT3		
1152	0261	NZP	T2	
1153	1141	SHIFT2	-1	
1154	0221	LDM	T2	
1155	1142	SHIFT2		
1156	0341	STM	T3	SPECIAL STORE FOR BOUNDRY ADDRESS
1157	0377	377		
1160	0001	SHA		
1161	0241	STM	T2	
1162	1142	SHIFT2		
1163	0303	TTA	T3	CHECK FOR ALL BANKS FULL
1164	0034	SBN		
1165	0015	OUTTAG	1	
1166	0060	ZJP		
1167	0241	GENA		RETURN
1170	0020	LDN		
1171	0015	OUTTAG	1	
1172	0302	ATT	T3	
1173	0264	UJP	T2	
1174	1141	SHIFT2	-1	
1175	0020	LDN		GENERATE ALL ONES (377)
1176	0377	377		
1177	0341	STM	T3	
1200	6000	OUTPUT		
1201	0255	RAO	T2	
1202	1200	ONES1		
1203	0261	NZP	T2	
1204	1175	GENONE		ALL DATA SAME IN OUTPUT AREA
1205	0020	LDN		
1206	0377	377		
1207	0341	STM	T3	BOUNDRY ADDRESS STORE
1210	0377	377		
1211	0303	TTA	T3	
1212	0034	SBN		CHECK ALL BANKS FULL
1213	0015	OUTTAG	1	
1214	0060	ZJP		
1215	0241	GENA		RETURN
1216	0020	LDN		

1217	0015		OUTTAG	1	
1220	0302		ATT	T3	
1221	0264		UJP	T2	
1222	1175		GENONE		GO GENERATE
		REM			
1223	0103	RAND1	TTA	T1	SAVE TAG ONE
1224	0241		STM	T2	
1225	1235		RAND1A		
1226	0203		TTA	T2	
1227	0102		ATT	T1	TAG 2 TO TAG 1 FOR RETURN JUMP
1230	0020		LDN		
1231	1234		RAND1C		RETURN ADDRESS
1232	0264		UJP	T2	GO GENERATE A RANDOM NUMBER
1233	1374		GENRAN		
1234	0020	RAND1C	LDN		
1235	0000	RAND1A	0		RESTORE TAGS
1236	0102		ATT	T1	
1237	0021		LDM		STORE RANDOM NUMBER
1240	0066		RANDM1		
1241	0341		STM	T3	IN OUTPUT AREA
1242	6000	RAND2B	OUTPUT		
1243	0264		UJP	T2	
1244	1245	RAND2F	RAND2C		
1245	0055	RAND2C	RAO		ADJUST STORAGE ADDRESS AND
1246	1242		RAND2B		REPEAT IF BANK NOT FULL
1247	0261		NZP	T2	
1250	1223		RAND1		
1251	0020		LDN		SET UP FOR BOUNDRY ADDRESS
1252	0377		377		
1253	0241		STM	T2	
1254	1242		RAND2B		
1255	0020		LDN		SET JUMP BACK TO NORMAL
1256	1263		RAND2E		STORE AFTER A BOUNDRY ADDRESS STORE
1257	0241		STM	T2	
1260	1244		RAND2F		
1261	0264		UJP	T2	
1262	1223		RAND1		
1263	0003	RAND2E	CLA		RESET RANDOM DATA STORAGE FOR
1264	0041		STM		NEXT BANK
1265	1242		RAND2B		
1266	0020		LDN		
1267	1245		RAND2C		RESET JUMP FOR NORMAL STORAGE
1270	0241		STM	T2	
1271	1244		RAND2F		
1272	0303		TTA	T3	UP TAG 3 AND
1273	0030		ADN		CHECK FOR ALL BANKS FULL
1274	0001		1		
1275	0302		ATT	T3	
1276	0034		SBN		
1277	0015		OUTTAG	1	
1300	0261		NZP	T2	GO GENERATE MORE DATA
1301	1223		RAND1		
1302	0064		UJP		
1303	0241		GENA		RETURN JUMP
		REM			
		REM			
		REM			DATA GENERATOR ROUTINE (RANDOM)
1304	0241	GENRAN	STM	T2	GENERATE A RANDOM NUMBER
1305	1347		EXIT14		SAVE TAG AND ADDRESS FOR RETURN
1306	0103		TTA	T1	

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1307	0241		STM	T2	
1310	1344		EXIT15		
1311	0025		LCM		
1312	0066		RANDM1		SET SQUARING AMOUNT
1313	0041		STM		
1314	0076		TEMP1		
1315	0021	SQUARE	LDM		SQUARE OLD RANDOM NUMBER
1316	0066		RANDM1		
1317	0051		RAM		
1320	0101		TEMP		
1321	0055		RAO		
1322	0076		TEMP1		
1323	0261		NZP	T2	
1324	1315		SQUARE		
1325	0021		LDM		GET OLD RANDOM NUMBER AND
1326	0066		RANDM1		ADD TO NEW SQUARED NUMBER
1327	0031		ADM		
1330	0101		TEMP		
1331	0031		ADM		ADD VARIABLE
1332	0074		VAR		
1333	0041		STM		
1334	0066		RANDM1		NEW RANDOM NUMBER
1335	0051		RAM		
1336	0074		VAR		
1337	0021		LDM		
1340	0101		TEMP		CHANGE VARIABLE
1341	0051		RAM		
1342	0074		VAR		
1343	0020		LDN		
1344	0000	EXIT15	0		RETURN JUMP
1345	0202		ATT	T2	
1346	0264		UJP	T2	
1347	0000	EXIT14	0		
1350	0020	TESTSX	LDN		
1351	0077		77		601,608 DATA COMPARE MASK
1352	0041		STM		
1353	0025		MASK1A		
1354	0021		LDM		
1355	0060		MASK1		CHECK FOR 609 TAPE DRIVE
1356	0260		ZJP	T2	601 DRIVE
1357	1366		TESTSY		
1360	0020		LDN		
1361	0377		377		609 DATA COMPARE MASK
1362	0041		STM		
1363	0025		MASK1A		
1364	0020		LDN		609 DRIVE
1365	0004		4		
1366	0030	TESTSY	ADN		
1367	0021		21		
1370	0041		STM		
1371	0026		FILE		609 ALWAYS HAS PARITY ERROR ON FILE MARK.
1372	0020		LDN		
1373	0004		T20		
1374	0102		ATT	T1	
1375	0202		ATT	T2	
1376	0264		UJP	T2	
1377	2000		TESTS		
	1400	PRG	1400		

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* BANK *
* 03 *
* * * * *
* ***** *

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1400 0020 SEL1 REM LDN SELECT FUNCTION AND RETURN
1401 0010 CONTR EQU CONTR SET CONTROLLER NUMBER
      0010 CONTR EQU 10
1402 0031 ADM ADD UNIT NUMBER
1403 0050 UNIT
1404 0241 STM T2
1405 1415 UNIT2
1406 0041 STM
1407 0142 UNIT2X
1410 0021 LDM GET FUNCTION
1411 0005 LFUNCT
1412 0241 STM T2
1413 1416 UNIT3
1414 0075 EXF SELECT TAPE DRIVE
1415 0000 UNIT2 0
1416 0000 UNIT3 0
1417 0064 UJP
1420 0222 SEL2 RETURN
      REM I/O NORMAL 256 WORDS OR LESS
1421 0021 NORM2 LDM
1422 0071 TAG3A SET I/O TAG
1423 0302 ATT T3
1424 0021 LDM
1425 0077 IOTYP READ OR WRITE FUNCTION
1426 0241 STM T2
1427 1434 NORM2A
1430 0021 LDM
1431 0065 LWA SET LAST ADDRESS + 1
1432 0241 STM T2
1433 1436 NORM2B
1434 0000 NORM2A 0 READ OR WRITE (72 OR 73)
1435 0000 0 FIRST WORD ADDRESS
1436 0000 NORM2B 0 LWA +1
1437 0041 STM
1440 0064 LAST SAVE TERMINATING ADDRESS
1441 0064 UJP RETURN
1442 0156 NORM1A
      REM BUFFER I/O ROUTINE
1443 0021 BUFF2 LDM SET TAG 3 FOR LOADING OF BER REGISTER
1444 0071 TAG3A
1445 0302 ATT T3
1446 0003 CLA LOWER 8 BIT ADDRESS ALWAYS ZERO
1447 0204 BUFF2A ABR T2
1450 1472 BUSY1
1451 0021 LDM SET TAG FOR LOADING OF BXR REGISTER
1452 0072 TAG3B
1453 0302 ATT T3
1454 0021 LDM
1455 0065 LWA LAST WORD ADDRESS +1 OR +2
1456 0205 BUFF2B ABX T2 READ IS LWA +1. WRITE IS LWA +2.
1457 1472 BUSY2
1460 0021 LDM
1461 0077 IOTYP
1462 0241 STM T2
1463 1466 BUFF2C

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1464	0041		STM	
1465	0731		EXPEC2	EXPECT BUFFER INTERRUPT
1466	0000	BUFF2C	0	READ OR WRITE FUNCTION
1467	1472		BUSY3	TAG 2 JUMP IF BUSY
1470	0064		UJP	
1471	0175		BUFF1A	RETURN AFTER OPERATION
1472	0000	BUSY1	BSS	0
1472	0000	BUSY2	BSS	0
1472	0000	BUSY3		0
1473	0203		TTA	T2
1474	0102		ATT	T1
1475	0020		LDN	
1476	0066		CODE20	BUFFER INDICATES BUSY
1477	0041		STM	
1500	0063		ERRCOD	
1501	0021		LDM	
1502	0003		ASTAT	
1503	0041		STM	
1504	0054		AREG	
1505	0020		LDN	
1506	1443		BUFF2	RETURN ADDRESS
1507	0064		RJP	
1510	0333		ERPORT	REPORT ERROR
	0002	GENTAG	EQU	2
	0003	1BNKTG	EQU	3
	0003	2BNKTG	EQU	3
	0003	BUFTAG	EQU	3
	0016	INNTAG	EQU	16
	0014	OUTTAG	EQU	14
	0003	SELTAG	EQU	3
	6000	OUTPUT	EQU	6000
			REM	
			REM	
				COMPARE DATA ROUTINE
1511	0020	COMP2	LDN	
1512	0016		INNTAG	SET TAGS 1 AND 3 FOR
1513	0102		ATT	T1 COMPARING DATA READ AND WRITTEN
1514	0020		LDN	
1515	0014		OUTTAG	
1516	0302		ATT	T3
1517	0003		CLA	
1520	0041		STM	START COMPARE WITH FWA
1521	0057		DATAIO	
1522	0322	COMP2A	LDI	T3 WRITE DATA BANK
1523	0057		DATAIO	
1524	0116		LSI	T1
1525	0057		DATAIO	DATA READ BANK
1526	0011		LPM	MASK FOR CORRECT TAPE DRIVE
1527	0025		MASK1A	DATA IS 77 IF 601 OR 608 DRIVE
				DATA IS 377 IF 609 TAPE DRIVE
			REM	
1530	0261		NZP	T2
1531	1604		DATER	
1532	0055	COMP3A	RAO	GO TO ERROR ROUTINE
1533	0057		DATAIO	UPDATE COMPAR ADDRESSES
1534	0260		ZJP	T2 CHECK FOR MORE BANKS
1535	1544		COMP2B	
1536	0035		SBM	
1537	0075		AMNT1	
1540	0261		NZP	T2
1541	1522		COMP2A	
1542	0064		UJP	

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1543	0260		COMP1A		EXIT. COMPARING FINISHED
1544	0321	COMP2B	LDM	T3	
1545	0377		377		BOUNDRY ADDRESS
		REM			DATA IS 377 IF 609 TAPE DRIVE
1546	0115		LSM	T1	
1547	0377		377		BOUNDRY ADDRESS
1550	0011		LPM		MASK FOR CORRECT TAPE DRIVE
1551	0025		MASK1A		DATA IS 77 IF 601 OR 608 DRIVE
1552	0260		ZJP	T2	
1553	1562		COMP2C		
1554	0020		LDN		
1555	0377		377		
1556	0041		STM		DATA ERROR AT BOUNDRY ADDRESS
1557	0057		DATAIO		INDICATE BOUNDRY ADDRESS FOR ERROR REPORTER
1560	0264		UJP	T2	GO REPORT ERROR
1561	1604		DATERR		
1562	0103	COMP2C	TTA	T1	UP TAG CHECK NEXT BANK
1563	0030		ADN		
1564	0001		1		
1565	0102		ATT	T1	
1566	0303		TTA	T3	
1567	0034		SBN		
1570	0015		OUTTAG	1	
1571	0260		ZJP	T2	IF COMPARE COMPLETED, EXIT
1572	0260		COMP1A		
1573	0020		LDN		
1574	0015		OUTTAG	1	
1575	0302		ATT	T3	
1576	0021		LDM		SET LWA FOR FINAL BANK OF DATA
1577	0100		AMNT2		
1600	0041		STM		
1601	0075		AMNT1		
1602	0264		UJP	T2	
1603	1522		COMP2A		GO COMPARE FINAL DATA BANK
1604	0020	DATERR	LDN		
1605	0050		CODE13		DATA COMPARE ERROR
1606	0041		STM		
1607	0063		ERRCOD		STORE ERROR CODE FOR SMM
1610	0322		LDI	T3	GET LAST COMPARED EXPECTED DATA WORD
1611	0057		DATAIO		
1612	0041		STM		STORE FOR DISPLAY
1613	0052		ERRABX		
1614	0122		LDI	T1	GET LAST COMPARED RECEIVED DATA WORD
1615	0057		DATAIO		
1616	0041		STM		STORE FOR ERROR DISPLAY
1617	0054		AREG		
1620	0103		TTA	T1	
1621	0241		STM	T2	
1622	1642		SAVE1		
1623	0203		TTA	T2	
1624	0102		ATT	T1	
1625	0303		TTA	T3	
1626	0241		STM	T2	
1627	1645		SAVE3		
1630	0020		LDN		
1631	1634		COMP2F		RETURN ADDRESS
1632	0064		UJP		GO REPORT ERROR VIA SMM
1633	0333		ERPORT		
1634	0102	COMP2F	ATT	T1	
1635	0020		LDN		

1636	1641	SAVE1	-1	RETURN ADDRESS
1637	0064	UJP		GO CHECK FOR INTERRUPT 10
1640	0102	SMMQX		
1641	0020	LDN		
1642	0000	SAVE1		RESTORE TAGS AND
1643	0102	ATT	T1	CONTINUE COMPAR
1644	0020	LDN		
1645	0000	SAVE3		
1646	0302	ATT	T3	
1647	0021	LDM		
1650	0057	DATAIO		
1651	0260	ZJP	T2	
1652	1532	COMP3A		
1653	0034	SBN		GO CONTINUE COMPARE AFTER ERROR DISPLAY
1654	0377	377		
1655	0261	NZP	T2	
1656	1532	COMP3A		
1657	0041	STM		
1660	0057	DATAIO		
1661	0264	UJP	T2	
1662	1562	COMP2C		GO COMPARE
1663	0020	NEXSEC		
1664	0054	LDN		
		CODE15		THIS CODE INDICATES THIS TEST SECTION
		REM		IS ON THE SECOND MAG TAPE SECTION OF TESTS
		REM		SMM92 MUST BE RELOADED AND USE TEST PARAMETER 015
1665	0041	STM		
1666	0063	ERRCOD		
1667	0003	CLA		
1670	0041	STM		
1671	0052	ERRABX		
1672	0041	STM		
1673	0054	AREG		
1674	0020	LDN		
1675	0004	4		
1676	0102	ATT	T1	SET TAG FOR RETURN TO END TEST SECTION
1677	0020	LDN		
1700	2047	XXX	-5	GO END ALL TESTING
1701	0064	RJP		GO REPORT CODE VIA REGISTER DISPLAY
1702	0333	REPORT		
1703	0020	LDN		
1704	0004	T20		
1705	0202	ATT	T2	
1706	0102	ATT	T1	
1707	0003	CLA		
1710	0041	STM		RESET DELAY COUNTERS TO ZERO
1711	0076	COMM1		
1712	0041	STM		
1713	0055	COMM2		
1714	0041	STM		
1715	0056	COMM3		
1716	0264	UJP	T2	
1717	2132	PRG		
	2000	LOOP1		
		2000		

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*   *   *   *   *
* *   *   * *
*   BANK   *
* *   *   * *
*   *   *   *
*   *   *   *
*   *   *   *

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REM

ADDRESS	DATA	TESTS	REM REM	SELECT TEST SECTION
2000	0020	TESTS	LDN	RESET FLAGS
2001	0001		1	
2002	0241		STM T2	
2003	2021		TESTS1	
2004	0020		LDN	
2005	2112		TGTST	
2006	0241		STM T2	
2007	2070		RUNA 1	
2010	0020		LDN	
2011	2122		LOCTES	
2012	0241		STM T2	
2013	2075		RUNA2	
2014	0021	TESTSA	LDM	CHECK FOR TESTS WANTED TO RUN IF PARAMETER IS ZERO, RUN ALL.
2015	0047		PARAM	
2016	0260		ZJP T2	
2017	2057		RUNALL	
2020	0010		LPN	
2021	0001	TESTS1	1	MASK FOR EACH TEST
2022	0261		NZP T2	
2023	2065		RUNX	GO EXECUTE TEST
2024	0255		RAO T2	
2025	2070		RUNA 1	
2026	0255		RAO T2	
2027	2075		RUNA2	
2030	0221	TESTSB	LDM T2	ALTER MASK FOR NEXT TEST
2031	2021		TESTS1	
2032	0001		SHA	
2033	0241		STM T2	
2034	2021		TESTS1	
2035	0034		SBN	
2036	0001		1	CHECK FOR ALL TESTS COMPLETED GO CHECK FOR NEXT TEST
2037	0261		NZP T2	
2040	2014		TESTSA	
2041	0021		LDM	
2042	0002		SWITCH	CHECK FOR REPEAT OF ALL TESTS
2043	0010		LPN	
2044	0100		100	
2045	0261		NZP T2	GO REPEAT TESTS
2046	2000		TESTS	
2047	0020		LDN	
2050	0001		1	
2051	0352		ATT T3	
2052	0020		LDN	
2053	0002		2	
2054	0204	XXX	ABR T2	
2055	2054		XXX	
2056	0077		HLT	END OF ALL SELECTED TEST SECTIONS
2057	0020	RUNALL	LDN	
2060	0377		377	SET PARAMETER FOR RUNNING ALL TESTS
2061	0041		STM	
2062	0047		PARAM	
2063	0264		UJP T2	GO CHECK FOR NEXT TEST
2064	2014		TESTSA	
2065	0041	RUNX	STM	
2066	0017		SECTS	SAVE SECTION BIT NUMBER
2067	0221	RUNA	LDM T2	SET TEST TAG
2070	2112		TGTST	
2071	0102		ATT T1	

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2072	0255		RAO	T2	
2073	2070		RUNA	1	UPDATE TAG SETTER
2074	0221		LDM	T2	
2075	2122	RUNA2	LOCTES		SET TEST ADDRESS FOR JUMPING
2076	0241		STM	T2	
2077	2110		RUNA1		
2100	0255		RAO	T2	
2101	2075		RUNA2		
2102	0103		TTA	T1	
2103	0202		ATT	T2	
2104	0003		CLA		CLEAR EXPECTED STATUS
2105	0041		STM		
2106	0004		ESTAT		
2107	0264		UJP	T2	GO EXECUTE TEST
2110	0000	RUNA1	0		
2111	0000	TEST			
2112	0004	TGTEST	TESATG		TEST TAGS
2113	0006		TESBTG		
2114	0007		TESCTG		
2115	0003		TESDTG		
2116	0003		TESFTG		
2117	0003		TESGTG		
2120	0003		TESHTG		
2121	0003		TESHTG		
2122	2201	LOCTES	TESYA		TEST ADDRESSES
2123	3155		TESYB		
2124	3513		TESYC		
2125	1663		TESY1		
2126	1663		TESYE		
2127	1663		TESYF		
2130	1663		TESYG		
2131	1663		TESYH		
	0004	TESATG EQU	4		
	0006	TESBTG EQU	6		
	0007	TESCTG EQU	7		
	0003	TESDTG EQU	3		
	0003	TESETG EQU	3		
	0003	TESFTG EQU	3		
	0003	TESGTG EQU	3		
	0003	TESHTG EQU	3		
	1663	TESD1 EQU	NEXSEC		
	1663	TESTE EQU	NEXSEC		
	1663	TESTF EQU	NEXSEC		
	1663	TESTG EQU	NEXSEC		
	1663	TESTH EQU	NEXSEC		
		REM			
2132	0021	LOOP1	LDM		
2133	0142		UNIT2X		GET UNIT AND CONTROLLER NUMBER
2134	0241		STM	T2	
2135	2137		UNIT2A		
2136	0075		EXF		READ STATUS
2137	0000	UNIT2A	0		
2140	0000		RST		
2141	0076		INA		INPUT STATUS
2142	0013		CIL		
2143	0011		LPM		MASK FOR STATUS WAITING FOR
2144	0046		WTBIT		
2145	0060		ZJP		RETURN IF STATUS HAS DROPPED
2146	0325		EXIT1A		
2147	0055		RAO		

2150	0076	COMM1	DELAY AND WAIT FOR STATUS TO DROP
2151	0261	NZP T2	
2152	2136	UNIT2A -1	
2153	0055	RAO	
2154	0055	COMM2	
2155	0261	NZP T2	
2156	2136	UNIT2A -1	
2157	0055	RAO	
2160	0056	COMM3	
2161	0261	NZP T2	
2162	2136	UNIT2A -1	
2163	0020	LDN	TERMINATE DELAY IF STATUS HAS NOT DROPPED
2164	0072	CODE22	
2165	0041	STM	
2166	0063	ERRCOD	CODES TO ERROR REGISTERS
2167	0021	LDM	
2170	0003	ASTAT	LAST STATUS
2171	0041	STM	
2172	0052	ERRABX	
2173	0003	CLA	
2174	0102	ATT T1	
2175	0020	LDN	
2176	0325	EXIT1A	RETURN ADDRESS
2177	0064	UJP	
2200	0333	ERPORT	GO REPORT ERROR

REM
REM
REM

TEST SECTION A

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2201	0020	TESTA	LDN	
2202	0337		337	
2203	0041		STM	
2204	0007		MASK	
2205	0203		TTA T2	
2206	0102		ATT T1	
2207	0003		CLA	EXPECT STATUS OF 00X00000
2210	0041		STM	
2211	0004		ESTAT	
2212	0041		STM	
2213	0100		AMNT2	
2214	0020		LDN	LOAD POINT STATUS NOT PREDICTABLE
2215	2365		JUMP -1	
2216	0041		STM	
2217	0070		RETURN	
2220	0020		LDN	
2221	0010		SOX	SET ODD PARITY
2222	0064		RJP	
2223	0202		SELECT	
2224	0064	TESTXX	RJP	
2225	0300		STATUS	
2226	0020	TESTA1	LDN	SET REWIND FUNCTION
2227	0034		REW	
2230	0064		RJP	
2231	0202		SELECT	GO SELECT FUNCTION
2232	0003	TESTA2	CLA	SET STATUS FUNCTION
2233	0041		STM	ZERO COUNTER ALSO
2234	0075		AMNT1	
2235	0064		RJP	GO EXECUTE FUNCTION
2236	0202		SELECT	
2237	0076	TESTA3	INA	
2240	0010		LPN	

2241	0040		40	LOOP AND WAIT FOR LOADPOINT
2242	0261		NZP T2	
2243	2246		TEST1A	
2244	0064		RJP	
2245	0206		SELECT 4	
2246	0020	TEST1A	LDN	
2247	0002		2	SET DATA GENERATOR FOR BINARY
2250	0041		STM	
2251	0062		DATYP	
2252	0020		LDN	
2253	2256		TESTA4	RETURN ADDRESS
2254	0064		RJP	GO GENERATE DATA
2255	0227		GEN	
2256	0020	TESTA4	LDN	
2257	0012		T50	
2260	0041		STM	
2261	0071		TAG3A	SET OUTPUT DATA TAG
2262	0041		STM	
2263	0072		TAG3B	
2264	0020		LDN	SET TYPE OF OPERATION
2265	0271		IBO T2	(OUTPUT BUFFER)
2266	0041		STM	
2267	0077		IOTYP	
2270	0020		LDN	SET AMOUNT OF OUTPUT
2271	0145		100D 1	LAST WORD ADDRESS PLUS TWO
2272	0041		STM	
2273	0065		LWA	
2274	0020		LDN	
2275	0377		377	
2276	0041		STM	
2277	0007		MASK	
2300	0020		LDN	
2301	0020		WRT	
2302	0064		RJP	GO SELECT WRITE
2303	0202		SELECT	
2304	0020	TESTA5	LDN	
2305	2310		TESTA	RETURN ADDRESS
2306	0064		RJP	GO OUTPUT DATA VIA BUFFER CHANNEL
2307	0163		BUFF1	
2310	0003	TESAA	CLA	
2311	0041		STM	
2312	0730		EXPECX	DO NOT EXPECT EXTERNAL INTERRUPT
2313	0013		CIL	WAIT FOR INTERRUPT
2314	0064		RJP	
2315	0387		WAIT	
2316	0021	TEST2A	LDM	
2317	0731		EXPEC2	INTERRUPT INDICATOR
2320	0260		ZJP T2	NON-ZERO = NO INTERRUPT
2321	2332		TESTA7	
2322	0021	TESTA6	LDM	
2323	0044		CODE11	EXPECTED INTERRUPT NOT RECEIVED
2324	0041		STM	
2325	0063		ERRCOD	
2326	0020		LDN	
2327	2332		TESTA7	
2330	0064		RJP	
2331	0333		REPORT	
2332	0064	TESTA7	RJP	
2333	0300		STATUS	CHECK STATUS FOR ERRORS
2334	0055	TESTA8	RAO	AFTER WRITE OPERATION

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2424	0021	TESAA1	LDM		
2425	0730		EXPECX		
2426	0260		ZJP	T2	GO CONTINUE. NO ERROR
2427	2450		TESTAC		
2430	0020		LDN		
2431	0046		CODE12		EXTERNAL INTERRUPT ON LOAD POINT DID NOT OCCUR
		REM			
2432	0041		STM		
2433	0063		ERRMOD		
2434	0020		LDN		
2435	0004		ESTAT		
2436	0041		STM		
2437	0052		ERRABX		
2440	0020		LDN		
2441	0003		ASTAT		
2442	0041		STM		
2443	0054		AREG		
2444	0020		LDN		
2445	2450		TESTAC		
2446	0064		RJP		
2447	0333		REPORT		
2450	0020	TESTAC	LDN		
2451	0040		40		
2452	0041		STM		READ STATUS
2453	0004		ESTAT		
2454	0020		LDN		EXPECT LOADPOINT
2455	0367		367		MASK FOR PROGRAM ERROR EXPECTED
2456	0041		STM		
2457	0007		MASK		ALL ZEROS STATUS EXPECTED
2460	0064		RJP		
2461	0300		STATUS		GO READ STATUS
2462	0020	TESTAE	LDN		SET INTERRUPT LOCKOUT
2463	0002		SLO		
2464	0064		RJP		GO SELECT FUNCTION
2465	0202		SELECT		
2466	0076	TESTAF	INA		DISREGARD STATUS WHEN SELECTING INTERRUPT
2467	0013		CIL		
2470	0020		LDN		
2471	2474		TESTAF	6	
2472	0064		RJP		GO CHECK FOR INTERRUPT 10
2473	0102		SMMQX		
2474	0055		RAO		REPEAT COMPLETE OPERATION
2475	0100		AMNT2		
2476	0034		SBN		10 TIMES
2477	0001		1		
2500	0260		ZJP	T2	
2501	2514		TEST4A		
2502	0020		LDN		
2503	0327		327		MASK FOR PROGRAM ERROR AND LOADPOINT
2504	0041		STM		
2505	0007		MASK		
2506	0020	TESAA2	LDN		
2507	0004		T20		
2510	0102		ATT	T1	
2511	0202		ATT	T2	
2512	0264		UJP	T2	
2513	2205		TESTA	4	
2514	0021	TEST4A	LDM		
2515	0002		SWITCH		PARAMETER BIT 4 REPEATS SECTION
2516	0010		LPN		COMPLETE SEGMENT

2517	0020		20	
2520	0261		NZP	T2
2521	2522		TESAA2	4
		REM		
		REM		
		REM		WRITE/BACKSPACE/WRITE SEGMENT
2522	0020	TESA1	LDN	
2523	0014		SEX	SELECT EVEN PARITY
2524	0064		RJP	
2525	0202		SELECT	
2526	0020	TESAZ1	LDN	
2527	0021		WFM	SET FILE MARK FUNCTION
2530	0064		RJP	GO SELECT FUNCTION
2531	0202		SELECT	
2532	0021	TESA2	LDM	
2533	0026		FILE	
2534	0041		STM	EXPECT STATUS OF 30
2535	0004		ESTAT	
2536	0003		CLA	
2537	0041		STM	
2540	0075		AMNT1	
2541	0020		LDN	
2542	0377		377	
2543	0041		STM	
2544	0007		MASK	
2545	0064		RJP	
2546	0307		WAIT	
2547	0064	TESA3	RJP	CHECK STATUS
2550	0300		STATUS	EXPECT FILE MARK
2551	0020	TESAZ2	LDN	
2552	0010		SOX	
2553	0064		RJP	
2554	0202		SELECT	SELECT ODD PARITY
2555	0020	TESA4	LDN	
2556	0020		WRT	WRITE FUNCTION
2557	0064		RJP	
2560	0202		SELECT	GO SELECT FUNCTION
2561	0074	TESA5	OTN	
2562	0052		52	OUTPUT DATA WORD (25)
2563	0064		RJP	
2564	0307		WAIT	
2565	0003	TESA6	CLA	
2566	0041		STM	EXPECT STATUS OF 000
2567	0004		ESTAT	
2570	0064		RJP	
2571	0300		STATUS	
2572	0020	TESA7	LDN	
2573	0031		SBR	SEARCH BACK ONE RECORD
2574	0064		RJP	
2575	0202		SELECT	
2576	0064	TESA8	RJP	GO WAIT FOR BUSY TO DROP
2577	0307		WAIT	
2600	0064	TESA9	RJP	
2601	0300		STATUS	READ STATUS
2602	0020	TESA10	LDN	EXPECT 000
2603	0020		WRT	
2604	0064		RJP	SELECT WRITE
2605	0202		SELECT	
2606	0074	TESA11	OTN	OUTPUT ONE WORD
2607	0025		25	

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2610	0064		RJP	GO DELAY
2611	0307		WAIT	
2612	0064	TESA12	RJP	READ STATUS
2613	0300		STATUS	EXPECT 000
2614	0055	TES5A	RAO	
2615	0075		AMNT1	
2616	0034		SBN	
2617	0372		2500	
2620	0260		ZJP	T2 REPEAT WRITE 250 TIMES
2621	2630		TES6A	
2622	0020		LDN	
2623	2736		JUMP1	100
2624	0041		STM	
2625	0070		RETURN	
2626	0264		UJP	T2
2627	2555		TESA4	
2630	0041	TES6A	STM	
2631	0075		AMNT1	
2632	0020		LDN	
2633	0014		SEX	SELECT EVEN PARITY
2634	0064		RJP	
2635	0202		SELECT	
2636	0020	TESA13	LDN	
2637	0021		WFM	
2640	0064		RJP	
2641	0202		SELECT	EXECUTE FUNCTION
2642	0064	TESAX1	RJP	
2643	0307		WAIT	WAIT BUSY TO DROP
2644	0021	TESA14	LDM	
2645	0026		FILE	
2646	0041		STM	
2647	0004		ESTAT	
2650	0064		RJP	
2651	0300	TESA15	STATUS	
2652	0020		LDN	
2653	0375		375	
2654	0041		STM	
2655	0075		AMNT1	
2656	0020		LDN	
2657	0033		SBF	SEARCH FILE BACK
2660	0064		RJP	
2661	0202		SELECT	
2662	0064	TESA16	RJP	
2663	0307		WAIT	WAIT BUSY
2664	0064	TESA17	RJP	
2665	0300		STATUS	GO READ STATUS
2666	0055	TESAX5	RAO	
2667	0075		AMNT1	
2670	0263		NJP	T2
2671	2712		TES6A	
2672	0020		LDN	
2673	0032		SFF	
2674	0064		RJP	
2675	0202		SELECT	
2676	0064	TESA18	RJP	
2677	0307		WAIT	WAIT BUSY
2700	0020	TESA19	LDN	
2701	3125		JUMP2	-1
2702	0041		STM	
2703	0070		RETURN	

2704	0020		LDN	
2705	0006		T30	
2706	0102		ATT	T1
2707	0202		ATT	T2
2710	0264		UJP	T2
2711	3000		TESAX2	
2712	0020	TESTA	LDN	
2713	2753		JUMP1	23D
2714	0041		STM	
2715	0070		RETURN	
2716	0020		LDN	
2717	0025		25	
2720	0041		STM	
2721	0004		ESTAT	
2722	0264		UJP	T2
2723	2656		TESA15	4

ADDRESSES FOR RETURN JUMPS*****

2724	2410	JUMP1	TESTA9	
2725	2416		TESTAA	
2726	2421		TESTAB	
2727	2424		TESA1	
2730	2462		TESAE	
2731	2466		TESAF	
2732	2526		TESAZ1	
2733	2532		TESA2	
2734	2547		TESA3	
2735	2551		TESAZ2	
2736	2555		TESA4	
2737	2561		TESA5	
2740	2565		TESA6	
2741	2572		TESA7	
2742	2576		TESA8	
2743	2600		TESA9	
2744	2602		TESA10	
2745	2606		TESA11	
2746	2612		TESA12	
2747	2614		TESA	
2750	2636		TESA13	
2751	2642		TESAX1	
2752	2644		TESA14	
2753	2652		TESA15	
2754	2662		TESA16	
2755	2664		TESA17	
2756	2666		TESAX5	
2757	2676		TESA18	
2760	2700		TESA19	
	3000	PRG	300*	

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*   *   *   *   *
* *   *   *   *
*  BANK  *
*   06   *
* *   *   *   *
*   *   *   *

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3000	0020	TESAX2	LDN	
3001	0014		SEX	
3002	0064		RJP	
3003	0202		SELFC	
3004	0020	TESAX3	LDN	
3005	0024		RF	
3006	0064		RJP	

SELECT BCD MODE

SELECT READ FORWARD FUNCTION

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3007	0222		SELFC		
3010	0076	TESAX4	INA		INPUT ONE WORD RECORD
3011	0041		STM		
3012	0054		AREG		SAVE DATA INPUTED
3013	0034		SBN		CHECK FOR CORRECT DATA WORD
3014	0025		Z5		
3015	0260		ZJP	T2	GO CHECK NEXT RECORD
3016	3033		TESA20		
3017	0020		LDM		
3020	0052		CODE14		BACKSPACE ERROR
3021	0041		STM		STORE ERROR CODE
3022	0063		ERRCOD		
3023	0020		LDM		
3024	0025		Z5		
3025	0041		STM		STORE EXPECTED DATA
3026	0052		ERRABX		
3027	0020		LDM		
3030	3033		TESA20		RETURN ADDRESS
3031	0064		RJP		GO REPORT ERROR
3032	0333		ERRORT		
3033	0064	TESA20	RJP		
3034	0307		WAIT		WAIT BUSY
3035	0020	TESA21	LDM		EXPECT PARITY ERROR AND BCD
3036	0005		Z5		
3037	0041		STM		
3040	0004		ESTAT		
3041	0020		LDM		
3042	0377		Z77		
3043	0041		STM		
3044	0007		MASK		NO UN PREDICTABLE BITS
3045	0064		RJP		GO CHECK STATUS
3046	0300		STATUS		
3047	0020	TESA22	LDM		
3050	3126		JUMP2		
3051	0041		STM		
3052	0070		RETURN		RESET RETURN JUMP ADDRESSES
3053	0020		LDM		
3054	3057		TESA22	8D	CHECK FOR INTERRUPT 10
3055	0064		RJP		
3056	0102		SMMOX		
3057	0055		RAO		REPEAT READ 250 TIMES
3060	0140		TEMP2		
3061	0034		SBN		
3062	0372		Z50D		
3063	0261		NZP	T2	REPEAT READ OPERATION
3064	3004		TESAX3		
3065	0041		STM		
3066	0140		TEMP2		
3067	0021		LDM		CHECK FOR END OF TEST HALT
3070	0002		SWITCH		
3071	0010		LPN		
3072	0001		Z1		
3073	0260		ZJP	T2	
3074	3104		TESA24		
3075	0302		ATT	T3	CODES TO HER REGISTER
3076	0204	TESA25	ABR	T2	
3077	3076		TESA25		
3100	0021		LDM		
3101	0017		SECTS		SECTION NUMBER TO A REGISTER
3102	0077		HLT		

3103	0013		CIL	
3104	0021	TESA24	LDM	
3105	0002		SWITCH	CHECK REPEAT PARAMETER
3106	0010		LPN	
3107	0030		30	
3110	0260		ZJP	T2
3111	3120		TESA23	
3112	0020		LDN	
3113	0005		T24	
3114	0102		ATT	T1
3115	0202		ATT	T2
3116	0264		UJP	T2
3117	2712		TES7A	
3120	0020	TESA23	LDN	
3121	0004		T20	
3122	0102		ATT	T1
3123	0202		ATT	T2
3124	0264		UJP	T2
3125	2030		TESTSB	GO EXECUTE NEXT TEST
3126	3004	JUMP2	TES3X3	
3127	3010		TES4X4	
3130	3033		TESA20	
3131	3035		TESA21	
3132	3047		TESA22	
3133	0021	SMMQ1A	LDM	CHECK FOR INT. 10
3134	0125		SMMINT	
3135	0060		ZJP	
3136	0115		EXIT21 -1	
3137	0003		CLA	CLEAR INTERRUPT 10
3140	0041		STM	
3141	0125		SMMINT	
3142	0020	SMMQ5	LDN	
3143	0111		CODEX1	
3144	0204	SMMQ3X	ABR	T2
3145	3144		SMMQ3X	
3146	0021		LDM	
3147	0002		SWITCH	SWITCH PARAMETER MAY NOW BE CHANGED IN A REG.
3150	0077		HLT	
3151	0041		STM	RESTORE NEW SWITCH PARAMETER
3152	0002		SWITCH	
3153	0064		UJP	
3154	0115		EXIT21 -1	
3155	0203	TESTB	TTA	T2
3156	0102		ATT	T1
3157	0003		CLA	
3160	0041		STM	
3161	0075		AMNT1	
3162	0020		LDN	
3163	3231		JUMP2A -1	
3164	0041		STM	
3165	0070		RETURN	
3166	0020		LDN	
3167	0014		SEX	
3170	0064		RJP	SELECT EVEN PARITY
3171	0202		SELECT	
3172	0020	TESB1	LDN	EXPECT BCD STATUS
3173	0001		1	
3174	0041		STM	
3175	0004		ESTAT	
3176	0020		LDN	

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3177	0333		333	PARITY AND LOADPOINT NOT PREDICTABLE
3200	0041		STM	
3201	0007		MASK	
3202	0064		RJP	GO READ STATUS
3203	0380		STATUS	
3204	0020	TESB2	LDN	
3205	0020		WRT	SELECT WRITE FUNCTION
3206	0064		RJP	
3207	0282		SELECT	
3210	0074	TESB3	OTN	OUTPUT ZERO (ILLEGAL BCD)
3211	0000		0	
3212	0074		OTN	OUTPUT LEGAL BCD
3213	0076		76	
3214	0020		LDN	
3215	3505		JUMP2B -1	
3216	0041		STM	
3217	0070		RETURN	
3220	0020		LDN	
3221	0007		T34	
3222	0102		ATT	T1
3223	0202		ATT	T2
3224	0020		LDN	
3225	0377		377	
3226	0041		STM	NO UNPREDICTABLE
3227	0007		MASK	
3230	0264		UJP	T2
3231	3400		TESB3X	
3232	3172	JUMP2A	TESB1	
3233	3204		TESB2	
3234	3210		TESB3	
3235	0205	ERROR1	ABX	T2
3236	3235		ERR0R1	WAIT FOR BUFFER TO FINISH
3237	0006		BER	
3240	0041		STM	SAVE TERMINATING ADDRESS
3241	0064		LAST	
3242	0021		LDM	LOAD TAG 3 WITH UPPER 2 BITS OF ERROR CODE
3243	0053		ERR0D1	
3244	0302		ATT	T3
3245	0021		LDM	LOAD BER REGISTER WITH LOWER 8 BITS OF ERROR CODE
3246	0063		ERR0D	
3247	0204	ERROR2	ABR	T2
3250	3247		ERR0R2	ERROR JUMP ADDRESS IF BUFFER BUSY
3251	0021		LDM	LOAD BXR REG. WITH EXPECTED DATA OR STATUS
3252	0052		ERR0BX	
3253	0285	ERROR3	ABX	T2
3254	3253		ERR0R3	BUSY JUMP ADDRESS
3255	0055		RAO	
3256	0037		ERR0RS	COUNT ERRORS
3257	0021		LDM	
3260	0002		SWITCH	CHECK PARAMETER FOR STOP ON ERROR
3261	0010		LPN	
3262	0004		4	
3263	0260		ZJP	T2
3264	3304		G01	NO STOP ON ERROR
3265	0021		LDM	CHECK ERROR COUNT
3266	0051		ERR0MT	
3267	0260		ZJP	T2
3270	3277		STOP2	STOP ON ERROR
3271	0035		SBM	STOP AFTER XXX ERRORS
3272	0037		ERR0RS	

3426	0020	TESB8	LDN		
3427	3232		JUMP2A		
3430	0041		STM		
3431	0070		RETURN		
3432	0055		RAO		
3433	0075		AMNT1		
3434	0034		SBN		
3435	0062		50D		REPEAT ILLEGAL WRITE 50 TIMES
3436	0261		NZP	T2	
3437	3500		TESB10		
3440	0013	TESB9	CIL		
3441	0020		LDN		
3442	3445		TESR9	5	
3443	0064		RJP		
3444	0102		SMMQX		
3445	0021		LDM		
3446	0002		SWITCH		CHECK FOR END OF SECTION HALT
3447	0010		LPN		
3450	0001		1		
3451	0260		ZJP	T2	
3452	3463		TESB9B		
3453	0020		LDN		
3454	0002		2		
3455	0302		ATT	T3	
3456	0204	TESB9A	ABR	T2	CODE TO BER REGISTER
3457	3456		TESB9A		
3460	0021		LDM		
3461	0017		SECTS		SECTION NUMBER TO A REGISTER
3462	0077		HLT		END OF SECTION HALT
3463	0013	TESB9B	CIL		
3464	0021		LDM		CHECK FOR REPEAT ON SWITCH PARAMETER.
3465	0002		SWITCH		
3466	0010		LPN		
3467	0020		20		
3470	0261		NZP	T2	
3471	3500		TESB10		
3472	0020		LDN		
3473	0004		T20		
3474	0102		ATT	T1	
3475	0202		ATT	T2	
3476	0264		UJP	T2	
3477	2030		TESTSB		
3500	0020	TESB10	LDN		
3501	0006		T30		
3502	0102		ATT	T1	
3503	0202		ATT	T2	
3504	0264		UJP	T2	
3505	3162		TESR1	-8D	
3506	3406	JUMP2B	TESR4		
3507	3410		TESR5		
3510	3420		TESR6		
3511	3424		TESR7		
3512	3426		TESR8		
		REM			
		REM			
		REM			ERASE TAPE AND SEARCH END OF FILE TEST
3513	0020	TESTC	LDN		
3514	3754		JUMPC	-1	
3515	0041		STM		
3516	0070		RETURN		

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3517	0203		TTA	T2	
3520	0102		ATT	T1	
3521	0003		CLA		
3522	0041		STM		
3523	0075		AMNT1		
3524	0041		STM		
3525	0100		AMNT2		
3526	0020		LDN		
3527	0010		SOX		SET ODD PARITY. (BINARY)
3530	0064		RJP		
3531	0202		SELECT		GO SELECT FUNCTION
3532	0020	TESC1	LDN		SET GENERATOR FOR ALL 377 DATA
3533	0020		Z0		
3534	0041		STM		
3535	0062		DATTYP		
3536	0020		LDN		
3537	3542		TESC2		
3540	0064		RJP		
3541	0227		GEN		GO GENERAT DATA
3542	0020	TESC2	LDN		
3543	0012		T50		
3544	0041		STM		SET BUFFER TAGS
3545	0071		TAG3A		
3546	0030		ADN		
3547	0001		1		
3550	0041		STM		
3551	0072		TAG3B		
3552	0020		LDN		SET LAST WORD ADDRESS
3553	0376		376		
3554	0041		STM		
3555	0065		LWA		
3556	0020		LDN		
3557	0271		IBO	T2	SET WRITE BUFFER OPERATION
3560	0041		STM		
3561	0077		IOTYP		
3562	0020		LDN		
3563	0020		WRT		GO SELECT WRITE FUNCTION
3564	0064		RJP		
3565	0202		SELECT		
3566	0020	TESC2X	LDN		
3567	3572		TESC3		RETURN ADDRESS
3570	0064		RJP		GO INITIATE WRITE BUFFER
3571	0163		BUFF1		
3572	0064	TESC3	RJP		
3573	0307		WAIT		WAIT BUSY
3574	0006	TESC4	BER		CHECK TERMINATION ADDRESS
3575	0041		STM		SAVE LAST WORD ADDRESS
3576	0064		LAST		
3577	0205		ABX	T2	CHECK FOR BUFFER BUSY
3600	3625		TESF5		REPORT ERROR IF BUFFER BUSY
3601	0020		LDN		
3602	0376		376		LAST WORD ADDRESS
3603	0035		SBM		
3604	0064		LAST		
3605	0260		ZJP	T2	GO CONTINUE
3606	3646		TESF7		
3607	0041		STM		STORE FINAL AMOUNT SHORT
3610	0052		ERRABX		
3611	0021		LDM		
3612	0003		ASTAT		GET STATUS FOR DISPLAY

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3613	0041		STM	
3614	0054		AREG	
3615	0020		LDN	GET ERROR CODE FOR DISPLAY
3616	0056		CODE16	
3617	0041		STM	
3620	0063		ERRMOD	
3621	0020		LDN	
3622	3646		TESC7	RETURN ADDRESS
3623	0064		RJP	GO REPORT ERROR
3624	0333		ERPORT	
3625	0007	TESC5	CBC	CLEAR BUFFER
3626	0020		LDN	INDICATE WRITE OPERATION
3627	0001		1	
3630	0041		STM	
3631	0052		ERRABX	
3632	0021		LDM	GET LAST STATUS FOR DISPLAY
3633	0003		ASTAT	
3634	0041		STM	
3635	0054		AREG	
3636	0020		LDN	STORE ERROR CODE = NO BUFFER TERMINATION.
3637	0060		CODE17	
3640	0041		STM	
3641	0063		ERRMOD	
3642	0020		LDN	
3643	3646		TESC7	
3644	0064		RJP	GO REPORT ERROR
3645	0333		ERPORT	
3646	0064	TESC7	RJP	
3647	0300		STATUS	
3650	0055	TESC7A	RAO	
3651	0075		AMNT1	
3652	0261		NZP	T2
3653	3662		TESC9	
3654	0055		RAO	
3655	0100		AMNT2	
3656	0034		SBN	
3657	0002		2	
3660	0260		ZJP	T2
3661	3670		TESC10	
3662	0020	TESC9	LDN	RESET RETURN JUMP ADDRESSES
3663	3755		JUMPC	
3664	0041		STM	
3665	0070		RETURN	
3666	0264		UJP	T2
3667	3552		TESC2X -120	
3670	0041	TESC10	STM	RESET COUNTER TO ZERO
3671	0100		AMNT2	
3672	0020		LDN	
3673	0034		REW	REWIND FUNCTION
3674	0064		RJP	
3675	0202		SELECT	GO SELECT FUNCTION
3676	0020	TESC11	LDN	
3677	0003		CLO	
3700	0064		RJP	SELECT INTERRUPT ON LOADPOINT
3701	0202		SELECT	
3702	0020	TESC12	LDN	
3703	0040		40	
3704	0041		STM	EXPECT LOADPOINT
3705	0004		ESTAT	
3706	0041		STM	

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4006	0064		RJP	
4007	0202		SELECT	
4010	0020	TESCYS	LDN	
4011	0367		367	SET COUNTER FOR -10
4012	0041		STM	
4013	0075		AMNT1	
4014	0020		LDN	
4015	4337		CCOUNT	RESET COUNTER
4016	0241		STM	T2
4017	4077		TESC27	
4020	0020	TESC15	LDN	WRITE FILE MARK
4021	0021		WFM	
4022	0064		RJP	
4023	0202		SELECT	GO SELECT FUNCTION
4024	0064	TESC16	RJP	
4025	0307		WAIT	WAIT BUSY
4026	0021	TESCX1	LDM	
4027	0026		FILE	
4030	0041		STM	EXPECT FILE MARK STATUS
4031	0004		ESTAT	
4032	0041		STM	
4033	0140		TEMP2	
4034	0064		RJP	GO READ STATUS
4035	0300		STATUS	
4036	0020	TESC18	LDN	
4037	0033		SBF	SEARCH BACK ONE FILE
4040	0064		RJP	
4041	0202		SELECT	
4042	0064	TESC19	RJP	
4043	0307		WAIT	WAIT BUSY
4044	0055	TESC20	RAO	REPEAT WRITE FILE AND BACKSPACE FILE 10 TIMES
4045	0075		AMNT1	
4046	0261		NZP	T2
4047	4170		TESC21	
4050	0020		LDN	
4051	0021		WFM	
4052	0064		RJP	GO WRITE FILE MARK
4053	0202		SELECT	
4054	0064	TESC23	RJP	
4055	0307		WAIT	WAIT BUSY
4056	0064	TESC24	RJP	GO READ STATUS
4057	0300		STATUS	
4060	0020	TESC25	LDN	
4061	0001		I	
4062	0041		STM	EXPECT BCD STATUS ONLY
4063	0004		ESTAT	
4064	0020		LDN	
4065	0020		WRT	WRITE FUNCTION
4066	0064		RJP	
4067	0202		SELECT	
4070	0074	TESC26	OTN	OUTPUT ONE WORD RECORD OF 70
4071	0070		70	
4072	0064		RJP	
4073	0307		WAIT	WAIT BUSY
4074	0064	TESCX3	RJP	
4075	0300		STATUS	GO READ STATUS
4076	0221		LDM	T2
4077	4337	TESC27	CCOUNT	UPDATE FILEMARK COUNTER
4100	0041		STM	
4101	0075		AMNT1	

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4102	0034	SBN	
4103	0377	377	377 IS END OF OPERATION SIGNAL
4104	0260	ZJP	T2
4105	4116	TESC28	
4106	0255	RAO	T2
4107	4077	TESC27	
4110	0020	LDN	TESC21
4111	4344	JUMPC1	
4112	0041	STM	
4113	0070	RETURN	
4114	0264	UJP	T2 GO REPEAT WRITE AND READ FILE MARK ROUTINE
4115	4020	TESC15	
4116	0020	LDN	TESC28
4117	0372	372	
4120	0041	STM	SET COUNTER FOR -5
4121	0075	AMNT1	
4122	0020	LDN	TESC39
4123	0033	SBF	SEARCH FILE BACK FUNCTION
4124	0064	RJP	GO SELECT
4125	0262	SELECT	
4126	0064	RJP	TESC29
4127	0307	WAIT	WAIT BUSY
4130	0021	LDM	RESET FILE MARK STATUS EXPECTED CONDITION
4131	0140	TEMP2	
4132	0041	STM	
4133	0074	ESTAT	
4134	0064	RJP	GO READ STATUS AND REPORT ERROR IF ANY
4135	0300	STATUS	
4136	0055	RAO	TESCY1
4137	0075	AMNT1	
4140	0260	ZJP	T2 GO EXECUTE NEXT ROUTINE
4141	4150	TESC31	
4142	0020	LDN	
4143	4357	JUMPC1	110
4144	0041	STM	
4145	0070	RETURN	
4146	0264	UJP	T2 GO SEARCH FILE BACK AGAIN
4147	4122	TESC39	
4150	0020	LDN	TESC31
4151	0372	372	
4152	0041	STM	
4153	0075	AMNT1	
4154	0020	LDN	
4155	0032	SFF	GO SEARCH FILE FORWARD
4156	0064	RJP	
4157	0202	SELECT	
4160	0064	RJP	TESC32
4161	0307	WAIT	WAIT BUSY
4162	0064	RJP	GO READ STATUS
4163	0300	STATUS	
4164	0020	LDN	TESC34
4165	0001	1	
4166	0041	STM	
4167	0004	ESTAT	EXPECT BCD STATUS
4170	0020	LDN	
4171	0024	RF	READ FORWARD FUNCTION
4172	0064	RJP	
4173	0202	SELECT	
4174	0076	INA	TESC35 INPUT ONE WORD RECORD
4175	0041	STM	

4176	0141		TEMP3		SAVE DATA
4177	0064		RJP		
4200	0307		WAIT		WAIT BUSY
4201	0064	TESCX5	RJP		GO READ STATUS
4202	0300		STATUS		
4203	0021	TESCX6	LDM		
4204	0141		TEMP3		
4205	0034		SRN		
4206	0070		T0		
4207	0260		ZJP	T2	DATA CORRECT
4210	4321		TESC36		
4211	0020		LDN		
4212	0050		CODE13		COMPARE ERROR CODE
4213	0041		STM		
4214	0063		ERRC0D		
4215	0021		LDM		
4216	0141		TEMP3		
4217	0041		STM		
4220	0054		AREG		RECEIVED DATA TO A REGISTER
4221	0020		LDN		
4222	0070		T0		
4223	0041		STM		EXPECTED DATA TO BUFFER EXIT REGISTER
4224	0052		ERRABX		
4225	0020		LDN		
4226	4321		TESC36		RETURN ADDRESS
4227	0064		RJP		GO REPORT ERROR
4230	0333		ERPORT		
4231	0021	TESC41	LDM		
4232	0061		MASK2		
4233	0261		NZP	T2	
4234	4263		TESC50		
4235	0020		LDN		
4236	0011		T44		
4237	0202		ATT	T2	
4240	0020		LDN		
4241	0012		T50		
4242	0102		ATT	T1	
4243	0020		LDN		RESET FLAGS
4244	4550		JUMPC2	2	
4245	0041		STM		
4246	0070		RETIJRN		
4247	0020		LDN		
4250	0376		376		
4251	0041		STM		
4252	0357		AMNT3		
4253	0020		LDN		
4254	5255		CADDR	4	
4255	0141		STM	T1	
4256	5153		TESC69		
4257	0203		TTA	T2	
4260	0102		ATT	T1	
4261	0264		UJP	T2	
4262	4512		TESC47		
4263	0021	TESC50	LDM		
4264	0060		MASK1		CHECK FOR 609 TAPE DRIVE
4265	0260		ZJP	T2	
4266	4271		TESC53		
4267	0020		LDN		609 FILEMARK IS 23 OCTAL
4270	0004		4		
4271	0030	TESC53	ADN		

EXPECTED DATA TO BUFFER EXIT REGISTER

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4272	0017	17
4273	0041	STM
4274	0141	TEMP3
4275	0020	LDN
4276	0001	1
4277	0041	STM
4300	0075	AMNT1
4301	0041	STM
4302	0100	AMNT2
4303	0020	LDN
4304	0367	367
4305	0041	STM
4306	0357	AMNT3
4307	0020	LDN
4310	0011	T44
4311	0102	ATT T1
4312	0202	ATT T2
4313	0020	LDN
4314	4545	JUMPC2 -1
4315	0041	STM
4316	0070	RETURN
4317	0264	UJP T2
4320	4400	TESC40
4321	0055	RAO
4322	0075	AMNT1
4323	0260	ZJP T2
4324	4231	TESC41
4325	0020	LDN
4326	4362	JUMPC1 140
4327	0041	STM
4330	0070	RETURN
4331	0021	LDM
4332	0140	TEMP2
4333	0041	STM
4334	0004	ESTAT
4335	0264	UJP T2
4336	4154	TESC31 4
4337	0352	CCOUNT 352
4340	0327	327
4341	0352	352
4342	0367	367
4343	0377	377
4344	4010	JUMPC1 TESC45
4345	4024	TESC16
4346	4026	TESCX1
4347	4036	TESC18
4350	4042	TESC19
4351	4044	TESC20
4352	4054	TESC23
4353	4056	TESC24
4354	4060	TESC25
4355	4070	TESC26
4356	4074	TESCX3
4357	4076	TESC27 -1
4360	4126	TESC29
4361	4130	TESC30
4362	4136	TESCY1
4363	4160	TESC32
4364	4162	TESC33
4365	4164	TESC34

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4462	0260		ZJP	T2	DATA COMPARED
4463	4474		TESC46		
4464	0020		LDN		
4465	0062		CODE18		INCORRECT FILEMARK WRITTEN
4466	0041		STM		
4467	0063		ERRCOD		
4470	0020		LDN		
4471	4474		TESC46		RETURN ADDRESS
4472	0064		RJP		
4473	0333		REPORT		REPORT ERROR
4474	0064	TESC46	RJP		
4475	0300		STATUS		
4476	0055	TESC44	RAO		
4477	0100		AMNT2		CHECK FOR ALL RECORDS READ
4500	0034		SBN		
4501	0012		12		
4502	0260		ZJP	T2	
4503	4512		TESC47		
4504	0020		LDN		
4505	4545		JUMPC2	-1	
4506	0041		STM		
4507	0070		RETURN		
4510	0264		UJP	T2	REPEAT READ OPERATION
4511	4400		TESC42	-4	
4512	0020	TESC47	LDN		REWIND TAPE DRIVE
4513	0034		REW		
4514	0064		RJP		
4515	0202		SELECT		
4516	0064	TESC48	RJP		
4517	0307		WAIT		WAIT BUSY
4520	0020	TESC49	LDN		
4521	4524		TESC49	4	
4522	0064		RJP		
4523	0102		SMMQX		
4524	0021		LDM		
4525	0002		SWITCH		CHECK FOR REPEAT SECTION
4526	0010		LPN		
4527	0020		20		
4530	0260		ZJP	T2	
4531	4540		TESC54		
4532	0020		LDN		
4533	0010		T40		
4534	0102		ATT	T1	
4535	0202		ATT	T2	
4536	0264		UJP	T2	
4537	4000		TESCX7		GO REPEAT SECTION
4540	0020	TESC54	LDN		
4541	0012		T50		
4542	0102		ATT	T1	
4543	0202		ATT	T2	
4544	0264		UJP	T2	
4545	5000		TESC52		
4546	4404	JUMPC2	TESC42		
4547	4411		TESC43		
4550	4476		TESC44		
4551	4516		TESC48		
4552	4520		TESC49		
	5000	PRG	5000		

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* BANK *
* 12 *
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001	0020	TESC52	LDN		
002	5256		CADnR	5	
003	0241		STM	T2	
004	5064		TESC51		RESET INITIAL CONDITIONS
005	0020		LDN		
006	5347		JUMPC3	-1	RESET RETURN JUMP ADDRESSES
007	0041		STM		
008	0070		RETURN		
009	0021		LDM		
010	0026		FILE		
011	0041		STM		
012	0004		ESTAT		EXPECT FILE MARK STATUS
013	0020		LDN		
014	0375		375	-2	
015	0041		STM		
016	0357		AMNT3		
017	0003		CLA		
018	0041		STM		
019	0141		TEMP3		RESET FLAG
020	0020		LDN		
021	0367		367		
022	0041		STM		
023	0100		AMNT2		
024	0020		LDN		
025	5221		TESC72		
026	0241		STM	T2	
027	5044		TESC60	1	
028	0020		LDN		
029	5240		TESC73		
030	0241		STM	T2	
031	5050		TESC61		
032	0020		LDN		
033	5251		CADnR		
034	0241		STM	T2	
035	5153		TESC69		
036	0221	TESC60	LDM	T2	
037	5221		TESC72		FUNCTION FLAG
038	0041		STM		
039	0005		LFUNCT		
040	0221		LDM	T2	AMOUNT FLAG
041	5240	TESC61	TESC73		
042	0041		STM		
043	0075		AMNT1		
044	0264		UJP	T2	
045	5126		TESC65		
046	0255		RAO	T2	UPDATE FLAGS
047	5044		TESC60	1	
048	0255		RAO	T2	
049	5050		TESC61		
050	0255		RAO	T2	
051	5153		TESC69		
052	0034		SBN		
053	5256	TESC51	CADnR	5	
054	0261		NZP	T2	INTERMEDIATE EXIT POINT
055	5043		TESC60		
056	0055		RAO		
057					

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70	0357	AMNT3		
71	0260	ZJP	T2	END OF SECTION
72	5270	CEXIT1		
73	0020	LDN		
74	0011	9D		
75	0251	RAM	T2	
76	5064	TESC51		
77	0020	LDN		
80	0001	1		BCD STATUS EXPECTED
81	0041	STM		
82	0004	ESTAT		
83	0020	LDN		
84	0024	RF		SELECT READ FORWARD FUNCTION
85	0064	RJP		
86	0202	SELECT		
87	0076	TESC62		INPUT ONE WORD RECORD
88	0041	STM		
89	0054	AREG		SAVE DATA
90	0064	RJP		
91	0307	WAIT		GO WAIT FOR BUSY TO DROP
92	0064	RJP	TESC63	
93	0300	STATUS		GO READ STATUS
94	0021	TESC64		
95	0026	LDM		EXPECT FILE MARK STATUS
96	0041	FILE		
97	0041	STM		
98	0004	ESTAT		
99	0264	UJP	T2	
100	5055	TESC61	5	
101	0041	STM		STORE FUNCTION CODE
102	0005	LFUNCT		
103	0020	LDN	TESC65	
104	5132	TESC66		RETURN ADDRESS
105	0064	RJP		GO SELECT FUNCTION
106	0270	SELECT	6	
107	0102	TESC66	T1	
108	0020	ATT		
109	0020	LDN		
110	5137	TESC67		RETURN ADDRESS
111	0064	RJP		GO WAIT BUSY
112	0313	WAIT	4	
113	0020	TESC67		
114	0001	LDN		
115	0202	T04		
116	0202	ATT	T2	
117	0020	LDN		
118	5146	TESC68		RETURN ADDRESS
119	0264	RJP	T2	GO READ STATUS
120	0402	STAT2	2	
121	0055	RAO	TESC68	
122	0075	AMNT1		
123	0261	NZP	T2	REPEAT LAST FUNCTION
124	5126	TESC65		
125	0221	LDM	T2	CHECK FOR SPECIAL PROGRAM
126	5251	TESC69		
127	0261	CADDR		
128	0055	NZP	T2	GO UPDATE FLAGS AND EXECUTE FUNCTION
129	5055	TESC61	5	
130	0055	RAO		
131	0100	AMNT2		
132	0260	ZJP	T2	TERMINATE SPECIAL PROGRAM
133	5211	TESC71		
134	0020	LDN		RESET COUNTER

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5163	0376		376	
5164	0041		STM	
5165	0075		AMNT1	
5166	0021		LDM	CHECK FOR DIRECTION FLAG
5167	0141		TEMP3	
5170	0261		NZP	T2
5171	5202		TESC70	
5172	0020		LDN	TOGGLE DIRECTION FLAG
5173	0001		1	
5174	0041		STM	
5175	0141		TEMP3	
5176	0020		LDN	SET SEARCH FILE FORWARD FUNCTION
5177	0032		SFF	
5200	0264		UJP	T2
5201	5124		TESC65	-2
5202	0003	TESC70	CLA	TOGGLE DIRECTION FLAG
5203	0041		STM	
5204	0141		TEMP3	
5205	0020		LDN	
5206	0033		SBF	SEARCH BACK FILE FUNCTION
5207	0264		UJP	T2
5210	5124		TESC65	-2
5211	0041	TESC71	STM	
5212	0141		TEMP3	
5213	0020		LDN	
5214	0353		353	
5215	0041		STM	
5216	0100		AMNT2	
5217	0264		UJP	T2
5220	5055		TESC61	5
5221	0032	TESC72	SFF	
5222	0033		SBF	
5223	0032		SFF	
5224	0033		SBF	
5225	0032		SFF	
5226	0000		0	
5227	0033		SBF	
5230	0032		SFF	
5231	0033		SBF	
5232	0033		SBF	
5233	0033		SBF	
5234	0033		SBF	
5235	0033		SBF	
5236	0033		SBF	
5237	0000		0	
5240	0374	TESC73	374	-3
5241	0375		375	-2
5242	0374		374	-3
5243	0375		375	-2
5244	0375		375	-2
5245	0000		0	
5246	0376		376	-1
5247	0376		376	-1
5250	0376		376	-1
5251	0375	CADDR	375	-2
5252	0376		376	-1
5253	0376		376	-1
5254	0376		376	-1
5255	0375		375	-2
5256	0000		0	

5257	0000	0	
5260	0001	1	
5261	0000	0	
5262	0001	1	
5263	0000	0	
5264	0001	1	
5265	0000	0	
5266	0001	1	
5267	0001	1	
5270	0020	LDN	
5271	0033	SBF	SEARCH BACK FILE FUNCTION
5272	0064	RJP	GO SELECT
5273	0202	SELECT	
5274	0020	LDN	
5275	0051	51	
5276	0041	STM	EXPECTED STATUS
5277	0004	ESTAT	
5300	0064	RJP	
5301	0307	WAIT	
5302	0064	RJP	GO READ STATUS
5303	0300	STATUS	
5304	0020	LDN	
5305	5306	TESC74	
5306	0021	LDM	
5307	0002	SWITCH	CHECK FOR END OF TEST HALT
5310	0010	LPN	
5311	0001	1	
5312	0260	ZJP	T2
5313	5304	TESC75	-2
5314	0020	LDN	
5315	0002	2	
5316	0302	ATT	T3
5317	0204	ABR	T2
5320	5317	TESC77	
5321	0001	LDM	
5322	0017	SECTS	
5323	0077	HLT	END OF SECTION HALT
5324	0013	CIL	
5325	0002	NOP	
5326	0021	LDM	CHECK FOR REPEAT SECTION
5327	0002	SWITCH	
5330	0010	LPN	
5331	0010	10	
5332	0260	ZJP	T2
5333	5342	TESC76	
5334	0020	LDN	SET TAGS
5335	0007	T34	
5336	0102	ATT	T1
5337	0202	ATT	T2
5340	0264	UJP	T2
5341	3513	TESTC	GO REPEAT TEST SECTION C
5342	0020	LDN	
5343	0004	T20	
5344	0102	ATT	T1
5345	0202	ATT	T2
5346	0264	UJP	T2
5347	2030	TESTSB	GO CHECK FOR NEXT TEST TO EXECUTE
5350	5107	TESC62	
5351	5114	TESC63	
5352	5116	TESC64	

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0054	CODE15 EQU	54	THESE TESTS ARE ON THE OTHER MAG TAPE SECTION
			RELOADE SMM92 AND
			PARAMETER 14 IS SECTIONS A,B,C,D.
			PARAMETER 15 IS SECTIONS DEFG
0056	CODE16 EQU	56	INCORRECT WRITE BUFFER LENGTH
			A REGISTER = LAST STATUS
			ABX REGISTER = AMOUNT SHORT.
			EXPECTED AMOUNT IS 376 OCTAL
0060	CODE17 EQU	60	NO BUFFER TERMINATION
0062	CODE18 EQU	62	INCORRECT FILE MARK WRITTEN
			A REGISTER = FILE MARK WRITTEN
			ABX REGISTER = FILE MARK EXPECTED
0064	CODE19 EQU	64	ERROR STOP NUMBER 2
			A REGISTER = SECTION NUMBER
			ABX REGISTER = LAST OCTAL FUNCTION CODE
0066	CODE20 EQU	66	CONSTANT BUFFER BUSY STATUS
			BUFFER SHOULD NOT BE BUSY
0070	CODE21 EQU	70	TAPE DRIVE CONSTANTLY BUSY
			A REGISTER = N/A
			ABX REGISTER = ACTUAL STATUS
0072	CODE22 EQU	72	THIRD ERROR STOP FOR SECTIONS
			D AND E ONLY.
			A REGISTER = I/O LENGTH EXPECTED
			ABX REGISTER = AMOUNT OF I/O THAT WAS
			PROCESSED (LENGTH)

0074	CODE23 EQU	74
0076	CODE24 EQU	76
0111	CODEX1 EQU	111

SWITCH PARAMETER CHANGE CODE

0001	T04 EQU	1		002690
0002	T10 EQU	2		002700
0003	T14 EQU	3		002710
0004	T20 EQU	4		002720
0005	T24 EQU	5		002730
0006	T30 EQU	6		002740
0007	T34 EQU	7		002750
0010	T40 EQU	10		002760
0011	T44 EQU	11		002770
0012	T50 EQU	12		002780
0013	T54 EQU	13		002790
0014	T60 EQU	14		002800
0015	T64 EQU	15		002810
0016	T70 EQU	16		002820
0017	T74 EQU	17		002830
0100	T1 EQU	100		002840
0200	T2 EQU	200		002850
0300	T3 EQU	300		002860
0000	ERR EQU	0	ERROR STOP	002880
0001	SHA EQU	1	SHIFT A LEFT ONE BIT	002890
0002	NOP EQU	2	NO OPERATION	002900
0002	ATT EQU	2	A TO TAG REGISTER	002910
0003	CLA EQU	3	CLEAR REGISTER A	002920
0003	TTA EQU	3	TAG REGISTER TO A	002930
0004	ABR EQU	4	A TO BUFFER ENTRANCE REGISTER	002940
0005	ABX EQU	5	A TO BUFFER EXIT REGISTER	002950
0006	BER EQU	6	CONTENTS OF BER REGISTER TO A	002960
0007	CBC EQU	7	CLEAR BUFFER CONTROLS	002970
0010	LPN EQU	10	LOGICAL PRODUCT NO ADDRESS	002980
0011	LPM EQU	11	LOGICAL PRODUCT MEMORY ADDRESS	002990
0012	LPI EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS	003000

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0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT	003010
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS	003020
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS	003030
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS	003040
0020	LDN	EQU	20	LOAD A NO ADDRESS	003050
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS	003060
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS	003070
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY	003080
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT	003090
0030	ADN	EQU	30	ADD NO ADDRESS	003100
0031	ADM	EQU	31	ADD MEMORY ADDRESS	003110
0032	ADI	EQU	32	ADD INDIRECT ADDRESS	003120
0034	SBN	EQU	34	SUBTRACT NO ADDRESS	003130
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS	003140
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS	003150
0041	STM	EQU	41	STORE MEMORY ADDRESS	003160
0042	STI	EQU	42	STORE INDIRECT ADDRESS	003170
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS	003180
0055	RAO	EQU	55	REPLACE ADD ONE MEMORY ADDRESS	003190
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A = ZERO	003200
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A = NON#ZERO	003210
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A ARE POSITIVE	003220
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A ARE NEGATIVE	003230
0064	RJP	EQU	64	INDIRECT RETURN JUMP INDICATOR	
0064	UJP	EQU	64	UNCONDITIONAL JUMP	003240
0070	IBI	EQU	70	INITIATE BUFFER INPUT	003250
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT	003260
0072	INN	EQU	72	INPUT NORMAL	003270
0073	OUT	EQU	73	OUTPUT NORMAL	003280
0074	OTN	EQU	74	OUTPUT, NO ADDRESS	003290
0075	EXF	EQU	75	EXTERNAL FUNCTION	003300
0076	INA	EQU	76	INPUT TO A	003210
0077	HLT	EQU	77	HALT	003320
0000	END				003330

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0044	0064		UJP		
0045	0266		INTCOM		
0046	0200	WTBIT	200		
0047	0000	PARAM			TEST PARAMETER
0050	0000	UNIT			TAPE DRIVE UNIT NUMBER
0051	0000	ERRAMT			AMOUNT OF ERRORS BEFORE ERROR HLT
0052	0000	ERRABX	0		EXPECTED DATA OR STATUS
0053	0000	ERRCD1	0		UPPER 2 BITS OF ERROR CODE
0054	0000	AREG	0		RECEIVED DATA OR STATUS
0055	0010	COMM2			EACH DIGIT IS 1 M.S. DELAY
0056	0000	COMM3			EACH DIGIT IS 256 M. S. DELAY
0057	0000	DATAIO			COMPARE ADDRESS FLAG
0060	0000	MASK1	0		0 = 601 OR 608 DRIVE. 1 = 609 DRIVE
0061	0000	MASK2	0		0 = 601 TAPE DRIVE. 1 = 608 OR 609 TAPE DRIVE
0062	0000	DATTYP	0		1,2,4,10 AND 20 (TYPE OF DATA)
		REM			1 = BCD
		REM			2 = BINARY
		REM			4 = SHIFT
		REM			10 = RANDOM
		REM			20 = ALL ONES (377)
0063	0000	ERRCOD			LAST ERROR CODE
0064	0000	LAST	0		TERMINATING ADDRESS AFTER
		REM			READ OR WRITE OPERATION
0065	0000	LWA	0		LAST WORD ADDRESS
0066	0000	RANDM1			RANDOM DATA
0067	0000	SAVITG	0		TAG 2 ON INTERRUPT
0070	2736	RETURN	JUMPD	-1	CURRENT RETURN JUMP ADDRESS
0071	0000	TAG3A			TAG ADDRESS FOR BER LOADING OR NORMAL I/O
0072	0000	TAG3B			TAG ADDRESS FOR BXR LOADING
0073	0000	TOGGLE			PRESENT STATUS BITS CHECKING
0074	0000	VAR	0		VARIABLE FOR RANDOM GENERATOR
0075	0000	AMNT1		0	
0076	0000	TEMP1	BSS	0	
0076	0000	COMM1		0	COUNTER
0077	0000	IOTYP		0	READ OR WRITE AND BUFFER OR NORMAL CHANNEL
0100	0000	AMNT2		0	
0101	0000	IOTYP1		0	0 = READ. 1 = WRITE
0102	0041	SMMQX	STM		SAVE ADDRESS
0103	0122		EXIT20		
0104	0103		TTA	T1	SAVE TAG
0105	0041		STM		
0106	0116		EXIT21		
0107	0020	SMMQA	LDN		
0110	0006		T30		GO CHECK FOR INTERRUPT 10 RECEIVED
0111	0102		ATT	T1	
0112	0202		ATT	T2	
0113	0264		UJP	T2	
0114	3000		SMMQ1A		
0115	0020		LDN		
0116	0000	EXIT21		0	
0117	0102		ATT	T1	
0120	0202		ATT	T2	
0121	0264		UJP	T2	RETURN TO PROGRAM
0122	0000	EXIT20		0	
0124	0124	PRG		124	
0124	0000	SMMFLG			USED IN CONJUNCTION WITH MANUAL INTERRUPT
		REM			A. NEGATIVE ZERO = END OF TEST
		REM			B. POSITIVE ZERO = PARAMETER CHANGE (SWITCH)
		REM			C. NON-ZERO = LOAD NEXT OVERLAY (SECTION)

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Address	Hex	Label	Op	Target	Description
0125	0000	SMMINT	0		1.AMOUNT SPECIFIED IN SMMFLG IS
0126	0041	SMMQ	STM		THE OVERLAY NUMBER
0127	0125		LDM		1 = INTERRUPT 10 RECEIVED
0130	0021		LDM		FLAG INTERRUPT 10 RECEIVED
0131	0016		SAVEA		
0132	0113		CIL	T1	RETURN WHERE INTERRUPTED
0133	0020		LDN		SET SMM FLAG AND GIVE CONTROL TO SMM
0134	0017		T74		
0135	0202		ATT	T2	
0136	0264		UJP	T2	
0137	7777		CTRL		GO TO SMM
0140	0000	TEMP2	0		
0141	0000	TEMP3	0		
0142	0000	UNIT2X	0		
	0144		PRG	144	
			REM		NORMAL I/O ROUTINE (ONE BANK OR LESS)
0144	0041	NORM1	STM		SAVE ADDRESS
0145	0162		EXIT6		
0146	0103		TTA	T1	SAVE TAG
0147	0041		STM		
0150	0157		EXIT7		
0151	0020		LDN		
0152	0003		IBNKTG		
0153	0202		ATT	T2	
0154	0264		UJP	T2	
0155	1421		NORM2		GO EXECUTE ONE BANK I/O
0156	0020	NORM1A	LDN		
0157	0000	EXIT7	0		
0160	0202		ATT	T2	
0161	0264		UJP	T2	
0162	0000	EXIT6	0		RETURN JUMP
0163	0041	BUFF1	STM		SAVE ADDRESS
0164	0201		EXIT8		
0165	0103		TTA	T1	SAVE TAG
0166	0041		STM		
0167	0176		EXIT9		
0170	0020		LDN		
0171	0003		BUFTAG		
0172	0202		ATT	T2	
0173	0264		UJP	T2	GO EXECUTE BUFFER I/O
0174	1443		BUFF2		
0175	0020	BUFF1A	LDN		
0176	0000	EXIT9	0		
0177	0202		ATT	T2	LOAD TAG AND RETURN
0200	0264		UJP	T2	
0201	0000	EXIT8	0		
			REM		SELECT FUNCTION ROUTINE
0202	0041	SELECT	STM		STORE FUNCTION CODE
0203	0005		LFUNCT		
0204	0055		RAO		UPDATE ADDRESS POINTER
0205	0070		RETURN		
0206	0122		LDI	T1	
0207	0070		RETURN		SET UP RETURN ADDRESS
0210	0041		STM		
0211	0226		EXIT		
0212	0103		TTA	T1	
0213	0041		STM		SAVE TAG

0214	0223		EXIT1		GO TO SELECT ROUTINE
0215	0020		LDN		
0216	0003		SELTAG		SET TAG FOR JUMP
0217	0202		ATT	T2	
0220	0264		UJP	T2	
0221	1400		SEL1		
0222	0020	SEL2	LDN		RETURN JUMP
0223	0000	EXIT1	0		
0224	0202		ATT	T2	
0225	0264		UJP	T2	
0226	0000	EXIT	0		
0227	0041	GEN	STM		
0230	0245		EXIT10		SAVE TAG AND ADDRESS
0231	0103		TTA	T1	
0232	0041		STM		
0233	0242		EXIT11		
0234	0020		LDN		SET NEW BANK TAG
0235	0002		GENTAG		
0236	0202		ATT	T2	
0237	0264		UJP	T2	GO TO GENERATE DATA ROUTINE
0240	1000		GEN1		
0241	0020	GENA	LDN		
0242	0000	EXIT11	0		
0243	0202		ATT	T2	
0244	0264		UJP	T2	RETURN JUMP
0245	0000	EXIT10	0		
		REM			
		REM			COMPARE DATA ROUTINE
		REM			
0246	0041	COMP1	STM		
0247	0265		EXIT12		SAVE ADDRESS
0250	0103		TTA	T1	
0251	0041		STM		SAVE TAG
0252	0261		EXIT13		
0253	0020		LDN		
0254	0003		COMTAG		
0255	0202		ATT	T2	
0256	0264		UJP	T2	GO TO COMPARE DATA
0257	1515		COMP2		
0260	0020	COMP1A	LDN		
0261	0000	EXIT13	0		
0262	0102		ATT	T1	
0263	0202		ATT	T2	
0264	0264		UJP	T2	RETURN JUMP
0265	0000	EXIT12	0		
	0003	COMTAG EQU	3		
0266	0041	INTCOM	STM		
0267	0360		TEMP		
0270	0203		TTA	T2	
0271	0041		STM		
0272	0067		SAVITG		
0273	0020		LDN		
0274	0001		T04		
0275	0202		ATT	T2	
0276	0264		UJP	T2	
0277	0632		INTC01		
0300	0055	STATUS	RA0		UPDATE ADDRESS POINTER
0301	0070		RETURN		
0302	0020		LDN		
0303	0001		T04		

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0304	0202		ATT	T2	
0305	0264		UJP	T2	
0306	0400		STATA2		
0307	0055	WAIT	RAO		
0310	0070		RETURN		UPDATE ADDRESS POINTER
0311	0122		LDI	T1	
0312	0070		RETURN		
0313	0041		STM		
0314	0332		EXIT1B		SET UP RETURN ADDRESS
0315	0103		TTA	T1	
0316	0041		STM		STORE TAG FOR RETURN
0317	0326		EXIT2B		
0320	0020		LDN		
0321	0003		T14		
0322	0202		ATT	T2	
0323	0264		UJP	T2	
0324	1710		LOOP1Z		
0325	0020	EXIT1A	LDN		
0326	0000	EXIT2B	0		
0327	0102		ATT	T1	
0330	0202		ATT	T2	
0331	0264		UJP	T2	RETURN TO ORIGINAL POINT
0332	0000	EXIT1B	0		
0333	0041	ERPORT	STM		SAVE ADDRESS
0334	0351		EXIT16		
0335	0103		TTA	T1	SAVE TAG FOR RETURN
0336	0041		STM		
0337	0346		EXIT17		
0340	0020		LDN		SET TAG AND GO TO CODE DISPLAY ROUTINE
0341	0001		T04		
0342	0202		ATT	T2	
0343	0264		UJP	T2	
0344	0563		ERROR1		
0345	0020		LDN		RETURN TO PROGRAM
0346	0000	EXIT17	0		
0347	0202		ATT	T2	
0350	0264		UJP	T2	
0351	0000	EXIT16	0		
0352	0020	START	LDN		
0353	0002		T10		
0354	0202		ATT	T2	
0355	0264		UJP	T2	
0356	1350		TESTSX		
0357	0000	AMNT3			
0360	0000	TEMP	0		
0361	0000	EXPECX			
0362	0000	EXPEC2			
	0400	PRG	400		

000160

```

*   *   *   *   *
* *   *   *   *
*  BANK  *
*   01   *
* *   *   *   *
*   *   *   *

```

0400	0122	STATA2	LDI	T1	
0401	0070		RETURN		
0402	0241		STM	T2	SET UP RETURN ADDRESS
0403	0452		RET1		
0404	0021		LDM		
0405	0005		LFUNCT		

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0406	0041		STM		
0407	0076		TEMP1		
0410	0103		TTA	T1	000190
0411	0241		STM	T2	
0412	0442		RET2		000210
0413	0003		CLA		SET STATUS FUNCTION
0414	0041		STM		000230
0415	0005		LFUNCT		
0416	0203		TTA	T2	
0417	0102		ATT	T1	
0420	0020		LDN		000250
0421	0424		STATA		RETURN ADDRESS
0422	0064		RJP		
0423	0210		SELECT	6	
0424	0076	STATA	INA		000290
0425	0041		STM		000300
0426	0003		ASTAT		000310
0427	0041		STM		
0430	0054		AREG		
0431	0015		LSM		000340
0432	0004		ESTAT		000350
0433	0011		LPM		
0434	0007		MASK		000330
0435	0041		STM		000360
0436	0360		TEMP		000370
0437	0261		NZP	T2	000380
0440	0453		ERROR		FIND ERROR
0441	0020		LDN		000390
0442	0000	RET2	0		000400
0443	0102		ATT	T1	SET TAGS
0444	0202		ATT	T2	000420
0445	0021		LDM		
0446	0076		TEMP1		
0447	0041		STM		
0450	0005		LFUNCT		
0451	0264		UJP	T2	RETURN TO ROUTINE
0452	0000	RET1	0		000430
0453	0020	ERROR	LDN		000440
0454	0551		BITX		RESET STATUS SEQUENCE FLAGS
0455	0041		STM		
0456	0056		COMM3		
0457	0020		LDN		
0460	0020		CODE1		RESET ERROR CODES
0461	0241		STM	T2	
0462	0520		STAT5		
0463	0021	STAT1	LDM		FETCH INCORRECT STATUS
0464	0360		TEMP		
0465	0212		LPI	T2	MASK FOR PARTICULAR BIT OR BITS
0466	0056		COMM3		
0467	0041		STM		SAVE ERROR BITS
0470	0073		TOGGLE		
0471	0216		LSI	T2	
0472	0056		COMM3		
0473	0260		ZJP	T2	GO REPORT ERROR
0474	0511		STATIT		
0475	0055	STAT2	RAO		
0476	0056		COMM3		UPDATE POINTERS
0477	0020		LDN		UPDATE ERROR CODE
0500	0002		2		
0501	0251		RAM	T2	

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0502	0520		STAT5			
0503	0034		SBN			
0504	0044		CODE10	2		
0505	0261		NZP	T2	GO CHECK NEXT STATUS BIT OR BITS	
0506	0463		STAT1			
0507	0264		UJP	T2	RETURN TO PROGRAM	
0510	0441		RET2	-1		
0511	0021	STABIT	LDM		REMOVE DETECTED STATUS BITS FROM ERROR FILE	
0512	0360		TEMP			
0513	0216		LSI	T2		
0514	0056		COMM3			
0515	0041		STM			
0516	0360		TEMP			
0517	0020		LDN		STORE ERROR CODE IN DISPLAY ROUTINE	
0520	0020	STAT5	CODE1			
0521	0041		STM			
0522	0063		ERRCOD			
0523	0021	PROCES	LDM		RESTORE LAST FUNCTION	
0524	0076		TEMP1			
0525	0041		STM			
0526	0005		LFUNCT			
0527	0021		LDM			
0530	0004		ESTAT			002320
0531	0041		STM		SAVE EXPECTED STATUS FOR DISPLAY	
0532	0052		ERRABX			
0533	0011		LPM		DETERMINE EXPECTED ERROR OR NOT CONDITION	002330
0534	0073		TOGGLE			002340
0535	0261		NZP	T2		002350
0536	0543		EXP			002360
0537	0020	NONEXP	LDN			
0540	0001		1			002400
0541	0051		RAM		ADJUST ERROR CODE FOR PROPER CONDITION	002410
0542	0063		ERRCOD			002420
0543	0203	EXP	TTA	T2		
0544	0102		ATT	T1		
0545	0020		LDN			
0546	0475		STAT2			
0547	0064		UJP		GO REPORT STATUS ERROR	
0550	0333		REPORT			
0551	0015	BITX	15		ILLEGAL BCD	
0552	0110		110		PROGRAM ERROR AND NO WRITE WRING	
0553	0001		1		BCD	
0554	0002		2		NOT READY	
0555	0004		4		PARITY ERROR	
0556	0010		10		PROGRAM ERROR	
0557	0020		20		FILE MARK	
0560	0040		40		LOAD POINT OR END OF TAPE MARK	
0561	0100		100		NO WRITE RING	
0562	0200		200		BUSY	
0563	0205	ERROR1	ABX	T2	WAIT FOR BUFFER TO FINISH	
0564	0563		ERROR1			
0565	0021		LDM		LOAD TAG 3 WITH UPPER 2 BITS OF ERROR CODE	
0566	0053		ERRCD1			
0567	0302		ATT	T3		
0570	0021		LDM		LOAD BER REGISTER WITH LOWER 8 BITS OF ERROR CODE	
0571	0063		ERRCOD			
0572	0204	ERROR2	ABR	T2		
0573	0572		ERROR2		ERROR JUMP ADDRESS IF BUFFER BUSY	
0574	0021		LDM		LOAD BXR REG. WITH EXPECTED DATA OR STATUS	
0575	0052		ERRABX			

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0576	0205	ERROR3	ABX	T2	
0577	0576		ERROR3		BUSY JUMP ADDRESS
0600	0055		RAO		
0601	0037		ERRORS		COUNT ERRORS
0602	0021		LDM		
0603	0002		SWITCH		CHECK PARAMETER FOR STOP ON ERROR
0604	0010		LPN		
0605	0004		4		
0606	0260		ZJP	T2	NO STOP ON ERROR
0607	0627		G01		
0610	0021		LDM		CHECK ERROR COUNT
0611	0051		ERRAMT		
0612	0260		ZJP	T2	STOP ON ERROR
0613	0622		STOP2		
0614	0035		SBM		STOP AFTER XXX ERRORS
0615	0037		ERRORS		
0616	0261		NZP	T2	COUNT NOT YET REACHED
0617	0627		G01		
0620	0041		STM		ZERO COUNT
0621	0037		ERRORS		
0622	0020	STOP2	LDN		
0623	0004		T20		
0624	0202		ATT	T2	
0625	0264		UJP	T2	
0626	2330		G02		
0627	0013	G01	CIL		
0630	0064		UJP		RETURN TO PROGRAM
0631	0345		EXIT17	-1	
0632	0021	INTC01	LDM		
0633	0360		TEMP		
0634	0260		ZJP	T2	INT10 RESERVED FOR SMM
0635	0642		CONTIN		0 = INTERRUPT 20
0636	0262		PJP	T2	
0637	0642		CONTIN		2 = INTERRUPT 40
0640	0020		LDN		
0641	0002		2		
0642	0041	CONTIN	STM		SAVE LAST INTERRUPT INDICATOR
0643	0006		LINT		
0644	0030		ADN		
0645	0665		BIAS		FIX TRANSFER ADDRESS
0646	0241		STM	T2	
0647	0651		INTJP		
0650	0221		LDM	T2	
0651	0000	INTJP	0		
0652	0241		STM	T2	
0653	0655		INTJP1		
0654	0264		UJP	T2	
0655	0000	INTJP1	0		
0656	0021	INTRET	LDM		
0657	0067		SAVITG		
0660	0202		ATT	T2	
0661	0021		LDM		RESTORE DATA SAVED ON INTERRUPT
0662	0016		SAVEA		
0663	0113		CIL	T1	RETURN WHERE INTERRUPTED
0664	0077		HLT		*****TEMP HLT NO RETURN AFTER INTERRUPT
0665	0670	BIAS	INT20J		INTERRUPT ADDRESSES
0666	0701		INT30J		
0667	0771		INT40J		
0670	0021	INT20J	LDM		
0671	0362		EXPEC2		CHECK FOR INTERRUPT EXPECTED

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0672	0260	ZJP	T2	ZERO = INTERRUPT NOT EXPECTED
0673	0715	INT20K		
0674	0003	CLA		
0675	0041	STM		
0676	0362	EXPEC2		
0677	0264	UJP	T2	
0700	0656	INTRET		
0701	0021	INT30J		
0702	0361	LDM		
0703	0260	EXPCX		INTERRUPT EXPECTED
0704	0260	ZJP	T2	ZERO = INTERRUPT NOT EXPECTED
0704	0723	INT34		
0705	0003	INT304		
0706	0041	CLA		
0707	0361	STM		
0710	0103	EXPECX		
0711	0041	TTA	T1	
0712	0056	STM		
0713	0264	COMM3		
0714	0746	UJP	T2	
0715	0020	DROPIT		
0716	0045	INT20K		
0717	0041	LDN		
0720	0063	CODE11	1	
0721	0264	STM		SET UP ERROR CODE FOR UNEXPECTED INTERRUPT
0722	0727	ERRCOD		
0723	0020	UJP	T2	
0724	0047	INT34		
0725	0041	INT34		
0726	0063	LDN		SET UP ERROR CODE FOR UNEXPECTED INT 30 OR 40
0727	0021	CODE12	1	
0730	0006	STM		
0731	0041	ERRCOD		
0732	0052	LDM		SET UP ERROR DATA FOR DISPLAY
0733	0021	LINT		LAST INTERRUPT INDICATOR TO ABX REGISTER
0734	0003	STM		
0735	0041	ERRABX		
0736	0054	LDM		LAST STATUS IO A REGISTER
0737	0103	ASTAT		
0740	0041	STM		
0741	0056	AREG		
0742	0020	TTA	T1	SAVE TAG ONE
0743	0746	STM		
0744	0064	COMM3		
0745	0333	LDN		
0746	0021	DROPIT		
0747	0006	RJP		
0750	0260	REPORT		GO REPORT ERROR CONDITION
0751	0764	LDM		IF EXTERNAL INTERRUPT, GO DROP SAME.
0752	0020	LINT		
0753	0002	ZJP	T2	
0754	0041	DROP1		
0755	0005	LDN		
0756	0203	SLO		GO DROP EXTERNAL INTERRUPT
0757	0102	STM		
0760	0020	LFUNCT		
0761	0764	TTA	T2	
0762	0064	ATT	T1	
0763	0210	LDN		
0764	0021	DROP1		RETURN ADDRESS
0765	0056	RJP		
		SELFC	6	
		LDM		
		COMM3		

```

0766 0102
0767 0264
0770 0656
0771 0021
0772 0361
0773 0261
0774 0705
0775 0264
0776 0723
      1000

```

INT40J

PRG

```

ATT T1
UJP T2
INTRET
LDM
EXPECX
NJP T2
INT304
UJP T2
INT34
1000

```

INTERRUPT EXPECTED

```

* * * * *
* * * * *
* * BANK * *
* * 02 * *
* * * * *
* * * * *

```

```

1000 0020
1001 0014
1002 0302
1003 0020
1004 0001
1005 0241
1006 1044
1007 0021
1010 0062
1011 0034
1012 0020
1013 0263
1014 1017
1015 0264
1016 1175
1017 0030
1020 0010
1021 0263
1022 1025
1023 0264
1024 1223
1025 0030
1026 0004
1027 0263
1030 1033
1031 0264
1032 1135
1033 0030
1034 0002
1035 0262
1036 1105
1037 0020
1040 0004
1041 0241
1042 1064
1043 0020
1044 0001
1045 0341
1046 6000
1047 0255
1050 1044
1051 0010
1052 0077
1053 0241

```

GEN1

NEXT1

NEXT2

NEXT3

BCD1A

BCD1

BCD2

```

LDN
OUTTAG
ATT T3
LDN
1
STM T2
BCDT
LDM
DATYP
SBN
20
NJP T2
NEXT1
UJP T2
GENONE
ADN
10
NJP T2
NEXT2
UJP T2
RAND1
ADN
4
NJP T2
NEXT3
UJP T2
SHIFT1
ADN
2
PJP T2
BINARY
LDN
4
STM T2
BCD3
LDN
1
STM T3
OUTPUT
RAO T2
BCDT
LPN
77
STM T2

```

RESET BCD GENERATOR INITIAL NUMBER

CHECK FOR TYPE OF GENERATOR
BIT 0 = BCD
BIT 1 = BINARY (8BITS)
BIT 2 = SHIFTING 13
BIT 3 = RANDOM
BIT 4 = ALL ONES (377)

GO GENERATE ALL ONES

GO GENERATE RANDOM DATA

GO GENERATE SHIFTING 13

GO GENERATE BINARY DATA

GENERATE BCD DATA

AD ONE TO BCD DATA WORD

USE 1---77 DATA WORDS ONLY

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1054	1044	BCD1		
1055	0260	ZJP	T2	IF ZERO GENERATE ANOTHER WORD
1056	1047	BCD5		
1057	0255	RAO	T2	
1060	1046	BCD2	-1	
1061	0261	NZP	T2	
1062	1043	BCD1	-1	
1063	0020	LDN		STORE BOUNDRY ADDRESS DATA
1064	0004	BCD3	4	
1065	0341	STM	T3	
1066	0377	377		
1067	0251	RAM	T2	UPDATE DATA FOR NEXT BOUNDRY ADDRESS
1070	1064	BCD3		
1071	0303	TTA	T3	CHECK FOR BOTH BANKSCOMPLETE
1072	0034	SBN		
1073	0015	OUTTAG	1	
1074	0060	ZJP		
1075	0241	GENA		RETURN
1076	0020	LDN		
1077	0015	OUTTAG	1	
1100	0302	ATT	T3	
1101	0255	RAO	T2	
1102	1044	BCD1		
1103	0264	UJP	T2	
1104	1043	BCD1	-1	GO GENERATE SOME MORE DATA
1105	0020	LDN		GENERATE BINARY DATA
1106	0000	BINARY	0	0----377
1107	0341	STM	T3	
1110	6000	BIN2	OUTPUT	STORE IN OUTPUT AREA
1111	0255	RAO	T2	
1112	1106	BIN1		
1113	0241	STM	T2	
1114	1110	BIN2		
1115	0261	NZP	T2	
1116	1105	BIN1	-1	
1117	0020	LDN		STORE DATA AT BOUNDRY ADDRESS
1120	0377	377		
1121	0341	STM	T3	
1122	0377	377		
1123	0303	TTA	T3	
1124	0034	SBN		CHECK FOR ALL BANKS FILLED
1125	0013	T54		
1126	0060	ZJP		
1127	0241	GENA		RETURN
1130	0020	LDN		
1131	0013	T54		SET NEXT BANK TAG
1132	0302	ATT	T3	
1133	0264	UJP	T2	
1134	1105	BIN1	-1	
1135	0020	LDN		STORE SHIFTING DATA (13)
1136	0013	13		IN OUTPUT AREA
1137	0241	STM	T2	
1140	1142	SHIFT2		
1141	0020	LDN		
1142	0013	SHIFT2	13	
1143	0341	STM	T3	
1144	6000	SHIFT3	OUTPUT	OUTPUT AREA
1145	0001	SHA		
1146	0241	STM	T2	SHIFT DATA WORD
1147	1142	SHIFT2		

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1150	0255		RAO	T2	
1151	1144		SHIFT3		
1152	0261		NZP	T2	
1153	1141		SHIFT2	-1	
1154	0221		LDM	T2	
1155	1142		SHIFT2		
1156	0341		STM	T3	SPECIAL STORE FOR BOUNDRY ADDRESS
1157	0377		377		
1160	0001		SHA		
1161	0241		STM	T2	
1162	1142		SHIFT2		
1163	0303		TTA	T3	CHECK FOR ALL BANKS FULL
1164	0034		SBN		
1165	0015		OUTTAG	1	
1166	0060		ZJP		
1167	0241		GENA		RETURN
1170	0020		LDN		
1171	0015		OUTTAG	1	
1172	0302		ATT	T3	
1173	0264		UJP	T2	
1174	1141		SHIFT2	-1	
1175	0020	GENONE	LDN		GENERATE ALL ONES (377)
1176	0377		377		
1177	0341		STM	T3	
1200	6000	ONES1	OUTPUT		
1201	0255		RAO	T2	
1202	1200		ONES1		
1203	0261		NZP	T2	
1204	1175		GENONE		ALL DATA SAME IN OUTPUT AREA
1205	0020		LDN		
1206	0377		377		
1207	0341		STM	T3	BOUNDRY ADDRESS STORE
1210	0377		377		
1211	0303		TTA	T3	
1212	0034		SBN		CHECK ALL BANKS FULL
1213	0015		OUTTAG	1	
1214	0060		ZJP		
1215	0241		GENA		RETURN
1216	0020		LDN		
1217	0015		OUTTAG	1	
1220	0302		ATT	T3	
1221	0264		UJP	T2	
1222	1175		GENONE		GO GENERATE
		REM			
1223	0103	RAND1	TTA	T1	SAVE TAG ONE
1224	0241		STM	T2	
1225	1235		RAND1A		
1226	0203		TTA	T2	
1227	0102		ATT	T1	TAG 2 TO TAG 1 FOR RETURN JUMP
1230	0020		LDN		
1231	1234		RAND1C		RETURN ADDRESS
1232	0264		UJP	T2	GO GENERATE A RANDOM NUMBER
1233	1304		GEN0AN		
1234	0020	RAND1C	LDN		
1235	0000	RAND1A			RESTORE TAGS
1236	0102		ATT	T1	
1237	0021		LDM		STORE RANDOM NUMBER
1240	0066		RANDM1		
1241	0341		STM	T3	IN OUTPUT AREA
1242	6000	RAND2B	OUTPUT		

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1243	0264		UJP	T2	
1244	1245	RAND2F	RAND2C		
1245	0255	RAND2C	RAO	T2	ADJUST STORAGE ADDRESS AND REPEAT IF BANK NOT FULL
1246	1242		RAND2B		
1247	0261		NZP	T2	
1250	1223		RAND1		
1251	0020		LDN		SET UP FOR BOUNDRY ADDRESS
1252	0377		377		
1253	0241		STM	T2	
1254	1242		RAND2B		
1255	0020		LDN		SET JUMP BACK TO NORMAL STORE AFTER A BOUNDRY ADDRESS STORE
1256	1263		RAND2E		
1257	0241		STM	T2	
1260	1244		RAND2F		
1261	0264		UJP	T2	
1262	1223		RAND1		
1263	0003	RAND2E	CLA		RESET RANDOM DATA STORAGE FOR NEXT BANK
1264	0241		STM	T2	
1265	1242		RAND2B		
1266	0020		LDN		
1267	1245		RAND2C		RESET JUMP FOR NORMAL STORAGE
1270	0241		STM	T2	
1271	1244		RAND2F		
1272	0303		TTA	T3	UP TAG 3 AND CHECK FOR ALL BANKS FULL
1273	0030		ADN		
1274	0001		1		
1275	0302		ATT	T3	
1276	0034		SBN		
1277	0015		OUTTAG	1	
1300	0261		NZP	T2	GO GENERATE MORE DATA
1301	1223		RAND1		
1302	0064		UJP		
1303	0241		GENA		RETURN JUMP
		REM			
		REM			DATA GENERATOR ROUTINE (RANDOM)
		REM			
1304	0241	GENRAN	STM	T2	GENERATE A RANDOM NUMBER SAVE TAG AND ADDRESS FOR RETURN
1305	1347		EXIT14		
1306	0103		TTA	T1	
1307	0241		STM	T2	
1310	1344		EXIT15		
1311	0025		LCM		
1312	0066		RANDM1		SET SQUARING AMOUNT
1313	0041		STM		
1314	0076		TEMP1		
1315	0021	SQUARE	LDM		SQUARE OLD RANDOM NUMBER
1316	0066		RANDM1		
1317	0051		RAM		
1320	0360		TEMP		
1321	0055		RAO		
1322	0076		TEMP1		
1323	0261		NZP	T2	
1324	1315		SQUARE		
1325	0021		LDM		GET OLD RANDOM NUMBER AND ADD TO NEW SQUARED NUMBER
1326	0066		RANDM1		
1327	0031		ADM		
1330	0360		TEMP		
1331	0031		ADM		ADD VARIABLE
1332	0074		VAR		
1333	0041		STM		

1417	0064		UJP		
1420	0222		SEL2		RETURN
		REM			I/O NORMAL 256 WORDS OR LESS
1421	0021	NORM2	LDM		
1422	0071		TAG3A		SET I/O TAG
1423	0302		ATT	T3	
1424	0021		LDM		
1425	0077		IOTYP		READ OR WRITE FUNCTION
1426	0241		STM	T2	
1427	1434		NORM2A		
1430	0021		LDM		
1431	0065		LWA		SET LAST ADDRESS + 1
1432	0241		STM	T2	
1433	1436		NORM2B		
1434	0000	NORM2A	0		READ OR WRITE (72 OR 73)
1435	0000		0		FIRST WORD ADDRESS
1436	0000	NORM2B	0		LWA +1
1437	0041		STM		
1440	0064		LAST		SAVE TERMINATING ADDRESS
1441	0064		UJP		RETURN
1442	0156		NORM1A		
		REM			BUFFER I/O ROUTINE
1443	0021	BUFF2	LDM		SET TAG 3 FOR LOADING OF BER REGISTER
1444	0071		TAG3A		
1445	0302		ATT	T3	
1446	0003		CLA		LOWER 8 BIT ADDRESS ALWAYS ZERO
1447	0204	BUFF2A	ABR	T2	
1450	1473		BUSY1	1	
1451	0021		LDM		SET TAG FOR LOADING OF BXR REGISTER
1452	0072		TAG3B		
1453	0302		ATT	T3	
1454	0021		LDM		LAST WORD ADDRESS +1 OR +2
1455	0065		LWA		READ IS LWA +1. WRITE IS LWA +2.
1456	0275	BUFF2B	ABX	T2	
1457	1473		BUSY1	1	
1460	0071		LDM		
1461	0077		IOTYP		
1462	0241		STM	T2	
1463	1466		BUFF2C		
1464	0041		STM		EXPECT BUFFER INTERRUPT
1465	0362		EXPEC2		
1466	0000	BUFF2C	0		READ OR WRITE FUNCTION
1467	1473		BUSY1	1	
1470	0064		UJP		
1471	0175		BUFF1A		RETURN AFTER OPERATION
1472	0000	BUSY1	0		
1473	0203		TTA	T2	
1474	0102		ATT	T1	
1475	0020		LDN		BUFFER BUSY ERROR CODE TO
1476	0066		CODE20		ENTRANCE REGISTER
1477	0041		STM		
1500	0063		ERRCOD		
1501	0021		LDM		LAST STATUS TO A REGISTER
1502	0003		ASTAT		
1503	0041		STM		
1504	0054		AREG		
1505	0021		LDM		PRESENT BUFFER OPERATION.
1506	0077		IOTYP		270 = BUFFER READ
1507	0041		STM		271 = BUFFER WRITE
1510	0052		ERRABX		

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1511	0020		LDN		
1512	1443		BUFF2		
1513	0064		RJP		GO REPORT ERROR
1514	0333		ERRORT		
	0002	GENTAG	EQU	2	
	0003	1BNKTG	EQU	3	
	0003	2BNKTG	EQU	3	
	0003	BUFTAG	EQU	3	
	0016	INNTAG	EQU	16	
	0014	OUTTAG	EQU	14	
	0003	SELTAG	EQU	3	
	6000	OUTPUT	EQU	6000	
			REM		
			REM		
					COMPARE DATA ROUTINE
1515	0020	COMP2	LDN		
1516	0016		INNTAG		SET TAGS 1 AND 3 FOR
1517	0102		ATT	T1	COMPARING DATA READ AND WRITTEN
1520	0020		LDN		
1521	0014		OUTTAG		
1522	0302		ATT	T3	
1523	0003		CLA		
1524	0041		STM		START COMPARE WITH FWA
1525	0057		DATAIO		
1526	0322	COMP2A	LDI	T3	WRITE DATA BANK
1527	0057		DATAIO		
1530	0116		LSI	T1	
1531	0057		DATAIO		DATA READ BANK
1532	0011		LPM		MASK FOR CORRECT TAPE DRIVE
1533	0025		MASK1A		DATA IS 77 IF L/U OR 608 DRIVE
			REM		DATA IS 377 IF 609 TAPE DRIVE
1534	0261		NZP	T2	
1535	1610		DATERR		GO TO ERROR ROUTINE
1536	0055	COMP3A	RAO		
1537	0057		DATAIO		UPDATE COMPAR ADDRESSES
1540	0260		ZJP	T2	CHECK FOR MORE BANKS
1541	1550		COMP2B		
1542	0035		SBM		
1543	0075		AMNT1		LESS THEN ONE BANK
1544	0261		NZP	T2	
1545	1526		COMP2A		
1546	0064		UJP		
1547	0260		COMP1A		EXIT. COMPARING FINISHED
1550	0321	COMP2B	LDM	T3	
1551	0377		377		BOUNDRY ADDRESS
1552	0011		LPM		MASK FOR CORRECT TAPE DRIVE
1553	0025		MASK1A		DATA IS 77 IF L/U OR 608 DRIVE
			REM		DATA IS 377 IF 609 TAPE DRIVE
1554	0135		SBM	T1	DATA IS 377 IF 609 TRANSPORT
1555	0377		377		BOUNDRY ADDRESS
1556	0260		ZJP	T2	
1557	1566		COMP2C		
1560	0020		LDN		
1561	0377		377		
1562	0041		STM		DATA ERROR AT BOUNDRY ADDRESS
1563	0057		DATAIO		INDICATE BOUNDRY ADDRESS FOR ERROR REPORTER
1564	0264		UJP	T2	GO REPORT ERROR
1565	1610		DATERR		
1566	0103	COMP2C	TTA	T1	UP TAG CHECK NEXT BANK
1567	0030		ADN		
1570	0001		1		

1571	0102		ATT	T1	
1572	0303		TTA	T3	
1573	0034		SBN		
1574	0015		OUTAG	1	
1575	0260		ZJP	T2	IF COMPARE COMPLETED, EXIT
1576	0260		COMP1A		
1577	0020		LDN		
1600	0015		OUTAG	1	
1601	0302		ATT	T3	
1602	0021		LDM		SET LWA FOR FINAL BANK OF DATA
1603	0100		AMNT2		
1604	0041		STM		
1605	0075		AMNT1		
1606	0264		UJP	T2	
1607	1526		COMP2A		GO COMPARE FINAL DATA BANK
1610	0020	DATERR	LDN		
1611	0050		CODE13		DATA COMPARE ERROR
1612	0041		STM		
1613	0063		ERRCOD		STORE ERROR CODE FOR SMM
1614	0322		LDI	T3	GET LAST COMPARED EXPECTED DATA WORD
1615	0057		DATAIO		
1616	0041		STM		STORE FOR DISPLAY
1617	0052		ERRABX		
1620	0122		LDI	T1	GET LAST COMPARED RECEIVED DATA WORD
1621	0057		DATAIO		
1622	0041		STM		STORE FOR ERROR DISPLAY
1623	0054		AREG		
1624	0103		TTA	T1	
1625	0241		STM	T2	
1626	1647		SAVE1		
1627	0203		TTA	T2	
1630	0102		ATT	T1	
1631	0303		TTA	T3	
1632	0241		STM	T2	
1633	1652		SAVE3		
1634	0020		LDN		
1635	1640		COMP2F		RETURN ADDRESS
1636	0064		UJP		GO REPORT ERROR VIA SMM
1637	0333		ERPORT		
1640	0102	COMP2F	ATT	T1	
1641	0020		LDN		
1642	1646		SAVE1	-1	RETURN ADDRESS
1643	0013		CIL		
1644	0064		UJP		GO CHECK FOR INTERRUPT 10
1645	0102		SMMGX		
1646	0020		LDN		
1647	0000	SAVE1	0		RESTORE TAGS AND
1650	0102		ATT	T1	CONTINUE COMPAR
1651	0020		LDN		
1652	0000	SAVE3	0		
1653	0302		ATT	T3	
1654	0021		LDM		
1655	0057		DATAIO		
1656	0260		ZJP	T2	
1657	1536		COMP3A		
1660	0034		SBN		GO CONTINUE COMPARE AFTER ERROR DISPLAY
1661	0377		377		
1662	0261		NZP	T2	
1663	1536		COMP3A		
1664	0041		STM		

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1665	0057		DATAIO		
1666	0264		UJP	T2	
1667	1566		COMP2C		GO COMPARE
1670	0020	NEXSEC	LDN		
1471	0055		CODE15	1	IS ON THE FIRST MAG TAPE SECTIONS OF TESTS SMM92 MUST BE RELOADED AND USE TEST PARAMETER 14
		REM			
		REM			IS ON THE SECOND MAG TAPE SECTION OF TESTS SMM92 MUST BE RELOADED AND USE TEST PARAMETER 015
1672	0041		STM		
1673	0063		ERRCOD		
1674	0003		CLA		
1675	0041		STM		
1676	0052		ERRABX		
1677	0041		STM		
1700	0054		AREG		
1701	0020		LDN		
1702	0004		4		
1703	0102		ATT	T1	SET TAG FOR RETURN TO END TEST SECTION
1704	0020		LDN		
1705	2047		XXX	-5	GO END ALL TESTING
1706	0064		RJP		GO REPORT CODE VIA REGISTER DISPLAY
1707	0333		REPORT		
1710	0020	LOOP1Z	LDN		
1711	0004		T20		
1712	0202		ATT	T2	
1713	0102		ATT	T1	
1714	0003		CLA		
1715	0041		STM		RESET DELAY COUNTERS TO ZERO
1716	0076		COMM1		
1717	0041		STM		
1720	0055		COMM2		
1721	0041		STM		
1722	0056		COMM3		
1723	0264		UJP	T2	
1724	2130		LOOP1		
	2000	PRG	2002		

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*   *   *   *   *
*   *   *   *   *
*   *   *   *   *

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		REM			SELECT TEST SECTION
		REM			
		REM			
2000	0020	TESTS	LDN		RESET FLAGS
2001	0001		1		
2002	0241		STM	T2	
2003	2021		TESTS1		
2004	0020		LDN		
2005	2112		TGT=ST		
2006	0241		STM	T2	
2007	2070		RUNA	1	
2010	0020		LDN		
2011	2121		LOC TES		
2012	0241		STM	T2	
2013	2075		RUNA2		
2014	0021	TESTSA	LDN		CHECK FOR TESTS WANTED TO RUN
2015	0047		PARAM		IF PARAMETER IS ZERO, RUN ALL.

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2016	0260		ZJP	T2	
2017	2057		RUNALL		
2020	0010		LPN		
2021	0001	TESTS1	1		MASK FOR EACH TEST
2022	0261		NZP	T2	
2023	2065		RUNX		GO EXECUTE TEST
2024	0255		RAO	T2	
2025	2070		RUNA	1	
2026	0255		RAO	T2	
2027	2075		RUNA2		
2030	0221	TESTSB	LDM	T2	ALTER MASK FOR NEXT TEST
2031	2021		TESTS1		
2032	0001		SHA		
2033	0241		STM	T2	
2034	2021		TESTS1		
2035	0034		SBN		
2036	0001		1		CHECK FOR ALL TESTS COMPLETED
2037	0261		NZP	T2	GO CHECK FOR NEXT TEST
2040	2014		TESTSA		
2041	0021		LDM		
2042	0002		SWITCH		CHECK FOR REPEAT OF ALL TESTS
2043	0010		LPN		
2044	0100		100		
2045	0261		NZP	T2	GO REPEAT TESTS
2046	2000		TESTS		
2047	0020		LDN		
2050	0001		1		
2051	0302		ATT	T3	
2052	0020		LDN		
2053	0002		2		
2054	0204	XXX	ABR	T2	
2055	2054		XXX		
2056	0077		HLT		END OF TEST HALT
2057	0020	RUNALL	LDN		
2060	0270		270		SET PARAMETER FOR RUNNING SECTIONS D,E,F,G.
2061	0041		STM		
2062	0047		PARAM		
2063	0264		UJP	T2	GO CHECK FOR NEXT TEST
2064	2014		TESTSA		
2065	0041	RUNX	STM		
2066	0017		SECTS		SAVE SECTION BIT NUMBER
2067	0221	RUNA	LDM	T2	SET TEST TAG
2070	2112		TGTEST		
2071	0102		ATT	T1	
2072	0255		RAO	T2	
2073	2070		RUNA	1	UPDATE TAG SETTER
2074	0221		LDM	T2	
2075	2121	RUNA2	LOCTES		SET TEST ADDRESS FOR JUMPING
2076	0241		STM	T2	
2077	2110		RUNA1		
2100	0255		RAO	T2	
2101	2075		RUNA2		
2102	0103		TTA	T1	
2103	0202		ATT	T2	
2104	0003		CLA		CLEAR EXPECTED STATUS
2105	0041		STM		
2106	0004		ESTAT		
2107	0264		UJP	T2	GO EXECUTE TEST
2110	0000	RUNA1	0		
2111	0000	TEST			

2112	0003	TGTEST	TESATG	TEST TAGS
2113	0003		TESBTG	
2114	0003		TESCTG	
2115	0005		TESDTG	
2116	0010		TESETG	
2117	0011		TESFTG	
2120	0013		TESGTG	
2121	1670	LOCRES	TESTA	TEST ADDRESSES
2122	1670		TESTB	
2123	1670		TESTC	
2124	2400		TESTD1	
2125	4201		TESTE	
2126	4634		TESTF	
2127	5516		TESTG	
	0003	TESATG EQU	3	
	0003	TESBTG EQU	3	
	0003	TESCTG EQU	3	
	0005	TESDTG EQU	5	
	0010	TESETG EQU	10	
	0011	TESFTG EQU	11	
	0013	TESGTG EQU	13	
	1670	TESTA EQU	NEXSEC	
	1670	TESTB EQU	NEXSEC	
	1670	TESTC EQU	NEXSEC	
		REM		
2130	0021	LOOP1	LDM	
2131	0142		UNIT2X	GET UNIT AND CONTROLLER NUMBER
2132	0241		STM T2	
2133	2135		UNIT2A	
2134	0075		EXF	READ STATUS
2135	0000	UNIT2A	0	
2136	0000		RST	
2137	0076		INA	INPUT STATUS
2140	0013		CIL	
2141	0041		STM	SAVE STATUS
2142	0054		AREG	
2143	0011		LPM	MASK FOR STATUS WAITING FOR
2144	0046		WTBIT	
2145	0060		ZJP	RETURN IF STATUS HAS DROPPED
2146	0325		EXIT1A	
2147	0055		RAO	
2150	0076		COMM1	DELAY AND WAIT FOR STATUS TO DROP
2151	0261		NZP T2	
2152	2134		UNIT2A -1	
2153	0055		RAO	
2154	0055		COMM2	
2155	0261		NZP T2	
2156	2134		UNIT2A -1	
2157	0055		RAO	
2160	0056		COMM3	
2161	0261		NZP T2	
2162	2134		UNIT2A -1	
2163	0020		LDN	TERMINATE DELAY IF STATUS HAS NOT DROPPED
2164	0072		CODE22	
2165	0041		STM	
2166	0063		ERRCOD	CODES TO ERROR REGISTERS
2167	0021		LDM	
2170	0003		ASTAT	LAST STATUS
2171	0041		STM	
2172	0054		AREG	

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2173	0003		CLA		
2174	0102		ATT	T1	
2175	0020		LDN		
2176	0325		EXITIA		RETURN ADDRESS
2177	0064		UJP		
2200	0333		ERP0RT		GO REPORT ERROR
2201	0241	SWAP	STM	T2	SAVE ADDRESS
2202	2265		SWAP1		
2203	0103		TTA	T1	
2204	0241		STM	T2	SAVE TAG ONE
2205	2261		SWAP2		
2206	0003		CLA		RESET FLAGS
2207	0041		STM		
2210	0357		AMNT3		
2211	0021		LDM		
2212	0065		LWA		
2213	0034		SBN		
2214	0001		I		
2215	0041		STM		
2216	0141		TEMP3		
2217	0260		ZJP	T2	NO SWAP NEEDED ON 1 WORD READ OPERATION
2220	2260		SWAP5		
2221	0020		LDN		
2222	0016		INNNTAG		
2223	0302		ATT	T3	
2224	0322	SWAP4	LDI	T3	REARRANGE DATA THAT WAS READ BACKWARDS
2225	0357		AMNT3		
2226	0041		STM		
2227	0360		TEMP		
2230	0322		LDI	T3	
2231	0141		TEMP3		
2232	0342		STI	T3	
2233	0357		AMNT3		
2234	0021		LDM		
2235	0360		TEMP		
2236	0342		STI	T3	
2237	0141		TEMP3		
2240	0055		RAO		UPDATE LOW COUNTER
2241	0357		AMNT3		
2242	0035		SBM		CHECK WITH HIGH COUNTER
2243	0141		TEMP3		
2244	0260		ZJP	T2	TERMINATE ODD AMOUNT SWAP
2245	2260		SWAP5		
2246	0020		LDN		SUBTRACT 1 FROM HIGH COUNTER
2247	0376		376		
2250	0051		RAM		
2251	0141		TEMP3		
2252	0035		SBM		CHECK WITH LOW COUNTER
2253	0357		AMNT3		
2254	0260		ZJP	T2	TERMINATE EVEN AMOUNT SWAP
2255	2260		SWAP5		
2256	0264		UJP	T2	REPEAT DATA MOVE ROUTINE
2257	2224		SWAP4		
2260	0020	SWAP5	LDN		
2261	0000	SWAP2	0		
2262	0102		ATT	T1	
2263	0202		ATT	T2	
2264	0264		UJP	T2	RETURN JUMP
2265	0000	SWAP1	0		
2266	0030	WAITB	ADN		BIAS TAG T54

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2267	0001		1	
2270	0030		ADN	BIAS TAG T50
2271	0001		1	
2272	0030		ADN	BIAS TAG T44
2273	0005		5	
2274	0241		STM	T2 SAVE RETURN TAG
2275	2314		WAITB1	
2276	0203		TTA	T2
2277	0102		ATT	T1
2300	0020		LDN	
2301	2304		WAITB2	RETURN ADDRESS
2302	0064		RJP	
2303	0313		WAIT	4 WAIT NOT BUSY
2304	0020	WAITB2	LDN	
2305	0001		T04	
2306	0202		ATT	T2
2307	0020		LDN	
2310	2313		WAITB3	RETURN ADDRESS
2311	0264		RJP	T2 GO READ STATUS
2312	0402		STATA2	2
2313	0020	WAITB3	LDN	RESET TAGS
2314	0000	WAITB1	0	
2315	0102		ATT	T1
2316	0055		RAO	UPDATE JUMP ADDRESSES
2317	0070		RETURN	
2320	0122		LDI	T1
2321	0070		RETURN	RETURN ADDRESS
2322	0241		STM	T2
2323	2327		WAITB4	
2324	0103		TTA	T1
2325	0202		ATT	T2
2326	0264		UJP	T2 RETURN JUMP
2327	0000	WAITB4	0	
2330	0021	G02	LDM	
2331	0054		AREG	
2332	0077		HLT	ERROR HALT NUMBER 1
2333	0021		LDM	
2334	0002		SWITCH	
2335	0010		LPN	
2336	0040		40	
2337	0061		NZP	
2340	0345		EXIT17	-1 RETURN TO ROUTINE
2341	0021		LDM	LAST FUNCTION TO A REGISTER
2342	0005		LFUNCT	
2343	0205	G03	ABX	T2
2344	2343		G03	
2345	0020		LDN	ERROR CODE TO EXIT REGISTER
2346	0064		CODE19	
2347	0204	G04	ABR	T2
2350	2347		G04	
2351	0021		LDM	SECTION NUMBER TO A REGISTER
2352	0017		SECTS	
2353	0077		HLT	ADDITIONAL ERROR STOP
2354	0021		LDM	
2355	0017		SECTS	IF IN SECTION D OR E USE THIRD ERROR STOP
2356	0010		LPN	
2357	0030		30	
2360	0060		ZJP	RETURN
2361	0345		EXIT17	-1

2362	0021		LDM		THIRD ERROR STOP
2363	0074		CODE23		STOP INDICATOR
2364	0204	G05	ABR	T2	
2365	2364		G05		
2366	0021		LDM		I/O DATA LENGTH LCPECTED
2367	0065		LWA		
2370	0205	G06	ABX	T2	
2371	2370		G06		
2372	0021		LDM		
2373	0064		LAST		TERMINATING LENGTH
2374	0077		HLT		THIRD ERROR STOP
2375	0064		UJP		
2376	0345		EXIT17 =1		
	2400	PRG	240-		

					* * * * *
					* * * * *
					* BANK *
					* 05 *
					* * * * *
					* * * * *

2400	0020	TESTD1	LDN		SELECT BCD MODE
2401	2736		JUMPD	=1	
2402	0041		STM		RESET JUMP ADDRESSES
2403	0070		RETURN		
2404	0020		LDN		
2405	0014		SEX		
2406	0064		RJP		
2407	0202		SELECT		
2410	0020	TESD1A	LDN		SET UP 20 WORD BUFFER
2411	0024		20D		
2412	0041		STM		
2413	0065		LWA		
2414	0020		LDN		REWIND FUNCTION
2415	0034		REW		
2416	0064		RJP		
2417	0202		SELECT		GO SELECT FUNCTION
2420	0064	TESD1B	RJP		
2421	0307		WAIT		
2422	0020	TESD1C	LDN		
2423	0014		T60		OUTPUT TAG
2424	0041		STM		
2425	0071		TAG3A		
2426	0041		STM		
2427	0072		TAG3B		
2430	0020		LDN		SET TYPE OF I/O (OUTPUT BUFFER)
2431	0271		IBO	T2	
2432	0041		STM		
2433	0077		IOTYP		
2434	0003		CLA		
2435	0041		STM		
2436	0361		EXPECX		DO NOT EXPECT EXTERNAL INTERRUPT
2437	0041		STM		
2440	0100		AMNT2		
2441	0041		STM		
2442	0101		IOTYP1		
2443	0020		LDN		INDICATE TYPE OF DATA TO GENERATE (BCD)
2444	0001		1		
2445	0041		STM		
2446	0062		DATYP		
2447	0020		LDN		

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2450	2453		TESD2	RETURN ADDRESS
2451	0064		RJP	GO GENERATE DATA
2452	0227		GEN	
2453	0020	TESD2	LDN	SELECT WRITE FUNCTION
2454	0020		WRT	
2455	0064		RJP	
2456	0202		SELECT	
2457	0020	TESD3	LDN	
2460	2463		TESD4	RETURN ADDRESS
2461	0064		RJP	GO WRITE DATA
2462	0163		BUFF1	
2463	0020	TESD4	LDN	
2464	0001		J	
2465	0041		STM	EXPECT STATUS OF 000
2466	0004		ESTAT	
2467	0020		LDN	
2470	0377		377	
2471	0041		STM	NO UNEXPECTED STATUS
2472	0007		MASK	
2473	0013		CIL	CLEAR INTERRUPT LOCKOUT
2474	0064		RJP	GO WAIT FOR BUSY TO DROP
2475	0307		WAIT	
2476	0064	TESD5A	RJP	STORE EXPECTED BCD STATUS
2477	0300		STATUS	
2500	0021	TESD5	LDM	
2501	0362		EXPEC2	
2502	0260		ZJP	T2 EXPECTED INTERRUPT OCCURED
2503	2524		TESD6	
2504	0020		LDN	SET UP ERROR DATA FOR DISPLAY
2505	0044		CODE11	
2506	0041		STM	INTERRUPT DID NOT OCCUR
2507	0063		ERRCOD	
2510	0021		LDM	
2511	0005		LFUNCT	STORE LAST FUNCTION IN
2512	0041		STM	EXIT REGISTER
2513	0052		ERRABX	
2514	0021		LDM	LAST STATUS FOR A REGISTER
2515	0003		ASTAT	
2516	0041		STM	
2517	0054		AREG	
2520	0020		LDN	
2521	2524		TESD6	RETURN ADDRESS
2522	0064		RJP	GO REPORT ERROR
2523	0333		REPORT	
2524	0020	TESD6	LDN	
2525	0024		ZND	ADD 20 TO WRITE BUFFER
2526	0051		RAM	
2527	0065		LWA	
2530	0055		RAO	COUNT WRITE BUFFERS COMPLETED
2531	0100		AMNT2	
2532	0034		SBN	
2533	0013		I1D	
2534	0260		ZJP	T2 GO SEARCH FILE BACK
2535	2544		TESD7	
2536	0020		LDN	
2537	2741		JUMPD	2
2540	0041		STM	
2541	0070		RETIJRN	
2542	0264		UJP	T2 GO REPEAT WRITE
2543	2453		TESD2	

2544	0041	TESD7	STM	
2545	0100		AMNT2	
2546	0020		LDN	
2547	0041		41	
2550	0041		STM	
2551	0004		ESTAT	
2552	0020		LDN	
2553	0034		REW	REWIND FUNCTION
2554	0064		RJP	
2555	0202		SELECT	
2556	0064	TESD7A	RJP	
2557	0307		WAIT	
2560	0064	TESD8	RJP	GO READ STATUS
2561	0300		STATUS	
2562	0020	TESD9	LDN	
2563	0023		19D	SET UP READ
2564	0041		STM	
2565	0065		LWA	
2566	0020		LDN	
2567	0016		T70	INPUT TAG
2570	0041		STM	
2571	0071		TAG3A	
2572	0041		STM	
2573	0072		TAG3B	
2574	0020		LDN	
2575	0270		IBI	T2 SET UP BUFFER INPUT INSTRUCTION
2576	0041		STM	
2577	0077		IOTYP	
2600	0003		CLA	INDICATE READ FUNCTION
2601	0041		STM	
2602	0101		IOTYP1	
2603	0020		LDN	
2604	0001		1	EXPECT BCD STATUS
2605	0041		STM	
2606	0004		ESTAT	
2607	0020		LDN	
2610	0024		RF	READ FORWARD FUNCTION
2611	0064		RJP	
2612	0202		SELECT	GO SELECT FUNCTION
2613	0020	TESD10	LDN	
2614	2617		TESn11	RETURN ADDRESS
2615	0064		RJP	GO INPUT DATA
2616	0163		BUFF1	
2617	0013	TESD11	CIL	
2620	0064		RJP	
2621	0307		WAIT	WAIT BUSY STATUS
2622	0064	TESD12	RJP	
2623	0300		STATUS	
2624	0021	TESD13	LDM	SET UP COMPARE AMOUNT
2625	0065		LWA	
2626	0041		STM	
2627	0075		AMNT1	
2630	0020		LDN	
2631	2634		TESn14	RETURN ADDRESS
2632	0064		RJP	
2633	0246		COMP1	GO COMPARE DATA
2634	0020	TESD14	LDN	UPDATE INPUT BUFFER AMOUNT
2635	0024		20D	
2636	0051		RAM	
2637	0065		LWA	

2640	0055		RAO	
2641	0100		AMNT2	
2642	0034		SBN	
2643	0013		110	
2644	0260		ZJP	T2
2645	2654		TESD15	
2646	0020		LDN	
2647	2747		JUMPD	80
2650	0041		STM	
2651	0070		RETURN	
2652	0264		UJP	T2
2653	2566		TESD9	4
2654	0041	TESD15	STM	
2655	0100		AMNT2	
2656	0021		LDN	
2657	0061		MASK2	
2660	0260		ZJP	T2
2661	2756		TESD26	
2662	0020		LDN	
2663	0333		219D	
2664	0041		STM	
2665	0065		LWA	
2666	0041		STM	
2667	0075		AMNT1	
2670	0020		LDN	
2671	0025		RB	
2672	0064		RJP	
2673	0202		SELECT	
2674	0020	TESD16	LDN	
2675	2700		TESD17	
2676	0064		RJP	
2677	0163		BUFF1	
2700	0064	TESD17	RJP	
2701	0307		WAIT	
2702	0064	TESD18	RJP	
2703	0300		STATUS	
2704	0020	TESD19	LDN	
2705	0004		T20	
2706	0202		ATT	T2
2707	0020		LDN	
2710	2713		TESD24	
2711	0264		RJP	T2
2712	2201		SWAP	
2713	0020	TESD24	LDN	
2714	2717		TESD25	
2715	0064		RJP	
2716	0246		COMP1	
2717	0020	TESD25	LDN	
2720	0353		353	
2721	0051		RAM	
2722	0065		LWA	
2723	0055		RAO	
2724	0100		AMNT2	
2725	0034		SBN	
2726	0013		110	
2727	0260		ZJP	T2
2730	2756		TESD26	
2731	0020		LDN	
2732	2752		JUMPD	110
2733	0041		STM	

GO READ BACKWARDS

RESET JUMP ADDRESSES

GO REPEAT

1 = 608 OR 609 TAPE DRIVE BEING TESTED

TEMP*****

SET UP READ BUFFER

LAST WORD ADDRESS

READ BACKWARD FUNCTION

GO SELECT FUNCTION

INITIATE BUFFER

WAIT BUSY

READ STATUS

RETURN ADDRESS

RETURN ADDRESS

GO COMPARE DATA JUST READ

REDUCE INPUT BUFFER BY 20D

REPEAT FIVE TIMES

RESET JUMP ADDRESSES

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3035	0020	LDN	
3036	2736	JUMPD	-1
3037	0041	STM	
3040	0070	RETURN	
3041	0020	LDN	
3042	0005	T24	
3043	0102	ATT	T1
3044	0202	ATT	T2
3045	0264	UJP	T2
3046	2400	TESTD1	GO REPEAT LAST SEGMENT
3047	0020	LDN	
3050	0013	I1D	SET UP INITIAL LAST WORD ADDRESS
3051	0041	STM	
3052	0065	LWA	
3053	0041	STM	
3054	0075	AMNT1	
3055	0020	LDN	
3056	3352	JUMPD1	-1
3057	0041	STM	
3060	0070	RETURN	RESET RETURN JUMP ADDRESSES
3061	0020	LDN	SET UP NORMAL CHANNEL OUTPUT
3062	0373	OUT	T3
3063	0041	STM	
3064	0077	IOTYP	
3065	0020	LDN	
3066	0014	OUTTAG	
3067	0041	STM	
3070	0071	TAG3A	
3071	0020	LDN	
3072	0034	REW	
3073	0064	RJP	GO SELECT REWIND
3074	0202	SELECT	
3075	0020	LDN	GENERATE RANDOM NUMBERS
3076	0010	I0	
3077	0041	STM	
3100	0062	DATYP	
3101	0020	LDN	
3102	3105	TESD29	
3103	0064	RJP	GO GENERATE DATA
3104	0227	GEN	
3105	0064	RJP	WAIT NOT BUSY
3106	0307	WAIT	
3107	0020	LDN	
3110	0010	SOX	SET ODD PARITY (BINARY)
3111	0064	RJP	
3112	0202	SELECT	
3113	0020	LDN	
3114	0364	364	-110
3115	0041	STM	
3116	0100	AMNT2	
3117	0003	CLA	EXPECT ZERO STATUS
3120	0041	STM	
3121	0004	ESTAT	
3122	0020	LDN	
3123	0020	WRT	
3124	0064	RJP	
3125	0202	SELECT	
3126	0020	LDN	
3127	3132	TESD33	RETURN ADDRESS
3130	0064	RJP	

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3131	0144		NORM1	GO OUTPUT VIA NORMAL CHANNEL
3132	0064	TESD33	RJP	
3133	0307		WAIT	WAIT NOT BUSY
3134	0064	TESD34	RJP	
3135	0300		STATUS	GO READ STATUS
3136	0020	TESD35	LDN	
3137	0024		ZAD	INCREASE OUTPUT BUFFER BY 20
3140	0051		RAM	
3141	0065		LWA	
3142	0055		RAO	REPEAT 11 TIMES
3143	0100		AMNT2	
3144	0260		ZJP	T2
3145	3154		TESD36	CONTINUE NEXT SEGMENT
3146	0020		LDN	RESET JUMP ADDRESSES
3147	3355		JUMP01	2
3150	0041		STM	
3151	0070		RETURN	
3152	0264		UJP	T2
3153	3122		TESD32	-4
3154	0020	TESD36	LDN	
3155	0034		REW	REWIND FUNCTION
3156	0064		RJP	
3157	0202		SELECT	
3160	0064	TESD36	RJP	
3161	0307		WAIT	WAIT NOT BUSY
3162	0020	TESD36A	LDN	
3163	0013		IID	
3164	0041		STM	RESET LAST WORD ADDRESS
3165	0065		LWA	
3166	0041		STM	
3167	0075		AMNT1	
3170	0020		LDN	
3171	0016		INN1AG	
3172	0041		STM	
3173	0071		TAG3A	
3174	0020		LDN	
3175	0364		364	-110
3176	0041		STM	
3177	0100		AMNT2	
3200	0020		LDN	I/O FUNCTION (READ)
3201	0372		INN	T3
3202	0041		STM	
3203	0077		IOTYP	
3204	0020		LDN	SELECT READ FORWARD
3205	0024		RF	
3206	0064		RJP	
3207	0202		SELECT	
3210	0020	TESD37	LDN	READ FORWARD
3211	3214		TESD38	RETURN ADDRESS
3212	0064		RJP	
3213	0144		NORM1	INPUT DATA
3214	0064	TESD38	RJP	
3215	0307		WAIT	WAIT NOT BUSY
3216	0064	TESD39	RJP	READ STATUS
3217	0300		STATUS	
3220	0020	TESD39	LDN	
3221	3224		TESD40	RETURN ADDRESS
3222	0064		RJP	GO COMPARE DATA
3223	0246		COMP1	
3224	0020	TESD40	LDN	

3225	0024		Z0D	
3226	0051		RAM	INCREASE BUFFER LENGTH
3227	0065		LWA	
3230	0041		STM	UPDATE COMPARE ADDRESS
3231	0075		AMNT1	
3232	0055		RAO	
3233	0100		AMNT2	REPEAT READ OPERATION 11 TIMES
3234	0260		ZJP	T2
3235	3244		TESD41	
3236	0020		LDN	RESET JUMP ADDRESSES
3237	3362		JUMP01	7
3240	0041		STM	
3241	0070		RETURN	
3242	0264		UJP	T2
3243	3274		TESD37	-4
3244	0021	TESD41	LDM	REPEAT READ OPERATION CHECK FOR 601 OR 608,609 TAPE DRIVE
3245	0061		MASK2	
3246	0260		ZJP	T2
3247	3327		TESD48	
3250	0020		LDN	
3251	0364		364	-110
3252	0041		STM	
3253	0100		AMNT2	
3254	0020		LDN	
3255	0323		Z110	
3256	0041		STM	
3257	0065		LWA	
3260	0041		STM	
3261	0075		AMNT1	
3262	0020		LDN	
3263	0025		RB	SELECT READ BACKWARDS FUNCTION
3264	0064		RJP	
3265	0272		SELECT	
3266	0020	TESD42	LDN	
3267	3272		TESD43	RETURN ADDRESS
3270	0064		RJP	GO READ DATA BACKWARDS
3271	0144		NORM1	
3272	0064	TESD43	RJP	
3273	0307		WAIT	WAIT NOT BUSY
3274	0064	TESD44	RJP	
3275	0300		STATUS	READ STATUS
3276	0020	TESD45	LDN	
3277	0004		T20	
3300	0202		ATT	T2
3301	0020		LDN	REARRANGE DATA THAT WAS READ BACKWARDS.
3302	3305		TESD46	
3303	0264		RJP	T2
3304	2271		SWAP	
3305	0020	TESD46	LDN	
3306	3311		TESD47	
3307	0064		RJP	GO COMPARE DATA JUMP READ
3310	0246		COMP1	
3311	0020	TESD47	LDN	
3312	0353		353	REDUCE READ BUFFER BY 200
3313	0051		RAM	
3314	0065		LWA	
3315	0055		RAO	REPEAT READ OPERATION
3316	0100		AMNT2	11 TIMES
3317	0260		ZJP	T2
3320	3327		TESD48	

3413	2400		TEST01	
3414	0020	TESD52	LDN	
3415	0271		IBO	T2 SETUP OUTPUT BUFFER
3416	0041		STM	
3417	0077		IOTYP	
3420	0020		LDN	
3421	0002		2	LAST WORD ADDRESS PLUS 2
3422	0041		STM	
3423	0065		LWA	
3424	0020		LDN	
3425	3742		JUMP02	-1
3426	0041		STM	
3427	0070		RETURN	
3430	0003		CLA	
3431	0041		STM	EXPECT STATUS OF ZERO
3432	0004		ESTAT	
3433	0020		LDN	
3434	0014		OUTTAG	
3435	0041		STM	
3436	0071		TAG3A	
3437	0041		STM	SET UP BUFFER TAGS
3440	0072		TAG3B	
3441	0020		LDN	SELECT WRITE FUNCTION
3442	0020		WRT	
3443	0064		RJP	
3444	0202		SELECT	
3445	0020	TESD53	LDN	
3446	3451		TESD54	RETURN ADDRESS
3447	0064		RJP	
3450	0163		BUFF1	OUTPUT DATA
3451	0064	TESD54	RJP	
3452	0307		WAIT	WAIT NOT BUSY
3453	0064	TESD55	RJP	
3454	0300		STATUS	READ STATUS
3455	0020	TESD56	LDN	
3456	0001		1	
3457	0051		RAM	INCREASE OUTPUT BUFFER BY 1
3460	0065		LWA	
3461	0034		SBN	
3462	0376		2540	
3463	0260		ZJP	T2 TERMINATE WRITE OPERATION
3464	3473		TESD57	
3465	0020		LDN	
3466	3742		JUMP02	-1
3467	0041		STM	RESET JUMP ADDRESSES
3470	0070		RETURN	
3471	0264		UJP	T2 REPEAT WRITE OPERATION
3472	3441		TESD53	-4
3473	0021	TESD57	LDM	
3474	0061		MASK2	
3475	0260		ZJP	T2 GO REWIND
3476	3560		TESD64	
3477	0020		LDN	
3500	0374		2520	
3501	0041		STM	
3502	0065		LWA	
3503	0041		STM	
3504	0075		AMNT1	SET UP COMPARE ROUTINE LWA
3505	0020		LDN	
3506	0372		INN	T3 INPUT NORMAL CHANNEL

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3507	0041		STM	
3510	0077		IOTYP	
3511	0020		LDN	
3512	0016		INN TAG	SET TAGS
3513	0041		STM	
3514	0071		TAG A	
3515	0020		LDN	
3516	0025		RB	SELECT READ BACKWARD
3517	0064		RJP	
3520	0202		SELECT	
3521	0070	TESD58	LDN	
3522	3525		TESD59	RETURN ADDRESS
3523	0064		RJP	
3524	0144		NORM1	GO INPUT ON NORMAL CHANNEL
3525	0064	TESD59	RJP	
3526	0307		WAIT	WAIT NOT BUSY
3527	0064	TESD60	RJP	
3530	0300		STATUS	GO READ STATUS
3531	0020	TESD61	LDN	
3532	0004		T20	
3533	0202		ATT	T2
3534	0020		LDN	
3535	3540		TESD62	RETURN ADDRESS
3536	0264		RJP	T2
3537	2201		SWAP	REARRANGE DATA THAT WAS JUST READ BACKWARD
3540	0020	TESD62	LDN	
3541	3544		TESD63	RETURN ADDRESS
3542	0064		RJP	GO COMPARE DATA
3543	0246		COMP1	
3544	0020	TESD63	LDN	
3545	0376		376	
3546	0051		RAM	
3547	0065		LWA	REDUCE LAST WORD ADDRESS BY ONE
3550	0260		ZJP	T2
3551	3560		TESD64	TERMINATE BACKWARD READ
3552	0020		LDN	
3553	3745		JUMP D2	2
3554	0041		STM	RESET JUMP ADDRESSES
3555	0070		RETURN	
3556	0264		UJP	T2
3557	3515		TESD58	-4
3560	0020	TESD64	LDN	
3561	3750		JUMP D2	5
3562	0041		STM	RESET JUMP ADDRESS
3563	0070		RETURN	
3564	0020		LDN	
3565	0034		REW	REWIND
3566	0064		RJP	
3567	0202		SELECT	
3570	0064	TESD65	RJP	WAIT NOT BUSY
3571	0307		WAIT	
3572	0020	TESD66	LDN	
3573	0001		1	RESET LAST WORD ADDRESS
3574	0041		STM	
3575	0065		LWA	
3576	0041		STM	
3577	0075		AMNT1	
3600	0020		LDN	
3601	0372		INN	T3
3602	0041		STM	INPUT NORMAL CHANNEL

3603	0077		IOTYP	
3604	0020		LDN	
3605	0016		INN TAG	
3606	0041		STM	
3607	0071		TAG 1A	
3610	0020		LDN	
3611	0024		RF	SELECT READ FORWARD
3612	0064		RJP	
3613	0202		SELECT	
3614	0020	TESD67	LDN	
3615	3620		TESD68	RETURN ADDRESS
3616	0064		RJP	
3617	0144		NORM 1	INPUT ON NORMAL CHANNEL
3620	0064	TESD68	RJP	
3621	0307		WAIT	WAIT NOT BUSY
3622	0064	TESD69	RJP	
3623	0300		STATUS	READ STATUS
3624	0020	TESD70	LDN	
3625	3630		TESD70 4	
3626	0064		RJP	
3627	0246		COMP 1	GO COMPARE DATA
3630	0020		LDN	
3631	0001		1	
3632	0051		RAM	
3633	0065		LWA	INCREASE READ BUFFER BY 1
3634	0041		STM	
3635	0075		AMNT 1	
3636	0034		SBN	
3637	0375		2530	
3640	0260		ZJP T2	TERMINATE READ OPERATION
3641	3650		TESD71	
3642	0020		LDN	
3643	3752		JUMP D2 7	
3644	0041		STM	RESET JUMP ADDRESSES
3645	0070		RETIJRN	
3646	0264		UJP T2	REPEAT READ OPERATION
3647	3610		TESD67 -4	
3650	0020	TESD71	LDN	
3651	0034		REW	
3652	0064		RJP	GO REWIND
3653	0202		SELECT	
3654	0064	TESD72	RJP	WAIT NOT BUSY
3655	0307		WAIT	
3656	0020	TESD72	LDN	
3657	3662		TESD73	RETURN ADDRESS
3660	0064		RJP	CHECK FOR INTERRUPT TEN
3661	0102		SMM 0X	
3662	0021	TESD73	LDM	
3663	0002		SWITCH	CHECK FOR REPEAT PARAMETER
3664	0010		LPN	
3665	0020		Z0	
3666	0260		ZJP T2	CONTINUE WITH NEXT TEST
3667	3672		TESD74	
3670	0264		UJP T2	GO REPEAT LAST TEST SECTION
3671	3414		TESD52	
3672	0020	TESD74	LDN	
3673	0004		4	
3674	0041		STM	
3675	0062		DAT TYP	
3676	0020		LDN	

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4004	0020	TESD76	LDN	
4005	4010		TESD77	RETURN ADDRESS
4006	0064		RJP	OUTPUT TWO BANKS VIA BUFFER CHANNEL
4007	0163		BUFF1	
4010	0064	TESD77	RJP	
4011	0307		WAIT	
4012	0064	TESD77A	RJP	
4013	0300		STATUS	READ STATUS
4014	0055	TESD77	RAO	COUNT OUTPUT BUFFERS
4015	0100		AMNT2	
4016	0260		ZJP	T2
4017	4026		TESD78	TERMINATE WRITE
4020	0020		LDN	RESET JUMP ADDRESSES
4021	4165		JUMP03	-1
4022	0041		STM	
4023	0070		RETURN	
4024	0264		UJP	T2
4025	4000		TESD76	-4
4026	0020	TESD78	LDN	
4027	0034		REW	REWIND FUNCTION
4030	0064		RJP	
4031	0202		SELECT	
4032	0064	TESD79	RJP	
4033	0307		WAIT	WAIT NOT BUSY
4034	0020	TESD80	LDN	
4035	0016		INNTAG	
4036	0041		STM	SET TAGS
4037	0071		TAG3A	
4040	0030		ADN	
4041	0001		I	
4042	0041		STM	
4043	0072		TAG3B	
4044	0020		LDN	
4045	0363		243D	
4046	0041		STM	
4047	0065		LWA	
4050	0041		STM	
4051	0100		AMNT2	
4052	0020		LDN	
4053	0270		IBI	T2
4054	0041		STM	INPUT BUFFER OPERATION
4055	0077		IOTYP	
4056	0020		LDN	
4057	0024		RF	SELECT READ FORWARD FUNCTION
4060	0064		RJP	
4061	0202		SELECT	
4062	0020	TESD81	LDN	
4063	4066		TESD82	RETURN ADDRESS
4064	0064		RJP	
4065	0163		BUFF1	INPUT DATA VIA BUFFER CHANNEL
4066	0064	TESD82	RJP	WAIT BUSY
4067	0307		WAIT	
4070	0064	TESD82	RJP	
4071	0300		STATUS	READ STATUS
4072	0003	TESD82A	CLA	
4073	0041		STM	RESET FLAGS
4074	0075		AMNT1	
4075	0020		LDN	
4076	4101		TESD83	RETURN ADDRESS
4077	0064		RJP	GO COMPARE DATA

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4100	0246		COMP1		
4101	0055	TESD83	RAO		
4102	0357		AMNT3		
4103	0260		ZJP	T2	TERMINATE READ OPERATION
4104	4113		TESD84		
4105	0020		LDN		
4106	4173		JUMPD3	5	
4107	0041		STM		RESET JUMP ADDRESSES
4110	0070		RETURN		
4111	0264		UJP	T2	GO REPEAT READ OPERATION
4112	4056		TESD81	-4	
4113	0020	TESD84	LDN		
4114	0034		REW		REWIND FUNCTION
4115	0064		RJP		
4116	0202		SELECT		
4117	0064	TESD84	RJP		WAIT NOT BUSY
4120	0307		WAIT		
4121	0020	TESD84A	LDN		
4122	4125		TESD85		CHECK FOR INTERRUPT 10
4123	0064		RJP		
4124	0102		SMMQX		
4125	0021	TESD85	LDM		
4126	0002		SWITCH		
4127	0010		LPN		CHECK FOR REPEAT PARAMETER
4130	0020		Z0		
4131	0260		ZJP	T2	TERMINATE TEST
4132	4141		TESD86		
4133	0020		LDN		
4134	0007		T34		
4135	0102		ATT	T1	
4136	0202		ATT	T2	
4137	0264		UJP	T2	
4140	3672		TESD74		GO REPEAT LAST READ OPERATION
4141	0021	TESD86	LDM		CHECK REPEAT COMPLETE TEST
4142	0002		SWITCH		
4143	0010		LPN		
4144	0010		10		
4145	0260		ZJP	T2	CONTINUE TESTING
4146	4161		TESD87		
4147	0020		LDN		
4150	2736		JUMPD	-1	
4151	0041		STM		RESET JUMP ADDRESSES
4152	0070		RETURN		
4153	0020		LDN		
4154	0005		T24		
4155	0102		ATT	T1	
4156	0202		ATT	T2	SET TAGS
4157	0264		UJP	T2	GO REPEAT SECTION D
4160	2400		TESTD1		
4161	0020	TESD87	LDN		
4162	0004		T20		
4163	0202		ATT	T2	
4164	0264		UJP	T2	GO CHECK FOR NEXT TEST SECTION E
4165	2030		TESTSB		
4166	4004	JUMPD3	TESD76		RETURN JUMP ADDRESSES
4167	4010		TESD77		
4170	4012		TESD7A		
4171	4014		TESD77		
4172	4032		TESD79		
4173	4034		TESD80		

4174	4062		TESD81	
4175	4070		TEDa2	
4176	4072		TEDa2A	
4177	4117		TEDa4	
4200	4121		TEDa4A	
4201	0020	TESE	LDN	
4202	4347		JUMDE -1	RESET JUMP ADDRESSES
4203	0041		STM	
4204	0070		RETURN	
4205	0020		LDN	
4206	0034		REW	SELECT REWIND FUNCTION
4207	0064		RJP	
4210	0202		SELECT	
4211	0064	TESE1	RJP	WAIT NOT BUSY
4212	0307		WAIT	
4213	0020	TESE2	LDN	SELECT EVEN PARITY
4214	0014		SEX	
4215	0064		RJP	
4216	0202		SELECT	
4217	0020	TESE3	LDN	EXPECT LOADPOINT
4220	0271		IBO T2	
4221	0041		STM	
4222	0077		IOTYP	
4223	0021	TESE4	LDM	EXPECT FILE MARK STATUS
4224	0026		FILE	
4225	0041		STM	
4226	0004		ESTAT	
4227	0020		LDN	
4230	0021		WFM	SELECT WRITE FILE MARK
4231	0064		RJP	
4232	0202		SELECT	
4233	0064	TESE5	RJP	WAIT NOT BUSY
4234	0307		WAIT	
4235	0064	TESE6	RJP	READ STATUS
4236	0300		STATUS	
4237	0064	TESE7	RJP	WRITE FILE = 2
4240	0204		SELECT 2	
4241	0064	TESE8	RJP	
4242	0307		WAIT	WAIT BUSY
4243	0064	TESE9	RJP	
4244	0300		STATUS	READ STATUS
4245	0064	TESE10	RJP	
4246	0204		SELECT 2	WRITE FILE 3
4247	0064	TESE11	RJP	
4250	0307		WAIT	
4251	0064	TESE12	RJP	
4252	0300		STATUS	READ STATUS
4253	0020	TESE13	LDN	
4254	0033		SBF	SEARCH BACK ONE FILE
4255	0064		RJP	
4256	0202		SELECT	
4257	0064	TESE14	RJP	WAIT NOT BUSY
4260	0307		WAIT	
4261	0064	TESE15	RJP	
4262	0300		STATUS	READ STATUS
4263	0064	TESE16	RJP	
4264	0204		SELECT 2	SEARCH BACK SECOND FILE
4265	0064	TESE17	RJP	
4266	0307		WAIT	WAIT NOT BUSY
4267	0064	TESE18	RJP	

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4270	0300		STATUS	READ STATUS
4271	0020	TESE19	LDN	
4272	0364		2440	
4273	0041		STM	SET LAST WORD ADDRESS
4274	0065		LWA	
4275	0041		STM	
4276	0100		AMNT2	FLAG FOR COMPARE ROUTINE
4277	0003		CLA	
4300	0041		STM	
4301	0075		AMNT1	
4302	0020		LDN	INDICAT 377 DATA TO BE WRITTEN
4303	0020		Z0	
4304	0041		STM	
4305	0062		DATTYP	
4306	0020		LDN	
4307	0014		OUTTAG	
4310	0041		STM	
4311	0071		TAG3A	
4312	0030		ADN	
4313	0001		1	
4314	0041		STM	
4315	0072		TAG3B	
4316	0020		LDN	
4317	4322		TESE20	RETURN ADDRESS
4320	0064		RJP	
4321	0227		GEN	GO GENERATE DATA
4322	0020	TESE20	LDN	
4323	0020		WRT	SELECT WRITE
4324	0064		RJP	
4325	0202		SELECT	
4326	0020	TESE21	LDN	
4327	4332		TESE22	RETURN ADDRESS
4330	0064		RJP	OUTPUT NORMAL CHANNEL
4331	0163		BUFF1	
4332	0064	TESE22	RJP	WAIT NOT BUSY
4333	0307		WAIT	
4334	0020	TESE23	LDN	
4335	0001		1	EXPECT BCD STATUS
4336	0041		STM	
4337	0044		ESTAT	
4340	0064		RJP	
4341	0300		STATUS	GO READ STATUS
4342	0020	TEE23A	LDN	
4343	0011		T44	
4344	0202		ATT	T2
4345	0102		ATT	T1
4346	0264		UJP	T2
4347	4400		TES24	
4350	4211	JUMPE	TESE1	RETURN JUMP ADDRESSES
4351	4213		TESF2	
4352	4217		TESF3	
4353	4233		TESF5	
4354	4235		TESF6	
4355	4237		TESF7	
4356	4241		TESF8	
4357	4243		TESF9	
4360	4245		TESF10	
4361	4247		TESE11	
4362	4251		TESF12	
4363	4253		TESF13	

4454	0260	ZJP	T2	
4455	4474	TESE38		
4456	0020	LDN		
4457	0031	SBR		SEARCH BACK ONE RECORD
4460	0064	RJP		
4461	0202	SELECT		
4462	0064	RJP		
4463	0307	WAIT		WAIT NOT BUSY
4464	0064	RJP		
4465	0300	STATUS		
4466	0020	LDN		RESET JUMP ADDRESSES
4467	4620	JUMPE1	5	
4470	0041	STM		
4471	0070	RETURN		
4472	0264	UJP	T2	REPEAT WRITE AND BACKSPACE OPERATIONS
4473	4436	TEE30		
4474	0020	LDN		
4475	4626	JUMPE1	110	
4476	0041	STM		
4477	0070	RETURN		
4500	0020	LDN		
4501	0376	376		
4502	0051	RAM		
4503	0065	LWA		
4504	0041	STM		
4505	0100	AMNT2		
4506	0020	LDN		
4507	0270	IBI	T2	SET UP INPUT ROUTINE
4510	0041	STM		
4511	0077	IOTYP		
4512	0020	LDN		SET TAGS
4513	0016	INN TAG		
4514	0041	STM		
4515	0071	TAG3A		
4516	0030	ADN		
4517	0001	1		
4520	0041	STM		
4521	0072	TAG3B		
4522	0020	LDN		SELECT READ FORWARD
4523	0024	RF		
4524	0064	RJP		
4525	0202	SELECT		
4526	0020	LDN		
4527	4532	TESE43		RETURN ADDRESS
4530	0064	RJP		
4531	0163	BUFF1		INPUT BUFFER CHANNEL
4532	0064	RJP		
4533	0307	WAIT		WAIT NOT BUSY
4534	0064	RJP		
4535	0300	STATUS		READ STATUS
4536	0020	LDN		
4537	4542	TESE46		RETURN ADDRESS
4540	0064	RJP		GO COMPARE DATA
4541	0246	COMP1		
4542	0020	LDN		
4543	0034	REW		REWIND FUNCTION
4544	0064	RJP		
4545	0202	SELECT		
4546	0064	RJP		WAIT NOT BUSY
4547	0307	WAIT		

4550	0020	TESE48	LDN		
4551	4570		TESE50		
4552	0064		RJP		CHECK FOR INTERRUPT 10
4553	0102		SMMQX		
4554	0021	TESE49	LDM		
4555	0002		SWITCH		
4556	0010		LPN		
4557	0030		3C		
4560	0260		ZJP	T2	NO REPEAT FUNCTION
4561	4606		TESE51		
4562	0020		LDN		
4563	4612		JUMPE1	-1	
4564	0041		STM		SET UP RETURN ADDRESSES
4565	0070		RETURN		
4566	0264		UJP	T2	
4567	4201		TESTE		REPEAT SEGMENT E
4570	0021	TESE50	LDM		
4571	0002		SWITCH		
4572	0010		LPN		
4573	0001		1		END OF SECTION HALT
4574	0260		ZJP	T2	CONTINUE
4575	4554		TESE49		
4576	0302		ATT	T3	
4577	0204	TEE50	ABR	T2	LOAD BUFFER ENT. REGISTER
4600	4577		TEE50		
4601	0021		LDM		
4602	0017		SECTS		
4603	0077		HLT		
4604	0264		UJP	T2	
4605	4554		TESE49		
4606	0020	TESE51	LDN		
4607	0004		T20		
4610	0202		ATT	T2	
4611	0264		UJP	T2	
4612	2030		TESTS8		
4613	4410	JUMPE1	TESF25		RETURN JUMP ADDRESSES
4614	4412		TESF26		
4615	4414		TESF27		
4616	4422		TESF28		
4617	4424		TESE29		
4620	4426		TESF30		
4621	4442		TESF31		
4622	4450		TESF33		
4623	4452		TESF34		
4624	4462		TESF35		
4625	4464		TESF36		
4626	4466		TESF37		
4627	4526		TESE42		
4630	4534		TESE44		
4631	4536		TESE45		
4632	4546		TESF47		
4633	4550		TESF48		
4634	0020	TESTF	LDN		
4635	4752		JUMPF	-1	
4636	0041		STM		RESET RETURN JUMP ADDRESSES
4637	0070		RETURN		
4640	0020		LDN		
4641	0366		366		SET COUNTERS
4642	0041		STM		
4643	0357		AMNT3		

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4444	0041	STM	
4445	0141	TEMP3	
4446	0020	LDN	
4447	0014	SEX	
4450	0064	RJP	
4451	0202	SELECT	
4452	0021	LDN	EXPECT FILE MARK STATUS
4453	0026	FILE	
4454	0041	STM	
4455	0004	ESTAT	
4456	0020	LDN	TESFJ
4457	0021	WFM	SELECT WRITE FILE MARK
4460	0064	RJP	
4461	0202	SELECT	
4462	0020	LDN	TESF5
4463	0001	1	
4464	0041	STM	EXPECT BCD STATUS
4465	0004	ESTAT	
4466	0020	LDN	
4467	0020	WRT	SELECT WRITE FUNCTION
4470	0064	RJP	
4471	0202	SELECT	
4472	0074	OTN	TESF6
4473	0077	77	
4474	0264	RJP	T2
4475	4746	WAITX	READ STATUS
4476	0064	RJP	OUTPUT TWO WORD RECORD
4477	0204	SELECT	2
4700	0074	OTN	TESF8
4701	0065	65	
4702	0074	OTN	
4703	0072	72	
4704	0264	RJP	T2
4705	4746	WAITX	
4706	0021	LDN	TESF9
4707	0026	FILE	EXPECT FILEMARK
4710	0041	STM	
4711	0004	ESTAT	
4712	0020	LDN	WRITE FILEMARK
4713	0021	WFM	
4714	0064	RJP	
4715	0202	SELECT	
4716	0020	LDN	TESF10
4717	0033	SBF	
4720	0064	RJP	
4721	0202	SELECT	
4722	0064	RJP	TESF11
4723	0204	SELECT	2
4724	0020	LDN	TESF12
4725	0032	SFF	SEARCH FILE FORWARD
4726	0064	RJP	
4727	0202	SELECT	
4730	0020	LDN	TESF13
4731	0001	1	EXPECT BCD STATUS
4732	0041	STM	
4733	0004	ESTAT	
4734	0020	LDN	
4735	0012	T50	
4736	0102	ATT	T1
4737	0202	ATT	T2

4740	0020		LDN	
4741	5313		JUMPF1	-1
4742	0041		STM	
4743	0070		RETURN	
4744	0264		UJP	T2
4745	5000		TEF13	
4746	0020	WAITX	LDN	
4747	0004		T20	
4750	0202		ATT	T2
4751	0264		UJP	T2
4752	2272		WAITB	4
4753	4652	JUMPF	TESF4	
4754	4746		WAITX	
4755	4662		TESF5	
4756	4672		TESF6	
4757	4676		TESF7	
4760	4700		TESF8	
4761	4706		TESF9	
4762	4746		WAITX	
4763	4716		TESF10	
4764	4746		WAITX	
4765	4722		TESF11	
4766	4746		WAITX	
4767	4724		TESF12	
4770	4746		WAITX	
4771	4730		TESF13	
	5000	PRG	5000	

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* *   BANK   * *
* *   12     * *
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5000	0020	TEF13	LDN	
5001	0024		RF	
5002	0064		RJP	
5003	0202		SELECT	
5004	0076	TESF14	INA	
5005	0041		STM	SAVE DATA
5006	0054		AREG	
5007	0020		LDN	
5010	0077		77	
5011	0041		STM	
5012	0052		ERRABX	
5013	0035		SBM	COMPARE DATA
5014	0054		AREG	
5015	0260		ZJP	T2 NO ERROR
5016	5027		TESF15	
5017	0020		LDN	ERROR CODE FOR NO COMPARE
5020	0050		CODE13	
5021	0041		STM	
5022	0063		ERRCOD	
5023	0020		LDN	
5024	5027		TESF15	
5025	0064		RJP	REPORT ERROR
5026	0333		REPORT	
5027	0264	TESF15	RJP	T2
5030	5327		WAITX1	
5031	0021	TESF16	LDM	EXPECT FILE MARK
5032	0026		FILF	

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5133	0041		STM	
5134	0004		ESTAT	
5135	0020		LDN	
5136	0032		SFF	SEARCH FILE FORWARD
5137	0064		RJP	
5140	0202		SELECT	
5141	0020	TESF17	LDN	
5142	0041		41	EXPECT LOADPAINT
5143	0041		STM	
5144	0004		ESTAT	
5145	0020		LDN	
5146	0034		REW	REWIND FUNCTION
5147	0064		RJP	
5150	0202		SELECT	
5151	0020	TESF18	LDN	
5152	5055		TESF19	CHECK FOR INTERRUPT 10
5153	0064		RJP	
5154	0102		SMMQX	
5155	0021	TESF19	LDM	CHECK FOR REPEAT
5156	0002		SWTCH	
5157	0010		LPN	
5160	0020		ZC	
5161	0260		ZJP	T2 NO REPEAT
5162	5071		TESF20	
5163	0020		LDN	
5164	0011		T44	
5165	0102		ATT	T1
5166	0202		ATT	T2
5167	0264		UJP	T2
5170	4634		TESTF	
5171	0021	TESF20	LDM	EXPECT FILE MARK STATUS
5172	0026		FILE	
5173	0041		STM	
5174	0004		ESTAT	
5175	0020		LDN	
5176	0021		WFM	SELECT WRITE FILEMARK
5177	0064		RJP	
5180	0202		SELECT	
5181	0020	TESF21	LDN	EXPECT BCD
5182	0001		1	
5183	0041		STM	
5184	0004		ESTAT	
5185	0020		LDN	
5186	0020		WRT	SELECT WRITE ONE WORD RECORD
5187	0064		RJP	
5188	0202		SELECT	
5189	0074	TESF22	OTN	
5190	0077		77	
5191	0264		RJP	T2
5194	5307		WAITX1	READ STATUS
5195	0064	TESF23	RJP	
5196	0204		SELECT	2 WRITE ONE WORD RECORD
5197	0074	TESF24	OTN	
5198	0016		16	
5199	0264		RJP	T2
5200	5307		WAITX1	READ STATUS
5201	0055	TESF25	RAO	REPEAT NINE TIMES
5202	0141		TEMP3	
5203	0260		ZJP	T2
5204	5135		TESF26	

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27	0020	LDN	
28	5323	JUMPF1	T2
29	0041	STM	
30	0070	RETURN	RESET RETURN JUMP ADDRESSES
31	0264	UJP	T2
32	5171	TESF21	
33	0021	TESF26	LDN
34	0026	FILE	EXPECT FILEMARK STATUS
35	0041	STM	
36	0004	ESTAT	
37	0020	LDN	
38	0021	WFM	
39	0064	RJP	
40	0202	SELECT	SELECT WRITE FILE MARK
41	0020	TESF27	LDN
42	0001	1	
43	0041	STM	EXPECT BCD STATUS
44	0004	ESTAT	
45	0020	LDN	
46	0020	WRT	WRITE ONE WORD RECORD
47	0064	RJP	
48	0202	SELECT	
49	0074	TESF28	OTN
50	0077	77	
51	0264	RJP	T2
52	5307	WAITX1	READ STATUS
53	0021	TESF29	LDN
54	0026	FILE	EXPECT FILE MARK
55	0041	STM	
56	0004	ESTAT	
57	0020	LDN	
58	0033	SBF	SEARCH BACK ONE FILE
59	0064	RJP	
60	0202	SELECT	
61	0064	TESF30	RJP
62	0204	SELECT	2 SELECT SEARCH BACK ONE FILE
63	0020	TESF31	LDN
64	0032	SFF	SELECT SEARCH FILE FORWARD
65	0064	RJP	
66	0202	SELECT	
67	0020	TESF32	LDN
68	0001	1	EXPECT BCD STATUS
69	0041	STM	
70	0004	ESTAT	
71	0020	LDN	
72	0024	RF	SELECT READ FORWARD
73	0064	RJP	
74	0202	SELECT	
75	0020	TESF33	INA
76	0041	STM	SAVE DATA
77	0054	AREG	
78	0020	LDN	
79	0077	77	
80	0041	STM	
81	0052	ERRABX	
82	0035	SBM	COMPARE DATA
83	0054	AREG	
84	0260	ZJP	T2 DATA COMPARED
85	5232	TESF34	
86	0020	LDN	ERROR CODE

23	0050		CODE13	
24	0041		STM	
25	0063		ERRCOD	
26	0020		LDN	
27	5232		TESF34	
29	0064		RJP	
31	0333		ERPORT	REPORT ERROR
32	0264	TESF34	RJP	T2
33	5307		WAITX1	
34	0064	TESF35	RJP	READ FORWARD
35	0204		SELECT	2
36	0076	TESF36	INA	
37	0041		STM	
40	0054		AREG	SAVE DATA
41	0020		LDN	
42	0016		16	
43	0041		STM	
44	0052		ERRABX	
45	0035		SBM	COMPARE DATA READ
46	0054		AREG	
47	0260		ZJP	T2
47	0260		ZJP	DATA COMPARED
50	5261		TESF37	
51	0020		LDN	ERROR CODE
52	0050		CODE13	
53	0041		STM	
54	0063		ERRCOD	
55	0020		LDN	
56	5261		TESF37	
57	0064		RJP	
60	0333		ERPORT	REPORT ERROR
61	0264	TESF37	RJP	T2
61	0264	TESF37	RJP	READ STATUS
62	5307		WAITX1	READ STATUS
63	0055	TESF38	RAO	REPEAT NINT TIMES
64	0357		AMNT3	
65	0260		ZJP	T2
65	0260		ZJP	TERMINATE OPERATION
66	5351		TESF39	
67	0020		LDN	
70	5341		JUMPF1	210
71	0041		STM	RESET JUMP ADDRESSES
72	0070		RETURN	
73	0264		UJP	T2
74	5177		TESF32	
75	0020	TEF42	LDN	
76	0013		T54	
77	0102		ATT	T1
80	0202		ATT	T2
81	0020		LDN	
82	5512		JUMPF2	-1
82	5512		JUMPF2	RESET JUMP ADDRESSES
83	0041		STM	
84	0070		RETURN	
85	0264		UJP	T2
86	5413		TESF43	
87	0020	WAITX1	LDN	
90	0004		T20	
91	0202		ATT	T2
92	0264		UJP	T2
93	2270		WAITB	2
94	5004	JUMPF1	TESF14	
95	5031		TESF16	
96	5307		WAITX1	

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5317	5041	TESF17	
5320	5307	WAITX1	
5321	5051	TESF18	
5322	5307	WAITX1	
5323	5101	TESF21	
5324	5111	TESF22	
5325	5115	TESF23	
5326	5117	TESF24	
5327	5123	TESF25	
5330	5307	WAITX1	
5331	5145	TESF27	
5332	5155	TESF28	
5333	5161	TESF29	
5334	5307	WAITX1	
5335	5171	TESF30	
5336	5307	WAITX1	
5337	5173	TESF31	
5340	5307	WAITX1	
5341	5177	TESF32	
5342	5207	TESF33	
5343	5234	TESF35	
5344	5236	TESF36	
5345	5263	TESF38	
5346	5357	TESF40	
5347	5362	TESF41	
5350	5370	TESF42	
5351	0021	LDM	EXPECT FILEMARK STATUS
5352	0026	FILE	
5353	0041	STM	
5354	0004	ESTAT	
5355	0064	RJP	SELECT READ FORWARD
5356	0204	SELECT	2
5357	0076	TESF40	INA
5360	0264	RJP	T2
5361	5307	WAITX1	READ STATUS
5362	0020	TESF41	LDN
5363	0001		EXPECT BCD
5364	0041	STM	
5365	0004	ESTAT	
5366	0064	RJP	SELECT READ FORWARD
5367	0204	SELECT	2
5370	0076	TESF42	INA
5371	0041	STM	SAVE DATA
5372	0054	AREG	
5373	0020	LDN	
5374	0077	77	
5375	0041	STM	
5376	0052	ERRABX	
5377	0035	SBM	COMPARE DATA READ
			* ***** *
			* * * * *
			* BANK *
			* 13 *
			* * * * *
			* ***** *
5400	0054	AREG	
5401	0260	ZJP	T2
5402	5275	TEF42	DATA COMPARED
5403	0020	LDN	
5404	0050	CODE13	

011

405	0041	STM		ERROR CODE
406	0063	ERRCOD		
407	0020	LDN		
408	5275	TEF42		
409	0064	RJP		REPORT ERROR
410	0333	ERPORT		
411	0264	RJP	T2	
412	5506	WAITX2		READ STATUS
413	0020	LDN		
414	0041	41		
415	0041	STM		
416	0004	ESTAT		
417	0020	LDN		
418	0034	REW		
419	0064	RJP		SELECT REWIND
420	0202	SELECT		
421	0020	LDN		CHECK FOR INTERRUPT 10
422	5431	TESF45		
423	0064	RJP		
424	0102	SMMQX		
425	0021	LDM		
426	0002	SWITCH		
427	0010	LPN		
428	0001	1		CHECK FOR END OF SECTION STOP
429	0260	ZJP	T2	
430	5445	TESF47		
431	0302	ATT	T3	
432	0204	ABR	T2	
433	5440	TESF46		
434	0021	LDM		
435	0017	SECTS		SECTION NUMBER TO A REGISTER
436	0077	HLT		
437	0021	LDM		
438	0002	SWITCH		
439	0010	LPN		CHECK FOR REPEAT SECTION
440	0020	Z0		
441	0260	ZJP	T2	NO REPEAT
442	5465	TESF48		
443	0020	LDN		
444	5321	JUMPF1	5D	
445	0041	STM		
446	0070	RETURN		
447	0020	LDN		
448	0012	T50		
449	0102	ATT	T1	
450	0202	ATT	T2	
451	0264	UJP	T2	
452	5071	TESF20		
453	0021	LDM		CHECK FOR REPEAT COMPLETE TEST
454	0002	SWITCH		
455	0010	LPN		
456	0010	10		
457	0260	ZJP	T2	
458	5501	TESF49		
459	0020	LDN		
460	0011	T44		
461	0102	ATT	T1	
462	0202	ATT	T2	
463	0264	UJP	T2	
464	4634	TESTF		

5501	0020	TESF49	LDN		
5502	0004		T20		
5503	0202		ATT	T2	GO CHECK FOR NEXT TEST
5504	0264		UJP	T2	
5505	2030		TESTSB		
5506	0020	WAITX2	LDN		
5507	0004		T20		
5510	0202		ATT	T2	
5511	0264		UJP	T2	
5512	2266		WAITB		
5513	5415	JUMPF2	TEF43A		
5514	5506		WAITX2		
5515	5425		TESF44		
5516	0020	TESTG	LDN		
5517	5674		JUMPB	-1	RESET RETURN JUMP ADDRESSES
5520	0041		STM		
5521	0070		RETURN		
5522	0020		LDN		
5523	0014		SEX		SELECT EVEN PARITY
5524	0064		RJP		
5525	0202		SELECT		
5526	0021	TESG1	LDM		
5527	0026		FILE		
5530	0041		STM		
5531	0004		ESTAT		EXPECT FILEMARK STATUS
5532	0020		LDN		SET COUNTER
5533	0363		363		-12
5534	0041		STM		
5535	0357		AMNT3		
5536	0064		RJP		
5537	0307		WAIT		
5540	0020	TESG2	LDN		
5541	0021		WFM		WRITE FILEMARK
5542	0064		RJP		
5543	0202		SELECT		
5544	0064	TESG3	RJP		
5545	0307		WAIT		WAIT NOT BUSY
5546	0064	TESG4	RJP		
5547	0300		STATUS		READ STATUS
5550	0020	TESG5	LDN		
5551	0033		SBF		SEARCH BACK ONE FILE
5552	0064		RJP		
5553	0202		SELECT		
5554	0064	TESG5A	RJP		WAIT NOT BUSY
5555	0307		WAIT		
5556	0064	TESG5B	RJP		READ STATUS
5557	0300		STATUS		
5560	0055	TESG5C	RAO		
5561	0357		AMNT3		
5562	0260		ZJP	T2	TERMINATE TAPE SPACER ROUTINE
5563	5572		TESG6		
5564	0020		LDN		
5565	5676		JUMPB	1	
5566	0041		STM		
5567	0070		RETURN		
5570	0264		UJP	T2	REPEAT OPERATION
5571	5540		TESG2		
5572	0020	TESG6	LDN		
5573	0001		1		EXPECT BCD STATUS
5574	0041		STM		

///

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575	0004	ESTAT	
576	0020	LDN	
577	0020	WRT	SELECT WRITE FUNCTION
600	0064	RJP	
601	0202	SELECT	
602	0074	OTN	OUTPUT ONE WORD RECORD
603	0025	25	
604	0064	RJP	
605	0307	WAIT	WAIT NOT BUSY
606	0064	RJP	
607	0300	STATUS	GO READ STATUS
610	0020	LDN	
611	0031	SBR	SEARCH BACK ONE RECORD
612	0064	RJP	
613	0202	SELECT	
614	0064	RJP	
615	0307	WAIT	WAIT NOT BUSY
616	0064	RJP	
617	0300	STATUS	GO READ STATUS
620	0055	RAO	
621	0357	AMNT3	REPEAT 256 TIMES
622	0260	ZJP	TERMINATE OPERATION
623	5632	TESG10	
624	0020	LDN	
625	5704	JUMP6	7D
626	0041	STM	RESET JUMP ADDRESSEX
627	0070	RETIJRN	
630	0264	UJP	T2
631	5576	TESG6	4
632	0020	LDN	
633	5636	TESG11	
634	0064	RJP	
635	0102	SMMQX	CHECK FOR INTERRUPT 10
636	0021	LDM	
637	0002	SWITCH	
640	0010	LPN	CHECK FOR END OF TEST STOP
641	0001	1	
642	0260	ZJP	T2 NO STOP
643	5652	TESG12	
644	0302	ATT	T3
645	0204	ABR	T2
646	5645	TEG11A	
647	0021	LDM	
650	0017	SECTS	END OF SECTION HALT
651	0077	HLT	
652	0021	LDM	
653	0002	SWITCH	
654	0010	LPN	REPEAT TESTS
655	0030	30	
656	0260	ZJP	T2 NO REPEAT
657	5670	TESG13	
660	0020	LDN	
661	5674	JUMP6	-1
662	0041	STM	
663	0070	RETURN	
664	0020	LDN	
665	0034	REW	REWIND FUNCTION
666	0064	RJP	
667	0202	SELCT	
670	0020	LDN	
		TESG13	

0050	CODE13 EQU	50	DATA COMPARE ERROR A REGISTER = DATA RECEIVED ABX REGISTER = DATA EXPECTED
0052	CODE14 EQU	52	BACKSPACE ERROR
0054	CODE15 EQU	54	THESE TESTS ARE ON THE OTHER MAG TAPE SECTION RELOADE SMM92 AND PARAMETER 14 IS SECTIONS A,B,C,D. PARAMETER 15 IS SECTIONS DEFG
0056	CODE16 EQU	56	INCORRECT WRITE BUFFER LENGTH A REGISTER = LAST STATUS ABX REGISTER = AMOUNT SHORT. EXPECTED AMOUNT IS 376 OCTAL
0060	CODE17 EQU	60	NO BUFFER TERMINATION
0062	CODE18 EQU	62	INCORRECT FILE MARK WRITTEN A REGISTER = FILE MARK WRITTEN ABX REGISTER = FILE MARK EXPECTED
0064	CODE19 EQU	64	ERROR STOP NUMBER 2 A REGISTER = SECTION NUMBER ABX REGISTER = LAST OCTAL FUNCTION CODE
0066	CODE20 EQU	66	CONSTANT BUFFER BUSY STATUS BUFFER SHOULD NOT BE BUSY
0070	CODE21 EQU	70	TAPE DRIVE CONSTANTLY BUSY A REGISTER = N/A ABX REGISTER = ACTUAL STATUS
0072	CODE22 EQU	72	THIRD ERROR STOP FOR SECTIONS D AND E ONLY. A REGISTER = I/O LENGTH EXPECTED ABX REGISTER = AMOUNT OF I/O THAT WAS PROCESSED (LENGTH)

0074	CODE23 EQU	74
0076	CODE24 EQU	76
0111	CODEX1 EQU	111

SWITCH PARAMETER CHANGE CODE

0001	T04 EQU	1	002690
0002	T10 EQU	2	002700
0003	T14 EQU	3	002710
0004	T20 EQU	4	002720
0005	T24 EQU	5	002730
0006	T30 EQU	6	002740
0007	T34 EQU	7	002750
0010	T40 EQU	10	002760
0011	T44 EQU	11	002770
0012	T50 EQU	12	002780
0013	T54 EQU	13	002790
0014	T60 EQU	14	002800
0015	T64 EQU	15	002810
0016	T70 EQU	16	002820
0017	T74 EQU	17	002830
0100	T1 EQU	100	002840
0200	T2 EQU	200	002850
0300	T3 EQU	300	002860
0000	ERR EQU	0	002880
0001	SHA EQU	1	002890
0002	NOP EQU	2	002900
0002	ATT EQU	2	002910
0003	CLA EQU	3	002920
0003	TTA EQU	3	002930
0004	ABR EQU	4	002940
0005	ABX EQU	5	002950
0006	BER EQU	6	002960

ERROR STOP
SHIFT A LEFT ONE BIT
NO OPERATION
A TO TAG REGISTER
CLEAR REGISTER A
TAG REGISTER TO A
A TO BUFFER ENTRANCE REGISTER
A TO BUFFER EXIT REGISTER
CONTENTS OF BER REGISTER TO A

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0007	CBC	EQU	7	CLEAR BUFFER CONTROLS	002970
0010	LPN	EQU	10	LOGICAL PRODUCT NO ADDRESS	002980
0011	LPM	EQU	11	LOGICAL PRODUCT MEMORY ADDRESS	002990
0012	LPI	EQU	12	LOGICAL PRODUCT INDIRECT ADDRESS	003000
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT	003010
0014	LSN	EQU	14	LOGICAL SUM NO ADDRESS	003020
0015	LSM	EQU	15	LOGICAL SUM MEMORY ADDRESS	003030
0016	LSI	EQU	16	LOGICAL SUM INDIRECT ADDRESS	003040
0020	LDN	EQU	20	LOAD A NO ADDRESS	003050
0021	LDM	EQU	21	LOAD A MEMORY ADDRESS	003060
0022	LDI	EQU	22	LOAD A INDIRECT ADDRESS	003070
0025	LCM	EQU	25	LOAD COMPLIMENT TO A MEMORY	003080
0026	LCI	EQU	26	LOAD COMPLIMENT TO A INDIRECT	003090
0030	ADN	EQU	30	ADD NO ADDRESS	003100
0031	ADM	EQU	31	ADD MEMORY ADDRESS	330110
0032	ADI	EQU	32	ADD INDIRECT ADDRESS	003120
0034	SBN	EQU	34	SUBTRACT NO ADDRESS	003130
0035	SBM	EQU	35	SUBTRACT MEMORY ADDRESS	003140
0036	SBI	EQU	36	SUBTRACT INDIRECT ADDRESS	003150
0041	STM	EQU	41	STORE MEMORY ADDRESS	003160
0042	STI	EQU	42	STORE INDIRECT ADDRESS	003170
0051	RAM	EQU	51	REPLACE ADD MEMORY ADDRESS	003180
0055	RAO	EQU	55	REPLACE ADD ONE MEMORY ADDRESS	003190
0060	ZJP	EQU	60	JUMP, IF CONTENTS OF A = ZERO	003200
0061	NZP	EQU	61	JUMP, IF CONTENTS OF A = NON#ZERO	003210
0062	PJP	EQU	62	JUMP, IF CONTENTS OF A ARE POSITIVE	003220
0063	NJP	EQU	63	JUMP, IF CONTENTS OF A ARE NEGATIVE	003230
0064	RJP	EQU	63	INDIRECT RETURN JUMP INDICATOR	
0064	UJP	EQU	64	UNCONDITIONAL JUMP	003240
0070	IBI	EQU	70	INITIATE BUFFER INPUT	003250
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT	003260
0072	INN	EQU	72	INPUT NORMAL	003270
0073	OUT	EQU	73	OUTPUT NORMAL	003280
0074	OTN	EQU	74	OUTPUT, NO ADDRESS	003290
0075	EXF	EQU	75	EXTERNAL FUNCTION	003300
0076	INA	EQU	76	INPUT TO A	003210
0077	HLT	EQU	77	HALT	003320
0000	END				003330

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115

NUMBER: (T22)

TITLE: Mag Tape Test { MT1 }

MINIMUM EQUIPMENT NEEDED: 8092, 162, 603

PURPOSE

To test reliability of Mag Tape units and 162 Synchronizer.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: Section 1: 000 A = # of units
Section 2: 400 A = 0
Section 3: 600 A = 0
Section 4: 700 A = 0

TERMINAL ADDRESS: 1277 (destroys contents of locations up to 2300)

DESCRIPTION

Section 1: Read, write, parity, file mark, and status checks for any number of 603 units. Load A with the total number of mag tape units to be used. Start run at 000.

Section 2: Compatibility test. (Set unit dials on 0 and 1.) Two units at a time are used. Each unit will be written on for complete length of tape. When a halt occurs at P = 461, exchange reels on units and reset the run switch. Test will compare one tape against the other. Start at 400.

Section 3: Servo test. (One unit at a time. Set unit dial to 0.) Start at 600.

Section 4: Creep test. (One unit at a time. Set unit dial to 0.) Reels should have a slight forward creep. Start at 700.

HALTS

P = 142	Status halt. A displays status code.
P = 202	Error in bits.
P = 303	File mark not working.
P = 325	Illegal BCD status not working.
P = 431	Parity error on write (tape 0).
P = 455	Parity error on write (tape 1).
P = 461	Exchange reels and reset run switch.
P = 506	Parity error on read (tape 0).
P = 525	Parity error on read (tape 1).
P = 542	Error in bits.

0000	041	STM	
0001	004		
0002	064	UJP	
0003	041		
0010	113	CIL	
0011	075	EXF	} Back Space One Record
0012	011		
0013	020		
0014	076	INA	
0015	064	UJP	
0016	021		
0017			
0020	113	CIL	
0021	075	EXF	} Read Forward With Input
0022	011		
0023	030		
0024	064	UJP	
0025	152		
0026			
0027			
0030	113	CIL	
0040	113	CIL	
0041	020	LDN	
0042	001		
0043	102	ATT	
0044	020	LDN	
0045	002		
0046	202	ATT	
0047	020	LDN	
0050	004		
0051	302	ATT	
0052	020	LDN	
0053	060		
0054	041	STM	
0055	122		
0056	020	LDN	
0057	010		
0060	041	STM	
0061	130		
0062	041	STM	
0063	243		
0064	041	STM	
0065	311		
0066	020	LDN	
0067	040		
0070	041	STM	
0071	136		
0072	041	STM	
0073	157		

0074	041	STM	
0075	275		
0076	041	STM	
0077	317		
0100	020	LDN	
0101	030		
0102	041	STM	
0103	023		
0104	020	LDN	
0105	020		
0106	041	STM	
0107	262		
0110	020	LDN	
0111	020		
0112	041	STM	
0113	013		
0114	020	LDN	
0115	010		
0116	041	STM	
0117	133		
0120	075	EXF	Rewind Load
0121	011		
0122	060		
0123	075	EXF	Set Tapes to Odd Parity
0124	011		
0125	071		
0126	075	EXF	Select Write
0127	011		
0130	010		
0131	273	OUT	
0132	000		
0133	010		
0134	075	EXF	Request Status
0135	011		
0136	040		
0137	076	INA	
0140	060	ZJP	
0141	143		
0142	077	HLT	
0143	021	LDM	
0144	133		
0145	041	STM	
0146	154		
0147	064	UJP	
0150	011		
0151	034	SBN	
0152	372	INN	
0153	000		
0154	010		
0155	075	EXF	Request Status
0156	011		
0157	040		

0160	076	INA	
0161	060	ZJP	
0162	164		
0163	077	HLT	
0164	020	LDN	
0165	000		
0166	041	STM	
0167	175		
0170	041	STM	
0171	177		
0172	002	NOP	
0173	002	NOP	
0174	221	LDM	
0175	000		
0176	335	SBM	
0177	000		
0200	060	ZJP	
0201	203		
0202	077	HLT	
0203	021	LDM	
0204	133		
0205	034	SBN	
0206	001		
0207	035	SBM	
0210	177		
0211	060	ZJP	
0212	221		
0213	055	RAO	
0214	175		
0215	055	RAO	
0216	177		
0217	064	UJP	
0220	174		
0221	020	LDN	
0222	060		
0223	035	SBM	
0224	133		
0225	060	ZJP	
0226	235		
0227	020	LDN	
0230	010		
0231	051	RAM	
0232	133		
0233	064	UJP	
0234	126		
0235	020	LDN	
0236	000		
0237	041	STM	
0240	247		
0241	075	EXF	Select Write
0242	011		
0243	010		
0244	055	RAO	
0245	247		

0246	020	LDN	
0247	000		
0250	034	SBN	
0251	120		
0252	061	NZP	
0253	241		
0254	020	LDN	
0255	000		
0256	041	STM	
0257	266		
0260	075	EXF	Back Space One Record
0261	071		(tape #)
0262	020		
0263	055	RAO	
0264	266		
0265	020	LDN	
0266	000		
0267	034	SBN	
0270	117		
0271	061	NZP	
0272	260		
0273	075	EXF	Request Status
0274	011		
0275	040		
0276	076	INA	
0277	010	LPN	
0300	040		
0301	060	ZJP	
0302	304		
0303	077	HLT	
0304	075	EXF	Set Tapes to Even Parity
0305	011		
0306	072		
0307	075	EXF	Select Write
0310	011		
0311	010		
0312	073	OUT	
0313	366		
0314	373		
0315	075	EXF	Request Status
0316	011		
0317	040		
0320	076	INA	
0321	010	LPN	
0322	015		
0323	061	NZP	
0324	326		
0325	077	HLT	
0326	021	LDM	
0327	004		
0330	030	ADN	
0331	037		
0332	035	SBM	
0333	317		

0334	060	ZJP
0335	052	
0336	055	RAO
0337	122	
0340	055	RAO
0341	130	
0342	055	RAO
0343	136	
0344	055	RAO
0345	013	
0346	055	RAO
0347	157	
0350	055	RAO
0351	243	
0352	055	RAO
0353	262	
0354	055	RAO
0355	275	
0356	055	RAO
0357	311	
0360	055	RAO
0361	317	
0362	055	RAO
0363	023	
0364	064	UJP
0365	114	
0366	025	
0367	052	
0370	000	
0371	052	
0372	025	

0400	020	LDN	End Section 1
0401	001		
0402	102	ATT	
0403	020	LDN	
0404	002		
0405	202	ATT	
0406	164	UJP	
0407	164		
0410			
0411	075	EXF	Select Write
0412	011		
0413	010		
0414	273	OUT	
0415	000		
0416	300		
0417	075	EXF	Request Status
0420	011		
0421	040		
0422	076	INA	
0423	160	ZJP	

0424	011	.	
0425	010	LPN	
0426	040		
0427	160	ZJP	
0430	270		
0431	077	HLT	Rewind Unload
0432	075	EXF	
0433	011		
0434	060		
0435	075	EXF	Select Write
0436	011		
0437	011		
0440	273	OUT	
0441	000		
0442	300		
0443	075	EXF	Request Status
0444	011		
0445	041		
0446	076	INA	
0447	160	ZJP	
0450	035		
0451	010	LPN	
0452	040		
0453	160	ZJP	
0454	058		
0455	077	HLT	
0456	075	EXF	
0457	011		
0460	061	NZP	
0461	077		
0462	020	LDN	
0463	003		
0464	202	ATT	
0465	020	LDN	
0466	004		
0467	302	ATT	
0470	075	EXF	Select Read Forward
0471	011		
0472	030		
0473	272	INN	
0474	000		
0475	300		
0476	075	EXF	Request Status
0477	011		
0500	040		
0501	076	INA	
0502	010	LPN	
0503	004		
0504	160	ZJP	
0505	107		
0506	077	HLT	
0507	075	EXF	

0510	011		Read Forward
0511	031		
0512	372	INN	
0513	000		
0514	300		
0515	075	EXF	Request Status
0516	011		
0517	041		
0520	076	INA	
0521	010	LPN	
0522	004		
0523	160	ZJP	
0524	126		
0525	077	HLT	
0526	020	LDN	
0527	000		
0530	141	STM	
0531	135		
0532	141	STM	
0533	137		
0534	221	LDM	
0535	000		
0536	335	SBM	
0537	000		
0540	160	ZJP	
0541	143		
0542	077	HLT	
0543	020	LDN	
0544	277		
0545	121	LDM	
0546	135		
0547	030	ADN	
0550	100		
0551	160	ZJP	
0552	161		
0553	155	RAO	
0554	135		
0555	155	RAO	
0556	137		
0557	164	UJP	
0560	134		
0561	164	UJP	
0562	070		
0563			
0564	075	EXF	Set Tapes to Odd Parity
0565	011		
0566	071		
0567	075	EXF	Rewind Unload
0570	011		
0571	060		
0572	164	UJP	
0573	011		

0600	020	LDN	
0601	001		
0602	102	ATT	
0603	020	LDN	
0604	002		
0605	202	ATT	
0606	164	UJP	
0607	212		
0610	030		
0611	347		
0612	020	LDN	
0613	030		
0614	141	STM	
0615	210		
0616	125	LCM	
0617	210		
0620	141	STM	
0621	211		
0622	020	LDN	
0623	002		
0624	202	ATT	
0625	075	EXF	
0626	011		
0627	070		
0630	075	EXF	Select Write
0631	011		
0632	010		
0633	273	OUT	
0634	000		
0635	376		
0636	155	RAO	
0637	211		
0640	161	NZP	
0641	230		
0642	125	LCM	
0643	210		
0644	141	STM	
0645	211		
0646	075	EXF	Space Space One Record
0647	011		
0650	020		
0651	076	INA	
0652	155	RAO	
0653	211		
0654	161	NZP	
0655	246		
0656	121	LDM	
0657	210		
0660	034	SBN	
0661	001		
0662	160	NZP	
0663	212		
0664	141	STM	
0665	210		
0666	164	UJP	
0667	216		

0240	015	
0241	141	STM
0242	171	
0243	020	LDN
0244	001	
0245	064	UJP
0246	333	
0247	075	EXF
0250	063	
0251	001	
0252	075	EXF
0253	007	
0254	040	
0255	076	
0256	064	UJP
0257	357	
0260	075	EXF
0261	007	
0262	020	
0263	075	EXF
0264	007	
0265	010	
0266	173	OUT
0267	000	
0270	174	
0271	021	LDM
0272	314	
0273	034	SBN
0274	001	
0275	041	STM
0276	314	
0277	055	RAO
0300	310	
0301	034	SBN
0302	074	
0303	062	PJP
0304	321	
0305	013	NOP
0306	013	NOP
0307	121	LDM
0310	000	
0311	141	STM
0312	173	
0313	121	LDM
0314	073	
0315	141	STM
0316	171	
0317	064	UJP
0320	260	
0321	021	LDM
0322	376	
0323	034	SBN

0670	075	EXF	Rewind Load
0671	011		
0672	061		
0673	164	UJP	
0674	032		
0700	020	LDN	
0701	001		
0702	102	ATT	
0703	020	LDN	
0704	002		
0705	202	ATT	Select Write
0706	075	EXF	
0707	011		
0710	010		
0711	273	OUT	
0712	000		
0713	376		
0714	075	EXF	Back Space One Record
0715	011		
0716	020		
0717	076	INA	
0720	164	UJP	
0721	306		
1000	000		
1001	001		
1002	002		
1003	003		
1004	004		
1005	005		
1006	006		
1007	007		
1010	010		
1011	011		
1012	012		
1013	013		
1014	014		
1015	015		
1016	016		
1017	017		
1020	020		
1021	021		
1022	022		
1023	023		
1024	024		
1025	025		
1026	026		
1027	027		

1030	030
1031	031
1032	032
1033	033
1034	034
1035	035
1036	036
1037	037
1040	040
1041	041
1042	042
1043	043
1044	044
1045	045
1046	046
1047	047
1050	050
1051	051
1052	052
1053	053
1054	054
1055	055
1056	056
1057	057
1060	060
1061	061
1062	062
1063	063
1064	064
1065	065
1066	066
1067	067
1070	070
1071	071
1072	072
1073	073
1074	074
1075	075
1076	076
1077	077
1100	000
1101	001
1102	002
1103	003
1104	004
1105	005
1106	006
1107	007
1110	010
1111	011
1112	012
1113	013
1114	014

1115	015
1116	016
1117	017
1120	020
1121	021
1122	022
1123	023
1124	024
1125	025
1126	026
1127	027
1130	030
1131	031
1132	032
1133	033
1134	034
1135	035
1136	036
1137	037
1140	040
1141	041
1142	042
1143	043
1144	044
1145	045
1146	046
1147	047
1150	050
1151	051
1152	052
1153	053
1154	054
1155	055
1156	056
1157	057
1160	060
1161	061
1162	062
1163	063
1164	064
1165	065
1166	066
1167	067
1170	070
1171	071
1172	072
1173	073
1174	074
1175	075
1176	076
1177	077

1200	000
1201	001
1202	002
1203	003
1204	004
1205	005
1206	006
1207	007
1210	010
1211	011
1212	012
1213	013
1214	014
1215	015
1216	016
1217	017
1220	020
1221	021
1222	022
1223	023
1224	024
1225	025
1226	026
1227	027
1230	030
1231	031
1232	032
1233	033
1234	034
1235	035
1236	036
1237	037
1240	040
1241	041
1242	042
1243	043
1244	044
1245	045
1246	046
1247	047
1250	050
1251	051
1252	052
1253	053
1254	054
1255	055
1256	056
1257	057
1260	060
1261	061
1262	062
1263	063

1264	064
1265	065
1266	066
1267	067
1270	070
1271	071
1272	072
1273	073
1274	074
1275	075
1276	076
1277	077

8092, 8093, 603, 8193 , 601 Test { MT2 }
(T26)

Starting Location 000
Terminal Location 2077
Test 1 is Sense
Test 2 Will Run Away if Total Track Failure
Test 3 is an Erase Test
Test 4 is a Set Pattern-LO Density
Test 5 is a Random Pattern-LO Density
Test 6 is a Set Pattern-HI Density
Test 7 is a RNDOM.Pattern-HI Density
Test 8 is an EOF Test
Test 9 is a Chatter Test
Test 10 is a Variable Block Test
Test 11 is a Short Block Test
Test 12 is a Creep Test Using INTRPT

ERROR STOPS

P = 70 LD PT or Even Parity Missed
P = 106 LD PT or HI Density Missed
P = 264 Did Not Sense Illegal BCD
P = 292 Busy or Even Parity Missed
P = 230 Did Not Sense Parity Error
P = 427 Did Not Sense EOF
P = 560 Compare Error A = Word In Error
P = 563 A = I Incorrect Word
P = 606 Incorrect Parity
P = 1026 Lower 6 Bits of A = Correct Word
P = 1031 A = Incorrect Word
P = 1236 Did Not Read EOF
P = 1415 Chatter Error
P = 1554 Compare Error Variable Block
Output Area-Location 50-100 In 10 Word INC
Input Area-Location 3050-3100 in 10 Word INC
P = 1740 Location 2300-2310 Should = 25
Creep Test Should Allow The Tape Reels
To Slowly Creep Clockwise
If no INTERPT, Program Will Hang

To Run Non-stop (no apparent errors)
Set Location 2075=2

To Run 601-8193 , Make the Following Changes

Location 103 = 40
 Location 427 = 164
 Location 430 = 42
 Location 2056 = 1
 Location 2066 = 1

	0000		ORG	0	
0000	0020		LDN		
0001	0000			0	
0002	0102		ATT	T1	Clear
0003	0202		ATT	T2	Tag
0004	0302		ATT	T3	Registers
0005	0064		UJP		
0006	0050			SENSE	
0007	0000	COUNTE			
0010	0077	PAT 1		77	
0011	0007	PAT 2		7	
0012	0070	PAT 3		70	
0013	0025	PAT 4		25	
0014	0052	PAT 5		52	
0015	0001	PAT 6		1	
0016	0010	PAT 7		10	
0017	0076	PAT 10		76	
0020	0067	PAT 11		67	
0021	0022	PAT 12		22	
	0030		PRG	30	
0030	0264	INTRPT	UJP	T2	Jump to INTRRUPT Routine
0031	2044			INT3	
	0050		PRG	50	
0050	0075	SENSE	EXF		Rewind to LD PT
0051	0010			10	
0052	0034			34	
0053	0075		EXF		Set BCD#LO Density
0054	0010			10	
0055	0015			15	
0056	0075	SENSE 1	EXF		Status
0057	0010			10	
0060	0000			0	
0061	0076		INA		
0062	0063		NJP		
0063	0056			SENSE 1	
0064	0014		LSN		
0065	0041			41	
0066	0060		ZJP		

0067	0073			ODD	
0070	0077		HLT		Error Status Should be 41
0071	0064		UJP		Go back to the start of the test
0072	0050			SENSE	
0073	0075	ODD	EXF		Odd Parity-HI Density
0074	0010			10	
0075	0012			12	
0076	0075		EXF		Status 2
0077	0010			10	
0100	0000			0	
0101	0076		INA		
0102	0014		LSN		Mask for HI density
0103	0140			140	
0104	0060		ZJP		
0105	0111			EVEN	
0106	0077		HLT		Error-status should be 140
0107	0064		UJP		Go back to the start
0110	0050			SENSE	
0111	0075	EVEN	EXF		Set even LO density
0112	0010			10	
0113	0015			15	
0114	0020		LDN		
0115	0012			12	
0116	0102		ATT	T1	Set tag 1 = 12
0117	0020		LDN		Reset write address
0120	0000			0	
0121	0041		STM		
0122	0126			WRITE	
0123	0020	LOAD	LDN		Set contents of write
0124	0022			22	
0125	0141		STM	T1	
0126	0000	WRITE		0	
0127	0055		RAO		
0130	0126			WRITE	
0131	0034		SBN		
0132	0200			200	
0133	0061		NZP		If BLK not complete
0134	0123			LOAD	
0135	0075		EXF		Set write
0136	0010			10	
0137	0020			20	
0140	0173		OUT	T1	Output 5000 ≠ 5200
0141	0000			0	
0142	0200			200	
0143	0075		EXF		Write EOF
0144	0010			10	

0145	0021		21	
0146	0075	EXF		Write illegal BCD
0147	0010		10	
0150	0020		20	
0151	0073	OUT		
0152	0262	OUTA	+1	
0153	0264	OUTA	+3	
0154	0075	EXF		Status 1
0155	0010		10	
0156	0000		0	
0157	0076	INA		
0160	0014	LSN		
0161	0215		215	
0162	0060	ZJP		
0163	0167		ILLEGA	
0164	0077	HLT		Error did not sense illegal BCD
0165	0064	UJP		
0166	0050		SENSE	
0167	0075	EXF		Rewind
0170	0010		10	
0171	0034		34	
0172	0075	EXF		Status 1
0173	0010		10	
0174	0000		0	
0175	0076	INA		
0176	0014	LSN		Mask for Busy
0177	0201		201	
0200	0060	ZJP		
0201	0205		ODDLO	
0202	0077	HLT		Error-status should be 201
0203	0064	UJP		
0204	0050		SENSE	
0205	0075	EXF		Set odd-lo density
0206	0010		10	
0207	0011		11	
0210	0075	EXF		Read
0211	0010		10	
0212	0024		24	
0213	0172	INN	T1	Input 500 ≠ 5200
0214	0000		0	
0215	0200		200	
0216	0075	EXF		Status 1
0217	0010		10	
0220	0000		0	
0221	0076	INA		
0222	0010	LPN		Mask for parity bit
0223	0004		4	

0224	0034		SBN		
0225	0004			4	
0226	0060		ZJP		
0227	0233			PARITY	
0230	0077		HLT		Error did not sense parity error
0231	0064		UJP		
0232	0050			SENSE	
0233	0020	PARITY	LDN		
0234	0002	TEST 1		2	
0235	0034		SBN		
0236	0001			1	
0237	0041		STM		
0240	0234			TEST 1	
0241	0061		NZP		Try test 4 times
0242	0050			SENSE	
0243	0020		LDN		Reset test 1 count
0244	0002			2	
0245	0041		STM		
0246	0234			TEST 1	
0247	0020	TRACK	LDN		
0250	0001			1	
0251	0041		STM		
0252	0260			BITPOS	
0253	0020	DATA	LDN		
0254	0000			0	
0255	0041		STM		
0256	0262		OUTA	+1	
0257	0020		LDN		
0260	0000	BITPOS		0	
0261	0141	OUTA	STM	T1	Output area
0262	0000			0	
0263	0055		RAO		
0264	0262		OUTA	+1	
0265	0062		PJP		
0266	0261			OUTA	
0267	0075		EXF		Write tracks
0270	0010			10	
0271	0020			20	
0272	0173		OUT	T1	
0273	0000			0	
0274	0200			200	
0275	0021		LDM		Next track
0276	0260			BITPOS	
0277	0031		ADM		
0300	0260			BITPOS	
0301	0041		STM		

0302	0260		BITPOS	
0303	0062		PJP	
0304	0253		DATA	
0305	0020		LDN	
0306	0060	TEST 2	60	
0307	0034		SBN	
0310	0001		1	
0311	0041		STM	
0312	0306		TEST 2	
0313	0061		NZP	Try test 3 times
0314	0247		Track	
0315	0020		LDN	Reset test 2 count
0316	0060		60	
0317	0041		STM	
0320	0306		TEST 2	
0321	0020		LDN	
0322	0001		1	
0323	0102		ATT T1	Set tag 1 = 1
0324	0020		LDN	
0325	0012		12	
0326	0202		ATT T2	Set tag 2 = 12
0327	0020		LDN	
0330	0040		40	
0331	0041		STM	
0332	0007		COUNTE	
0333	0020	ERASE	LDN	Set output area to 77
0334	0077		77	
0335	0241	DATA 1	STM T2	
0336	0000	OUTB	0	
0337	0055		RAO	
0340	0336		OUTB	
0341	0034		SBN	Limit
0342	0200		200	
0343	0061		NZP	
0344	0335		DATA 1	
0345	0020		LDN	
0346	0000		0	
0347	0041		STM	Reset OUTB
0350	0336		OUTB	
0351	0075		EXF	Write
0352	0010		10	
0353	0020		20	
0352	0273		OUT T2	Ouput all sevens
0355	0000		0	
0356	0200		200	
0357	0075		EXF	Search reverse
0360	0010		10	
0361	0031		31	

0362	0075		EXF		Write
0363	0010			10	
0364	0020			20	
0365	0074		OTN		Output 1 word
0366	0001			1	
0367	0075		EXF		Write EOF
0370	0010			10	
0371	0021			21	
0372	0075		EXF		Search reverse 1
0373	0010			10	
0374	0031			31	
0375	0075		EXF		Search reverse 2
0376	0010			10	
0377	0031			31	
0400	0075	ERASE 1	EXF		
0401	0010			10	
0402	0000			0	
0403	0076		INA		
0404	0163		NJP	T1	
0405	0400			ERASE 1	
0406	0075		EXF		Read
0407	0010			10	
0410	0024			24	
0411	0076		INA		Input 1 word
0412	0075		EXF		Search forward file
0413	0010			10	
0414	0032			32	
0415	0075	STAT 1	EXF		Status 1
0416	0010			10	
0417	0000			0	
0420	0076		INA		Check for EOF
0421	0014		LSN		
0422	0020			20	
0423	0163		NJP	T1	
0424	0415			STAT 1	
0425	0160		ZJP	T1	
0426	0432			NOEOF	
0427	0077		HLT		Error did not read EOF
0430	0064		UJP		
0431	0333			ERASE	
0432	0021	NOEOF	LDM		
0433	0007			COUNTE	
0434	0034		SBN		
0435	0001			1	
0436	0041		STM		
0437	0007			COUNTE	

0440	0061		NZP		
0441	0333			ERASE	
0442	0020	TEST 3	LDN		
0443	0000			0	
0444	0141		STM	T1	Reset output
0445	0463			WR1	
0446	0020	COUNTS	LDN		
0447	0010			10	
0450	0041		STM		Set Counter
0451	0007			COUNTE	
0452	0075	PATTRN	EXF		Write EOF
0453	0010			10	
0454	0021			21	
0455	0075		EXF		Set odd par-lo density
0456	0010			10	
0457	0011	ODD PAR		11	
0460	0020	SET OUT	LDN		Set pattern
0461	0000	PAT		0	
0462	0241		STM	T2	Store pattern
0463	0000	WR 1		0	
0464	0155		RAO	T1	INC output address
0465	0463			WR 1	
0466	0162		PJP	T1	
0467	0460			SET OUT	
0470	0075	WR 2	EXF		Set write
0471	0010			10	
0472	0020			20	
0473	0273		OUT	T2	
0474	0000			0	
0475	0200			200	
0476	0021		LDM		
0477	0007			COUNTE	
0500	0034		SBN		Decrement write count
0501	0001			1	
0502	0041		STM		
0503	0007			COUNTE	
0504	0161		NZP	T1	Test EOR 10 blocks
0505	0470			WR2	
0506	0075		EXF		Search reverse file
0507	0010			10	
0510	0033			33	
0511	0020		LDN		
0512	0010			10	
0513	0302		ATT	T3	Set tag 3 = 10
0514	0075	NORDY	EXF		Status ck
0515	0010			10	

0516	0000			0	
0517	0076		INA		
0520	0163		NJP	T1	
0521	0514			NORDY	
0522	0075		EXF		Read 1 word to eliminate EOF
0523	0010			1	
0524	0024			24	
0525	0076		INA		
0526	0075	NRDY	EXF		
0527	0010			10	
0530	0000			0	
0531	0076		INA		
0532	0163		NJP	T1	
0533	0526			NRDY	
0534	0075	READ	EXF		Read 1 record
0535	0010			10	
0536	0024			24	
0537	0372		INN	T3	Input 4000-4300
0540	0000			0	
0541	0200			200	
0542	0020		LDN		
0543	0000			0	
0544	0141		STM	T1	Reset comp 1
0545	0551			COMP 1	
0546	0141		STM	T1	Reset comp 2
0547	0553			COMP 2	
0550	0221	COMP	LDM	T2	Compare output
0551	0000	COMP 1		0	
0552	0335		SBM	T3	Check for compare
0553	0000	COMP 2		0	
0554	0160		ZJP	T1	
0555	0566			CKOK	
0556	0221		LDM	T2	
0557	0551			COMP 1	
0560	0077		HLT		A contains proper word
0561	0321		LDM	T3	
0562	0553			COMP 2	
0563	0077		HLT		A contains word in error
0564	0164		UJP	T1	
0565	0442			TEST 3	
0566	0155	CKOK	RAO	T1	
0567	0551			COMP 1	INC output
0570	0155		RAO	T1	
0571	0553			COMP 2	INC input
0572	0162		PJP	T1	Go back if not finished
0573	0550			COMP	

0574	0075	PARCK	EXF		Ck for parity error-busy
0575	0010			10	Status
0576	0000			0	One
0577	0076		INA		
0600	0163		NJP	T1	
0601	0574			PARCK	JMP UF still busy
0602	0010		LPN		Test parity bit
0603	0004			4	
0604	0160		ZJP	T1	
0605	0611			CONT	OK go on
0606	0077		HLT		Parity error halt
0607	0164		UJP	T1	
0610	0442			TEST 3	
0611	0020	CONT	LDN		
0612	0007			COUNTE	
0613	0055		RAO		INC read count
0614	0007			COUNTE	
0615	0034		SBN		
0616	0010			10	
0617	0161		NZP	T1	If not finished
0620	0534			READ	
0621	0021		LDM		
0622	0010	PATTN		PAT 1	
0623	0141		STM	T1	Try diff pattern
0624	0461			PAT	
0625	0155		RAO	T1	INC pattern test
0626	0622			PATTN	
0627	0020		LDN		
0630	0000	PCOUNT		0	
0631	0155		RAO	T1	
0632	0630			PCOUNT	
0633	0034		SBN		
0634	0012			12	
0635	0160		ZJP	T1	Test for last pattern
0636	0641			RESET	
0637	0164		UJP	T1	
0640	0442			TEST 3	Not last pattern
0641	0020	RESET	LDN		
0642	0014	HIDEN		14	
0643	0141		STM	T1	Try BCD
0644	0457			ODD PAR	
0645	0020		LDN		
0646	0001			1	
0647	0141		STM	T1	Adv by 1 do not try zeroes
0650	0630			PCOUNT	
0651	0020		LDN		

0652	0010		PAT 1	
0653	0141		STM T1	
0654	0622		PATTN	
0655	0020		LDN	
0656	0001	LAST	1	
0657	0161		NZP T1	Go back for BCD
0660	0704		CLEAR	
0661	0020		LDN	
0662	0011		11	
0663	0141		STM T1	Reset for odd par
0664	0457		ODD PAR	
0665	0020		LDN	
0666	0001		1	
0667	0141		STM T1	Reset for odd par test
0670	0656		LAST	
0671	0020		LDN	Pattern test complete
0672	0001		1	
0673	0102		ATT T1	Set tag 1 = 1
0674	0020		LDN	
0675	0006		6	
0676	0202		ATT T2	Set tag 2 = 6
0677	0020		LDN	
0700	0002		2	
0701	0302		ATT T3	
0702	0164		UJP T1	Jump to random pattern
0703	0712		RANDOM	
0704	0020	CLEAR	LDN	Set odd-even switch
0705	0000		0	
0706	0141		STM T1	
0707	0656		LAST	
0710	0164		UJP T1	Return
0711	0442		TEST 3	
0712	0020	RANDOM	LDN	
0713	0040		40	
0714	0041		STM	Set for 40 blocks
0715	0007		COUNTE	
0716	0075		EXF	Set binary-lo density
0717	0010		10	
0720	0011	HIDEN1	11	
0721	0075	WRAN	EXF	Write EOF
0722	0010		10	
0723	0021		21	
0724	0075	BUSY	EXF	Status 1
0725	0010		10	
0726	0000		0	
0727	0076		INA	
0730	0163		NJP T1	Busy go back

0731	0724		BUSY	
0732	0075		EXF	Write
0733	0010			10
0734	0020			20
0735	0073		OUT	Output random data
0736	0100			100
0737	0177			177
0740	0021		LDM	
0741	0007			COUNTE
0742	0034		SBN	Dec Counte
0743	0001			1
0744	0041		STM	
0745	0007			COUNTE
0746	0161		NZP T1	40 Blocks
0747	0724			BUSY
0750	0075		EXF	Yes-search file back
0751	0010			10
0752	0033			33
0753	0075	BUSY 0	EXF	
0754	0010			10
0755	0000			0
0756	0161		NZP T1	
0757	0753			BUSY 0
0760	0075		EXF	Read one word to eliminate EOF
0761	0010			10
0762	0024			24
0763	0076		INA	
0764	0075	BUSY 1	EXF	Status 1
0765	0010			10
0766	0000			0
0767	0076		INA	
0770	0163		NJP T1	Busy
0771	0764			BUSY 1
0772	0020		LDN	Yes
0773	0077			77
0774	0341		STM T3	Set compare limit
0775	1041			CMPLIM
0776	0075		EXF	No read
0777	0010			10
1000	0024			24
1001	0272		INN T2	Input record 3000-3077
1002	0000			0
1003	0077			77
1004	0020		LDN	
1005	0100			100

1006	0341		STM	T3	Set compare address
1007	1015			COMP 3	
1010	0020		LDN		
1011	0000			0	
1012	0341		STM	T3	Set compare address
1013	1021			COMP 4	
1014	0021	TEST 4	LDN		Load output word
1015	0100	COMP 3		100	
1016	0010		LPN		Drop bits 6-7
1017	0077			77	
1020	0235		SBM	T2	Sub input word
1021	0000	COMP 4		0	
1022	0360		ZJP	T3	Equal
1023	1034			OK	Yes
1024	0321		LDM	T3	No
1025	1015			COMP 3	
1026	0077		HLT		A = word output
1027	0321		LDM	T3	
1030	1021			COMP 4	
1031	0077		HLT		A = word input
1032	0164		UJP	T1	
1033	0712			RANDOM	
1034	0355	OK	RAO	T3	INC output address
1035	1015			COMP 3	
1036	0355		RAO	T3	INC input address
1037	1021			COMP 4	
1040	0020		LDN		
1041	0000	COMPLIM			
1042	0034		SBN		
1043	0001			1	
1044	0341		STM	T3	
1045	1041			CMPLIM	
1046	0361		NZP	T3	Compare Limit
1047	1014			TEST 4	
1050	0055		RAO		INC counte
1051	0007			COUNTE	
1052	0034		SBN		
1053	0040			40	
1054	0161		NZP	T1	40 Blocks
1055	0764			BUSY 1	No
1056	0020		LDN		Yes try 4 times
1057	0010	TRIAL		10	
1060	0034		SBN		
1061	0001			1	
1062	0341		STM	T3	
1063	1057			TRIAL	

1064	0161		NZP	T1	Finished
1065	0712			RANDOM	No
1066	0020		LDN		Yes
1067	0010			10	
1070	0341		STM	T3	Reset trial
1071	1057			TRIAL	
1072	0020		LDN		
1073	0012			12	
1074	0141		STM	T1	Set hi density for pattern test
1075	0457			ODD PAR	
1076	0141		STM	T1	Set hi density for random test
1077	0720			HIDEN 1	
1100	0020		LDN		
1101	0016			16	
1102	0141		STM	T1	Set even-hi density
1103	0642			HIDEN	
1104	0020		LDN		Density switch
1105	0001	SWITCH		1	
1106	0361		NZP	T3	Hi density test finished
1107	1130			DENSE	No
1110	0020		LDN		Yes
1111	0014			14	
1112	0141		STM	T1	Reset density
1113	0642			HIDEN	
1114	0020		LDN		
1115	0011			11	
1116	0141		STM	T1	Reset density
1117	0720			HIDEN 1	
1120	0141		STM	T1	
1121	0457			ODD PAR	
1122	0020		LDN		
1123	0001			1	
1124	0341		STM	T3	Reset density switch
1125	1105			SWITCH	
1126	0364		UJP	T3	JMP to EOF test
1127	1136			EOFTST	
1130	0020	DENSE	LDN		
1131	0000			0	
1132	0341		STM	T3	Set hi-lo switch
1133	1105			SWITCH	
1134	0164		UJP	T1	Return for hi-den test
1135	0442			TEST 3	
1136	0020	EOFTST	LDN		
1137	0002			2	
1140	0102		ATT	T1	Set tag 1 = 2
1141	0020		LDN		

1142	0012		12	
1143	0041		STM	
1144	0007		COUNTE	Set counte = 11
1145	0075	NEF	EXF	Status
1146	0010		10	
1147	0000		0	
1150	0076		INA	
1151	0163		NJP T1	Busy
1152	1145		NEF	Yes
1153	0075		EXF	No-write EOF
1154	0010		10	
1155	0021		21	
1156	0021		LDM	
1157	0007		COUNTE	
1160	0034		SBN	DEC counte
1161	0001		1	
1162	0041		STM	
1163	0007		COUNTE	
1164	0161		NZP T1	10 EOF written
1165	1145		NEF	No
1166	0075	BFILE	EXF	Yes-status
1167	0010		10	
1170	0000		0	
1171	0076		INA	
1172	0163		NJP T1	
1173	1166		BFILE	
1174	0075		EXF	Search file back
1175	0010		10	
1176	0033		33	
1177	0055		RAO	INC counte
1200	0007		COUNTE	
1201	0034		SBN	
1202	0011		11	
1203	0161		NZP T1	Finished
1204	1166		BFILE	No
1205	0020		LDN	
1206	0010		10	
1207	0041		STM	
1210	0007		COUNTE	
1211	0075	RFILE	EXF	Yes-status
1212	0010		10	
1213	0000		0	
1214	0076		INA	
1215	0163		NJP T1	Busy
1216	1211		RFILE	Yes
1217	0075		EXF	No-search file forward

1220	0010			10	
1221	0032			32	
1222	0075	FILE	EXF		Status.
1223	0010			10	
1224	0000			0	
1225	0076		INA		
1226	0163		NJP	T1	Busy
1227	1222			FILE	Yes
1230	0010		LPN		No-save bit 4
1231	0020			20	
1232	0034		SBN		
1233	0020			20	
1234	0160		ZJP	T1	File read
1235	1241			FILE 1	Yes
1236	0077		HLT		No-error
1237	0164		UJP	T1	Return to test EOF
1240	1136			EOFTST	
1241	0021	FILE 1	LDM		
1242	0007			COUNTE	
1243	0034		SBN		DEC counte
1244	0001			1	
1245	0041		STM		
1246	0007			COUNTE	
1247	0161		NZP	T1	Finished read
1250	1211			REFILE	No
1251	0020		LDN		Yes-try test 4 times
1252	0005	TRIES		5	
1253	0034		SBN		
1254	0001			1	
1255	0141		STM	T1	
1256	1252			TRIES	
1257	0161		NZP	T1	TRIES finished
1260	1136			EOFTST	No
1261	0020		LDN		Yes-reset TRIES
1262	0005			5	
1263	0141		STM	T1	
1264	1252			TRIES	
1265	0020	CHAT	LDN		
1266	0002			2	
1267	0102		ATT	T1	
1270	0020		LDN		
1271	0003			3	
1272	0202		ATT	T2	Set tag 2 = 3
1273	0020		LDN		
1274	0005			5	

1275	0041		STM		
1276	0007			COUNTE	Set counte = 5
1277	0075	CHAT 1	EXF		Status
1300	0010			10	
1301	0000			0	
1302	0076		INA		
1303	0163		NJP	T1	Busy
1304	1277			CHAT 1	Yes
1305	0075	CHAT 2	EXF		No-write EOF
1306	0010			10	
1307	0021			21	
1310	0021		LDM		
1311	0007			COUNTE	
1312	0034		SBN		DEC counte
1313	0001			1	
1314	0041		STM		
1315	0007			COUNTE	
1316	0161		NZP	T1	4 EOF written
1317	1277			CHAT 1	No
1320	0075	CHAT 3	EXF		Yes-status
1321	0010			10	
1322	0000			0	
1323	0076		INA		
1324	0163		NJP	T1	Busy
1325	1320			CHAT 3	Yes
1326	0075		EXF		No-write
1327	0010			10	
1330	0020			20	
1331	0074		OTN		Output one word of 77
1332	0077			77	
1333	0020	CHATT	LDN		
1334	0005			5	
1335	0041		STM		Set counte = 5
1336	0007			COUNTE	
1337	0075	CHAT 4	EXF		Status
1340	0010			10	
1341	0000			0	
1342	0076		INA		
1343	0163		NJP	T1	Busy
1344	1337			CHAT 4	Yes
1345	0075		EXF		No-search file back
1346	0010			10	
1347	0033			33	
1350	0021		LDM		
1351	0007			COUNTE	
1352	0034		SBN		DEC counte

1353	0001		1	
1354	0041		STM	
1355	0007		COUNTE	
1356	0161		NZP T1	4 files back
1357	1337		CHAT 4	No
1360	0075	CHAT 5	EXF	Yes-status
1361	0010		10	
1362	0000		0	
1363	0076		INA	
1364	0163		NJP T1	Busy
1365	1360		CHAT 5	Yes
1366	0075		EXF	No-search file forward
1367	0010		10	
1370	0032		32	
1371	0055		RAO	INC counte
1372	0007		COUNTE	
1373	0034		SBN	
1374	0005		5	
1375	0161		NZP T1	4 files read
1376	1360		CHAT 5	No
1377	0075	CHAT 6	EXF	Yes-status
1400	0010		10	
1401	0000		0	
1402	0076		INA	
1403	0163		NJP T1	Busy
1404	1377		CHAT 6	Yes
1405	0075		EXF	No-read
1406	0010		10	
1407	0024		24	
1410	0076		INA	
1411	0034		SBN	Check for error
1412	0077		77	
1413	0260		ZJP T2	
1414	1420		CHA	
1415	0077		HLT	Chatter error
1416	0164		UJP T1	
1417	1265		CHAT	
1420	0020	CHA	LDN	
1421	0025	CHAT 7	25	
1422	0034		SBN	
1423	0001		1	
1424	0241		STM T2	
1425	1421		CHAT 7	
1426	0161		NZP T1	Try 25 times
1427	1333		CHATT	
1430	0020		LDN	

1431	0025		25	
1432	0241		STM T2	
1433	1421		CHAT 7	
1434	0020	VAR	LDN	
1435	0100		100	
1436	0241		STM T2	Set output LWA
1437	1472		VAR 2	
1440	0241		STM T2	Set input LWA
1441	1543		VAR 5	
1442	0075		EXF	Set odd-lo density
1443	0010		10	
1444	0011		11	
1445	0020		LDN	
1446	0006		6	
1447	0302		ATT T3	Set tag 0 = 6
1450	0020		LDN	
1451	0011		11	
1452	0041		STM	Set counte = 11
1453	0007		COUNTE	
1454	0020		LDN	
1455	0003		3	
1456	0102		ATT T1	Set tag 1 = 3
1457	0075	VAR 1	EXF	Status
1460	0010		10	
1461	0000		0	
1462	0076		INA	
1463	0163		NJP T1	Busy
1464	1457		VAR 1	Yes
1465	0075		EXF	No-write
1466	0010		10	
1467	0020		20	
1470	0073		OUT	Output data
1471	0050		50	
1472	0100	VAR 2	100	
1473	0121		LDM T1	Load LWA
1474	1472		VAR 2	
1475	0030		ADN	INC LWA by 10
1476	0010		10	
1477	0141		STM T1	
1500	1472		VAR 2	
1501	0021		LDM	
1502	0007		COUNTE	
1503	0034		SBN	DEC counte
1504	0001		1	
1505	0041		STM	
1506	0007		COUNTE	

1507	0161		NZP	T1	10 blocks written
1510	1457			VAR 1	No
1511	0075	VAR 3	FXF		Yes-status
1512	0010			10	
1513	0000			0	
1514	0076		INA		
1515	0163		NJP	T1	Busy
1516	1511			VAR 3	Yes
1517	0075		EXF		No-reverse one record
1520	0010			10	
1521	0031			31	
1522	0055		RAO		INC counte
1523	0007			COUNTE	
1524	0034		SBN		
1525	0011			11	
1526	0161		NZP	T1	First record
1527	1511			VAR 3	No
1530	0075	STATUS	EXF		
1531	0010			10	
1532	0000			0	
1533	0076		INA		
1534	0163		NJP	T1	
1535	1530			STATUS	
1536	0075	VAR 4	EXF		READ
1537	0010			10	
1540	0024			24	
1541	0372		INN	T3	Input 3000-3XXX
1542	0050			50	
1543	0100	VAR 5		100	
1544	0021	CHECK	LDM		
1545	0050	OUTWOR		50	
1546	0010		LPN		Save lower 6 bits
1547	0077			77	
1550	0335		SBM	T3	Check compare
1551	0050	VAR 6		50	
1552	0260		ZJP	T2	OK-go on
1553	1557			VAR 7	
1554	0077		HLT		Compare error
1555	0164		UJP	T1	
1556	1434			VAR	
1557	0255	VAR 7	RAO	T2	INC compare address out
1560	1545			OUTWOR	
1561	0255		RAO	T2	
1562	1551			VAR 6	INC compare address in
1563	0135		SBM	T1	
1564	1543			VAR 5	
1565	0161		NZP	T1	Block finished

1566	1544		CHECK	No
1567	0121		LDM T1	
1570	1543		VAR 5	
1571	0030		ADN	INC read LW
1572	0010		10	
1573	0141		STM T1	
1574	1543		VAR 5	
1575	0020		LDN	Yes
1576	0050		50	
1577	0141		STM T1	Reset compare address out
1600	1545		OUTWOR	
1601	0141		STM T1	Reset compare address in
1602	1551		VAR 6	
1603	0021		LDM	
1604	0007		COUNTE	
1605	0034		SBN	
1606	0001		1	
1607	0041		STM	
1610	0007		COUNTE	
1611	0161		NZP T1	Read finished
1612	1530		STATUS	No
1613	0020		LDN	Yes
1614	0006	VAR 8	6	
1615	0034		SBN	
1616	0001		1	
1617	0141		STM T1	
1620	1614		VAR 8	
1621	0261		NZP T2	TRIES finished
1622	1434		VAR	No
1623	0020		LDN	
1624	0006		6	
1625	0141		STM T1	Reset TRIES
1626	1614		VAR 8	
1627	0164		UJP T1	Jump to short block test
1630	1641		SBT	
1631	0025		25	
1632	0025	SB1	25	
1633	0025	SB2	25	
1634	0025	SB3	25	
1635	0025	SB4	25	
1636	0025	SB5	25	
1637	0025	SB6	25	
1640	0025	SB7	25	
1641	0020	SBT	LDN	
1642	0201		201	
1643	0041		STM	
1644	0007		COUNTE	Set counte = 201

1645	0020		LDN		
1646	0004			4	
1647	0202		ATT	T2	Set tag 2 = 4
1650	0075		EXF		Set odd-lo density
1651	0010			10	
1652	0011	SBT1		11	
1653	0075	SBT2	EXF		Status
1654	0010			10	
1655	0000			0	
1656	0076		INA		
1657	0163		NJP	T1	Busy
1660	1653		SBT2		Yes
1661	0075		EXF		No-write
1662	0010			10	
1663	0020			20	
1664	0173		OUT	T1	
1665	1631			SB	
1666	1641			SBT	
1667	0021		LDM		
1670	0007			COUNTE	
1671	0034		SBN		DEC counte
1672	0001			1	
1673	0041		STM		
1674	0007			COUNTE	
1675	0161		NZP	T1	200 blocks written
1676	1653			SBT2	No
1677	0075	SBT3	EXF		Yes-status
1700	0010			10	
1701	0000			0	
1702	0076		INA		
1703	0163		NJP	T1	Busy
1704	1677			SBT3	Yes
1705	0075		EXF		No-reverse record
1706	0010			10	
1707	0031			31	
1710	0055		RAO		INC counte
1711	0007			COUNTE	
1712	0034		SBN		
1713	0201			201	
1714	0161		NZP	T1	First record
1715	1677			SBT3	No
1716	0075	SBT4	EXF		Yes-status
1717	0010			10	
1720	0000			0	
1721	0076		INA		
1722	0163		NJP	T1	Busy

1723	1716		SBT4	Yes
1724	0075		EXF	No-read
1725	0010		10	
1726	0024		24	
1727	0272		INN T2	Input to 2300-2310
1730	0300		300	
1731	0310		310	
1732	0121	SBTT	LDM T1	Load output
1733	1631		SB	
1734	0235		SBM T2	Subtract input
1735	0300	SBT5	300	
1736	0160		ZJP T1	Compare
1737	1743		SBT6	Yes
1740	0077		HLT	No
1741	0164		UJP T1	
1742	1641		SBT	
1743	0055	SBT6	RAO	INC input word address
1744	1735		SBT5	
1745	0034		SBN	
1746	0311		311	
1747	0161		NZP T1	Limit
1750	1732		SBTT	No
1751	0020		LDN	Yes
1752	0300		300	
1753	0141		STM T1	Reset input word address
1754	1735		SBT5	
1755	0021		LDM	
1756	0007		COUNTE	
1757	0034		SBN	
1760	0001		1	
1761	0041		STM	
1762	0007		COUNTE	
1763	0161		NZP T1	200 blocks read
1764	1716		SBT4	No
1765	0020		LDN	Yes
1766	0004	SBT7	4	
1767	0034		SBN	DEC TRIES
1770	0001		1	
1771	0141		STM T1	
1772	1766		SBT7	
1773	0161		NZP T1	Test ran 3 times
1774	1641		SBT	
1775	0020		LDN	
1776	0004		4	
1777	0141		STM T1	Reset TRIES
2000	1766		SBT7	

2001	0020		LDN		
2002	0000	SBT8		0	Odd-even switch
2003	0261		NZP	T2	JMP if even
2004	2017			SBT9	
2005	0020		LDN		
2006	0001			1	
2007	0241		STM	T2	Set odd switch
2010	2002			SBT8	
2011	0020		LDN		
2012	0015			15	
2013	0141		STM	T1	Set for even parity
2014	1652			SBT1	
2015	0164		UJP	T1	
2016	1641			SBT	
2017	0020	SBT9	LDN		
2020	0000			0	
2021	0241		STM	T2	Set even switch
2022	2002			SBT8	
2023	0020		LDN		
2024	0011			11	
2025	0141		STM	T1	
2026	1652			SBT1	Reset odd
2027	0075	INT	EXF		CIL
2030	0010			10	
2031	0003			3	
2032	0075	INT1	EXF		Write
2033	0010			10	
2034	0020			20	
2035	0074		OTN		Output one word
2036	0077			77	
2037	0013	INT2	CIL		Clear INT lockout
2040	0020		LDN		
2041	0000			0	
2042	0264		UJP	T2	Wait Loop
2043	2037			INT2	
2044	0075	INT3	EXF		Back space
2045	0010			10	
2046	0031			31	
2047	0020		LDN		
2050	0000	INT4		0	
2051	0255		RAO	T2	
2052	2050			INT4	
2053	0261		NZP	T2	
2054	2027			INT	
2055	0020		LDN		
2056	0005	INT5		5	

2057	0034	SBN	
2060	0001		1
2061	0241	STM	T2
2062	2056		INT5
2063	0261	NZP	T2
2064	2027		INT
2065	0020	LDN	
2066	0005		5
2067	0241	STM	T2
2070	2056		INT5
2071	0020	LDN	
2072	0000		0
2073	0041	STM	
2074	0262		262
2075	0077	HLT	
2076	0064	UJP	
2077	0050		SENSE

0100	T1	EQU	100	Bank reference
0200	T2	EQU	200	Bank reference
0300	T3	EQU	300	Bank reference
0000	ERR	EQU	0	Error stop
0001	SHA	EQU	1	Shift A left one bit
0002	ATT	EQU	2	A to tag register
0003	TTA	EQU	3	Tag register contents to A
0004	ABR	EQU	4	A to buffer entrance register
0005	ABX	EQU	5	A to buffer exist register
0006	BER	EQU	6	Contents of BER register to A
0007	CBC	EQU	7	Clear buffer controls
0010	LPN	EQU	10	Logical product no address
0011	LPM	EQU	11	Logical product memory address
0012	LPI	EQU	12	Logical product indirect address
0013	CIL	EQU	13	Clear interrupt lockout
0014	LSN	EQU	14	Logical sum no address
0015	LSM	EQU	15	Logical sum memory address
0016	LSI	EQU	16	Logical sum indirect address
0020	LDN	EQU	20	Load A no address mode
0021	LDM	EQU	21	Load A memory
0022	LDI	EQU	22	Load A indirect
0025	LCM	EQU	25	Load complement to A memory
0026	LCI	EQU	26	Load complement to A indirect
0030	ADN	EQU	30	Add no address
0031	ADM	EQU	31	Add memory address
0032	ADI	EQU	32	Add indirect address
0034	SBN	EQU	34	Subtract no address
0035	SBM	EQU	35	Subtract memory address
0036	SBI	EQU	36	Subtract indirect address
0041	STM	EQU	41	Store A memory
0042	STI	EQU	42	Store A indirect
0051	RAM	EQU	51	Replace add memory address
0055	RAO	EQU	55	Replace add one memory address
0060	ZJP	EQU	60	Jump, if contents of A = 0
0061	NZP	EQU	61	Jump, if contents of A \neq 0
0062	PJP	EQU	62	Jump, if contents of a = +
0063	NJP	EQU	63	Jump, if contents of A = -
0064	UJP	EQU	64	Unconditional jump
0070	IBI	EQU	70	Initiate buffer input
0071	IBO	EQU	71	Initiate buffer output
0072	INN	EQU	72	Input normal
0073	OUT	EQU	73	Output normal
0074	OTN	EQU	74	Output, no address
0075	EXF	EQU	75	External function
0076	INA	EQU	76	Input to A
0077	HLT	EQU	77	Halt
0000		END		

NUMBER: (T27) { MT3 }

TITLE: 8194 Magnetic Tape Controller and
609 Magnetic Tape Transport Test

I. Introduction

A. Identification

Title: 8194 Magnetic Tape Controller and
609 Magnetic Tape Transport Test

Type of program: Unit diagnostic program

Computer: CONTROL DATA 8092 TeleProgrammer[®]

B. Purpose

This test verifies all of the operating functions of the 8194 Magnetic Tape Controller and the 609 Magnetic Tape Transport. One controller and one transport are used for testing, with an option to include further operating function testing with two transports.

The program selects the operating functions of the transport and checks their operation under varying conditions of parity, density, and record length. The 609 transport operates at an 800 bpi rate, but is designed to accept 200 and 556 bpi function codes and perform these operations at 800 bpi. Information is written by the transport and then checked for record length and correct transport status after each operation.

II. Test routine operation

A. System preparation

1. The equipment required to perform this test consists of:

- 1 CONTROL DATA 8092 TeleProgrammer
- 1 CONTROL DATA 8194 Magnetic Tape Controller
- 1 (or 2) CONTROL DATA 609 Magnetic Tape Transport(s)
- 1 CONTROL DATA 8130 Card Reader and Controller

2. System preparation procedure

8092 TeleProgrammer:

1. Turn on cooling fans
2. Turn on power

8130 Card Reader and Controller

1. Turn on power
2. Set AUTO/MAN switch to AUTO

8194 Magnetic Tape Controller

1. Turn on power
2. Set transport LOAD switch to "OFF" position

609 Magnetic Tape Transport

1. Turn on main power
2. Turn on cooling fans
3. Turn on capstan motors
4. Turn on 20v power supplies
5. Turn on pneumatic motors
6. Depress POWER switch to turn on unit power and light POWER indicator.
7. Mount 800 bpi 9-track magnetic tape with write ring in place.
8. Depress LOAD switch to move tape to LOAD point. LOAD indicator and WRITE ENABLE indicator will light.
9. Depress READY switch to make unit ready to operate under program control and READY indicator will light.

B. Test routine loading

The test routine is loaded from a binary card deck into the Tele-Programmer as follows:

1. Place binary card deck in card reader hopper and position first card in the read station.
2. Set card reader controller LOAD switch to "ON" (up) position.
3. Master clear TeleProgrammer.
4. LOAD and RUN

5. After all cards have been read (P register = 6000), master clear.
6. Set card reader controller LOAD switch to "OFF".
7. Turn off card reader power.

The program is now stored in memory and ready to run following the directions outlined in section III.

III. Subtests and Subroutines

A. Subtests

1. Transport Autoload Subtest

The transport autoload subtest verifies the operation of the transport and controller to autoload records from magnetic tape into a selected memory location area in the TeleProgrammer. The subtest does this by writing the complete 8194-609 diagnostic routine onto magnetic tape in seven records, clearing TeleProgrammer memory, and autoloading these records back into TeleProgrammer memory.

This subtest is optional. Subtest 2 may be selected as the first subtest without adversely affecting subsequent subtests.

This subtest and the complete test routine require that the transport being tested be unit 3. After writing each of the seven records, the program halts at a "pause for writing" point. Reselecting RUN initiates a transport status check. If the transport status is correct, the next record is written. With incorrect status, a halt occurs with the A-register containing the incorrect transport status. Reselecting RUN will rewrite the record. The following directions apply for writing the program onto tape, clearing memory, and autoloading the records.

- a. Set transport to unit 3, and position tape at LOAD point and READY.
- b. Set controller to odd parity.
- c. Turn on transport LOAD switch.
- d. Master clear TeleProgrammer.
- e. Set P = 5400 and RUN.

Record	"Pause for writing" stops	Incorrect status stops
		P = 5424 (Expect load point)
1	P = 5447	P = 5456
2	P = 5466	P = 5475
3	P = 5505	P = 5514
4	P = 5541	P = 5550
5	P = 5560	P = 5567
6	P = 5577	P = 5606
7	P = 5633	P = 5642

- f. Final writing half at p = 5645 indicates all seven records are written on tape.
- g. Master clear, set p = 5650 and RUN.
- h. Program half at p = 5605 indicates 0000-4777 memory locations cleared and ready for autoloading.
- i. Master clear, set p = 0000, LOAD and RUN.
Master clear, set p = 1776, LOAD and RUN.
Master clear, set p = 1777, LOAD and RUN.
Master clear, set p = 2000, LOAD and RUN.
Master clear, set p = 3776, LOAD and RUN.
Master clear, set p = 3777, LOAD and RUN.
Master clear, set p = 4000, LOAD and RUN.

If errors are found in writing or autoloading records, it may be advisable to reload the program into memory from the card deck and begin testing with subtest 2 to localize the error.

2. Write, Read, Search, and Rewind Subtests

These subtests verify transport and controller operations when the following external function codes are issued and executed:

1X00	Request Status
1X02	Set interrupt lockout
1X03	Clear interrupt lockout
1X13	Set odd parity - high density
1X20	Write record
1X21	Write file mark
1X24	Read forward
1X25	Read backward
1X30	Search forward to record gap
1X31	Search backward to record gap
1X32	Search forward to file mark
1X33	Search backward to file mark
1X34	Rewind to load point

Before executing these subtests:

1. Rewind transport to LOAD point
2. Make transport READY
3. Set controller to EVEN parity
4. Master clear TeleProgrammer.

The routine is now ready to run from $p = 0$.

Note: Subtests 2 - 5 may be successively rerun as one section by storing any non-zero value in location 35 prior to execution of subtest 2. Upon completion of subtest 5, program control is transferred directly to subtest 2, for immediate execution. This re-execution sequence continues until an error is found or until the contents of location 35 are restored to zero.

a. 1X00 Request Status subtest

This subtest is used to check the initial status of the transport before any other operations are attempted. A halt at HALT 4 with the incorrect status in the A-register indicates status of load point and even parity was not found. To re-execute this subtest, clear the A-register and RUN.

b. 1X13 Set odd parity - high density subtest

This subtest checks the controller and transport operation in changing to odd parity. A halt at HALT 5 indicates incorrect status is sensed. To re-execute this subtest, clear the A-register and RUN.

c. 1X20 Write record subtest

This subtest writes a 200-character record and uses the TANDS subroutine to provide a time limit for the writing operation and to check the unit status after the writing operation is completed. See TANDS subroutine description for further information.

d. 1X02 Set interrupt lockout subtest

This subtest is used in conjunction with the 1X20 - Write record subtest. The 200-character record is written with interrupt lockout set by the 1X02 external function code. A halt at HALT 6 indicates that interrupts were not locked out as expected. To re-execute this subtest, set $p = \text{WRITER}$ and RUN.

e. 1X25 Read record backward subtest

This subtest performs a read backward operation using the record written by the 1X20-Write record subtest. See TANDS subroutine description for further information. A halt at HALT8 indicates an error occurred in reading the first and/or last word of the record. To re-execute this subtest, clear the A-register and RUN.

Note: Re-execution of this subtest (and most others following) assumes no tape movement occurred during the current operation.

Note: Subtests 2e and 2g verify status after the record has been read and verify the FWA and LWA of the record. Subtest 3 verifies operation status and performs a character by character verification of the record.

f. 1X03 Clear interrupt lockout subtest

This subtest is used in conjunction with the 1X25-read record backward subtest, with interrupt lockout cleared by the 1X03 function code. A halt at HALT7 indicates interrupt did not occur and the subtest failed. To re-execute this subtest, set p = WRITER and RUN.

g. 1X24 Read record forward subtest

This subtest performs a read forward operation using the record written by the 1X20-write record subtest. See TANDS subroutine description for further information. A halt at HALT9 indicates the first and/or last word of the record was read incorrectly. To re-execute this subtest, clear the A-register and RUN.

h. 1X31 Search backward to record gap subtest

This subtest searches backward past the 200 character record written by the 1X20 write record subtest, and uses the TANDS subroutine to verify transport status after the search operation. The record is read forward and verified, with a halt occurring at HALT10 if the record was read incorrectly or the wrong record was found. To re-execute this subtest, set p = BAKREC and RUN.

i. 1X30 Search forward to record gap subtest

This subtest searches forward past the 200 character record written by the 1X20-write record subtest, and uses the TANDS subroutine to verify transport status after the search operation. The record is read backward and verified, with a halt occurring at HALT11 if the record was read incorrectly or the wrong record was found. To re-execute this subtest, clear the A-register and RUN. This assumes correct tape motion occurred during the search forward operation.

j. 1X21 Write file mark subtest

This subtest writes a file mark and uses the TANDS subroutine to verify transport operation and status after writing the file mark. TANDS_error halt points provide the only means for re-execution of this subtest.

Note: The file mark and detection circuits are designed to indicate a parity error for each file mark written or detected during a search operation. For this reason, a parity error has been indicated as part of the expected status for all file mark operations. These parity error conditions will light the READ ERROR indicator on the controller, and should not be regarded as true errors.

k. 1X33 Search backward to file mark subtest

This subtest searches backward past the file mark written by the 1X21 - write file mark subtest and uses the TANDS subroutine to verify transport operation and status after the search operation. TANDS error halt points provide the only means for re-execution of this subtest.

l. 1X32 Search forward to file mark subtest

This subtest searches forward past the file mark written by the 1X21-write file mark subtest and uses the TANDS subroutine to verify transport operation and status after the search operation. A halt at HALT13 indicates a file mark has not been found. To re-execute this subtest, clear the A-register and RUN.

m. 1X34 Rewind to load point subtest

This subtest issues the rewind to load point function code and checks status to verify that the load point tape mark has been found. A halt at HALT 15 indicates that the load point tape mark was not found. To re-execute this subtest, clear the A-register and RUN.

3. Write, read backward and forward subtest

This subtest writes a 200 character record, reads the record forward and backward, verifies transport status after each operation, and checks each character of the record read with the original information, using every selected parity and density function. If no transport status or verification errors are encountered at the selected parity and density, the next parity and density function code is selected and the operations are repeated.

Table 1 lists the error stops used in this subtest and the appropriate action required at each error stop.

The following parity and density external function codes are selected by this subtest.

1X11	Set odd parity - low density
1X12	Set odd parity - medium density
1X13	Set odd parity - high density
1X15	Set even parity - low density
1X16	Set even parity - medium density
1X17	Set even parity - high density

The CONTROL DATA 609 Magnetic Tape Transport and 8194 Magnetic Tape Controller are designed to accept 200, 556, and 800 bpi function codes, but perform all read and write operations at high (800 bpi) density only.

Note: FWA and LWA of memory are used when record is read forward or backward into memory are incremented for each successive new parity and density function code selected.

TABLE 1 Write, read backward and forward substest

Error stop address	Error message	Action required
HALT 16	(A) = incorrect transport status before write operation at selected parity and density indicated at HALT 17	RUN
HALT 17	(A) = lower 6-bits of current 12-bit external function code	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN
HALT 18	(A) = incorrect transport status after write operation at selected parity and density indicated at HALT 19	RUN
HALT 19	(A) = lower 6-bits of current 12-bit external function code	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN
HALT 20	(A) = incorrect transport status after read backward operation at selected parity and density indicated at HALT 21	RUN
HALT 21	(A) = lower 6-bits of current 12-bit external function code	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN
HALT 22	Character verification error in read backward operation (A) = lower 6-bits of current 12-bit external function code (BER)0-7=original data (BXR)0-7=data written and read	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN
HALT 23	(A) = incorrect transport status after read forward operation at selected parity and density indicated at HALT AA	RUN

HALT AA	(A) = lower 6-bits of current 12-bit external function code	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN
HALT BB	Character verification error in read forward operation (A) = lower 6-bits of current 12-bit external function code (BER)0-7=original data (BXR)0-7=data written and read	Reloop: Zero into A, RUN Continue: Non-zero into A, RUN

4. Set even parity and set odd parity subtest

This subtest writes a 64 character record with even parity-high density selected. The record is read backward with even parity selected by the 1X14-set even parity function code. If the FWA or LWA of the record was read incorrectly, a halt occurs at HALT24, with an option provided to re-execute the error condition. If any status errors have occurred, a halt occurs at HALT25 with the incorrect status in the A-register. A re-execution option is provided at this point also.

The record is next read forward at odd parity selected by the 1X10 function code. A halt at HALT26 with the A-register containing the incorrect transport status indicates a set odd parity error. An option for re-execution is provided at this point.

5. Multiple record search and multiple file mark search subtests

This subtest writes a selected sequence of records and file marks. Transport status is checked after writing each record, with incorrect status causing a halt at HALTST with the incorrect status in the A-register. A second halt at HALTCA has the address of the next operation in T2 and the A-register. An unconditional restart of writing operations is begun if any status errors are found.

The multiple record search subtest consists of seven sequences of searching forward three records and backwards four records. The next record is read and verified, with a halt occurring at HALT27 if the wrong record is found. An option is provided to rewrite the record and file mark sequence and re-execute the multiple record search subtest.

The multiple file mark search subtest consists of three sequences of searching forward three file marks and backward two file marks. The next record is read and verified, with a halt occurring at HALT28 if the wrong record is found. An option is provided to rewrite the record and file mark sequence and re-execute the multiple file mark search subtest.

If no errors are found, the test routine continues with the dual transport subtest at HALT29.

6. Dual transport subtests

The dual transport subtests are designed to test the capability of the controller to operate two 609 transports simultaneously. A program halt at HALT29 provides the means of selecting or omitting these subtests. Clearing the A-register selects the subtest series. If the subtests are omitted, the next program stop occurs at HALT43 (search forward to end of tape subtest).

Unit 3 (main unit) and unit 1 (auxiliary unit) are used for these subtests. Transport status is checked before writing records and a file mark on each unit. Not finding a unit status of load point and even parity causes a halt at HALT30, with an unconditional jump to recheck status provided.

The first subtest verifies controller and transport operations when the auxiliary unit is rewound to load point while the main unit searches for a file mark. At the end of these operations both transports are checked for correct status. The expected auxiliary unit status is 040 (tape mark - odd parity) and the expected main unit status is 024 (file mark-parity error - odd parity). Error halt points are:

HALT 31 - incorrect main unit operation.
HALT 32 - incorrect auxiliary unit operation.
HALT 33 - incorrect main and auxiliary unit operations.

An option is provided at each error point to re-execute this subtest. Incorrect unit status storage locations for this subtest are:

STATXX - main unit status,
STATYY - auxiliary unit status.

The second subtest verifies controller rejection of simultaneous read operations on two transports. The 8194 Magnetic Tape Controller is designed to reject operation function codes after a read or search operation has been initiated on any transport. Error halt points are:

HALT34 - (A) = incorrect main unit status (expect 000)
HALT35 - First read record function code overridden by following read record function code.

Clearing the A-register and selecting RUN at HALT35 will re-execute this subtest.

At HALT36 an operator decision to switch tapes between the two transports and verify the records written on each tape is required. Entering any non-zero value into the A-register and selecting RUN after physically switching the tapes will start execution of the switch tape subtest. Clearing the A-register at HALT36 and selecting RUN will omit this subtest.

If the switch tapes subtest is selected, the following error halts may occur:

HALT37 - unit not at load point and odd parity,
HALT38 - even parity, read forward error,
HALT39 - odd parity, read forward error,
HALT40 - odd parity, read backward error,
HALT41 - even parity, read backward error.

The switch tapes subtest begins record verification using the auxiliary unit tape on the main transport. At HALT42 an operator decision to verify the main unit tape on the auxiliary transport is required. To omit these operations, clear the A-register and RUN.

The dual transport subtest exits directly to the search forward to end of tape subtest.

7. Search forward to end of tape subtest

This subtest is provided as an option to search forward to the end of tape mark. At HALT43 an operator decision to select or reject this subtest is required. Clearing the A-register and running rejects the subtest and unconditionally jumps to the rewind unload tape subtest.

The subtest locates the end of tape mark by repeatedly writing a one-character record and checking status for tape mark status. A halt at HALT44 occurs if the tape mark has been reached, with the A-register containing the tape mark status. One character record writing continues until the end of tape mark is reached.

NOTE: This subtest will require about 15 minutes to find the end of tape mark for a full 2400 foot tape.

This subtest exits directly to the rewind unload tape subtest.

8. Rewind unload tape subtest

This subtest rewinds and unloads tape from the transport. A program halt at HALT45 occurs while the tape is rewinding. After tape motion has ceased, reselecting RUN causes a halt at HALT46, with the transport status in the A-register. This should be (A) = 102 or 103, indicating transport not ready and write not ready. Depressing the READY switch to light the indicator and running causes a halt at HALT47 with tape mark status in the A-register. An option is provided at this point to re-execute this subtest if desired. This is the last subtest of the 8194-609 diagnostic routine.

B. Subroutines

1. TANDS subroutine

The time and status (TANDS) subroutine is used to allow sufficient time for tape movement operations to proceed and to check the transport status after tape motion has ceased.

Prior to entry into TANDS, the time allowed for the operation, the expected transport status after the operation, a reloop address to be used to repeat the operation, and a continuation address for further program operations are assigned for TANDS reference.

The TANDS time limit decrement cycle may be interrupted by a peripheral device interrupt routine (30 or 40), which causes an exit to the transport status verification section of TANDS. TANDS first checks for a not busy transport status. If a busy condition is indicated, a program halt occurs at p = 263 and the operator must terminate the transport operation in progress and reselect RUN to continue the TANDS status verification.

If the transport is not busy, TANDS compares the current transport status with the expected status. Any discrepancy causes a program halt at p = 266 with the A-register containing the incorrect current transport status. After re-

selecting RUN, the program halts at p = 271 with tag Register 2 and the A-register containing the 12-bit reloop address for the current operation. At this point, an operator decision to re-execute the incorrect current operation or to continue running the program is required. Any non-zero value entered in the A-register causes a re-execution of the current operation while clearing the A-register and running causes the program to continue with the next operation.

NOTE: If TANDS signifies an incorrect operation has occurred, the veracity of any following tests cannot be guaranteed if the option to continue with the following program operations is chosen. The program was written assuming that all previous tests have been executed correctly.

Table 2 summarizes the TANDS subroutine error halts, error messages, and the operator action required at each halt point.

Table 3 lists the program reloop addresses which may be displayed at the p = 271 program halt in the TANDS subroutine. The table lists the function codes used and the operations associated with each function code.

TABLE 2 TANDS SUBROUTINE SUMMARY

(P)	(A)	Error message	Operator action required
263	--	Transport busy after time limit reached	Terminate current tape motion or operation, RUN
266	Incorrect transport status	Transport status incorrect at end of current operation	RUN
271	(T2) = Program reloop address 8-11 (A) = Program reloop address 0-7		Reloop: Non-zero into A, RUN Continue: Zero into A, RUN

TABLE 3 TANDS Subroutine Re-execution Addresses

Reloop address displayed at p=271	Operation function code	Description of operation
WRITER 444	1X20 WRT	Write record
CLLOCK 513	1X25 RB	Read record backward
APREP3 613	1X24 RF	Read record forward
BAKREC 673	1X31 SBR	Search backward to record gap
FWDREC 1003	1X30 SFR	Search forward to record gap
WRTFM 1114	1X21 WFM	Write file mark
BAKFIL 1141	1X33 SBF	Search backward to file mark
SETUEV 3717	1X24 RF	Read record V forward
SETU0D 4043	1X24 RF	Read record W forward
SETTOD 4161	1X25 RB	Read record W backward
SETTEV 4274	1X25 RB	Read record U backward

2. TIME Subroutine

The time limit only (TIME) subroutine modifies the TANDS subroutine to only allow sufficient time for tape movement operations to proceed. Peripheral equipment interrupts (30 or 40) also cause an exit from the time limit decrement cycle. Transport status is not checked in either case, and control is transferred directly to the next operation in the program. Prior to entry into TIME, the time allowed for the operation and the continuation address for program control are assigned for TANDS usage.

IV. APPENDIX

TEST ROUTINE HALT POINTS AND ASSOCIATED SUBTESTS

0011	HALT 3	Manual interrupt
0263	HALT 0	Transport illegally busy - TANDS
0266	HALT 1	Incorrect transport status in A-TANDS
0271	HALT 2	Re-execution address in A - TANDS
0417	HALT 4	Request status subtest
0441	HALT 5	Set odd parity - high density subtest
0512	HALT 6	Set interrupt lockout subtest
0571	HALT 7	Clear interrupt lockout subtest
0610	HALT 8	Read record backward subtest
0670	HALT 9	Read record forward subtest
0757	HALT 10	Search backward to record gap subtest
1071	HALT 11	Search forward to record gap subtest
1224	HALT 13	Search forward to file mark subtest
1344	HALT 15	Rewind to load point subtest
1461	HALT 16	Write, read backward and forward subtest
1464	HALT 17	" " " " " "
1530	HALT 18	" " " " " "
1533	HALT 19	" " " " " "
1601	HALT 20	" " " " " "
1604	HALT 21	" " " " " "
1664	HALT 22	" " " " " "
1725	HALT 23	" " " " " "
1730	HALT AA	" " " " " "
4714	HALT BB	" " " " " "
2073	HALT 24	Set even parity and set odd parity subtest
2113	HALT 25	" " " " " "
2164	HALT 26	" " " " " "

2265	HALT ST	Multiple record and file mark search subtest
2270	HALT CA	" " " " " " "
2634	HALT 27	" " " " " " "
2760	HALT 28	" " " " " " "
5047	HALT 29	Dual transport subtest decision
3116	HALT 30	Dual transport subtest
3463	HALT 32	" " "
3473	HALT 33	" " "
3600	HALT 34	" " "
3631	HALT 35	" " "
3667	HALT 36	" " "
3714	HALT 37	" " "
4026	HALT 38	" " "
4147	HALT 39	" " "
4262	HALT 40	Dual transport subtest
4403	HALT 41	" " "
4436	HALT 42	" " "
4570	HALT 43	Search forward to end of tape decision
4622	HALT 44	Search forward to end of tape subtest
4632	HALT 45	Rewind unload tape subtest
4641	HALT 46	" " " "
4650	HALT 47	" " " "
4653	HALT XX	" " " "

REFERENCE LOCATIONS

0673	BAKREC
0444	WRITEA
0316	STATYY
0315	STATXX

11

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8194 - 609 DIAGNOSTIC 11 - 67

0000		ORG	0		
0000	0020		LDN		
0001	0001			1	
0002	0202		ATT	T2	
0003	0264		UJP	T2	
0004	0400			ENTRY1	
0005	0000	T2STOR			
	0010				
0010	0002	ORG	10		
			DON		MANUAL INTERRUPT
0011	0077	HALT3	HLT		HALT - OPERATOR ACTION
	0012		12		
0012	0041	EPJMP1	STM		
0013	0342			EPSTAT	
0014	0010		LPN		LOGICAL PRODUCT WITH EVEN PARITY CODE
0015	0001			1	
0016	0064		UJP		JUMP TO CONTINUE ROUTINE
0017	0022			EPJMP2	
	0020				
0020	0002	ORG	20		
			DON		BUFFER INTERRUPT
0021	0113		CIL	100	CLEAR INTERRUPT LOCKOUT-RETURN TO MAIN PROGRAM
	0022		22		
0022	0061	EPJMP2	NZP		
0023	0026			EPEXIT	
0024	0064		UJP		JUMP TO RESET EVEN PARITY
0025	0343			SEP	
0026	0264	EPEXIT	UJP	T2	RETURN TO MAIN PROGRAM
0027	0002	EPRETN	DON		
	0030				
0030	0002	ORG	30		
			DON		PERIPHERAL INTERRUPT
0031	0064		UJP		JUMP TO COMBINED CODING
0032	0041			COMBN	
	0040				
0040	0002	ORG	40		
			DON		PERIPHERAL INTERRUPT
0041	0041	COMBN	STM		STORE (A)
0042	0052			STOREA	
0043	0020		LDN		SET CODE TO INDICATE
0044	0001			1	INTERRUPT PROCESSED
0045	0041		STM		
0046	0136			INTDUN	
0047	0021		LDM		
0050	0052			STOREA	
0051	0113		CIL	100	CLEAR INTERRUPT LOCKOUT-RETURN TO MAIN PROGRAM
0052	0002	STOREA	DON		
	0053				
	0020	ORG	53		
				20	LOAD A, NO ADDRESS MODE
	0021	LDN	EQU	21	LOAD A, MEMORY ADDRESSING
	0022	LDI	EQU	22	LOAD A, INDIRECT ADDRESSING
	0025	LCM	EQU	25	LOAD A, COMPLEMENT (MEMORY)
	0026	LCI	EQU	26	LOAD A, COMPLEMENT (INDIRECT)
	0003	TTA	EQU	3	TAG REGISTER TO A

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0003	CLA	EQU	3	CLEAR A
0006	BER	EQU	6	BER TO A
0041	STM	EQU	41	STORE A, MEMORY ADDRESSING
0042	STI	EQU	42	STORE A, INDIRECT ADDRESSING
0002	ATT	EQU	2	A TO TAG REGISTER
0004	ABR	EQU	4	A TO BER
0005	ABX	EQU	5	A TO BXR
0060	ZJP	EQU	60	JUMP, IF (A) EQUAL 0
0061	NZP	EQU	61	JUMP, IF (A) NOT EQUAL 0
0062	PJP	EQU	62	JUMP, IF (A) EQUAL OR GREATER THAN 0
0063	NJP	EQU	63	JUMP, IF (A) LESS THAN 0
0064	UJP	EQU	64	UNCONDITIONAL JUMP
0002	DON	EQU	2	DO NOTHING
0001	SHA	EQU	1	LEFT SHIFT (A) 1 BIT
0030	ADN	EQU	30	ADD, NO ADDRESS MODE
0031	ADM	EQU	31	ADD, MEMORY ADDRESSING
0032	ADI	EQU	32	ADD, INDIRECT ADDRESSING
0034	SBN	EQU	34	SUBTRACT, NO ADDRESS MODE
0035	SBM	EQU	35	SUBTRACT, MEMORY ADDRESSING
0036	SBI	EQU	36	SUBTRACT, INDIRECT ADDRESSING
0051	RAM	EQU	51	REPLACE ADD, MEMORY ADDRESSING
0055	RAO	EQU	55	REPLACE ADD ONE, MEMORY ADDRESSING
0010	LPN	EQU	10	LOGICAL PRODUCT, NO ADDRESS
0011	LPM	EQU	11	LOGICAL PRODUCT, MEMORY
0012	LPI	EQU	12	LOGICAL PRODUCT, INDIRECT
0014	LSN	EQU	14	LOGICAL SUM, NO ADDRESS
0015	LSM	EQU	15	LOGICAL SUM, MEMORY
0016	LSI	EQU	16	LOGICAL SUM, INDIRECT
0073	OUT	EQU	73	OUTPUT NORMAL
0072	INN	EQU	72	INPUT NORMAL
0070	IBI	EQU	70	INITIATE BUFFER INPUT
0071	IBO	EQU	71	INITIATE BUFFER OUTPUT
0076	INA	EQU	76	INPUT TO A
0074	OTN	EQU	74	OUTPUT, NO ADDRESS
0075	EXF	EQU	75	EXTERNAL FUNCTION
0013	CIL	EQU	13	CLEAR INTERRUPT LOCKOUT
0007	CBC	EQU	7	CLEAR BUFFER CONTROLS
0000	FRR	EQU	0	ERROR STOP
0077	HLT	EQU	77	HALT
0130	0130	ORG	130	
0130	0062	TWRT	62	50 MSEC WRITE LIMIT
0131	0372	TWRTCH	372	250 MSEC WRITE LIMIT
0132	0074	TREAD	74	60 MSEC READ LIMIT
0133	0005	TREAD1	5	TIME LIMIT TO TIME1
0134	0001	TREAD3	1	TIME LIMIT TO TIME3
0135	0010	TREAD4	10	25 SEC (TIME3) REWIND LIMIT
0136	0000	INTDUN		INTERRUPT
0137	0000	TIME1		CENTER 8-BITS OF TIME COUNTER
0140	0000	TIME2		RIGHTMOST 8-BITS OF TIME COUNTER
0141	0000	TIME3		LEFTMOST 8-BITS OF TIME COUNTER
0142	0000	STAT		CURRENT STATUS

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0143	0000	STATUS			EXPECTED STATUS
0144	0200	BUSYMS		200	BUSY MASK
0145	0000	TIMER			= 1 IF TIME ONLY ROUTINE
0146	0000	STATPD			MULTIPLE PARITY-DENSITY STATUS
	0151		ORG	151	
0151	0020	TANDS		LDN	(A) = 0
0152	0000				0
0153	0041			STM	(INTDUN) = 0
0154	0136			INTDUN	
0155	0041			STM	(TIME2)=0
0156	0140			TIME2	
0157	0013			CIL	
0160	0021	CHEK		LDM	(INTDUN) INTO A
0161	0136			INTDUN	
0162	0061			NZP	JUMP TO TIMEUP IF (INTDUN) NOT = 0
0163	0224			TIMEUP	
0164	0021	TLOOP		LDM	(TIME2) = (TIME2) - 1
0165	0140			TIME2	
0166	0034			SBN	
0167	0001				1
0170	0041			STM	
0171	0140			TIME2	
0172	0061			NZP	JUMP TO CHEK IF (TIME2).NE.0
0173	0160			CHEK	
0174	0021			LDM	
0175	0137			TIME1	
0176	0061			NZP	JUMP TO T1DATE IF (TIME1) .NE.0
0177	0214			T1DATE	
0200	0021			LDM	
0201	0141			TIME3	
0202	0061			NZP	JUMP TO T3DATE IF (TIME3) .NE.0
0203	0206			T3DATE	
0204	0064			UJP	TIME LIMIT REACHED,
0205	0224			TIMEUP	JUMP TO TIMEUP
0206	0021	T3DATE		LDM	(TIME3) = (TIME3) - 1
0207	0141			TIME3	
0210	0034			SBN	
0211	0001				1
0212	0041			STM	
0213	0141			TIME3	
0214	0021	T1DATE		LDM	(TIME1) = (TIME1) - 1
0215	0137			TIME1	
0216	0034			SBN	
0217	0001				1
0220	0041			STM	
0221	0137			TIME1	
0222	0064			UJP	JUMP TO CHEK FOR INTERRUPT
0223	0160			CHEK	CODE
0224	0021	TIMEUP		LDM	LOAD TIME-ROUTINE-ONLY CODE
0225	0145			TIMER	
0226	0061			NZP	JUMP TO EXIT IF TIME LIMIT

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0227	0274			EXIT	REACHED
0230	0075			EXF	REQUEST UNIT STATUS
0231	0013	TSSTAT		13	
0232	0000			0	
0233	0076			INA	
0234	0013			CIL	
0235	0041			STM	STORE CURRENT STATUS AT STAT
0236	0142			STAT	
0237	0010			LPN	LOGICAL PRODUCT - BUSY CODE
0240	0200			200	AND CURRENT STATUS
0241	0035			SBM	
0242	0144			BUSYMS	
0243	0060			ZJP	JUMP TO HALTO IF UNIT BUSY
0244	0263			HALTO	
0245	0064			UJP	JUMP TO FLAG2
0246	0253			FLAG2	
0247	0021	FLAG1		LDM	
0250	0145			TIMER	
0251	0061			NZP	JUMP TO EXIT IF TIME LIMIT
0252	0274			EXIT	ONLY ROUTINE
0253	0021	FLAG2		LDM	COMPARE CURRENT AND EXPECTED
0254	0142			STAT	STATUS CODES
0255	0035			SBM	
0256	0143			STATUS	
0257	0060			ZJP	JUMP TO EXIT IF STATUS CORRECT
0260	0274			EXIT	
0261	0064			UJP	JUMP FOR INCORRECT STATUS
0262	0264			DISPLA	
0263	0077	HALTO		HLT	OPERATOR TO TERMINATE TAPE MOTION
0264	0021	DISPLA		LDM	HALT AND DISPLAY CURRENT
0265	0142			STAT	UNIT STATUS IN A
0266	0077	HALT1		HLT	
0267	0021			LDM	HALT AND DISPLAY PROGRAM
0270	0273			LOOPAD	RELOOP ADDRESS IN A AND T2
0271	0077	HALT2		HLT	
0272	0261			NZP	T2 RELOOP JUMP
0273	0000	LOOPAD		0	
0274	0020	EXIT		LDN	RESET TIMER = 0
0275	0000			0	
0276	0041			STM	
0277	0145			TIMER	
0300	0264			UJP	T2 CONTINUE JUMP
0301	0000	CONTAD		0	
	0302		ORG	302	
0302	0020	PAT3		LDN	SET T1 = T3 = 17 OCTAL
0303	0017			17	
0304	0102			ATT	T1
0305	0302			ATT	T3
0306	0264			UJP	T2
0307	0522			APREP2	
	0310		ORG	310	

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0310	0000	STAT1		0	ODD PARITY
0311	0020	STAT2		20	ODD PARITY, FILE MARK
0312	0040	STAT3		40	ODD PARITY, TAPE MARK
0313	0000	TAG3		0	
0314	0000	STEP			
0315	0000	STATXX			
0316	0000	STATYY			
0317	0000	COUNTR			
	0100	T1	EQU	100	
	0200	T2	EQU	200	
	0300	T3	EQU	300	
	0323		ORG	323	
0323	0075	PAT1	EXF		WRITE FILE MARK
0324	0013			13	
0325	0021			21	
0326	0020		LDN		
0327	0000			0	
0330	0202		ATT	T2	
0331	0020		LDN		
0332	0335			PAT2	
0333	0064		UJP		JUMP TO TIME ROUTINE
0334	0360		TIME		EXIT TO PAT2
0335	0020	PAT2	LDN		
0336	0003			3	
0337	0202		ATT	T2	
0340	0264		UJP	T2	JUMP TO SETEVN
0341	1772			SETEVN	
	0342		ORG	342	
0342	0002	EPSTAT	DON		
0343	0041	SEP	STM		SET EVEN PARITY ROUTINE
0344	0027			EPRETN	STORE RETURN ADDRESS
0345	0075		EXF		SET EVEN PARITY
0346	0013			13	
0347	0014			14	
0350	0013		CIL		
0351	0075		EXF		REQUEST STATUS
0352	0013			13	
0353	0000			0	
0354	0076		INA		
0355	0013		CIL		
0356	0064		UJP		JUMP TO CONTINUE ROUTINE
0357	0012			EPJMP1	
	0360		ORG	360	
0360	0041	TIME	STM		TIME ONLY ROUTINE
0361	0301			CONTAD	STORE CONTINUE ADDRESS
0362	0021		LDM		STORE TIME LIMIT
0363	0133			TREAD1	OF 260 MSEC
0364	0041		STM		
0365	0137			TIME1	
0366	0021		LDM		
0367	0134			TREAD3	

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0370	0041		STM		
0371	0141			TIME3	
0372	0020		LDN		SET TIME ONLY CODE
0373	0001			1	
0374	0041		STM		
0375	0145			TIMER	
0376	0064		UJP		JUMP TO TANDS ROUTINE
0377	0151			TANDS	
	0400		ORG	400	
0400	0075	ENTRY1	EXP		SET INTERRUPT LOCKOUT
0401	0013			13	
0402	0002			2	
0403	0075		EXP		REQUEST UNIT STATUS
0404	0013			13	
0405	0000			0	
0406	0076		INA		
0407	0041		STM		STORE CURRENT STATUS
0410	0142			STAT	
0411	0034	ASTART	SBN		SUBTRACT EXPECTED STATUS
0412	0041			41	
0413	0260		ZJP	T2	JUMP IF STATUS CORRECT
0414	0422			ODDHI	
0415	0021		LDM		
0416	0142			STAT	
0417	0077	HALT4	HLT		HALT WITH INCORRECT STATUS IN A
0420	0260		ZJP	T2	RELOOP OPTION
0421	0400			ENTRY1	
0422	0075	ODDHI	EXP		SET ODD PARITY - HIGH DENSITY
0423	0013			13	
0424	0013			13	
0425	0075		EXP		REQUEST UNIT STATUS
0426	0013			13	
0427	0000			0	
0430	0076		INA		
0431	0041		STM		STORE CURRENT STATUS
0432	0142			STAT	
0433	0034		SBN		SUBTRACT EXPECTED STATUS
0434	0040			40	
0435	0260		ZJP	T2	JUMP IF STATUS CORRECT
0436	0444			WRITEA	
0437	0021		LDM		
0440	0142			STAT	
0441	0077	HALT5	HLT		HALT WITH INCORRECT STATUS IN A
0442	0260		ZJP	T2	RELOOP OPTION
0443	0422			ODDHI	
0444	0020	WRITEA	LDN		WRITE RECORD A PREPARATION
0445	0001			1	
0446	0302		ATT	T3	SET TAG3 = 1
0447	0020		LDN		
0450	0011			11	
0451	0204	ABR1	ABR	T2	FWA = 411 INTO BER

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0452	0451			ABR1	
0453	0020		LDN		
0454	0322			322	
0455	0205	ABX1	ABX	T2	LWA+2 = 722 INTO BXR
0456	0455			ABX1	
0457	0075		EXF		WRITE RECORD A
0460	0013			13	
0461	0020			20	
0462	0271	IBO1	IBO	T2	
0463	0462			IBO1	
0464	0021		LDM		SET FOR TANDS ENTRY
0465	0130			TWRT	
0466	0041		STM		STORE TIME LIMIT
0467	0137			TIME1	
0470	0020		LDN		
0471	0444			WRITEA	
0472	0041		STM		STORE RELOOP ADDRESS
0473	0273			LOOPAD	
0474	0020		LDN		
0475	0506			SLOCHK	
0476	0041		STM		STORE CONTINUE ADDRESS
0477	0301			CONTAD	
0500	0021		LDM		
0501	0310			STAT1	
0502	0041		STM		STORE EXPECTED STATUS
0503	0143			STATUS	
0504	0064		UJP		JUMP TO TANDS ROUTINE
0505	0151			TANDS	
0506	0021	SLOCHK	LDM		SET INTERRUPT LOCKOUT CHECK
0507	0136			INTDUN	
0510	0260		ZJP		JUMP
0511	0513			CLLOCK	
0512	0077	HALT6	HLT		** SET INTERRUPT LOCKOUT DIAGNOSTIC
0513	0075	CLLOCK	EXF		CLEAR INTERRUPT LOCKOUT
0514	0013			13	
0515	0003			3	
0516	0013		CIL		
0517	0064		UJP		JUMP TO SET T1=T3=17 OCTAL
0520	0302			PAT3	
0521	0002		DON		
0522	0020	APREP2	LDN		READ RECORD A PREPARATION
0523	0011			11	
0524	0204	ABR2	ABR	T2	FWA = 7411 INTO BER
0525	0524			ABR2	
0526	0020		LDN		
0527	0321			321	
0530	0205	ABX2	ABX	T2	LWA +1 = 7721 INTO BXR
0531	0530			ABX2	
0532	0075	READAB	EXF		READ RECORD A BACKWARD
0533	0013			13	
0534	0025			25	

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0535	0270	IB11	IBI	T2	
0536	0535			IB11	
0537	0021		LDM		SET FOR TANDS ENTRY
0540	0133			TREAD1	
0541	0041		STM		STORE TIME LIMIT
0542	0137			TIME1	
0543	0021		LDM		
0544	0134			TREAD3	
0545	0041		STM		
0546	0141			TIME3	
0547	0020		LDN		
0550	0513			CLLOCK	
0551	0041		STM		STORE RELOOP ADDRESS
0552	0273			LOOPAD	
0553	0020		LDN		
0554	0565			CLOCKK	
0555	0041		STM		STORE CONTINUE ADDRESS
0556	0301			CONTAD	
0557	0021		LDM		
0560	0310			STAT1	
0561	0041		STM		STORE EXPECTED STATUS
0562	0143			STATUS	
0563	0064		UJP		
0564	0151			TANDS	JUMP TO TANDS ROUTINE
0565	0021	CLOCKK	LDM		CLEAR INTERRUPT LOCKOUT CHECK
0566	0136			INTDUN	
0567	0261		NZP	T2	
0570	0572			RBCHEK	
0571	0077	HALT7	HLT		** CLEAR INTERRUPT LOCKOUT DIAGNOSTIC
0572	0121	RBCHEK	LDM	T1	READ BACKWARD CHECK ROUTINE
0573	0320			320	
0574	0235		SBM	T2	
0575	0011			11	
0576	0261		NZP	T2	JUMP IF (ASTART) NOT
0577	0606			RBDIAG	CORRECTLY TRANSFERRED
0600	0121		LDM	T1	
0601	0011			11	
0602	0235		SBM	T2	
0603	0720			AEND	
0604	0260		ZJP	T2	JUMP IF (AEND)
0605	0613			APREP3	CORRECTLY TRANSFERRED
0606	0121	RBDIAG	LDM	T1	(A) SHOULD BE SAME AS
0607	0320			320	(ASTART)
0610	0077	HALT8	HLT		** READ BACKWARD DIAGNOSTIC
0611	0260		ZJP	T2	RELOOP OPTION JUMP
0612	0522			APREP2	
0613	0020	APREP3	LDN		READ RECORD A PREPARATION
0614	0011			11	
0615	0204	ABR3	ABR	T2	FWA = 7411 INTO BER
0616	0615			ABR3	
0617	0020		LDN		

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0620	0321			321	
0621	0205	ABX3	ABX	T2	LWA+1 = 7721 INTO BXR
0622	0621			ABX3	
0623	0075	READAF	EXF		READ RECORD A FORWARD
0624	0013			13	
0625	0024			24	
0626	0270	IBI2	IBI	T2	
0627	0626			IBI2	
0630	0021		LDM		SET FOR TANDS ENTRY
0631	0133			TREAD1	
0632	0041		STM		STORE TIME LIMIT
0633	0137			TIME1	
0634	0021		LDM		
0635	0134			TREAD3	
0636	0041		STM		
0637	0141			TIME3	
0640	0020		LDN		
0641	0613			APREP3	
0642	0041		STM		STORE RELOOP ADDRESS
0643	0273			LOOPAD	
0644	0020		LDN		
0645	0652			RFCHEK	
0646	0041		STM		STORE CONTINUE ADDRESS
0647	0301			CONTAD	
0650	0064		UJP		
0651	0151			TANDS	JUMP TO TANDS ROUTINE
0652	0121	RFCHEK	LDM	T1	READ FORWARD CHECK ROUTINE
0653	0320			320	
0654	0235		SBM	T2	
0655	0720			AEND	
0656	0261		NZP	T2	JUMP IF (AEND) NOT
0657	0666			RFDIAG	CORRECTLY TRANSFERRED
0660	0121		LDM	T1	
0661	0011			11	
0662	0235		SBM	T2	
0663	0011			11	
0664	0260		ZJP	T2	JUMP IF (ASTART)
0665	0673			BAKREC	CORRECTLY TRANSFERRED
0666	0121	RFDIAG	LDM	T1	(A) SHOULD BE SAME
0667	0320			320	AS (AEND)
0670	0077	HALT9	HLT		** READ FORWARD DIAGNOSTIC
0671	0260		ZJP	T2	RELOOP OPTION JUMP
0672	0613			APREP3	
0673	0075	BAKREC	EXF		SEARCH BACK TO RECORD GAP ROUTINE
0674	0013			13	
0675	0031			31	
0676	0021		LDM		SET FOR TANDS ENTRY
0677	0133			TREAD1	
0700	0041		STM		STORE TIME LIMIT
0701	0137			TIME1	
0702	0021		LDM		

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0703	0134			TREAD3	
0704	0041		STM	TIME3	
0705	0141				
0706	0020		LDN	BAKREC	
0707	0673				
0710	0041		STM		STORE RELOOP ADDRESS
0711	0273			LOOPAD	
0712	0020		LDN		
0713	0720			AEND	
0714	0041		STM		STORE CONTINUE ADDRESS
0715	0301			CONTAD	
0716	0064		UJP		JUMP TO TANDS ROUTINE
0717	0151			TANDS	
0720	0020	AEND	LDN		
0721	0011			11	
0722	0204	ABR4	ABR	T2	FWA = 7411 INTO BER
0723	0722			ABR4	
0724	0020		LDN		
0725	0321			321	
0726	0205	ABX4	ABX	T2	LWA + 1 = 7721 INTO BXR
0727	0726			ABX4	
0730	0075		EXF		READ RECORD A FORWARD
0731	0013			13	
0732	0024			24	
0733	0270	IBI4	IBI	T2	
0734	0733			IBI4	
0735	0020		LDN		
0736	0741			RECCHK	
0737	0064		UJP		JUMP TO TIME ROUTINE
0740	0360			TIME	
0741	0121	RECCHK	LDM	T1	RECORD A READ CHECK ROUTINE
0742	0320			320	
0743	0235		SBM	T2	
0744	0720			AEND	
0745	0261		NZP	T2	JUMP IF (AEND) CORRECT
0746	0755			SBRDIA	
0747	0121		LDM	T1	
0750	0011			11	
0751	0235		SBM	T2	
0752	0011			11	
0753	0260		ZJP	T2	NO JUMP IF (ASTART) CORRECT
0754	0760			RECSCCH	
0755	0121	SBRDIA	LDM	T1	(A) SHOULD BE SAME
0756	0320			320	AS (AEND)
0757	0077	HALT10	HLT		** SEARCH BACK RECORD DIAGNOSTIC
0760	0075	RECSCCH	EXF		SEARCH BACK TO RECORD GAP
0761	0013			13	
0762	0031			31	
0763	0020		LDN		SET FOR TIME ONLY ROUTINE
0764	0767			T2UP1	
0765	0064		UJP		JUMP TO TIME ROUTINE

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0766	0360			TIME	
0767	0203	T2UP1	TTA	T2	SET TAG2 = 2
0770	0030		ADN		
0771	0001			1	
0772	0202		ATT	T2	
0773	0020		LDN		
0774	1003			FWDREC	
0775	0041		STM		STORE RELOOP ADDRESS
0776	0273			LOOPAD	
0777	0020		LDN		
1000	1020			CONT1	
1001	0041		STM		STORE CONTINUE ADDRESS
1002	0301			CONTAD	
1003	0075	FWDREC	EXF		SEARCH FORWARD TO RECORD GAP ROUTINE
1004	0013			13	
1005	0030			30	
1006	0021		LDM		SET FOR TANDS ENTRY
1007	0133			TREAD1	
1010	0041		STM		
1011	0137			TIME1	
1012	0021		LDM		
1013	0134			TREAD3	
1014	0041		STM		
1015	0141			TIME3	
1016	0064		UJP		JUMP TO TANDS ROUTINE
1017	0151			TANDS	
1020	0020	CONT1	LDN		READ RECORD BACKWARD
1021	0011			11	
1022	0204	ABR5	ABR	T2	FWA = 7411 INTO BER
1023	1022			ABR5	
1024	0020		LDN		
1025	0321			321	
1026	0205	ABX5	ABX	T2	LWA +1 = 7721 INTO BXR
1027	1026			ABX5	
1030	0075	CHECK5	EXF		
1031	0013			13	
1032	0025			25	
1033	0270	IBI5	IBI	T2	
1034	1033			IBI5	
1035	0020		LDN		
1036	1041			CHEK5	
1037	0064		UJP		JUMP TO TIME ROUTINE
1040	0360			TIME	
1041	0303	CHEK5	TTA	T3	USE T3 FOR RECORD REFERENCING
1042	0041		STM		
1043	0313			TAG3	STORE T3 AT TAG3
1044	0203		TTA	T2	
1045	0034		SBN		
1046	0001			1	
1047	0302		ATT	T3	
1050	0121		LDM	T1	

1051	00320		320	
1052	0335	SBM	T3	
1053	0011		11	
1054	0261	NZP	T2	JUMP IF (ASTART) NOT
1055	1064		SFRDIA	CORRECTLY TRANSFERRED
1056	0121	LDM	T1	
1057	0011		11	
1060	0335	SBM	T3	
1061	0720		AEND	
1062	0260	ZJP	T2	JUMP IF (AEND)
1063	1076		FWD	CORRECTLY TRANSFERRED
1064	0021	SFRDIA	LDM	RESTORE T3
1065	0313		TAG3	
1066	0302	ATT	T3	
1067	0121	LDM	T1	(A) SHOULD BE SAME
1070	0320		320	AS (ASTART)
1071	0077	HALT11	HLT	** SEARCH FORWARD RECORD DIAGNOSTIC
1072	0260		ZJP	RELOOP OPTION JUMP
1073	1003		FWDREC	
1074	0264		UJP	
1075	1101		T2	
1076	0021	FWD	LDM	SFR
1077	0313		TAG3	
1100	0302		ATT	
1101	0075	SFR	EXF	SEARCH FORWARD TO RECORD GAP
1102	0013		13	
1103	0030		30	
1104	0020		LDN	
1105	1111		WRTFM	
1106	0064		UJP	JUMP TO TIME ROUTINE
1107	0360		TIME	
1110	0002		DON	
1111	0003	WRTFM	CLA	
1112	0041		STM	
1113	0142		STAT	
1114	0075		EXF	WRITE FILE MARK ROUTINE
1115	0013		13	
1116	0021		21	
1117	0020		LDN	
1120	0024		24	
1121	0041		STM	STORE EXPECTED STATUS
1122	0143		STATUS	
1123	0020		LDN	
1124	1111		WRTFM	
1125	0041		STM	STORE RELOOP ADDRESS
1126	0273		LOOPAD	
1127	0020		LDN	
1130	1141		BAKFIL	
1131	0041		STM	STORE CONTINUE ADDRESS
1132	0301		CONTAD	
1133	0021		LDM	

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1134	0131		TWRTCH	
1135	0041		STM	STORE TIME LIMIT
1136	0137		TIME1	
1137	0064		UJP	JUMP TO TANDS ROUTINE
1140	0151		TANDS	
1141	0075	BAKFIL	EXF	SEARCH BACKWARD TO FILE MARK ROUTINE
1142	0013		13	
1143	0033		33	
1144	0020		LDM	
1145	0024		24	
1146	0041		STM	STORE EXPECTED STATUS
1147	0143		STATUS	
1150	0020		LDM	
1151	1141		BAKFIL	
1152	0041		STM	STORE RELOOP ADDRESS
1153	0273		LOOPAD	
1154	0020		LDM	
1155	1166		FWDFIL	
1156	0041		STM	STORE CONTINUE ADDRESS
1157	0301		CONTAD	
1160	0021		LDM	
1161	0131		TWRTCH	
1162	0041		STM	STORE TIME LIMIT
1163	0137		TIME1	
1164	0064		UJP	
1165	0151		TANDS	JUMP TO TANDS ROUTINE
1166	0003	FWDFIL	CLA	
1167	0041		STM	
1170	0142		STAT	
1171	0075		EXF	SEARCH FORWARD TO FILE MARK ROUTINE
1172	0013		13	
1173	0032		32	
1174	0020		LDM	
1175	0024		24	
1176	0041		STM	STORE EXPECTED STATUS
1177	0143		STATUS	
1200	0020		LDM	
1201	1166		FWDFIL	
1202	0041		STM	STORE RELOOP ADDRESS
1203	0273		LOOPAD	
1204	0020		LDM	
1205	1216		REQST2	
1206	0041		STM	STORE CONTINUE ADDRESS
1207	0301		CONTAD	
1210	0021		LDM	
1211	0131		TWRTCH	
1212	0041		STM	STORE TIME LIMIT
1213	0137		TIME1	
1214	0064		UJP	
1215	0151		TANDS	JUMP TO TANDS ROUTINE
1216	0021	REQST2	LDM	

{MT3-30}

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1217	0142		STAT	LOAD STATUS
1220	0010	LPN	20	
1221	0020		T2	JUMP IF FILE MARK FOUND
1222	0261	NZP	RWLDPT	
1223	1227			
1224	0077	HALT13	HLT	** SEARCH FORWARD FILE MARK DIAGNOSTIC
1225	0260		ZJP	RELOOP JUMP OPTION
1226	1166		FWDFIL	
1227	0075	RWLDPT	EXF	REWIND TO LOAD POINT ROUTINE
1230	0013		13	
1231	0034		34	
1232	0013		GIL	
1233	0075	STATLP	EXF	REQUEST STATUS
1234	0013		13	
1235	0000		0	
1236	0076		INA	
1237	0013		CIL	
1240	0041		STM	
1241	0142		STAT	
1242	0010		LPN	
1243	0200		200	
1244	0261		T2	JUMP IF UNIT BUSY
1245	1233		STATLP	
1246	0021		LDM	UNIT NOT BUSY
1247	0142		STAT	
1250	0034		SBN	
1251	0040		40	
1252	0260		ZJP	JUMP IF TAPE MARK FOUND
1253	1256		ODPAR	
1254	0264		UJP	
1255	1233		STATLP	
1256	0002	ODPAR	DON	
1257	0002		DON	
1260	0002		DON	
1261	0002		DON	
1262	0002		DON	
1263	0002		DON	
1264	0002		DON	
1265	0020	FWREAD	LDN	
1266	0000		0	
1267	0141		T1	ZERO INTO FWA AND
1270	0011		11	LWA OF INPUT BLOCK
1271	0141		STM	
1272	0320		T1	
1273	0020		320	
1274	0011		LDN	
1275	0204	ABR6	11	
1276	1275		T2	FWA = 7411 INTO BER
1277	0020		ABR6	
1300	0321		LDN	
1301	0205	ABX6	321	
			T2	LWA+1 = 7721 INTO BXR

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1302	1301		ABX6	
1303	0075		EXF	READ RECORD A FORWARD
1304	0013			13
1305	0024			24
1306	0270	IBI6	IBI	T2
1307	1306			IBI6
1310	0020		LDN	
1311	1314			TEST1
1312	0064		UJP	JUMP TO TIME ROUTINE
1313	0360			TIME
1314	0303	TEST1	TTA	T3 RECORD A READ - CHECK ROUTINE
1315	0041		STM	
1316	0313			TAG3
1317	0203		TTA	T2 SET T3 FOR REFERENCING
1320	0034		SBN	
1321	0001			1
1322	0302		ATT	T3
1323	0121		LDM	T1
1324	0320			320
1325	0335		SBM	T3
1326	0720			AEND
1327	0261		NZP	T2
1330	1337			EOTPT
1331	0121		LDM	T1
1332	0011			11
1333	0335		SBM	T3
1334	0011			11
1335	0260		ZJP	T2
1336	1347			POINT
1337	0021	EOTPT	LDM	RESTORE T3 VALUE
1340	0313			TAG3
1341	0302		ATT	T3
1342	0121		LDM	T1
1343	0320			320
1344	0077	HALT15	HLT	** REWIND TO LOAD POINT DIAGNOSTIC-TAPE END FOUND
1345	0260		ZJP	RELOOP JUMP OPTION
1346	1227			RWLDPT
1347	0021	POINT	LDM	RESTORE T3 VALUE
1350	0313			TAG3
1351	0302		ATT	T3
1352	0075		EXF	SEARCH FORWARD TO FILE MARK
1353	0013			13
1354	0032			32
1355	0020		LDN	
1356	1361			GETSET
1357	0064		UJP	
1360	0360			TIME
1361	0075	GETSET	EXF	WRITE SPACING RECORD ON TAPE
1362	0013			13
1363	0020			20
1364	0013		CIL	

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1365	0074		OTN		
1366	0377			377	
1367	0020		LDN		
1370	0003			3	
1371	0202		ATT	T2	
1372	0020		LDN		
1373	0011			11	
1374	0241		STM	T2	
1375	1443			PDCODE	
1376	0003		CLA		
1377	0241	STSTOR	STM	T2	
1400	1454			PDSTAW	
1401	0241		STM	T2	
1402	1523			STATX	
1403	0241		STM	T2	
1404	1574			STATY	
1405	0241		STM	T2	
1406	1720			STATZ	
1407	0020	FLINIT	LDN		INITIALIZE FIRST AND LAST WORD ADDRESSES
1410	0041			41	
1411	0241		STM	T2	
1412	1617			RBORFW	
1413	0241		STM	T2	
1414	1743			RFORFW	
1415	0020		LDN		
1416	0330			330	
1417	0241		STM	T2	
1420	1621			RBSTFW	
1421	0020		LDN		
1422	0021			21	
1423	0241		STM	T2	
1424	1745			RFSTFW	
1425	0020		LDN		
1426	0004			4	
1427	0202		ATT	T2	
1430	0241		STM	T2	
1431	2100			THREE	
1432	0241		STM	T2	
1433	2151			FOUR	
1434	0241		STM	T2	
1435	2250			HALF	
1436	0020		LDN		
1437	0003			3	
1440	0202		ATT	T2	
1441	0075	SETPD	EXF		SET PARITY AND DENSITY
1442	0013			13	
1443	0011	PDCODE		11	
1444	0075		EXF		REQUEST INITIAL STATUS
1445	0013			13	
1446	0000			0	
1447	0076		INA		

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1450	0013		CIL		
1451	0041		STM	STORE STATUS	
1452	0146			STATPD	
1453	0034		SBN		
1454	0377	PDSTAW		377	
1455	0260		ZJP	T2	JUMP IF STATUS CORRECT
1456	1467			PDWRT	
1457	0021		LDM		
1460	0146			STATPD	
1461	0077	HALT16	HLT	(A)=INCORRECT INITIAL STATUS	
1462	0221		LDM	T2	
1463	1443			PDCODE	
1464	0077	HALT17	HLT	(A)=SELECTED PARITY AND DENSITY CODE	
1465	0260		ZJP	T2	JUMP FOR RESELECTION
1466	1441			SETPD	
1467	0020	PDWRT	LDN	SET T3 = 4 OCTAL FOR 20XX	
1470	0004			4	RECORD WRITING
1471	0302		ATT	T3	
1472	0020	WRTPD	LDN		
1473	0041			41	
1474	0204	WRTABR	ABR	T2	FWA = 2041
1475	1474			WRTABR	
1476	0020		LDN		
1477	0352			352	
1500	0205	WRTABX	ABX	T2	LWA+2 = 2352
1501	1500			WRTABX	
1502	0075		EXF		WRITE 200 = CHARACTER RECORD
1503	0013			13	
1504	0020			20	
1505	0271	WRTIBO	IBO	T2	
1506	1505			WRTIBO	
1507	0020		LDN		
1510	1513			WRTST	
1511	0064		UJP		JUMP TO TIME ROUTINE
1512	0360			TIME	EXIT TO WRTST
1513	0075	WRTST	EXF		REQUEST STATUS AFTER WRITING
1514	0013			13	
1515	0000			0	
1516	0076		INA		
1517	0013		CIL		
1520	0041		STM		
1521	0146			STATPD	
1522	0034		SBN		
1523	0377	STATX		377	
1524	0260		ZJP	T2	JUMP IF NO STATUS ERROR
1525	1536			PDRB	AFTER WRITE OPERATION
1526	0021		LDM		
1527	0146			STATPD	
1530	0077	HALT18	HLT	(A) = INCORRECT STATUS AFTER WRITE OPERATION	
1531	0221		LDM	T2	
1532	1443			PDCODE	

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1533	0077	HALT19	HLT		(A) = SELECTED PARITY AND DENSITY
1534	0260		ZJP	T2	JUMP FOR RESELECTION
1535	1407			FLINIT	
1536	0303	PDRB	TTA	T3	EST T3 = T1 = 4 OCTAL
1537	0102		ATT	T1	
1540	0020	RBPD	LDN		SET T3 = 16 OCTAL
1541	0016			16	
1542	0302		ATT	T3	
1543	0020		LDN		READ BACKWARD OPERATION
1544	0021			21	
1545	0204	RBABR	ABR	T2	FWA = 7021
1546	1545			RBABR	
1547	0020		LDN		
1550	0331			331	
1551	0205	RBABX	ABX	T2	LWA*1 = 7331
1552	1551			RBABX	
1553	0075		EXF		READ RECORD BACKWARD
1554	0013			13	
1555	0025			25	
1556	0270	RBIBI	IRI	T2	
1557	1556			RBIBI	
1560	0020		LDN		
1561	1564			RBST	
1562	0064		UJP		JUMP TO TIME ROUTINE
1563	0360			TIME	EXIT TO RBST
1564	0075	RBST	EXF		REQUEST STATUS AFTER READING BACKWARD
1565	0013			13	
1566	0000			0	
1567	0076		INA		
1570	0013		CIL		
1571	0041		STM		
1572	0146			STATPD	
1573	0034		SBN		
1574	0377	STATY		377	
1575	0260		ZJP	T2	JUMP IF NO STATUS ERROR AFTER
1576	1612			RBVERF	READ BACKWARD OPERATION
1577	0021		LDM		
1600	0146			STATPD	
1601	0077	HALT20	HLT		(A)=INCORRECT STATUS AFTER READ
1602	0221		LDM	T2	BACKWARD OPERATION
1603	1443			PDCODE	
1604	0077	HALT21	HLT		(A)=SELECTED PARITY AND DENSITY
1605	0260		ZJP	T2	JUMP FOR RESELECTION
1606	1407			FLINIT	
1607	0264		UJP	T2	JUMP TO READ BACKWARD
1610	1612			RBVERF	VERIFICATION ROUTINE
1611	0002	RBCNT	DON		COUNTER FOR 200 CHARACTERS
1612	0020	RBVERF	LDN		FOR READ BACK VERIFICATION
1613	0067			67	
1614	0241		STM	T2	
1615	1611			RBCNT	

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1616	0121	RBVFC	LDM	T1	
1617	0041	RBORFW		41	
1620	0335		SBM	T3	
1621	0330	RBSTFW		330	
1622	0261		NZP	T2	
1623	1642			RBERVF	
1624	0255		RAO	T2	
1625	1617			RBORFW	
1626	0221		LDM	T2	
1627	1621			RBSTFW	
1630	0034		SBN		
1631	0001			1	
1632	0241		STM	T2	
1633	1621			RBSTFW	
1634	0255		RAO	T2	
1635	1611			RBCNT	
1636	0261		NZP	T2	
1637	1616			RBVFC	
1640	0264		UJP	T2	
1641	1667			RFPD	
1642	0221	RBERVF	LDM	T2	READ BACK DATA ERROR DISPLAY
1643	1617			RBORFW	
1644	0241		STM	T2	
1645	1653			RBEROR	
1646	0221		LDM	T2	
1647	1621			RBSTFW	
1650	0241		STM	T2	
1651	1657			RBERST	
1652	0121		LDM	T1	
1653	0377	RBEROR		377	
1654	0204	BABR	ABR	T2	
1655	1654			BABR	
1656	0321		LDM	T3	
1657	0377	RBERST		377	
1660	0205	BABX	ABX	T2	
1661	1660			BABX	
1662	0221		LDM	T2	(A) = LOWER 6 - BITS OF SELECT CODE
1663	1443			PDCODE	(BER)0-7 = ACTUAL DATA
1664	0077	HALT22	HLT		(BXR)0-7 = DATA WRITTEN AND READ
1665	0260		ZJP	T2	JUMP FOR RESELECTION
1666	1407			FLINIT	
1667	0020	RFPD	LDN		READ FORWARD OPERATION
1670	0021			21	
1671	0204	RFABR	ABR	T2	FWA = 7021
1672	1671			RFABR	
1673	0020		LDN		
1674	0331			331	
1675	0205	RFABX	ABX	T2	LWA + 1 = 7331
1676	1675			RFABX	
1677	0075		EXF		READ RECORD FORWARD
1700	0013			13	

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1701	0024			24	
1702	0270	RFIBI	IBI	T2	
1703	1702			RFIBI	
1704	0020		LDN		
1705	1710			RFST	
1706	0064		UJP		JUMP TO TIME ROUTINE
1707	0360			TIME	EXIT TO RFST
1710	0075	RFST	EXF		REQUEST STATUS AFTER READING FORWARD
1711	0013			13	
1712	0000			0	
1713	0076		INA		
1714	0013		CIL		
1715	0041		STM		
1716	0146			STATPD	
1717	0034		SBN		
1720	0377	STATZ		377	
1721	0260		ZJP	T2	JUMP IF NO STATUS ERROR
1722	1736			RFVERF	AFTER READ FORWARD OPERATION
1723	0021		LDM		
1724	0146			STATPD	
1725	0077	HALT23	HLT		(A)=INCORRECT STATUS AFTER READ FORWARD OPERATION
1726	0221		LDM	T2	
1727	1443			PDCODE	
1730	0077	HALTAA	HLT		(A)=SELECTED PARITY AND DENSITY CODE
1731	0260		ZJP	T2	JUMP FOR RESELECTION
1732	1407			FLINIT	
1733	0264		UJP	T2	JUMP TO READ FORWARD VERIFICATION ROUTINE
1734	1736			RFVERF	
1735	0002	RFCNT	DON		
1736	0020	RFVERF	LDN		
1737	0067			67	
1740	0241		STM	T2	
1741	1735			RFCNT	
1742	0121	RFVFC	LDM	T1	
1743	0041	RFORFW		41	
1744	0335		SBM	T3	
1745	0021	RFSTFW		21	
1746	0261		NZP	T2	
1747	1765			RFERVF	
1750	0255		RAO	T2	
1751	1743			RFORFW	
1752	0255		RAO	T2	
1753	1745			RFSTFW	
1754	0255		RAO	T2	
1755	1735			RFCNT	
1756	0261		NZP	T2	
1757	1742			RFVFC	
1760	0020		LDN		
1761	0011			11	
1762	0302		ATT	T3	
1763	0364		UJP	T3	

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1764	4717			ALLPD	
1765	0020	RFERVF	LDN		
1766	0011			11	
1767	0302		ATT	T3	
1770	0364		UJP	T3	
1771	4664			ERVFRF	
1772	0020	SETEVN	LDN		SET T1 - 17 OCTAL
1773	0017			17	
1774	0102		ATT	T1	
1775	0020		LDN		SET T2 - T3 = 4 OCTAL
1776	0004			4	
1777	0202		ATT	T2	
2000	0302		ATT	T3	
2001	0075	STARTS	EXF		SET EVEN PARITY, HIGH DENSITY
2002	0013			13	
2003	0017			17	
2004	0020		LDN		
2005	0261			261	
2006	0204	ABR12	ABR	T2	FWA - 2261
2007	2006			ABR12	
2010	0020		LDN		
2011	0362			362	
2012	0205	ABX12	ABX	T2	LWA = 2360
2013	2012			ABX12	
2014	0075		EXF		WRITE 64 CHARACTER RECORD
2015	0013			13	
2016	0020			20	
2017	0271	IB012	IB0	T2	
2020	2017			IB012	
2021	0020		LDN		
2022	2025			SETODD	
2023	0064		UJP		JUMP TO TIME ROUTINE
2024	0360			TIME	EXIT TO SETODD
2025	0075	SETODD	EXF		SET ODD PARITY, HIGH DENSITY
2026	0013			13	
2027	0013			13	
2030	0075	EVEN	EXF		SET EVEN PARITY ROUTINE
2031	0013			13	
2032	0014			14	
2033	0020		LDN		SET T3 TO 17 OCTAL FOR
2034	0017			17	READING OPERATIONS
2035	0302		ATT	T3	
2036	0020		LDN		
2037	0101			101	
2040	0204	ABR13	ABR	T2	FWA = 7501 INTO BER
2041	2040			ABR13	
2042	0020		LDN		
2043	0201			201	
2044	0205	ABX13	ABX	T2	LWA + 1 = 7601 INTO BXR
2045	2044			ABX13	
2046	0075		EXF		READ RECORD BACKWARD

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2047	0013			13	
2050	0025			25	
2051	0270	IBI13	IBI	T2	
2052	2051			IBI13	
2053	0020		LDN		
2054	2057			EVNCHK	
2055	0064		UJP		JUMP TO TIME ROUTINE
2056	0360			TIME	EXIT TO EVNCHK
2057	0221	EVNCHK	LDM	T2	FWA CHECK
2060	0261			261	
2061	0335		SBM	T3	
2062	0200			200	
2063	0261		NZP	T2	JUMP IF STATUS INCORRECT
2064	2073			HALT24	
2065	0221		LDM	T2	LWA CHECK
2066	0360			360	
2067	0335		SBM	T3	
2070	0101			101	
2071	0260		ZJP	T2	JUMP IF ENDS CORRECT
2072	2076			STATCK	
2073	0077	HALT24	HLT		RECORD NOT READ CORRECTLY
2074	0260		ZJP	T2	RELOOP JUMP OPTION
2075	2116	ENDS		SETFWD	
2076	0075	STATCK	EXF		REQUEST STATUS
2077	0013			13	
2100	0000	THREE		0	
2101	0076		INA		
2102	0013		CIL		
2103	0041		STM		STORE STATUS
2104	0146			STATPD	
2105	0034		SBN		
2106	0001			1	
2107	0260		ZJP	T2	JUMP IF STATUS CORRECT
2110	2123			ODD	
2111	0021		LDM		LOAD INCORRECT STATUS
2112	0146			STATPD	
2113	0077	HALT25	HLT		** SET EVEN PARITY DIAGNOSTIC
2114	0261		NZP	T2	JUMP IF NO RELOOP TAKEN
2115	2123			ODD	
2116	0020	SETFWD	LDN		
2117	0003			3	
2120	0202		ATT	T2	
2121	0264		UJP	T2	
2122	1772			SETEVN	
2123	0075	ODD	EXF		SET ODD PARITY ROUTINE
2124	0013			13	
2125	0010			10	
2126	0020		LDN		
2127	0001			1	
2130	0204	ABR14	APR	T2	FWA = 7401 INTO BER
2131	2130			ABR14	

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2132	0020		LDN		
2133	0101			101	
2134	0205	ABX14	ABX	T2	LWA +1 = 7501 INTO BER
2135	2134			ABX14	
2136	0075		EXF		READ RECORD FORWARD
2137	0013			13	
2140	0024			24	
2141	0270	IBI14	IBI	T2	
2142	2141			IBI14	
2143	0020		LDN		
2144	2147			ODDCHK	
2145	0064		UJP		JUMP TO TIME ROUTINE
2146	0360			TIME	EXIT TO ODDCHK
2147	0075	ODDCHK	EXF		REQUEST STATUS
2150	0013			13	
2151	0000	FOUR		0	
2152	0076		INA		
2153	0013		CIL		
2154	0041		STM		STORE STATUS
2155	0146			STATPD	
2156	0034		SBN		
2157	0004			4	EXPECTED STATUS
2160	0260		ZJP	T2	JUMP IF STATUS CORRECT
2161	2171			SETWFM	
2162	0021		LDM		LOAD STATUS
2163	0146			STATPD	
2164	0077	HALT26	HLT		** SET ODD PARITY DIAGNOSTIC
2165	0261		NZP	T2	JUMP IF RELOOP NOT TAKEN
2166	2171			SETWFM	
2167	0264		UJP	T2	RELOOP OPTION
2170	2116			SETFWD	
2171	0075	SETWFM	EXF		
2172	0013			13	
2173	0010			10	
2174	0075		EXF		WRITE FILE MARK
2175	0013			13	
2176	0021			21	
2177	0020		LDN		
2200	2305			WRITE1	
2201	0064		UJP		JUMP TO TIME ROUTINE
2202	0360			TIME	EXIT TO WRITE1
2203	0341	MULREC	STM	T3	MASTER WRITE RECORD ROUTINE
2204	2262			CADDR	
2205	0020		LDN		
2206	0001			1	
2207	0341		STM	T3	
2210	2250			HALF	
2211	0203		TTA	T2	(T2) INTO T2STOR
2212	0041		STM		
2213	0005			T2STOR	
2214	0303		TTA	T3	(T3) INTO T2

2215	0202		ATT	T2	
2216	0020		LDN		
2217	0377	XFWA		377	
2220	0304	ABR15	ARR	T3	FWA INTO BER
2221	2220			ABR15	
2222	0020		LDN		
2223	0377	YLWA		377	
2224	0305	ABX15	ABX	T3	
2225	2224			ABX15	
2226	0075		EXF		WRITE RECORD
2227	0013			13	
2230	0020			20	
2231	0013		CIL		
2232	0371	IBO15	IBO	T3	
2233	2232			IBO15	
2234	0020		LDN		
2235	2240			ZADDR	
2236	0064		UJP		JUMP TO TIME ROUTINE
2237	0360			TIME	EXIT TO ZADDR
2240	0003	ZADDR	CLA		RESTORE ZERO IN STATUS REQUEST
2241	0341		STM	T3	
2242	2250			HALF	
2243	0021		LDM		RESET T2 VALUE
2244	0005			T2STOR	
2245	0202		ATT	T2	
2246	0075		EXF		STATUS REQUEST
2247	0013			13	
2250	0000	HALF		0	
2251	0076		INA		
2252	0041		STM		
2253	0142			STAT	
2254	0013		CIL		
2255	0010		LPN		
2256	0376			376	INCORRECT STATUS CODES
2257	0361		NZP	T3	JUMP IF STATUS ERROR
2260	2263			WRTErr	
2261	0264	WRTOk	UJP	T2	JUMP TO CONTINUE
2262	0377	CADDR		377	
2263	0021	WRTErr	LDM		
2264	0142			STAT	
2265	0077	HALTST	HLT		(A) = INCORRECT STATUS, RUN
2266	0321		LDM	T3	
2267	2262			CADDR	
2270	0077	HALTCA	HLT		(T2)(A)=CONTINUE ADDRESS, RUN
2271	0364		UJP	T3	UNCONDITIONAL RESTART OF
2272	2305			WRITE1	WRITING OPERATIONS
2273	0341	MULTFM	STM	T3	MASTER WRITE FILE MARK ROUTINE
2274	2302			FMADDR	STORE CONTINUE ADDRESS
2275	0075		EXF		WRITE FILE MARK
2276	0013			13	
2277	0021			21	

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2300	0013		CIL		
2301	0020		LDN		
2302	0377	FMADDR		377	
2303	0064		UJP		JUMP TO TIME ROUTINE
2304	0360		TIME		EXIT TO ADDRESS IN T2+FMADDR
2305	0203	WRITE1	TTA	T2	SET T3 FOR RECORD WRITING
2306	0302		ATT	T3	
2307	0020		LDN		STORE NON-ZERO AT THREE
2310	0001			1	AND FOUR FOR WRITING
2311	0241		STM	T2	
2312	2100			THREE	
2313	0241		STM	T2	
2314	2151			FOUR	
2315	0020	WRTK	LDN		WRITE RECORD K
2316	0113			113	
2317	0341		STM	T3	FWA = 2113
2320	2217			XFWA	
2321	0020		LDN		
2322	0212			212	
2323	0341		STM	T3	LWA+2 = 2212
2324	2223			YLWA	
2325	0020		LDN		
2326	2331			WRTK1	
2327	0364		UJP	T3	JUMP TO MULREC
2330	2203		MULREC		EXIT TO WRTK1
2331	0020	WRTK1	LDN		WRITE RECORD K+1
2332	0121			121	
2333	0341		STM	T3	FWA = 2121
2334	2217			XFWA	
2335	0020		LDN		
2336	0356			356	
2337	0341		STM	T3	LWA + 2 = 2356
2340	2223			YLWA	
2341	0020		LDN		
2342	2345			WRTK2	
2343	0364		UJP	T3	JUMP TO MULREC
2344	2203		MULREC		EXIT TO WRTK2
2345	0020	WRTK2	LDN		WRITE RECORD K + 2
2346	0223			223	
2347	0341		STM	T3	FWA = 2223
2350	2217			XFWA	
2351	0020		LDN		
2352	0244			244	
2353	0341		STM	T3	LWA + 2 = 2244
2354	2223			YLWA	
2355	0020		LDN		
2356	2361		WRTFM1		
2357	0364		UJP	T3	JUMP TO MULREC
2360	2203		MULREC		
2361	0020	WRTFM1	LDN		WRITE FILE MARK 1
2362	2365			WRTFM2	

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2363	0364		UJP	T3	JUMP TO MULTFM
2364	2273			MULTFM	EXIT TO WRTFM2
2365	0020	WRTFM2	LDN		WRITE FILE MARK 2
2366	2371			WRTK3	
2367	0364		UJP	T3	JUMP TO MULTFM
2370	2273			MULTFM	EXIT TO WRTK3
2371	0020	WRTK3	LDN		WRITE RECORD K + 3
2372	0103			103	
2373	0341		STM	T3	FWA = 2103
2374	2217			XFWA	
2375	0020		LDN		
2376	0376			376	
2377	0341		STM	T3	LWA + 2 = 2376
2400	2223			YLWA	
2401	0020		LDN		UPDATE T2 TO 5 OCTAL
2402	0005			5	
2403	0202		ATT	T2	
2404	0020		LDN		
2405	2410			WRTK4	
2406	0364		UJP	T3	JUMP TO MULREC
2407	2203			MULREC	EXIT TO WRTK4
2410	0020	WRTK4	LDN		WRITE RECORD K + 4
2411	0231			231	
2412	0341		STM	T3	FWA = 2231
2413	2217			XFWA	
2414	0020		LDN		
2415	0275			275	
2416	0341		STM	T3	LWA + 2 = 2275
2417	2223			YLWA	
2420	0020		LDN		
2421	2424			WRTFM3	
2422	0364		UJP	T3	JUMP TO MULREC
2423	2203			MULREC	EXIT TO WRTFM3
2424	0020	WRTFM3	LDN		WRITE FILE MARK 3
2425	2430			WRTK5	
2426	0364		UJP	T3	JUMP TO MULTFM
2427	2273			MULTFM	EXIT TO WRTK5
2430	0020	WRTK5	LDN		WRITE RECORD K + 5
2431	0100			100	
2432	0341		STM	T3	
2433	2217			XFWA	FWA = 2100
2434	0020		LDN		
2435	0327			327	
2436	0341		STM	T3	LWA + 2 = 2327
2437	2223			YLWA	
2440	0020		LDN		
2441	2444			WRTK6	
2442	0364		UJP	T3	JUMP TO MULREC
2443	2203			MULREC	EXIT TO WRTK6
2444	0020	WRTK6	LDN		WRITE RECORD K + 6
2445	0150			150	

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2446	0341		STM	T3	FWA = 2150
2447	2217			XFWA	
2450	0020		LDN		
2451	0361			361	
2452	0341		STM	T3	LWA + 2 = 2361
2453	2223			YLWA	
2454	0020		LDN		
2455	2460			WRTFM4	
2456	0364		UJP	T3	JUMP TO MULREC
2457	2203			MULREC	EXIT TO WRTFM4
2460	0020	WRTFM4	LDN		WRITE FILE MARK 4
2461	2464			WRTFM5	
2462	0364		UJP	T3	JUMP TO MULTFM
2463	2273			MULTFM	EXIT TO WRTFM5
2464	0020	WRTFM5	LDN		WRITE FILE MARK 5
2465	2473			SBF1	
2466	0364		UJP	T3	JUMP TO MULTFM
2467	2273			MULTFM	EXIT TO SFM1
2470	0000	SCOUNT		0	SEARCH COUNT
2471	0000	RCOUNT		0	RECORD COUNT
2472	0000	FCOUNT		0	FILE MARK COUNT
2473	0003	SBF1	CLA		0 INTO SCOUNT
2474	0002		DON		
2475	0241		STM	T2	
2476	2470			SCOUNT	
2477	0075	GOBACK	EXF		SEARCH BACK 3 FILE MARKS
2500	0013	FMSET1		13	
2501	0033			33	
2502	0020		LDN		
2503	2506			DONE	
2504	0064		UJP		JUMP TO TIME ROUTINE
2505	0360			TIME	EXIT TO DONE
2506	0255	DONE	RAO	T2	INCREMENT SEARCH COUNT
2507	2470			SCOUNT	
2510	0034		SBN		
2511	0003			3	
2512	0261		NZP	T2	JUMP IF 3 SEARCHES NOT
2513	2477			GOBACK	COMPLETED
2514	0341		STM	T3	RESET STATUS REQUEST
2515	2100			THREE	INSTRUCTION PARTS
2516	0341		STM	T3	TO ZERO
2517	2151			FOUR	
2520	0003	SETRCT	CLA		START MULTIPLE RECORD SEARCHES
2521	0002		DON		
2522	0241		STM	T2	
2523	2471			RCOUNT	
2524	0003	SETS1	CLA		
2525	0002		DON		
2526	0241		STM	T2	INITIALIZE SCOUNT = 0
2527	2470			SCOUNT	
2530	0075	BACK1	EXF		SEARCH FORWARD RECORD

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2531	0013		13	
2532	0030		30	
2533	0020	LDN		
2534	2537		DONE1	
2535	0064	UJP		JUMP TO TIME ROUTINE
2536	0360		TIME	EXIT TO DONE1
2537	0255	DONE1	RAO	T2 INCREMENT SEARCH COUNT
2540	2470		SCOUNT	
2541	0034	SBN		
2542	0003		3	
2543	0261	NZP	T2	JUMP IF 3 FORWARD RECORD
2544	2530		BACK1	SEARCHES NOT DONE
2545	0241	STM	T2	RESET SCOUNT TO 0
2546	2470		SCOUNT	
2547	0075	BACK2	EXF	SEARCH BACKWARD RECORD
2550	0013		13	
2551	0031		31	
2552	0020	LDN		
2553	2556		DONE2	
2554	0064	UJP		JUMP TO TIME
2555	0360		TIME	EXIT TO DONE2
2556	0255	DONE2	RAO	T2 INCREMENT SEARCH COUNT
2557	2470		SCOUNT	
2560	0034	SBN		
2561	0004		4	
2562	0261	NZP	T2	JUMP IF 4 BACKWARD RECORD
2563	2547		BACK2	SEARCHES NOT DONE
2564	0255	RAO	T2	INCREMENT RECORD COUNT
2565	2471		RCOUNT	
2566	0034	SBN		
2567	0007		7	
2570	0261	NZP	T2	JUMP IF 7 RECORD SEARCHES
2571	2524		SETS1	NOT DONE
2572	0103	TTA	T1	SET T3 = T1 = 17 OCTAL
2573	0302	ATT	T3	
2574	0020	LDN		
2575	0113		113	
2576	0204	ABR16	ABR	T2 FWA = 7513 INTO BER
2577	2576		ABR16	
2600	0020	LDN		
2601	0211		211	
2602	0205	ABX16	ABX	T2 LWA+1 = 7611 INTO BXR
2603	2602		ABX16	
2604	0075	EXF		READ RECORD FORWARD
2605	0013		13	
2606	0024		24	
2607	0270	IBI16	IBI	T2
2610	2607		IBI16	
2611	0020	LDN		
2612	2615		KCHEK	
2613	0064	UJP		JUMP TO TIME ROUTINE

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2614	0360			TIME	EXIT TO KCHEK
2615	0020	KCHEK	LDN		SET T3 TO 4 OCTAL - REFERENCE
2616	0004			4	ORIGINAL RECORD
2617	0302		ATT	T3	
2620	0321		LDM	T3	FWA CHECK
2621	0113			113	
2622	0135		SBM	T1	
2623	0113			113	
2624	0261		NZP	T2	JUMP IF FWA INCORRECT
2625	2634			HALT27	
2626	0321		LDM	T3	LWA CHECK
2627	0210			210	
2630	0135		SBM	T1	
2631	0210			210	
2632	0260		ZJP	T2	JUMP IF LWA CORRECT
2633	2644			SETFCT	
2634	0077	HALT27	HLT		** MULTIPLE RECORD SEARCH DIAGNOSTIC
2635	0261		NZP	T2	CONTINUE JUMP OPTION
2636	2644			SETFCT	
2637	0020		LDN		SET T2 = 4 OCTAL
2640	0004			4	
2641	0202		ATT	T2	
2642	0264		UJP	T2	JUMP TO REWRITE RECORDS AND
2643	2305			WRITE1	EXECUTE MULTIPLE RECORD SEARCHES
2644	0003	SETFCT	CLA		START MULTIPLE FILE MARK SEARCHES
2645	0002		DON		
2646	0241		STM	T2	
2647	2472			FCOUNT	
2650	0003	SETS2	CLA		
2651	0002		DON		
2652	0241		STM	T2	INITIALIZE SEARCH COUNT
2653	2470			SCOUNT	
2654	0075	FMFWD	EXF		SEARCH FORWARD 3 FILE MARKS
2655	0013			13	
2656	0032			32	
2657	0020		LDN		
2660	2663			DONE4	
2661	0064		UJP		JUMP TO TIME ROUTINE
2662	0360			TIME	EXIT TO DONE4
2663	0255	DONE4	RAO	T2	INCREMENT SEARCH COUNT
2664	2470			SCOUNT	
2665	0034		SBN		
2666	0003			3	
2667	0261		NZP	T2	JUMP IF 3 FORWARD FILE
2670	2654		FMFWD		MARK SEARCHES NOT DONE
2671	0241		STM	T2	INITIALIZE SEARCH COUNT = 0
2672	2470			SCOUNT	
2673	0075	FMBK	EXF		SEARCH BACKWARD 2 FILE MARKS
2674	0013			13	
2675	0033			33	
2676	0020		LDN		

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2677	2702			DONE5	
2700	0064		UJP		JUMP TO TIME ROUTINE
2701	0360			TIME	EXIT TO DONE5
2702	0255	DONE5	RAO	T2	INCREMENT SEARCH COUNT
2703	2470			SCOUNT	
2704	0034		SBN		
2705	0002			2	
2706	0261		NZP	T2	JUMP IF 2 BACKWARD FILE
2707	2673			FMBK	MARK SEARCHES NOT DONE
2710	0255		RAO	T2	INCREMENT FILE MARK COUNT
2711	2472			FCOUNT	
2712	0034		SBN		
2713	0003			3	
2714	0261		NZP	T2	JUMP IF 3 FILE MARK SEARCHES
2715	2650			SETS2	NOT DONE
2716	0103		TTA	T1	SET T3 = 17 OCTAL FOR
2717	0302		ATT	T3	RECORD READING
2720	0020		LDN		
2721	0150			150	
2722	0204	ABR17	ABR	T2	FWA = 7550 INTO BER
2723	2722			ABR17	
2724	0020		LDN		
2725	0360			360	
2726	0205	ABX17	ABX	T2	LWA + 1 = 7760 INTO BER
2727	2726			ABX17	
2730	0075		EXF		READ RECORD BACKWARD
2731	0013			13	
2732	0025			25	
2733	0270	IBI17	IBI	T2	
2734	2733			IBI17	
2735	0020		LDN		
2736	2741			DONE6	
2737	0064		UJP		JUMP TO TIME ROUTINE
2740	0360			TIME	EXIT TO DONE6
2741	0020	DONE6	LDN		SET T3 = 4 OCTAL TO REFERENCE
2742	0004			4	ORIGINAL RECORD
2743	0302		ATT	T3	
2744	0321		LDM	T3	FWA CHECK = RECORD K + 6
2745	0150			150	
2746	0135		SBM	T1	
2747	0357			357	
2750	0261		NZP	T2	JUMP IF FWA INCORRECT
2751	2760			HALT28	
2752	0321		LDM	T3	
2753	0357			357	
2754	0135		SBM	T1	
2755	0150			150	
2756	0260		ZJP	T2	JUMP IF LWA CORRECT
2757	2770			FWD2	
2760	0077	HALT28	HLT		** MULTIPLE FILE MARK SEARCH DIAGNOSTIC
2761	0261		NZP	T2	JUMP IF NO RELOOP DESIRED

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2762	2770			FWD2	
2763	0020	T2T04	LDN		SET T2 = 4 OCTAL
2764	0004			4	
2765	0202		ATT	T2	
2766	0264		UJP	T2	JUMP TO REWRITE RECORDS AND
2767	2305			WRITE1	EXECUTE MULTIPLE FILE MARK SEARCHES
2770	0075	FWD2	EXF		SEARCH FORWARD FILE MARK
2771	0013			13	
2772	0032			32	
2773	0020		LDN		
2774	2777			DONE10	
2775	0064		UJP		
2776	0360			TIME	
2777	0020	DONE10	LDN		SET T2 = 6 OCTAL
3000	0006			6	
3001	0202		ATT	T2	
3002	0075		EXF		SEARCH FORWARD FILE MARK
3003	0013			13	
3004	0032			32	
3005	0020		LDN		
3006	3011			CHEK29	
3007	0064		UJP		
3010	0360			TIME	
3011	0020	CHEK29	LDN		
3012	0012			12	
3013	0202		ATT	T2	
3014	0264		UJP	T2	
3015	5000			REWIND	
3016	0020	TEST2	LDN		
3017	0006			6	
3020	0202		ATT	T2	
3021	0075		EXF		SET MAIN UNIT - EVEN PARITY
3022	0013			13	
3023	0014			14	
3024	0075		EXF		REWIND MAIN UNIT TO LOAD POINT
3025	0013			13	
3026	0034			34	
3027	0020		LDN		
3030	0144			144	
3031	0041		STM		
3032	0141			TIME3	
3033	0020		LDN		
3034	3037			SETYEV	
3035	0064		UJP		JUMP TO TIME ROUTINE
3036	0360			TIME	EXIT TO SETYEV
3037	0075	SETYEV	EXF		SET AUX. UNIT - EVEN PARITY
3040	0011			11	
3041	0014			14	
3042	0020	XYZERO	LDN		STORE NON-ZERO FOR RECORD
3043	0004			4	WRITING FROM 2000-
3044	0302		ATT	T3	2777 CODING AREA

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3045	0020		LDN		
3046	0111	CHG1		111	
3047	0341		STM	T3	
3050	2100			THREE	
3051	0341		STM	T3	
3052	2151			FOUR	
3053	0341		STM	T3	
3054	2250			HALF	
3055	0020		LDN		
3056	0005			5	
3057	0302		ATT	T3	
3060	0020		LDN		
3061	0111	CHG2		111	
3062	0341		STM	T3	
3063	2470			SCOUNT	
3064	0341		STM	T3	
3065	2471			RCOUNT	
3066	0341		STM	T3	
3067	2472			FCOUNT	
3070	0075		EXF		CLEAR MAIN UNIT INTERRUPT LOCKOUT
3071	0013			13	
3072	0003			3	
3073	0013		CIL		
3074	0264		UJP	T2	
3075	3076	CHG3		XYRITE	
3076	0075	XYRITE	EXF		
3077	0011	XY0		11	
3100	0014			14	
3101	0013		CIL		
3102	0075		EXF		REQUEST UNIT STATUS
3103	0011	XY1		11	
3104	0000			0	
3105	0076		INA		
3106	0041		STM		
3107	0142			STAT	
3110	0034		SBN		
3111	0041			41	EXPECTED STATUS
3112	0260		ZJP	T2	JUMP IF STATUS AS EXPECTED.
3113	3121			XYEVHI	
3114	0021		LDM		LOAD INCORRECT STATUS AND HALT
3115	0142			STAT	
3116	0077	HALT30	HLT		
3117	0264		UJP	T2	JUMP TO RECHECK STATUS
3120	3076			XYRITE	
3121	0020	XYEVHI	LDN		WRITE RECORD V ROUTINE
3122	0004			4	
3123	0302		ATT	T3	
3124	0003		CLA		
3125	0204	ABRXY1	ABR	T2	FWA = 2000 INTO BER
3126	3125			ABRXY1	
3127	0020		LDN		

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3130	0005			5	
3131	0302		ATT	T3	
3132	0020		LDN		
3133	0377			377	
3134	0205	ABXXY1	ABX	T2	LWA+2 =2777 INTO BXR
3135	3134			ABXXY1	
3136	0075		EXF		SET EVEN PARITY - HIGH DENSITY
3137	0011	XY2		11	
3140	0017			17	
3141	0075		EXF		WRITE RECORD V
3142	0011	XY3		11	
3143	0020			20	
3144	0271	IBOXY1	IBO	T2	
3145	3144			IBOXY1	
3146	0020		LDN		
3147	3152			XYODHI	
3150	0064		UJP		JUMP TO TIME ROUTINE
3151	0360			TIME	EXIT TO XYODHI
3152	0020	XYODHI	LDN		WRITE RECORD W ROUTINE
3153	0004			4	
3154	0302		ATT	T3	
3155	0020		LDN		
3156	0012			12	
3157	0204	ABRXY2	ABR	T2	FWA 2012
3160	3157			ABRXY2	
3161	0020		LDN		
3162	0005			5	
3163	0302		ATT	T3	
3164	0020		LDN		
3165	0371			371	
3166	0205	ABXXY2	ABX	T2	LWA = 2771
3167	3166			ABXXY2	
3170	0075		EXF		SET ODD PARITY = HIGH DENSITY
3171	0011	XY4		11	
3172	0013			13	
3173	0075		EXF		WRITE RECORD W
3174	0011	XY5		11	
3175	0020			20	
3176	0271	IBOXY2	IBO	T2	
3177	3176			IBOXY2	
3200	0020		LDN		
3201	3204			XYFILM	
3202	0064		UJP		JUMP TO TIME ROUTINE
3203	0360			TIME	EXIT TO XYFILM
3204	0075	XYFILM	EXF		WRITE FILE MARK ROUTINE
3205	0011	XY6		11	
3206	0021			21	
3207	0020		LDN		
3210	3214			XYDONE	
3211	0064		UJP		JUMP TO TIME ROUTINE
3212	0360			TIME	EXIT TO XYDONE

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3213	0000	XYCODE		0	
3214	0221	XYDONE	LDM	T2	CHECK IF RECORDS WRITTEN ON
3215	3213			XYCODE	BOTH TRANSPORTS
3216	0261		NZP	T2	JUMP IF BOTH WRITTEN
3217	3244			BACKXY	
3220	0255		RAO	T2	
3221	3213			XYCODE	
3222	0020	RESET	LDN		RESET INSTRUCTION FUNCTION
3223	0013	CHG5		13	CODES FOR MAIN UNIT
3224	0241		STM	T2	
3225	3077			XY0	
3226	0241		STM	T2	
3227	3103			XY1	
3230	0241		STM	T2	
3231	3137			XY2	
3232	0241		STM	T2	
3233	3142			XY3	
3234	0241		STM	T2	
3235	3171			XY4	
3236	0241		STM	T2	
3237	3174			XY5	
3240	0241		STM	T2	
3241	3205			XY6	
3242	0264		UJP	T2	JUMP FOR MAIN UNIT OPERATION
3243	3076	CHG6		XYRITE	
3244	0020	BACKXY	LDN		RESTORE ZERO TO ALL
3245	0000			0	ORIGINAL LOCATIONS
3246	0241		STM	T2	IN 2000-2777 AREA
3247	3046			CHG1	
3250	0241		STM	T2	
3251	3061			CHG2	
3252	0241		STM	T2	
3253	3213			XYCODE	
3254	0020		LDN		
3255	3262			CHG4	
3256	0241		STM	T2	
3257	3075			CHG3	
3260	0264		UJP	T2	
3261	3042			XYZERO	
3262	0020	CHG4	LDN		RESET TO NON-ZERO STORAGE
3263	0111			111	FOR POSSIBLE MULTIPLE
3264	0241		STM	T2	TRANSPORT PROGRAM
3265	3046			CHG1	SECTION RERUN
3266	0241		STM	T2	
3267	3061			CHG2	
3270	0020		LDN		
3271	3076			XYRITE	
3272	0241		STM	T2	
3273	3075			CHG3	
3274	0020		LDN		RESET MAIN PROGRAM FUNCTION
3275	0011			11	CODES FOR AUX, UNIT

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3276	0241		STM	T2	OPERATIONS
3277	3223			CHG5	
3300	0020		LDN		
3301	3306			CHG7	
3302	0241		STM	T2	
3303	3243			CHG6	
3304	0264		UJP	T2	
3305	3222			RESET	
3306	0020	CHG7	LDN		
3307	3076			XYRITE	
3310	0241		STM	T2	
3311	3243			CHG6	
3312	0020		LDN		
3313	0013			13	
3314	0241		STM	T2	
3315	3223			CHG5	
3316	0075	BACKX2	EXF		SEARCH BACK RECORD-MAIN UNIT
3317	0013			13	
3320	0031			31	
3321	0020		LDN		
3322	3325			XBACK	
3323	0064		UJP		JUMP TO TIME ROUTINE
3324	0360			TIME	EXIT TO XBACK
3325	0075	XBACK	EXF		SEARCH BACK RECORD-MAIN UNIT
3326	0013			13	
3327	0031			31	
3330	0020		LDN		
3331	3334			FORWX1	
3332	0064		UJP		JUMP TO TIME ROUTINE
3333	0360			TIME	EXIT TO FORWX1
3334	0075	FORWX1	EXF		SEARCH FORWARD RECORD-MAIN UNIT
3335	0013			13	
3336	0030			30	
3337	0020		LDN		
3340	3343			XSLOCK	
3341	0064		UJP		JUMP TO TIME ROUTINE
3342	0360			TIME	EXIT TO XSLOCK
3343	0075	XSLOCK	EXF		SET INTERRUPT LOCKOUT-MAIN UNIT
3344	0013			13	
3345	0002			2	
3346	0075	XFMFWD	EXF		REWIND AUX UNIT TO LOAD POINT
3347	0011			11	
3350	0034			34	
3351	0075		EXF		SEARCH FORWARD FILE MARK ON MAIN UNIT
3352	0013			13	
3353	0032			32	
3354	0020		LDN		
3355	0010			10	
3356	0041		STM		STORE 28 SEC REWIND
3357	0141			TIME3	TIME LIMIT
3360	0020		LDN		

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3361	0001		1	
3362	0041	STM		STORE TIME - LIMIT
3363	0145		TIMER	ROUTINE ONLY CODE
3364	0020	LDN		
3365	3372		RSTAT1	
3366	0041	STM		
3367	0301		CONTAD	
3370	0064	UJP		JUMP TO TANDS ROUTINE
3371	0151		TANDS	EXIT TO RSTAT1
3372	0020	RSTAT1 LDN		SET T2 = 7 OCTAL
3373	0007		7	
3374	0202	ATT	T2	
3375	0075	EXP		REQUEST AUX, UNIT STATUS
3376	0011		11	
3377	0000		0	
3400	0076	INA		
3401	0041	STM		STORE AUX, UNIT STATUS
3402	0316		STATYY	
3403	0034	SBN		
3404	0040		40	EXPECTED AUX. UNIT STATUS
3405	0261	NZP	T2	JUMP IF AUX, UNIT STATUS
3406	3451		RSTAT3	INCORRECT
3407	0075	RSTAT2 EXP		REQUEST MAIN UNIT STATUS
3410	0013		13	
3411	0000		0	
3412	0076	INA		
3413	0041	STM		STORE MAIN UNIT STATUS
3414	0315		STATXX	
3415	0034	SBN		
3416	0024		24	EXPECTED MAIN UNIT STATUS
3417	0260	ZJP	T2	JUMP IF MAIN UNIT STATUS
3420	3503		XYOK1	CORRECT
3421	0077	HALT31 HLT		INCORRECT MAIN UNIT OPERATION
3422	0261	NZP	T2	JUMP IF NO RELOOP DESIRED
3423	3503		XYOK1	
3424	0003	CLA		
3425	0041	STM		SET SEARCH COUNTER = 0
3426	0317		COUNTR	
3427	0075	BEGIN EXP		SEARCH FORWARD 3 RECORDS ON
3430	0011		11	AUX, UNIT
3431	0030		30	
3432	0020	LDN		
3433	3436		FINIS	
3434	0064	UJP		JUMP TO TIME ROUTINE
3435	0360		TIME	EXIT TO FINIS
3436	0055	FINIS RAO		INCREMENT SEARCH COUNTER
3437	0317		COUNTR	
3440	0034	SBN		
3441	0003		3	
3442	0261	NZP	T2	JUMP IF 3 BACK RECORD
3443	3427	BEGIN		SEARCHES NOT DONE

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3444	0020		LDN		RESET T2 = 6 OCTAL
3445	0006			6	
3446	0202		ATT	T2	
3447	0264		UJP	T2	
3450	3346			XFMFWD	
3451	0075	RSTAT3	EXF		REQUEST MAIN UNIT STATUS
3452	0013			13	
3453	0000			0	
3454	0076		INA		
3455	0041		STM		STORE MAIN UNIT STATUS
3456	0315			STATXX	
3457	0034		SBN		
3460	0024			24	EXPECTED MAIN UNIT STATUS
3461	0261		NZP	T2	JUMP IF MAIN UNIT STATUS
3462	3473			HALT33	INCORRECT ALSO
3463	0077	HALT32	HLT		INCORRECT AUXILLIARY UNIT OPERATION
3464	0261		NZP	T2	JUMP IF NO RELOOP DESIRED
3465	3503			XYOK1	
3466	0020		LDN		RESET T2 = 6 OCTAL FOR JUMP
3467	0006			6	
3470	0202		ATT	T2	
3471	0264		UJP	T2	JUMP FOR RELOOP
3472	3316			BACKX2	
3473	0077	HALT33	HLT		INCORRECT MAIN AND AUXILLIARY UNIT OPERATION
3474	0261		NZP	T2	JUMP IF NO RELOOP DESIRED
3475	3503			XYOK1	
3476	0020		LDN		RESET T2 = 6 OCTAL FOR JUMP
3477	0006			6	
3500	0202		ATT	T2	
3501	0264		UJP	T2	JUMP FOR RELOOP
3502	3346			XFMFWD	
3503	0075	XYOK1	EXF		SEARCH BACK RECORD ON MAIN UNIT
3504	0013			13	
3505	0031			31	
3506	0020		LDN		
3507	3512			YRECFD	
3510	0064		UJP		JUMP TO TIME ROUTINE
3511	0360			TIME	EXIT TO YRECFD
3512	0075	YRECFD	EXF		SEARCH FORWARD RECORD ON AUX. UNIT
3513	0011			11	
3514	0030			30	
3515	0020		LDN		
3516	3521			YLOCK	
3517	0064		UJP		JUMP TO TIME ROUTINE
3520	0360			TIME	EXIT TO YLOCK
3521	0075	YLOCK	EXF		SET INTERRUPT LOCKOUT ON
3522	0011			11	AUX. UNIT
3523	0002			2	
3524	0020	WPREP	LDN		SET T3 = 16 OCTAL FOR READING
3525	0016			16	RECORD W FROM TAPE(S)
3526	0302		ATT	T3	

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3527	0075		EXF		SET ODD PARITY ON MAIN UNIT
3530	0013			13	
3531	0013			13	
3532	0075		EXF		SET ODD PARITY ON AUX. UNIT
3533	0011			11	
3534	0013			13	
3535	0020		LDN		
3536	0010			10	
3537	0204	XYABR	ABR	T2	FWA = 7010 INTO BER
3540	3537			XYABR	
3541	0020		LDN		
3542	0017			17	
3543	0302		ATT	T3	
3544	0020		LDN		
3545	0366			366	
3546	0205	XYABX	ABX	T2	LWA+1 = 7766 INTO BXR
3547	3546			XYABX	
3550	0075		EXF		READ RECORD W BACKWARD
3551	0013			13	ON MAIN UNIT
3552	0025			25	
3553	0270	WRBIN	IBI	T2	
3554	3553			WRBIN	
3555	0075		EXF		READ RECORD W FORWARD
3556	0011			11	ON AUX. UNIT
3557	0024			24	
3560	0270	WRFIN	IBI	T2	
3561	3560			WRFIN	
3562	0020		LDN		
3563	3566			WXREAD	
3564	0064		UJP		JUMP TO TIME ROUTINE
3565	0360			TIME	EXIT TO WXREAD
3566	0075	WXREAD	EXF		REQUEST MAIN UNIT STATUS
3567	0013			13	
3570	0000			0	
3571	0076		INA		
3572	0041		STM		
3573	0142			STAT	
3574	0260		ZJP	T2	JUMP IF STATUS CORRECT
3575	3601			XREADW	
3576	0021		LDM		
3577	0142			STAT	
3600	0077	HALT34	HLT		(A) SHOW INCORRECT MAIN UNIT STATUS
3601	0020	XREADW	LDN		CHECK IF RECORD W READ BACKWARD
3602	0017			17	FROM MAIN UNIT
3603	0102		ATT	T1	
3604	0020		LDN		
3605	0004			4	
3606	0362		ATT	T3	
3607	0321		LDM	T3	FWA CHECK
3610	0012			12	
3611	0135		SBM	T1	

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3612	0365		365	
3613	0261	NZP	T2	JUMP IF FWA INCORRECT
3614	3631		HALT35	
3615	0020	LDN		
3616	0016		16	
3617	0102	ATT	T1	
3620	0020	LDN		
3621	0005		5	
3622	0302	ATT	T3	
3623	0321	LDM	T3	LWA CHECK
3624	0367		367	
3625	0135	SBM	T1	
3626	0010		10	
3627	0260	ZJP	T2	JUMP IF LWA CORRECT
3630	3643		CLRXY	
3631	0077	HALT35	HLT	** MAIN UNIT FUNCTION CODE OVERRIDDEN DIAGNOSTIC
3632	0261	NZP	T2	JUMP IF NO RELOOP DESIRED
3633	3643		CLRXY	
3634	0075	EXF		SEARCH BACK RECORD-AUX. UNIT
3635	0011		11	
3636	0031		31	
3637	0020	LDN		
3640	3524		WPREP	
3641	0064	UJP		JUMP TO TIME ROUTINE
3642	0360		TIME	EXIT TO RELOOP POINT
3643	0075	CLRXY	EXF	CLEAR AUX. UNIT INTERRUPT LOCKOUT
3644	0011		11	
3645	0003		3	
3646	0075	EXF		CLEAR MAIN UNIT INTERRUPT LOCKOUT
3647	0013		13	
3650	0003		3	
3651	0075	EXF		SEARCH FORWARD FILE MARK
3652	0013		13	ON MAIN UNIT
3653	0032		32	
3654	0020	LDN		
3655	3660		AUXFD	
3656	0064	UJP		JUMP TO TIME ROUTINE
3657	0360		TIME	EXIT TO AUXFD
3660	0075	AUXFD	EXF	SEARCH FORWARD FILE MARK
3661	0011		11	ON AUX. UNIT
3662	0032		32	
3663	0020	LDN		
3664	3667		HALT36	
3665	0064	UJP		JUMP TO TIME ROUTINE
3666	0360		TIME	EXIT TO SWITCH
3667	0077	HALT36	HLT	DECISION - SWITCH TAPES
3670	0261	NZP	T2	PAUSE TO MANUALLY SWITCH TAPES
3671	3677		XREQST	AND JUMP TO SWITCH INSTR.
3672	0020	LDN		SET T2 AND JUMP IF
3673	0011		11	SWITCH ROUTINE OMITTED
3674	0202	ATT	T2	

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3675	0264		UJP	T2	
3676	4570			HALT43	
3677	0075	XREQST	EXF		REQUEST UNIT STATUS
3700	0013	XONE		13	
3701	0000			0	
3702	0076		INA		
3703	0013		CIL		
3704	0041		STM		
3705	0142			STAT	
3706	0034		SBN		
3707	0040			40	EXPECTED STATUS-TAPE MARK
3710	0260		ZJP	T2	JUMP IF STATUS CORRECT
3711	3717			SETUEV	
3712	0021		LDM		
3713	0142			STAT	
3714	0077	HALT37	HLT		
3715	0264		UJP	T2	
3716	3677			XREQST	
3717	0075	SETUEV	EXF		SET UNIT TO EVEN PARITY-
3720	0013	XTWO		13	HIGH DENSITY
3721	0017			17	READ RECORD V FORWARD ROUTINE
3722	0020		LDN		
3723	0016			16	
3724	0302		ATT	T3	
3725	0020		LDN		
3726	0000			0	
3727	0204	VABRF	ABR	T2	FWA = 7000
3730	3727			VABRF	
3731	0020		LDN		
3732	0017			17	
3733	0302		ATT	T3	
3734	0020		LDN		
3735	0376			376	
3736	0205	VABXF	ABX	T2	LWA + 1 = 7776
3737	3736			VABXF	
3740	0021		LDM		STORE TIME LIMIT
3741	0133			TREAD1	
3742	0041		STM		
3743	0137			TIME1	
3744	0021		LDM		
3745	0134			TREAD3	
3746	0041		STM		
3747	0141			TIME3	
3750	0020		LDN		STORE RELOOP ADDRESS
3751	3717			SETUEV	
3752	0041		STM		
3753	0273			LOOPAD	
3754	0020		LDN		STORE CONTINUE ADDRESS
3755	3773			VFWD	
3756	0041		STM		
3757	0301			CONTAD	

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3760	0020		LDN		STORE EXPECTED STATUS-
3761	0001			1	EVEN PARITY
3762	0041		STM		
3763	0143			STATUS	
3764	0075		EXF		READ RECORD FORWARD
3765	0013	XTHREE		13	
3766	0024			24	
3767	0270	VIBIF	IBI	T2	
3770	3767			VIBIF	
3771	0064		UJP		JUMP TO TANDS ROUTINE
3772	0151			TANDS	
3773	0020	VFWD	LDN		CHECK IF RECORD V READ FORWARD
3774	0004			4	
3775	0102		ATT	T1	
3776	0020		LDN		
3777	0016			16	
4000	0302		ATT	T3	
4001	0020		LDN		SET T2 = 10 OCTAL
4002	0010			10	
4003	0202		ATT	T2	
4004	0121		LDM	T1	FWA CHECK
4005	0000			0	
4006	0335		SBM	T3	
4007	0000			0	
4010	0261		NZP	T2	JUMP IF ERROR IN FWA
4011	4026			HALT38	
4012	0020		LDN		
4013	0005			5	
4014	0102		ATT	T1	
4015	0020		LDN		
4016	0017			17	
4017	0302		ATT	T3	
4020	0121		LDM	T1	LWA CHECK
4021	0375			375	
4022	0335		SBM	T3	
4023	0375			375	
4024	0260		ZJP	T2	JUMP IF LWA CORRECT
4025	4043			SETUOD	
4026	0077	HALT38	HLT		EVEN PARITY, HIGH DENSITY, READ FORWARD ERROR
4027	0261		NZP	T2	CONTINUE JUMP OPTION
4030	4043			SETUOD	
4031	0075		EXF		RELOOP OPTION
4032	0013	XFOUR		13	SEARCH BACK PAST ERROR RECORD
4033	0031			31	
4034	0020		LDN		
4035	0007			7	
4036	0202		ATT	T2	
4037	0020		LDN		
4040	3717			SETUEV	
4041	0064		UJP		JUMP TO TIME ROUTINE
4042	0360			TIME	EXIT TO SETUEV

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4043	0075	SETUOD	EXF		SET UNIT TO ODD PARITY-
4044	0013	XFIVE		13	HIGH DENSITY
4045	0013			13	READ RECORD W FORWARD ROUTINE
4046	0020		LDN		
4047	0016			16	
4050	0302		ATT	T3	
4051	0020		LDN		
4052	0010			10	
4053	0204	WABRF	ABR	T2	FWA = 7010
4054	4053			WABRF	
4055	0020		LDN		
4056	0017			17	
4057	0302		ATT	T3	
4060	0020		LDN		
4061	0366			366	
4062	0205	WABXF	ABX	T2	LWA+1 = 7766
4063	4062			WABXF	
4064	0021		LDM		STORE TIME LIMIT
4065	0133			TREAD1	
4066	0041		STM		
4067	0137			TIME1	
4070	0021		LDM		
4071	0134			TREAD3	
4072	0041		STM		
4073	0141			TIME3	
4074	0020		LDN		STORE RELOOP ADDRESS
4075	4043			SETUOD	
4076	0041		STM		
4077	0273			LOOPAD	
4100	0020		LDN		
4101	4117			WFWD	STORE CONTINUE ADDRESS
4102	0041		STM		
4103	0301			CONTAD	
4104	0020		LDN		STORE EXPECTED STATUS-
4105	0000			0	ODD PARITY
4106	0041		STM		
4107	0143			STATUS	
4110	0075		EXF		READ RECORD FORWARD
4111	0013	XSIX		13	
4112	0024			24	
4113	0270	WIBIF	IBI	T2	
4114	4113			WIBIF	
4115	0064		UJP		JUMP TO TANDS ROUTINE
4116	0151			TANDS	
4117	0020	WFWD	LDN		CHECK IF RECORD W READ FORWARD
4120	0004			4	
4121	0102		ATT	T1	
4122	0020		LDN		
4123	0016			16	
4124	0302		ATT	T3	
4125	0121		LDM	T1	FWA CHECK

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4126	0012		12	
4127	0335	SBM	T3	
4130	0010		10	
4131	0261	NZP	T2	JUMP IF ERROR IN FWA
4132	4147		HALT39	
4133	0020	LDN		
4134	0005		5	
4135	0102	ATT	T1	
4136	0020	LDN		
4137	0017		17	
4140	0302	ATT	T3	
4141	0121	LDM	T1	LWA CHECK
4142	0367		367	
4143	0335	SBM	T3	
4144	0365		365	
4145	0260	ZJP	T2	JUMP IF LWA CORRECT
4146	4161		SETTOD	
4147	0077	HALT39	HLT	ODD PARITY, HIGH DENSITY, READ FORWARD ERROR
4150	0261		NZP	CONTINUE JUMP OPTION
4151	4161		SETTOD	
4152	0075		EXF	RELOOP OPTION
4153	0013	XSEVEN	13	SEARCH BACK PAST ERROR RECORD
4154	0031		31	
4155	0020		LDN	
4156	4043		SETUOD	
4157	0064		UJP	JUMP TO TIME ROUTINE
4160	0360		TIME	EXIT TO SETUOD
4161	0020	SETTOD	LDN	READ RECORD W BACKWARD ROUTINE
4162	0016		16	
4163	0302		ATT	T3
4164	0020		LDN	
4165	0010		10	
4166	0204	WABRB	T2	FWA = 7010
4167	4166		WABRB	
4170	0020		LDN	
4171	0017		17	
4172	0302		ATT	T3
4173	0020		LDN	
4174	0366		366	
4175	0205	WABXB	T2	LWA+1 = 7766
4176	4175		WABXB	
4177	0021		LDM	STORE TIME LIMIT
4200	0133		TREAD1	
4201	0041		STM	
4202	0137		TIME1	
4203	0021		LDN	
4204	0134		TREAD3	
4205	0041		STM	
4206	0141		TIME3	
4207	0020		LDN	STORE RELOOP ADDRESS
4210	4161		SETTOD	

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4211	0041		STM		
4212	0273			LOOPAD	
4213	0020		LDN		STORE CONTINUE ADDRESS
4214	4232			WBACK	
4215	0041		STM		
4216	0301			CONTAD	
4217	0020		LDN		STORE EXPECTD STATUS-
4220	0000			0	ODD PARITY
4221	0041		STM		
4222	0143			STATUS	
4223	0075		EXF		READ RECORD BACKWARD
4224	0013	XEIGHT		13	
4225	0025			25	
4226	0270	WIBIB	IBI	T2	
4227	4226			WIBIB	
4230	0064		UJP		JUMP TO TANDS ROUTINE
4231	0151			TANDS	
4232	0020	WBACK	LDN		CHECK IF RECORD W READ BACKWARD
4233	0004			4	
4234	0102		ATT	T1	
4235	0020		LDN		
4236	0017			17	
4237	0302		ATT	T3	
4240	0121		LDM	T1	FWA CHECK
4241	0012			12	
4242	0335		SBM	T3	
4243	0365			365	
4244	0261		NZP	T2	JUMP IF ERROR IN FWA
4245	4262			HALT40	
4246	0020		LDN		
4247	0005			5	
4250	0102		ATT	T1	
4251	0020		LDN		
4252	0016			16	
4253	0302		ATT	T3	
4254	0121		LDM	T1	LWA CHECK
4255	0367			367	
4256	0335		SBM	T3	
4257	0010			10	
4260	0260		ZJP	T2	JUMP IF LWA CORRECT
4261	4274			SETTEV	
4262	0077	HALT40	HLT		ODD PARITY, HIGH DENSITY, READ BACKWARD ERROR
4263	0261		NZP	T2	CONTINUE JUMP OPTION
4264	4274			SETTEV	
4265	0075		EXF		RELOOP OPTION
4266	0013	XNINE		13	SEARCH FORWARD PAST ERROR RECORD
4267	0030			30	
4270	0020		LDN		
4271	4161			SETTOD	
4272	0064		UJP		JUMP TO TIME ROUTINE
4273	0360			TIME	EXIT TO SETTOD

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4274	0075	SETTEV	EXF		READ RECORD V BACKWARD ROUTINE
4275	0013	XTEN		13	
4276	0017			17	
4277	0020		LDN		
4300	0016			16	
4301	0302		ATT	T3	
4302	0020		LDN		
4303	0000			0	
4304	0204	VABRB	ABR	T2	FWA = 7000
4305	4304			VABRB	
4306	0020		LDN		
4307	0017			17	
4310	0302		ATT	T3	
4311	0020		LDN		
4312	0376			376	
4313	0205	VABXB	ABX	T2	LWA+1 = 7776
4314	4313			VABXB	
4315	0021		LDM		
4316	0133			TREAD1	STORE TIME LIMIT
4317	0041		STM		
4320	0137			TIME1	
4321	0021		LDM		
4322	0134			TREAD3	
4323	0041		STM		
4324	0141			TIME3	
4325	0020		LDN		STORE RELOOP ADDRESS
4326	4274			SETTEV	
4327	0041		STM		
4330	0273			LOOPAD	
4331	0020		LDN		STORE CONTINUE ADDRESS
4332	4350			VBACK	
4333	0041		STM		
4334	0301			CONTAD	
4335	0020		LDN		STORE EXPECTED STATUS-
4336	0001			1	EVEN PARITY
4337	0041		STM		
4340	0143			STATUS	
4341	0075		EXF		READ RECORD BACKWARD
4342	0013	XELEVN		13	
4343	0025			25	
4344	0270	VIBIB	IBI	T2	
4345	4344			VIBIB	
4346	0064		UJP		JUMP TO TANDS ROUTINE
4347	0151			TANDS	
4350	0020	VBACK	LDN		CHECK IF RECORD V READ BACKWARD
4351	0004			4	
4352	0102		ATT	T1	
4353	0020		LDN		SET T2 = 11 OCTAL
4354	0011			11	
4355	0202		ATT	T2	
4356	0020		LDN		

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4357	0017			17	
4360	0302		ATT	T3	
4361	0124		LDM	T1	FWA CHECK
4362	0000			0	
4363	0335		SBM	T3	
4364	0375			375	
4365	0264		NZP	T2	JUMP IF ERROR IN FWA
4366	4413			HALT41	
4367	0020		LDN		
4370	0005			5	
4371	0102		ATT	T1	
4372	0020		LDN		
4373	0016			16	
4374	0302		ATT	T3	
4375	0124		LDM	T1	LWA CHECK
4376	0375			375	
4377	0335		SBM	T3	
4400	0000			0	
4401	0260		ZJP	T2	JUMP IF LWA CORRECT
4402	4420			XSFF	
4403	0077	HALT41	HLT		EVEN PARITY, HIGH DENSITY, READ BACKWARD ERROR
4404	0264		NZP	T2	CONTINUE JUMP OPTION
4405	4420			XSFF	
4406	0075		EXF		RELOOP OPTION
4407	0013	XTHIRT		13	SEARCH FORWARD PAST ERROR RECORD
4410	0030			30	
4411	0020		LDN		
4412	0010			10	
4413	0202		ATT	T2	
4414	0020		LDN		
4415	4274			SETTEV	
4416	0064		UJP		JUMP TO TIME ROUTINE
4417	0360		TIME		EXIT TO SETTEV
4420	0075	XSFF	EXF		SEARCH FORWARD TO FILE MARK
4421	0013	XTWELV		13	
4422	0032			32	
4423	0020		LDN		
4424	4430			AUXDUN	
4425	0064		UJP		JUMP TO TIME ROUTINE
4426	0360		TIME		EXIT TO AUXDUN
4427	0000	AUXCNT		0	RESET FOR AUX. OPER. OR DONE
4430	0255	AUXDUN	RAO		
4431	4427			AUXCNT	
4432	0034		SBM		
4433	0001			1	
4434	0264		NZP	T2	JUMP IF AUX, UNIT OPERATIONS
4435	4530			ORIGIN	COMPLETED
4436	0077	HALT42	HLT		DECISION - DO AUXILLIARY UNIT OPERATIONS
4437	0264		NZP	T2	JUMP FOR AUX, UNIT
4440	4446		YOPER		OPERATIONS
4441	0003		CLA		NO AUX. UNIT OPERATIONS

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4442	0241		STM	T2	RESET AUXCNT = 0
4443	4427			AUXCNT	
4444	0264		UJP	T2	JUMP TO NOTEST
4445	4570			HALT43	
4446	0020	YOPER	LDN		RESET FUNCTION CODES FOR
4447	0007			7	AUX, UNIT OPERATIONS
4450	0102		ATT	T1	
4451	0020		LDN		
4452	0011	FCTONE		11	
4453	0041		STM		
4454	0231			TSSTAT	
4455	0141		STM	T1	
4456	3700			XONE	
4457	0141		STM	T1	
4460	3720			XTWO	
4461	0141		STM	T1	
4462	3765			XTHREE	
4463	0020		LDN		
4464	0010			10	
4465	0102		ATT	T1	
4466	0020		LDN		
4467	0011	FCTTWO		11	
4470	0141		STM	T1	
4471	4032			XFOUR	
4472	0141		STM	T1	
4473	4044			XFIVE	
4474	0141		STM	T1	
4475	4111			XSIX	
4476	0141		STM	T1	
4477	4153			XSEVEN	
4500	0141		STM	T1	
4501	4224			XEIGHT	
4502	0141		STM	T1	
4503	4266			XNINE	
4504	0141		STM	T1	
4505	4275			XTEN	
4506	0141		STM	T1	
4507	4342			XELEVN	
4510	0020		LDN		
4511	0011			11	
4512	0102		ATT	T1	
4513	0020		LDN		
4514	0011	FCTTHR		11	
4515	0141		STM	T1	
4516	4421			XTWELV	
4517	0141		STM	T1	
4520	4407			XTHIRT	
4521	0264		UJP	T2	JUMP OUT OF FUNCTION
4522	4523	JONE	YOP		CODE RESET ROUTINE
4523	0020	YOP	LDN		JUMP TO XREQST AND USE
4524	0007			7	AUX, UNIT

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4525	0202		ATT	T2	
4526	0264		UJP	T2	
4527	3677			XREQST	
4530	0020	ORIGIN	LDN		RESET FUNCTION CODES FOR
4531	0013			13	MAIN UNIT OPERATIONS
4532	0241		STM	T2	
4533	4452			FCTONE	
4534	0241		STM	T2	
4535	4467			FCTTWO	
4536	0241		STM	T2	
4537	4514			FCTTHR	
4540	0020		LDN		
4541	4546			JTWO	
4542	0241		STM	T2	
4543	4522			JONE	
4544	0264		UJP	T2	
4545	4446			YOPER	
4546	0020	JTWO	LDN		
4547	4523			YOP	
4550	0241		STM	T2	
4551	4522			JONE	
4552	0020		LDN		RESET AUXCNT = 0
4553	0000			0	
4554	0241		STM	T2	
4555	4427			AUXCNT	
4556	0020		LDN		
4557	0011			11	
4560	0241		STM	T2	
4561	4452			FCTONE	
4562	0241		STM	T2	
4563	4467			FCTTWO	
4564	0241		STM	T2	
4565	4514			FCTTHR	
4566	0264		UJP	T2	
4567	4570			HALT43	
4570	0077	HALT43	HLT		DECISION - SEARCH FORWARD TO END OF TAPE MARK
4571	0260		ZJP	T2	JUMP IF EOT SEARCH OMITTED
4572	4625			RWU	
4573	0264	SETITP	UJP	T2	SEARCH FORWARD TO END OF TAPE ROUTINE
4574	4654			PATX	
4575	0002		DON		
4576	0002		DON		
4577	0075	ETSTAT	EXF		REQUEST STATUS
4600	0013			13	
4601	0000			0	
4602	0076		INA		
4603	0013		CIL		
4604	0041		STM		
4605	0142			STAT	
4606	0010		LPN		
4607	0200			200	

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4610	0261		NZP	T2	JUMP IF UNIT BUSY
4611	4577			ETSTAT	
4612	0021		LDM		
4613	0142			STAT	
4614	0010		LPN		
4615	0040			40	
4616	0260		ZJP	T2	JUMP IF TAPE MARK NOT REACHED
4617	4573			SETITP	
4620	0021		LDM		
4621	0142			STAT	
4622	0077	HALT44	HLT		TAPE MARK STATUS IN A
4623	0260		ZJP	T2	RELOOP JUMP OPTION
4624	4573			SETITP	
4625	0075	RWU	EXF		REWIND UNLOAD TAPE ROUTINE
4626	0013			13	
4627	0035			35	
4630	0013		CIL		
4631	0002		DON		
4632	0077	HALT45	HLT		PAUSE UNTIL TAPE MOTION CEASES, RUN
4633	0075		EXF		REQUEST UNIT STATUS AFTER RWU COMPLETE
4634	0013			13	EXPECT (A) = 102 OR 103
4635	0000			0	INDICATING WRITE NOT READY
4636	0076		INA		AND TRANSPORT NOT READY
4637	0013		CIL		
4640	0002		DON		
4641	0077	HALT46	HLT		CHECK STATUS, MANUALLY SET TRANSPORT
4642	0075		EXF		READY SWITCH TO ON, RUN
4643	0013			13	
4644	0000			0	
4645	0076		INA		
4646	0013		CIL		
4647	0002		DON		
4650	0077	HALT47	HLT		EXPECT STATUS = 040 OR 041 = TAPE MARK
4651	0260		ZJP	T2	RELOOP JUMP OPTION
4652	4625			RWU	
4653	0077	HALTXX	HLT		END OF PROGRAM
4654	0075	PATX	EXF		WRITE 1-CHARACTER RECORD
4655	0013			13	
4656	0020			20	
4657	0074		OTN		
4660	0002			2	
4661	0013		CIL		
4662	0264		UJP	T2	
4663	4577			ETSTAT	
4664	0221	ERVFRF	LDM	T2	READ FORWARD ERROR DATA DISPLAY
4665	1743			RFORFW	
4666	0341		STM	T3	
4667	4675			RFEROR	
4670	0221		LDM	T2	
4671	1745			RFSTFW	
4672	0341		STM	T3	

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4673	4707			RFERST
4674	0121		LDM	T1
4675	0377	RFEROR		377
4676	0304	FABR	AHR	T3
4677	4676			FABR
4700	0020		LDN	
4701	0011			11
4702	0102		ATT	T1
4703	0020		LDN	
4704	0016			16
4705	0302		ATT	T3
4706	0321		LDM	T3
4707	0377	RFERST		377
4710	0105	FARX	ABX	T1
4711	4710			FABX
4712	0221		LDM	T2
4713	1443			PDCODE (A) = LOWER 6-BITS OF SELECT CODE
4714	0077	HALTBB	HLT	(BER)0-7= ACTUAL DATA
4715	0260		ZJP	(BXR)0-7= DATA WRITTEN AND READ
4716	1407			JUMP FOR RESELECTION
4717	0020	ALLPD	LDN	FLINIT
4720	0011			11
4721	0302		ATT	T3
4722	0255		RAO	T2
4723	1443			PDCODE
4724	0034		SBN	
4725	0020			20
4726	0360		ZJP	T3
4727	4745			PDDONE
4730	0221		LDM	T2
4731	1443			PDCODE
4732	0034		SBN	
4733	0014			14
4734	0261		NZP	T2
4735	1407			FLINIT
4736	0020		LDN	
4737	0002			2
4740	0302		ATT	T3
4741	0020		LDN	
4742	0001			1
4743	0364		UJP	T3
4744	1377			STSTOR
4745	0020	PDDONE	LDN	
4746	0004			4
4747	0202		ATT	T2
4750	0003		CLA	
4751	0241		STM	T2
4752	2100			THREE
4753	0241		STM	T2
4754	2151			FOUR
4755	0241		STM	T2

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4756	2250			HALF	
4757	0020		LDN		
4760	0003			3	
4761	0302		ATT	T3	
4762	0364		UJP	T3	
4763	1772			SETEVN	
	5000	ORG	5000		
5000	0021	REWIND	LDN		
5001	0035			35	
5002	0260		ZJP	T2	JUMP IF NOT DESIRED TO REEXECUTE
5003	5044			JUMP29	ALL TESTS REPETITIVELY
5004	0075	REWIND	EXF		REWIND MAIN UNIT
5005	0013			13	
5006	0034			34	
5007	0013		CIL		
5010	0075	RWSTAT	EXF		
5011	0013			13	
5012	0000			0	
5013	0076		INA		
5014	0013		CIL		
5015	0010		LPN		
5016	0200			200	
5017	0261		NZP	T2	
5020	5010			RWSTAT	
5021	0075		EXF		
5022	0013			13	
5023	0000			0	
5024	0076		INA		
5025	0013		CIL		
5026	0010		LPN		
5027	0040			40	
5030	0260		ZJP	T2	
5031	5004			REWIND	
5032	0020		LDN		
5033	0001			1	
5034	0202		ATT	T2	
5035	0075		EXF		SET EVEN PARITY
5036	0013			13	
5037	0017			17	
5040	0013		CIL		
5041	0264		UJP	T2	JUMP WHEN AT TAPE MARK AND NOT BUSY
5042	0400			ENTRY1	
5043	0002		DON		
5044	0020	JUMP29	LDN		
5045	0006			6	
5046	0202		ATT	T2	
5047	0077	HALT29	HLT		DECISION-TEST2-609 TAPE UNITS
5050	0261		NZP	T2	JUMP IF TEST DESIRED
5051	3016			TEST2	
5052	0020		LDN		TEST NOT DESIRED
5053	0011			11	

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5054	0202		ATT	T2	
5055	0264		UJP	T2	
5056	4570			HALT43	
	5400	ORG	5400		
5400	0002	MTSTAT	DON		LOADING ROUTINE ENTRY
5401	0020	MTJMP0	LDN		SET T2 = T1 = 011 OCTAL
5402	0013			13	
5403	0102		ATT	T1	
5404	0202		ATT	T2	
5405	0075		EXF		SET ODD PARITY = HIGH DENSITY
5406	0013			13	
5407	0013			13	
5410	0075		EXF		REQUEST STATUS
5411	0013			13	(EXPECT 040 = STATUS)
5412	0000			0	
5413	0076		INA		
5414	0241		STM	T2	
5415	5400			MTSTAT	
5416	0034		SBN		
5417	0040			40	
5420	0260		ZJP	T2	JUMP IF STATUS CORRECT
5421	5427			MTJMP1	
5422	0221		LDM	T2	
5423	5400			MTSTAT	
5424	0077	MTHT1	HLT		(A) = INCORRECT STATUS
5425	0264		UJP	T2	
5426	5401			MTJMP0	
5427	0003	MTJMP1	CLA		
5430	0302		ATT	T3	
5431	0204	MTOUT1	ABR	T2	FWA = 0000
5432	5431			MTOUT1	
5433	0020		LDN		
5434	0003			3	
5435	0302		ATT	T3	
5436	0020		LDN		
5437	0377			377	
5440	0205	MTOUT2	ABX	T2	LWA + 2 = 1777
5441	5440			MTOUT2	
5442	0075		EXF		WRITE RECORD 0000 - 1775
5443	0013			13	
5444	0020			20	
5445	0271	MTOUT3	IBO	T2	
5446	5445			MTOUT3	
5447	0077	MTHT2	HLT		PAUSE FOR WRITING
5450	0075		EXF		REQUEST STATUS
5451	0013			13	(EXPECT 000 = STATUS)
5452	0000			0	
5453	0076		INA		
5454	0260		ZJP	T2	JUMP IF STATUS CORRECT
5455	5461			MTJMP2	
5456	0077	MTHT3	HLT		(A) = INCORRECT STATUS

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5457	0264		UJP	T2	JUMP TO REWRITE 0000 - 1775
5460	5427			MTJMP1	
5461	0075	MTJMP2	EXF		WRITE RECORD - 1776
5462	0013			13	
5463	0020			20	
5464	0074		OTN		
5465	0004			4	
5466	0077	MTHT4	HLT		PAUSE FOR WRITING
5467	0075		EXF		REQUEST STATUS
5470	0013			13	(EXPECT 000 = STATUS)
5471	0000			0	
5472	0076		INA		
5473	0260		ZJP	T2	JUMP IF STATUS CORRECT
5474	5500			MTJMP3	
5475	0077	MTHT5	HLT		(A) = INCORRECT STATUS
5476	0264		UJP	T2	JUMP TO REWRITE 1776
5477	5461			MTJMP2	
5500	0075	MTJMP3	EXF		WRITE RECORD = 1777
5501	0013			13	
5502	0020			20	
5503	0074		OTN		
5504	0202			202	
5505	0077	MTHT6	HLT		PAUSE FOR WRITING
5506	0075		EXF		REQUEST STATUS
5507	0013			13	(EXPECT 000 = STATUS)
5510	0000			0	
5511	0076		INA		
5512	0260		ZJP	T2	JUMP IF STATUS CORRECT
5513	5517			MTJMP4	
5514	0077	MTHT7	HLT		(A) = INCORRECT STATUS
5515	0264		UJP	T2	JUMP TO REWRITE 1777
5516	5500			MTJMP3	
5517	0020	MTJMP4	LDN		
5520	0004			4	
5521	0302		ATT	T3	
5522	0003		CLA		
5523	0104	MTOUT4	ABR	T1	FWA = 2000
5524	5523			MTOUT4	
5525	0020		LDN		
5526	0007			7	
5527	0302		ATT	T3	
5530	0020		LDN		
5531	0377			377	
5532	0205	MTOUT5	ABX	T2	LWA + 2 = 377
5533	5532			MTOUT5	
5534	0075		EXF		WRITE RECORD 2000-3775
5535	0013			13	
5536	0020			20	
5537	0271	MTOUT6	IBO	T2	
5540	5537			MTOUT6	
5541	0077	MTHT8	HLT		PAUSE FOR WRITING

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5542	0075		EXF		REQUEST STATUS
5543	0013			13	(EXPECT 000 = STATUS)
5544	0000			0	
5545	0076		INA		
5546	0260		ZJP	T2	JUMP IF STATUS CORRECT
5547	5553			MTJMP5	
5550	0077	MTHT9	HLT		(A) = INCORRECT STATUS
5551	0164		UJP	T1	JUMP TO REWRITE 2000 = 3775
5552	5517			MTJMP4	
5553	0075	MTJMP5	EXF		WRITE RECORD = 3776
5554	0013			13	
5555	0020			20	
5556	0074		OTN		
5557	0020			20	
5560	0077	MTHT10	HLT		PAUSE FOR WRITING
5561	0075		EXF		REQUEST STATUS
5562	0013			13	(EXPECT 000 = STATUS)
5563	0000			0	
5564	0076		INA		
5565	0260		ZJP	T2	JUMP IF STATUS CORRECT
5566	5572			MTJMP6	
5567	0077	MTHT11	HLT		(A) = INCORRECT STATUS
5570	0264		UJP	T2	JUMP TO REWRITE 3776
5571	5553			MTJMP5	
5572	0075	MTJMP6	EXF		WRITE RECORD = 3777
5573	0013			13	
5574	0020			20	
5575	0074		OTN		
5576	0016			16	
5577	0077	MTHT12	HLT		PAUSE FOR WRITING
5600	0075		EXF		REQUEST STATUS
5601	0013			13	(EXPECT 000 = STATUS)
5602	0000			0	
5603	0076		INA		
5604	0260		ZJP	T2	JUMP IF STATUS CORRECT
5605	5611			MTJMP7	
5606	0077	MTHT13	HLT		(A) = INCORRECT STATUS
5607	0264		UJP	T2	JUMP TO REWRITE 3777
5610	5572			MTJMP6	
5611	0020	MTJMP7	LDN		
5612	0010			10	
5613	0302		ATT	T3	
5614	0003		CLA		
5615	0204	MTOUT7	ABR	T2	FWA = 4000
5616	5615			MTOUT7	
5617	0020		LDN		
5620	0012			12	
5621	0302		ATT	T3	
5622	0020		LDN		
5623	0102			102	
5624	0205	MTOT10	ABX	T2	LWA * 2 = 5102

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5625	5624			MTOT10	
5626	0075		EXF		WRITE RECORD 400-5100
5627	0013			13	
5630	0020			20	
5631	0271	MTOT11	I80	T2	
5632	5631			MTOT11	
5633	0077	MTHT14	HLT		PAUSE FOR WRITING
5634	0075		EXF		REQUEST STATUS
5635	0013			13	(EXPECT 000 = STATUS)
5636	0000			0	
5637	0076		INA		
5640	0260		ZJP	T2	JUMP IF STATUS CORRECT
5641	5645			MTHT16	
5642	0077	MTHT15	HLT		(A) = INCORRECT STATUS
5643	0264		UJP	T2	JUMP TO REWRITE 4000-5100
5644	5611		MTJMP7		
5645	0077	MTHT16	HLT		PROGRAM ON MAG. TAPE IN 7 RECORDS
5646	0002		DON		THE FOLLOWING ROUTINE WILL CLEAR
5647	0002		DON		MEMORY LOCATIONS 0000 = 5377
5650	0020		LDN		T3 = 13 OCTAL
5651	0013			13	
5652	0302		ATT	T3	
5653	0003		CLA		T1 = 0 OCTAL
5654	0102		ATT	T1	LOWER CLEARED MEMORY BANK
5655	0020		LDN		T2 = 12 OCTAL
5656	0012			12	UPPER CLEARED MEMORY BANK
5657	0202		ATT	T2	
5660	0003	MTJP10	CLA		
5661	0142		STI	T1	
5662	0000			0	
5663	0055		RAO		
5664	0000			0	
5665	0361		NZP	T3	
5666	5660			MTJP10	
5667	0203		TTA	T2	
5670	0041		STM		
5671	0001			1	
5672	0103		TTA	T1	
5673	0035		SBM		
5674	0001			1	
5675	0360		ZJP	T3	
5676	5705			MTHT17	
5677	9103		TTA	T1	
5700	0030		ADN		
5701	0001			1	
5702	0102		ATT	T1	
5703	0364		UJP	T3	
5704	5660			MTJP10	
5705	0077	MTHT17	HLT		PROGRAM MEMORY CLEARED
	0000	END			COMPLETE ASSEMBLY

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. The minimum hardware configuration required is:

8092B Teleprogrammer

8022 Page Reader Controller

915 Page Reader

8096, 8196 or 8299 Paper Tape Reader or

8193/601 Magnetic Tape Transport or

8194/609/608 Magnetic Tape Transport

B. LOADING PROCEDURE

1. Magnetic Tape Version

- a. LOAD and 'READY' tape on Unit 3.
- b. MASTER CLEAR, set LOAD/CLEAR switch to LOAD, and RUN.
- c. When the 8092 stops at 1401 or 1403 with the A = 377, MASTER CLEAR and RUN.
- d. When the 8092 stops at 7000 with A = 0, enter A with the desired file number and RUN. {See TABLE 1}.
- e. The 8092 will stop at 7000 with A equal the file number of the program loaded. To execute the program, MASTER CLEAR and RUN.

2. Paper Tape Version {8096 or 8196}*

- a. Manually ENTER the program in TABLE 2.
- b. MASTER CLEAR, Set P to 6000 and RUN.
- c. When the 8092 stops, place the RUN/STEP switch to center position, load the desired test routine paper tape into the Teletype reader.
- d. Set A and TAG 1 = 0. RUN. Turn on paper tape reader.
- e. When the computer stops, MASTER CLEAR and RUN to execute the program.

C. PARAMETERS

1. Setting a bit in memory location 21₈ will accomplish the following:

* If the system has an 8299, just LOAD and RUN.

I. C. 1. continued

- Bit 0 = Repeat Section
- Bit 1 = Not Used
- Bit 2 = Suppress Timeout
- Bit 3 = End of Section Stop
- Bit 4 = Not Used
- Bit 5 = Stop on Error
- Bit 6 = Not Used
- Bit 7 = Not Used

II. MESSAGES

A. NORMAL MESSAGES AND STOPS {A = STOP CODE}

1. 8092/915 OCR Test Sect X
No stop is incurred here X = Section Number.
2. {A = 55}
No timeout occurs. This is an end of section stop. Parameters may be modified. CLEAR and RUN are then actuated to repeat the test.
3. Microseconds time at compare = XXX X 48.
No stop is incurred here. Accuracy of check is limited to 48 microseconds. XXX is the multiplier.
4. TIMING MIN MAX AVG UNIT {A = 144}
READ AAA0 BBB0 CCC0 CHTR/SEC
FMM DDD0 EEE0 FFF0 CTS/SEC
RMM GGG0 HHH0 III0 CTS/SEC
1 SPACE JJJ KKK LLL MS
2 SPACE MMM NNN PPP MS
SORT RRR SSS TTT MS

This is a data summary. In the timeout, CHTR/SEC = Characters per second reading rate. CTS/SEC = mirror coordinate per second for forward and reverse mirror motion. MS = milliseconds to accomplish a sort, single, and double space.

If location 21₈ = 044₈ {consult I. C. 1.}, the computer will come to a stop and the data summary can be found in memory locations 5400₈ → 5465₈ in the order of A → T respectively.

B. COMMAND MESSAGES AND STOPS {A = STOP CODE}

1. ∇STOP, ENTER FUNCTION 1, START, RUN ∇ {A = 40}
STOP, FUNCTION 1 and START switches on the 915

- II. B. 1. continued
are depressed in that order. RUN on the 80928 is actuated.*
2. ▽STOP, ENTER FUNCTION 2, START, RUN ▽ {A = 41}
Same as 1 except FUNCTION 2.
 3. ▽STOP, ENTER FUNCTION 3, START, RUN ▽ {A = 42}
Same as 1 except FUNCTION 3.
 4. ▽STOP, ENTER EOF, START, RUN ▽ {A = 43}
Same as 1 except EOF.
 5. ▽CLEAR EOF ▽ {A = 47}
The EOF switch is depressed and the RUN is actuated.
 6. ▽MAKE RDY AFTER PROGRAM ERROR ▽ {A = 44}
The program error indicator should be lit. PROGRAM ERROR, LOAD DOCUMENT AND START are depressed in that order. RUN is actuated.
 7. ▽MAKE RDY AFTER HEADER REJECT ▽ {A = 45}
Same as 44 except HEADER REJECT.
 8. ▽ADVANCED COUNTERS ▽ {A = 46}
Run is actuated the counters advance to 100. The computer halts with A = 100. The operator may check the counters before actuating RUN to continue. To increment beyond 100, MASTER CLEAR and set T1 to 12, P to 5000 and RUN.
 9. ▽CHECK COUNTERS CLEARED ▽ {A = 50}
The 3 counters should be reset to zeroes.
- C. ERROR MESSAGES AND STOPS {A = STOP CODE}
1. S BIT X SET {A = 1}
Reader control status bit X is set but should not be. To display X +260 in the A register after such error stop RUN must be actuated.
 2. S BIT X NOT SET {A = 2}
Reader control status bit X is not set but should be. RUN displays X +260 after such an error stop.
 3. ES BIT X {NOT} SET {A = 3 or 4}
Same as 1 and 2 but for Entry Control Status.
 4. UNSEL X INT {A = 10}
An unselected X interrupt has occurred where X = R for ready and not busy {RNB} and interrupt 40 or E for an entry control interrupt 30.
- * A failure to follow this procedure for messages 1 - 4 may give error message 7.

- II. C. 5. NO X INT {A = 11}
An X interrupt did not occur where X is the same as for 10.
6. X INT ERR {A = 12}
Indicates inconsistent 915 status after a 30 or 40 interrupt.
7. NO E INT {A = 26}
A 30 interrupt did not occur after an entry in section 6.
8. STOP READ ERR {A = 31}
Busy status is set after selection of a stop read function.
9. X MIRROR YYY = ZZZ {A = 33}
An excessive overshoot has occurred on the mirror overshoot check. X indicates direction { X = F = forward or = R = reverse} YYY and ZZZ are expected and received mirror coordinates. BXR contains YYY after an error stop. RUN to display ZZZ in the A register.
10. X MOTION FAIL {A = 34}
Two conditions will generate this timeout. Either the mirror status cannot be monitored by the program and/or the mirror cannot travel freely between the limit switches. X = F or R and denotes forward {F} or reverse {R} direction.
11. COORDINATE DRIFT FROM XXX TO YYY {A = 130}
Reading a character and requesting mirror status YYY upon reception of the character has resulted in a coordinate drift in excess of two counts. XXX is the expected mirror coordinate and YYY the received coordinate.

III. TEST DESCRIPTION

A. INITIALIZATION

1. Location 21_a must be set prior to the running of the following 6 Test Sections. {consult I. C. 1.}

B. SECTION 1

1. Purpose: Check forward/reverse mirror overshoot, counter ability to increment and decrement, and basic status and function responses.

- III. B. 2. Documents Required: A document to keep the 915 in a ready condition.
3. Procedure: MIRROR MOTION
- a. Ready, not busy status expected
 - b. Mirror coordinate 200_B
 - c. Wait not busy
 - d. Wait for busy status
 - e. Type MICROSECOND TIME AT COMPARE = XXX x 4_B which is the approximate time for busy to clear and set
 - f. Mirror to 377_B
 - g. Ready, Busy status expected
 - h. Wait 50 ms
 - i. Request mirror status = XXX_B
 - j. Wait 10 ms
 - k. Request mirror status = YYY_B
 - l. If XXX_B < YYY_B go to n
 - m. Type F_BMOTION_BFAIL
 - n. If YYY_B < 375_B go to j
 - o. Expect_B ready, not busy status
 - p. Mirror to 000_B
 - q. Ready, busy status is expected
 - r. Request mirror status = XXX_B
 - s. Wait 20 ms
 - t. Request mirror status = YYY_B
 - u. If XXX_B > YYY_B go to w
 - v. Type R_BMOTION_BFAIL
 - w. Request mirror status = XXX_B
 - x. If XXX_B > 000_B go to r
 - y. Wait 50 ms
 - z. Expect ready and not busy status
 - aa. Repeat nine times from f
 - ab. Wait not busy
 - ac. Expect ready
 - ad. Mirror to XXX {=360_B initially}
 - ae. Expect busy
 - af. Wait 500 ms for compare to come up
 - ag. Mirror overshoot should be ≤ 2 counts
 - ah. Set XXX to XXX -5
 - ai. If XXX > 2_B go to ad
 - aj. Mirror to 377_B
 - ak. Expect busy
 - al. Wait not busy
 - am. Mirror reversed to XXX {= 30_B initially}
 - an. Wait for compare
 - ao. Wait for mirror to stop
 - ap. Overshoot should be ≤ 17 counts
 - aq. Update XXX by +5
 - ar. If XXX ≤ 370 _B go to aj
 - as. Zero the mirror
 - at. Mirror to XXX {=360_B initially}
 - au. Wait for mirror to stop

- III. B. 3. av. Overshoot should be ≤ 2
aw. Reverse to ZZZ (= 30_g originally)
ax. Wait for mirror to stop
ay. Overshoot should be ≤ 17
az. Update XXX by -5, ZZZ by +5
ba. If XXX < 207 _g repeat from at

C. SECTION 2

1. Purpose: To test the 915 sorting ability
2. Documents Required: 11 blank documents
3. Procedure:
 - a. Sort to primary stacker
 - b. Expect busy and ready
 - c. Wait not busy
 - d. Sort to secondary stacker
 - e. Expect busy and ready
 - f. Wait not busy
 - g. Repeat from a four times

D. SECTION 3

1. Purpose: Test interrupt 40 {interrupt on ready and not busy}
2. Documents Required: A document to keep the 915 in a ready condition
3. Procedure:
 - a. Expect ready, not busy
 - b. Mirror to 20_g
 - c. Expect ready_g and busy
 - d. Wait not busy
 - e. Clear interrupt lockout
 - f. Interrupt should have occurred
 - g. Zero the mirror
 - h. Repeat from b 49 times

E. SECTION 4

1. Purpose: Check mirror timing with respect to reading, forward mirror motion, reverse mirror motion, single spacing, double spacing and sorting.
2. Documents Required: Two blank documents
3. Procedure:
 - a. Reading rate: A line of characters is read for a fixed length of time {0.1 second} ten times. Times are printed as characters per second.
 - b. Forward mirror timing: The mirror is moved forward for a one tenth second interval ten times. The distance is in counts per second.

- III. E. 3. c. Reverse mirror timing: The mirror is reversed 40 times for 25 ms intervals. The distance in counts during one second is printed in counts per second.
- d. Line Spacing: Times for single spacing ten lines and double spacing ten times are printed in milliseconds. {Sort and line spacing times are the number of milliseconds the 915 has a busy status}.
- e. Sorting timing: The time to sort a document is calculated in milliseconds. One document is sorted.

F. SECTION 5

1. Purpose: Check the 915 marking pen
2. Documents Required: 6 blank documents
3. Procedure:
 - a. Single space
 - b. Wait 200 milliseconds
 - c. Mark document
 - d. Repeat from a 59 times
 - e. Sort to primary stacker
 - f. Repeat from a four times

G. SECTION 6

1. Purpose: Check the 915 counters, entry status indicators, and the entry status, program error status and function and the Header Reject function.
2. Documents Required: 3 blank documents are needed to keep the 915 ready.
3. Procedure:
 - a. Select enter partial
 - b. Type STOP, ENTER FUNCTION 1, START, RUN
 - c. The appropriate indicators on the 915 are pressed
 - d. Operator puts computer into RUN
 - e. All entry status is now checked
 - f. Steps a to e are repeated for FUNCTION 2
 - g. Steps a to e are repeated for FUNCTION 3
 - h. Steps a to e are repeated for ENTER EOF
 - i. Type CLEAR EOF
 - j. The program will halt the operator depresses the END OF FILE switch
 - k. Select PROGRAM ERROR
 - l. Expect not ready
 - m. Type MAKE RDY AFTER PROGRAM ERROR
 - n. The program stops and the 915 is made ready by the operator
 - o. Select HEADER REJECT
 - p. Expect not ready

- III. G. 3. q. Type MAKE READY AFTER HEADER REJECT
- r. The program stops and the 915 is made ready by depressing HEADER REJECT, LOAD DOCUMENT and START
- s. Type ADVANCE COUNTERS
- t. The counters advance to 100 and the computer halts with A = 100
- u. RUN to clear counters 1, 2, and 3
- v. Type CHECK COUNTERS CLEARED

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. The minimum hardware configuration required is:
 - 8092B Teleprogrammer
 - 8022/915 Page reader controller and reader
 - 8096, 8196, or 8299 Paper tape reader or,
 - 8193/601 or 8194/608/609 Magnetic Tape Transport
2. Those persons not having the additional USASA characters will have to set the number of characters read to 60 {see I.C.2.}

B. LOADING PROCEDURE

1. Magnetic Tape Version

- a. LOAD and READY tape on Unit 3.
- b. MASTER CLEAR, set LOAD/CLEAR switch to LOAD, and RUN.
- c. When the 8092 stops at 1401 or 1403 with A = 377, MASTER CLEAR and RUN.
- d. When the 8092 stops at 7000 with A = 000, enter A with the desired file number and RUN. {see TABLE 1}
- e. The 8092 will stop at 7000 with A = the file number of the program loaded. To execute the program, MASTER CLEAR and RUN.

2. Paper Tape Version {8096 or 8196}*

- a. Manually ENTER the program in TABLE 2.
- b. MASTER CLEAR, Set P to 6000 and RUN.
- c. When the 8092 stops, place the RUN/STEP switch to the center position, load the desired test routine paper tape into the Teletype reader.
- d. Set A and TAG 1 = 0 and RUN. Turn on the paper tape reader.
- e. When the computer stops, MASTER CLEAR and RUN to execute the program.

C. PARAMETERS {SWITCH & SEGMNT}

1. When the Interrupt System is enabled, MANUAL INTERRUPT will bring the computer to a stop with the A register = the contents of the location {2} SWITCH. Alter A to the desired options and RUN.

A Register

- Bit 0 = Section Stop
- Bit 1 = End of Test Stop**
- Bit 2 = Stop on Error
- Bit 3 = Repeat Section

* If the system has an 8299, just LOAD and RUN.

** Not Used.

I. C. 1. {continued}

- Bit 4 = Repeat Condition {Repeat Line}
- Bit 5 = Suppress Timeout
- Bit 6 = Repeat Test*
- Bit 7 = Option {Suppress Minor Info see II. C. 2}

* Not used.

2. Depressing a key on the Teletype or EOF on the 915 will bring the computer to a stop displaying Core Location {27₈} SEGMENT. Altering 'A' will do the following:

- Bit 0 & 1 = 1 - 3 = Single space through triple space, respectively.
- = 0 = No change {double space initially }
- Bit 2 = 1 = No Line Locate
- = 0 = Line Locate
- Bit 3 & 4 = 0 or 3 = Alternate Scan Height
- = 1 = R3P
- = 2 = R6P
- Bit 5 = 1 = Stop to display document parameters. This bit is cleared when the chain of stops is complete. When the computer is stopped, the value can be changed by changing the contents of A.

Stop 1 A = First coordinate of line read

Stop 2 A = Last coordinate of line read

Stop 3 A = Read mode

ANM = 010₈

ALF = 011₈

NUM = 012₈

MKS = 013₈

Stop 4 A = Number of characters to be read. A number in excess of 105₈ will be rejected.

Stop 5 A = Number of lines. If A = 0, it is because spacing was not requested in bits 0 + 1 of SEGMENT.

I. C. 2. {continued}

- Bit 6 = 1 = Type all data, line by line, from the document. Each line becomes the reference line until this bit of SEGMNT is cleared by the operator.
- Bit 7 = 1 = Compare Remainder of Document with Line 1 of first Document.

II. MESSAGES*

A. NORMAL MESSAGES

1. 8092/915 OCR Test Sect 7
Initial Timeout
2. END
X,XXX,XXX INT 40 S
End of test.
Up to 1,279,999 interrupts can be accounted for in a normal run. This is intended as a C.E. aid in determining READY, NOT BUSY time or interrupt 40 problems.

B. ERROR MESSAGES

1. R\$1 E XXX A XXX LS XX
Read Status 1 error. {BER = 1}
The actual bits checked are contained in the memory location 7_g called MASK.
The Expected Status {E} differs from the Actual Status {A}. The Last Select issued was {LS},
2. D XX L XX S X C XX EX X RD X P XX
Character Comparison error. {BER = 21}
In this message, redundant output is suppressed. Document No. {D} has an error on Line {L}. The Scan Mod was {SX}, the Character Number was {C}. The Character Expected was {EX}. The Character read was {RD}, and the Number of Repeated Passes on this line were {P}. P XX is not typed unless repeat line option is used. D XX types out once per document. L XX SX types out once per line, C XX EX X RD X types out in every character error.

* All numeric timeouts are in decimal except II. B. 1. which is all in octal.

- II. B. 3. Shift +1
This message is tagged on to the end of a character error typeout to indicate that a shift in the data input has been detected. The compare line is resynced to avoid erroneous typeouts.
4. LL SRCH FAIL L XX.
Line Locator Search Fail. {BER - 31}
The Search for Line Locator on Line {L XX} failed.
- C. ERROR STOPS {Bit 2 of SWITCH Set}
1. BER = 1 Read Status 1 Fail
A = Expected Status
Stop 2 A= Received Status
Stop 3 A= Last Select
2. BER = 21 Character Error
A = Expected Char
Stop 2 A= Received Char
- The following will be eliminated if Bit 7 of SWITCH is set.
- Stop 3 A= Pass No.
Stop 4 A= Line No.
Stop 5 A= Document No.
Stop 6 A= Scan Height
3. BER = 31 Line Locator Search Fail
A = Line Number
4. BER = 55 End of Section Stop
Stops only if Bit 0 of SWITCH is set.

III. TEST DESCRIPTION

A. INITIALIZATION

1. To change parameters before starting the test.
- MASTER CLEAR the computer
 - Set the INTERRUPT
 - RUN. After changing parameters, RUN to execute program.
2. The following are character substitutions for this test section.

<u>915</u>	<u>TELETYPE</u>
↓ or J)
Δ	<
↑ or H	↑
h or Y	>
‡	+
REJECT	@
FIELD MARK	!

- III. A. 3. A line drawn through 3 consecutive characters constitutes a delete the remainder of that line from error checking.

B. SECTION 7

1. Purpose: To check the reading and spacing ability of the 915 Page Reader.

2. Documents Required: One of the packages, A → F in TABLE 3. The purpose of each package is as follows:

- a. To test reading of characters rotated from -2.75 degrees to +2.75 degrees with stroke width from 10 mills to 14 mills.
- a'. Same as a but with a stroke width of 12 mills to 16 mills.
- b. To test the reading of minimum pitch, maximum stroke width characters.
- c. To test the reading of maximum pitch, and minimum stroke width characters.
- d. To test normal reading of a single spaced document.
- e. To test the normal reading of a triple spaced document.
- f. To test space suppression and generation.

3. Procedure:

- a. Type section message
- b. Sort first document to secondary
- c. Double space next document
- d. Set parameters
- e. Mirror → 24_g
- f. If SEGMENT = $\overline{XX4}_g$, line locate
- g. Mirror → 40_g
- h. Read line
- i. If SEGMENT = 100 → {l}, if 200 → {k}
if not → {m}
- j. If line number, document number, and pass number = 0 → {l} if not → {m}
- k. Type reference line, and if Bit 3 of switch is set, stop to display each character
- l. Test buffer for rejects. If reject → {n}
if not → {o}
- m. Confirm reject by status, go to 0
- n. Confirm no reject by status
- o. Compare data buffer to reference line. If no error → {q}, if error → {p}
- p. Output the error message
- q. Have data and reference lines shifted with respect to each other?
If yes {-} → {s}, if yes {+} → {r}, if no → {u}

- III. B. 3.
- r. Output shift +1 go to {t}
 - s. Output shift -1
 - t. Resync data and compare lines
 - u. Is character comparison complete?
If no, → {o}, if yes, → {v}
 - v. If Bit 4 of switch is set → {w}
if not → {x}
 - w. Zero mirror and increment pass counter,
go to {f}
 - x. Retrace mirror, space document, clear
pass counter and increment line number
 - y. Is document complete? If no → {f},
if yes, continue
 - z. Sort document to primary, clear line
counter, increment document counter,
double space next document
 - aa. Is test complete? If no → {f}, if yes,
continue
 - ab. Type out the number of INT 40's and END
message
 - ac. Is Bit 3 of switch set? If yes, → {a}
 - ad. Is Bit 0 of switch set? If yes, halt.
If not {halt, SMM 92 not yet present}

TABLE 1

BALD MAGNETIC TAPE LAYOUT

<u>TEST ROUTINE FILE NUMBER</u>	<u>TEST SECTION NUMBER</u>	<u>TEST DESCRIPTION</u>
32	1	Check mirror overshoot, basic functions and status responses.
33	2	Check 915 Alternate sorting ability.
34	3	Check Interrupt 40 on Ready and Not Busy.
35	4	Check timing on Forward/Reverse Mirror, and reading, single and double spacing, and sorting.
36	5	Check 915 Marking Pen.
37	6	Check 915 counters, entries, program error and header reject functions.
40	7	Reading test for single and double spaced documents.

TABLE 2
BIQUARTIC PAPER TAPE LOADER
{For use with an 8096}

6000	020	6060	001	6140	023
	014		341		321
	302		215		214
	020		075		030
	023		036		001
	341		003		341
	044		076		214
	020		010		363
6010	000	6070	004	6150	023
	341		360		360
	217		063		165
	177		075		034
	341		036		001
	214		005		341
	075		076		214
	036		341		103
6020	005	6100	216	6160	030
	074		010		001
	000		020		102
	075		361		364
	036		173		023
	003		321		020
	076		216		377
	010		010		341
6030	004	6110	017	6170	214
	360		315		364
	023		215		023
	075		341		075
	036		215		036
	005		331		005
	076		217		073
	341		341		201
6040	216	6120	217	6200	207
	010		321		077
	020		214		305
	360		341		317
	023		130		317
	020		321		322
	207		215		317
	341		141		321
6050	044	6130	376	6210	317
	321		321		364
	216		214		003
	010		363		000
	017		141		377
	001		355		000
	001		214		000
	001		364		000

TABLE 3

DOCUMENT **	PACKAGE***							
	a	a'	b	c	d	e	f	
60217502	1							
60217503	1							
60217504	1	1						
60217505	1	1						
60217506	1	1						
60217507	1	1						
60217508		1						
60217509		1						
60217510	1							
60217511	2	1						
60217512	1	2						
60217513		1						
60217514			10					
60217515				10				
60217516					10	10		
M								10

NOTES:

PACKAGES a or a'

For trouble shooting, use that package which falls within the stroke width adjustment of the machine. Occasionally, adjust the signal α to a range which will allow testing the other packet during Routine P. M.

PACKAGES a \rightarrow c

The reference line in core need not be changed for these documents. {no change in SEGMENT}

PACKAGES d \rightarrow f

SEGMENT must be changed on d and e to reflect single space {011} or triple space {013} respectively or {015} and {017} for the same without line locator. Package f needs a change in the reference line. To do this, SEGMENT must be set to {202}. This allows the first line of the first document to become the reference line. Check it on the teletype to insure that it is correct.

** Document still under consideration. When it is generated, it will be supplied to the field.

*** Each package consists of 12 documents. The 10 shown in the table, and one blank at the front and back of this group.

TABLE 4

<u>Document No.</u>	<u>Stroke Width</u> <u>± .0005"</u>	<u>CW Rotation</u> <u>± .24°</u>	<u>CCW Rotation</u> <u>± .24°</u>
60217502	.010		2.75
60217503	.010	2.75°	
60217504	.012		2.75
60217505	.012	2.75°	
60217506	.014		2.75
60217507	.014	2.75°	
60217508	.016		2.75
60217509	.016	2.75°	
60217510	.010	0 ± .5°	——
60217511	.012	0 ± .5°	——
60217512	.014	0 ± .5°	——
60217513	.016	0 ± .5°	——
60217514*	.0155	0 ± .5	——
60217515**	.0105	0 ± .5	——

* Pitch is $.082 \pm .002''$ except where restricted by a minimum clear space between adjacent characters of .016 inches.

** Pitch is $.133 \pm .002''$.

TABLE 5
STATUS RESPONSE

LS CODE	LS FUNCTION	E	MASK [Ⓜ]	DELAY ^{ⓂⓂ}	REMARKS	
01	SPA	300	300	0	Double space issued with the start of each new document Mirror from 0 → 24 ₈ Mirror ₈ from 350 → 0 Mirror ₈ from 350 → 0	
01	SPA	200	371	40		
02	SMF	200	300	50		
03	SMR	200	300	127		
05	ZM	300	376	0		
05	ZM	040	040	127		
44	LR	020	020	100		
44	LR	000	010	0		No reject found in data, check status to confirm.
44	LR	010	010	0		Reject found in data, check status to confirm.
44	LR	200	300	0		
50	SP	300	300	0		
50	SP	200	371	650 ^{ⓂⓂⓂ}		
51	SS	300	300	0		
51	SS	200	371	2050 ^{ⓂⓂⓂ}		

[Ⓜ] The one bits of the Mask are the only status bits considered in the error.

^{ⓂⓂ} All delays are performed after the function and prior to the actual status check. All delays are in milliseconds. This is a raw delay and does not include instruction execution time or prior delays.

^{ⓂⓂⓂ} Differences in delay time are due to document position at the time of selection execution.

TABLE 6
 SPECS.

FORWARD MIRROR

CHTR/SEC 370 + 13 CHARACTERS
 CTS/SEC 768 ± 48 COUNTS
 OVER SHOOT Less than 5 COUNTS

REVERSE MIRROR

CTS/SEC 2944 + 256 COUNTS
 OVER SHOOT Less than 25 COUNTS

SPACING

{Time in milliseconds}*

Setting in Lines per In.	Spaces	
	Single	Double
6	22	40
5 1/3	24	44
5	26	48
4	31	57

* The 8022 generates an additional 4 milliseconds which would have to be added to these figures to determine page reader ready time.

REMOTE CONTROLLER TEST (RMT)

8130 System/201A - 201A/311B/3266/6681/6X00

I. OPERATIONAL PROCEDURE

A. RESTRICTIONS

1. The 6X00 System and 8130 System operators must make the same parameter selections for the tests to run in unison (i.e. section numbers, sync codes, parity mode, etc.).
2. Test must run with 6X00 package following test requirements outlined in Software Interface Specifications between 6X00/6681/3266 Communications Test and a Remote Computer. (See Appendix A.)
3. 8130 remote test should be started first.
4. The test runs in UNIVERSAL MODE and makes no provisions for either ASCII or IBM 4 of 8 mode due to the limitations of the standard 8130 Remote Terminal System.
5. Any wired parity option may be used for parity checking (i.e., even, odd, or no character parity).

B. LOADING

Test is loaded with 64 column binary punched deck. P = 6500

C. PARAMETERS

1. HALT at P = 50

- a. Enter Sync code in location 372g.
- b. Load A Register with Section (i.e., set bit 0 to a "1" for Sec. 4, bit 1 for Sec. 5.)
- c. Enter parity mode in Tag 3 (i.e., 0g = NO PARITY, 1g = ODD PARITY, 2g = EVEN PARITY). Can select only one parity mode at one time.

2. a. Location 373g contains the STOP/REPEAT bits as follows:

Remote running under CRAP or SMM 2.0

XX1	STOP on Error
XX2	Stop at End of Section
XX4	Stop at End of Test
X1X	Repeat Condition (Pattern)
X2X	Repeat Section
X4X	Repeat Test

b. Remote running under SCOPE 3.1

1X1	Print Error
1X2	No Stop
1X4	No Stop
11X	No Repeat
12X	No Repeat

More than one bit may be set simultaneously.

II. MESSAGES

A. NORMAL MESSAGES

The following are the octal codes that will be displayed in the A Register during a normal HALT.

1. Code 13 will be displayed for a End of Section Stop.
This condition is determined by checking bit 1 of location 331g, which contains the STOP/REPEAT codes, and finding it set.
2. Code 14 will be displayed for an End of Test Stop. This condition is determined by checking bit 2 of location 331g and finding it set.
3. Code 20 will be displayed when the Manual Interrupt switch has been depressed. This stop allows the operator to change the parameters for the desired conditions (i.e.; STOP/REPEAT conditions in location 331g).

MI may be depressed during an Error Halt to allow the operator to change parameters for repeat of pattern.

B. ERROR MESSAGES

The following are the error codes that will be displayed during an error stop, where A contains the Error Code, BER contains the expected data or status, BXR contains the actual data or status. Only the lower 8 bits of the BER, BXR Register are meaningful for the following Error Stops.

Record program address at a HALT. Sweep any desired location. To continue program, enter recorded program address in P and put in Run.

1. Error code 00 -- Buffer was busy when executing a ABR or ABX instruction. Computer should not be in the buffer mode of operation. On error printouts, zero's (00) are to be ignored.
2. Error code 01 -- Unidentified interrupt occurred.
3. Error code 02 -- Data compare error between data generated and data received.
4. Error code 03 -- More than 108 compare errors occurred. BER holds the pattern number and BXR the error count.
5. Error code 04 -- Parity errors detected in data received. BER holds the pattern number and BXR the number of parity errors.
6. Error code 05 -- Word Lost. BER holds the pattern number and BXR the number of words lost.
7. Error code 06 -- Status Error.
8. Error code 07 -- DSC did not send an interrupt to the computer within the specified time (Timeout Error).
9. Error code 10 -- Card Reader not ready. Place CR in ready mode.

10. Error code 11 -- Line Printer not ready. Place LP in ready mode.
11. Error code 21 -- Interrupt received before program processed previous interrupt (INT not Cleared after executing a CIL).
12. Error code 12 -- Word Lost should be set on Pattern 15g and it was not set.

III. DESCRIPTION

This test is written to interface with 6X00/6681/311B/201A Data Set Controller Test.

After loading in 8130 Remote Test deck, Master Clear, clear Tag registers and place computer in Run mode. The program halts at P = 50 for parameter entry. (See PARAMETERS I.C.1 for proper entries.)

DO NOT MC after program has been loaded unless test is to be restarted. If operator wishes to HALT anywhere in program, enter appropriate HLT in program.

A. Section 4 DATA TRANSFER

Section 4 begins by initializing flags, the SSB and BSB flags. The program then goes into Receive mode and waits for the 6X00

test to send the first pattern. After receiving the data the test reports all errors detected since last lost input operation. The test then generates the pattern and compares it against the received pattern. If there is a data compare error, an Error Code of 2 will be displayed in the A register. BER contains the expected data and BXR the actual data. After checking the data, the pattern number and pattern index is updated. The test returns the data pattern and sets the controller to Receive Mode. If the test finds that operator set the bit for repeat of the last pattern, an unchanged DSB will be sent to the 6X00 and again set the controller to Receive Mode. If the test receives an unchanged SSB from the 6X00, the last pattern is again transmitted to the 6X00.

A Word Lost condition is forced on pattern 15g. The test reads in two less words than the 6X00 transmits thereby forcing Word Lost to set.

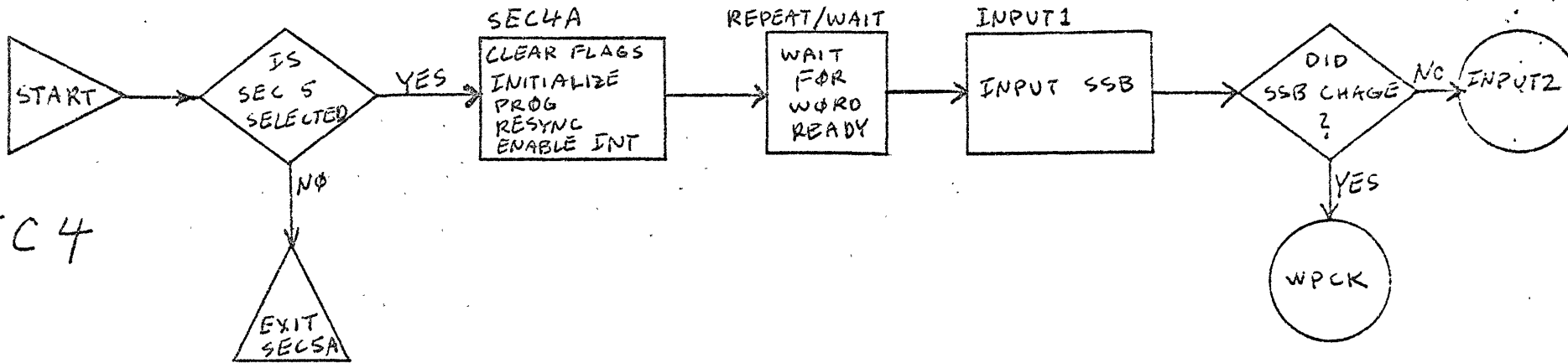
On data patterns 20g through 27g, the 6X00 forces opposite parity on data transmitted. The above sequence then continued until pattern 44g is exchanged. Following pattern 44g, the 6X00 sends a "wasted" pattern (one word transmission) and the test gains control to send random data patterns to the 6X00. The 6X00 returns the pattern and they are checked against the generated patterns. After the last pattern is received, a

{RMT-L}

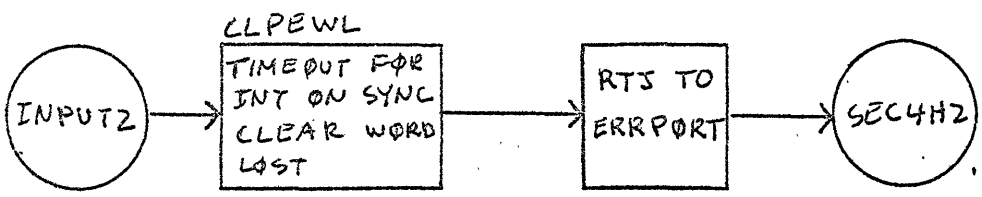
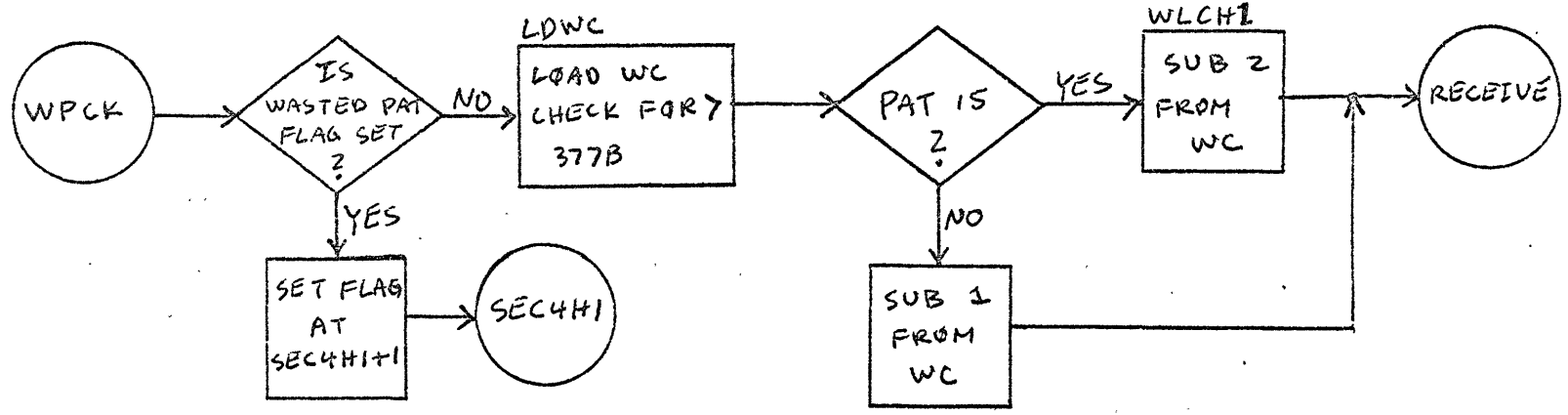
One word "wasted" pattern is sent to the 6X00 which now gains control of the test. Repeat section parameter is checked and if set, section 4 is repeated. Test is terminated if section 4 is not to be repeated and section 5 is not selected.

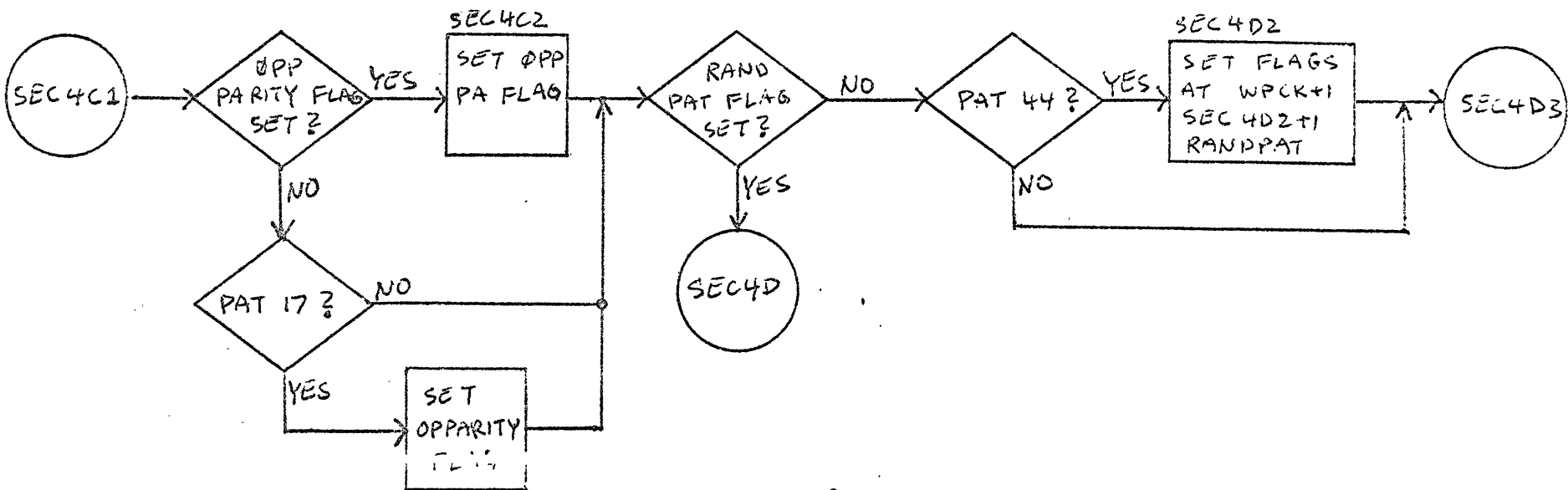
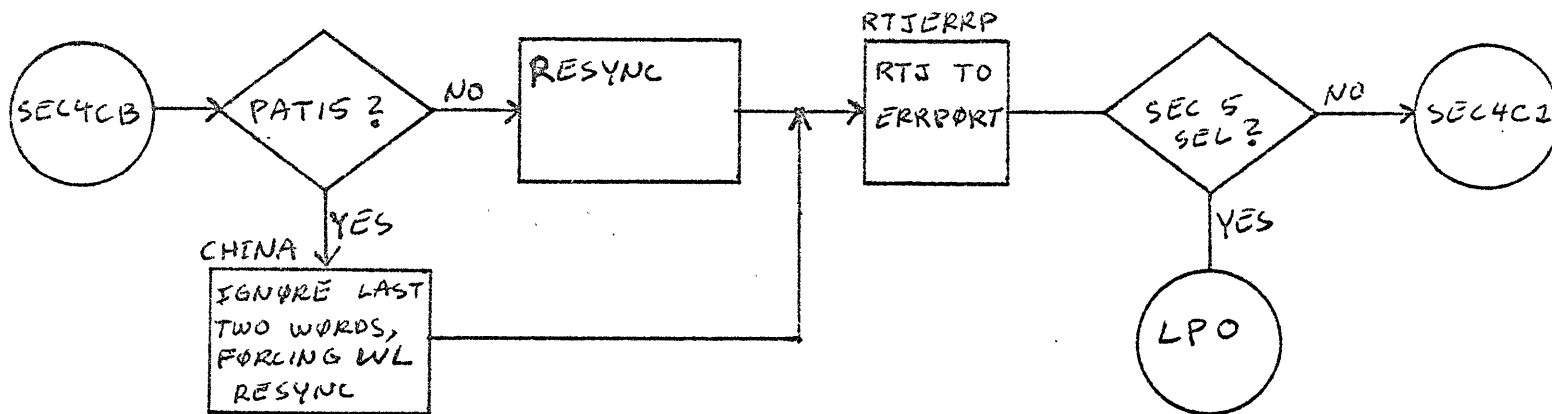
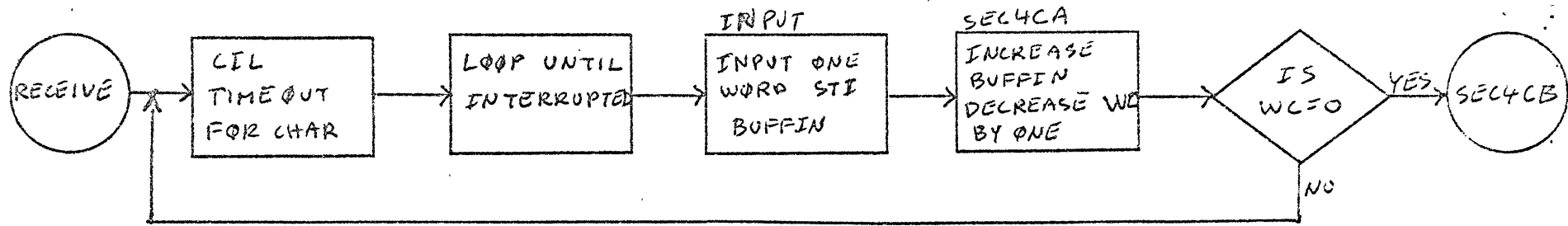
Section 5 reads cards from the card reader and trasmits information to the 6X00. The 6X00 returns data unchecked and the 8092 prints data on line printer. 3 Hollerith cards should be used for the test.

SEC 4



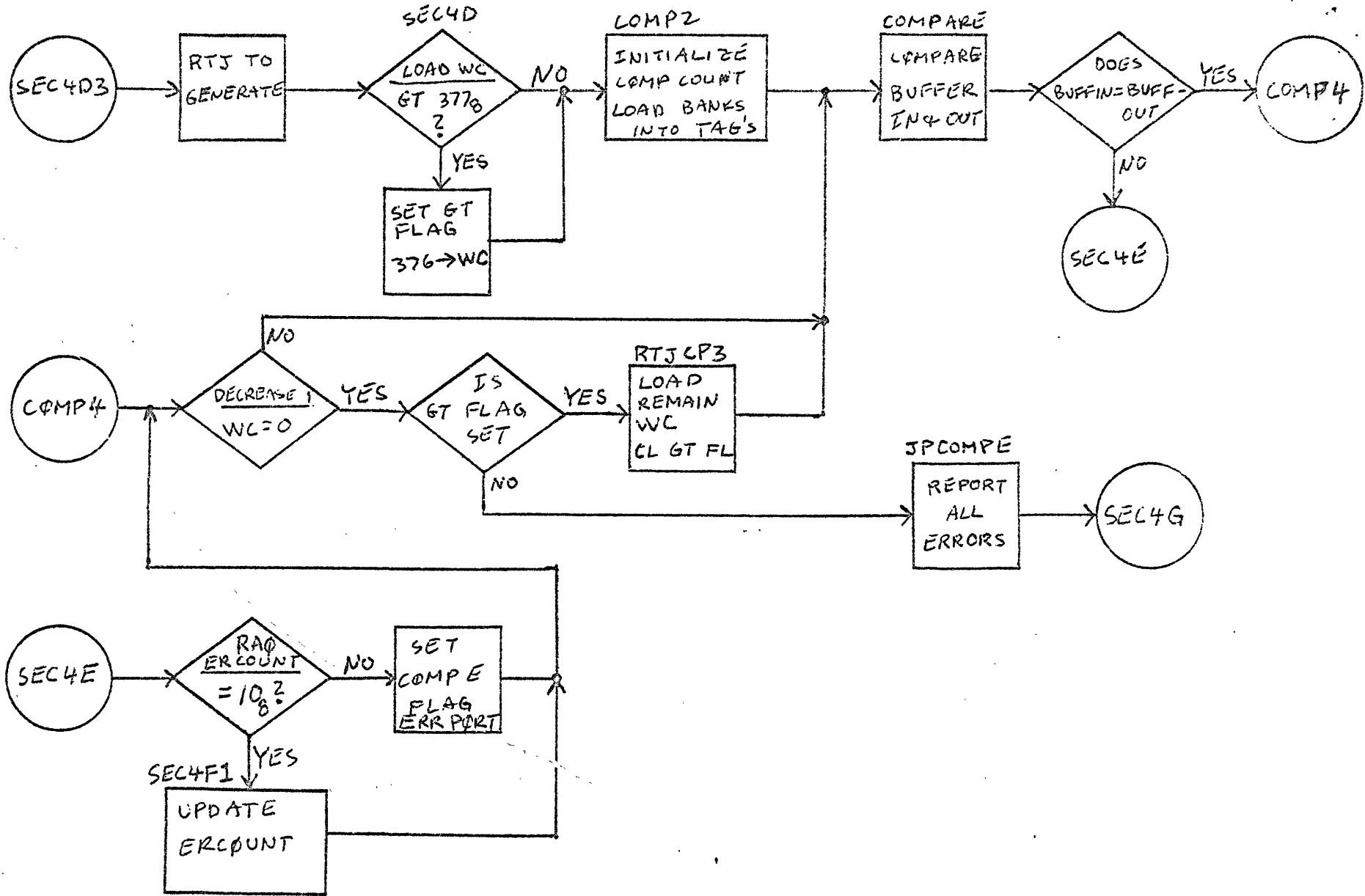
{RMT-B}



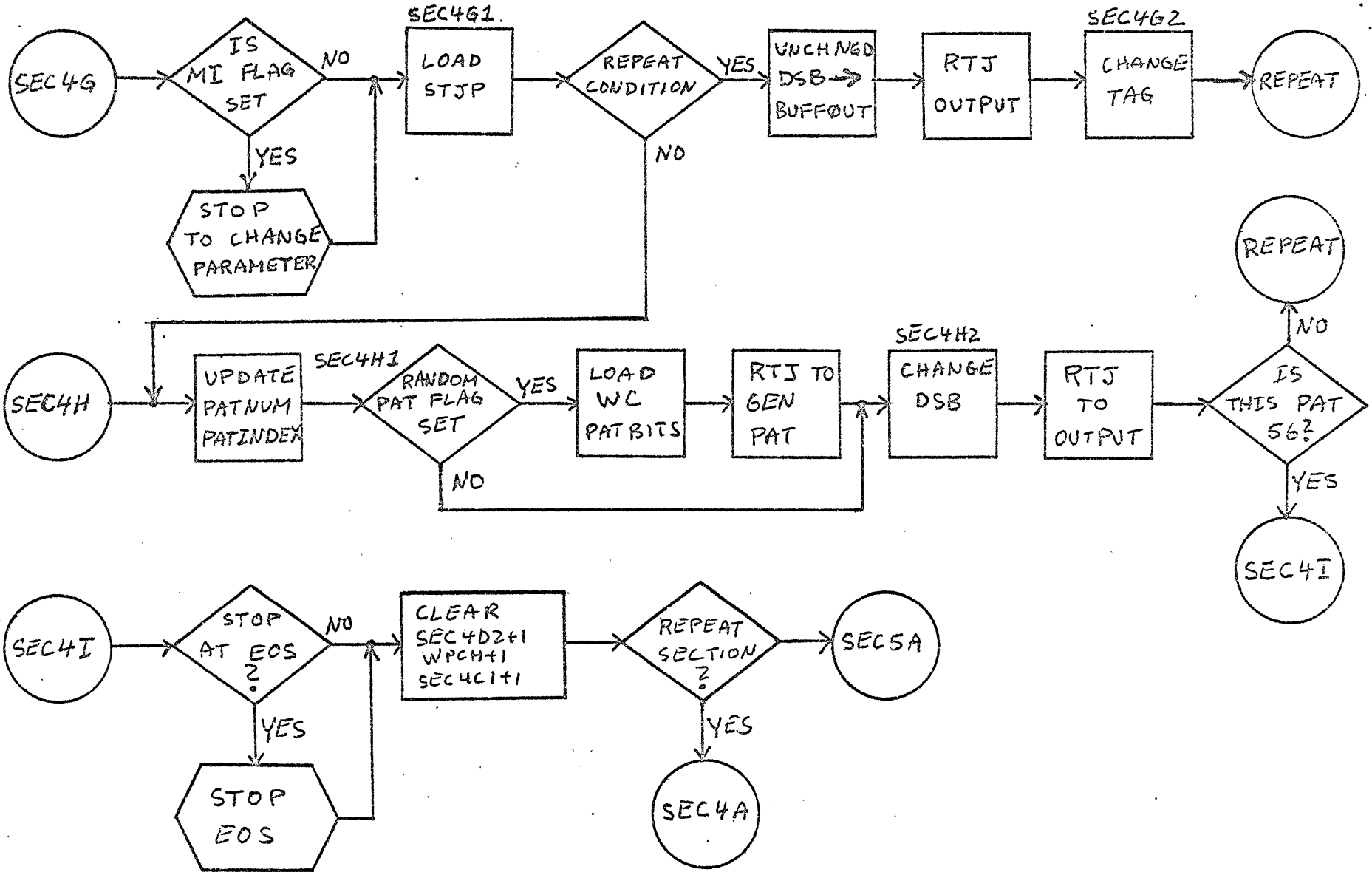


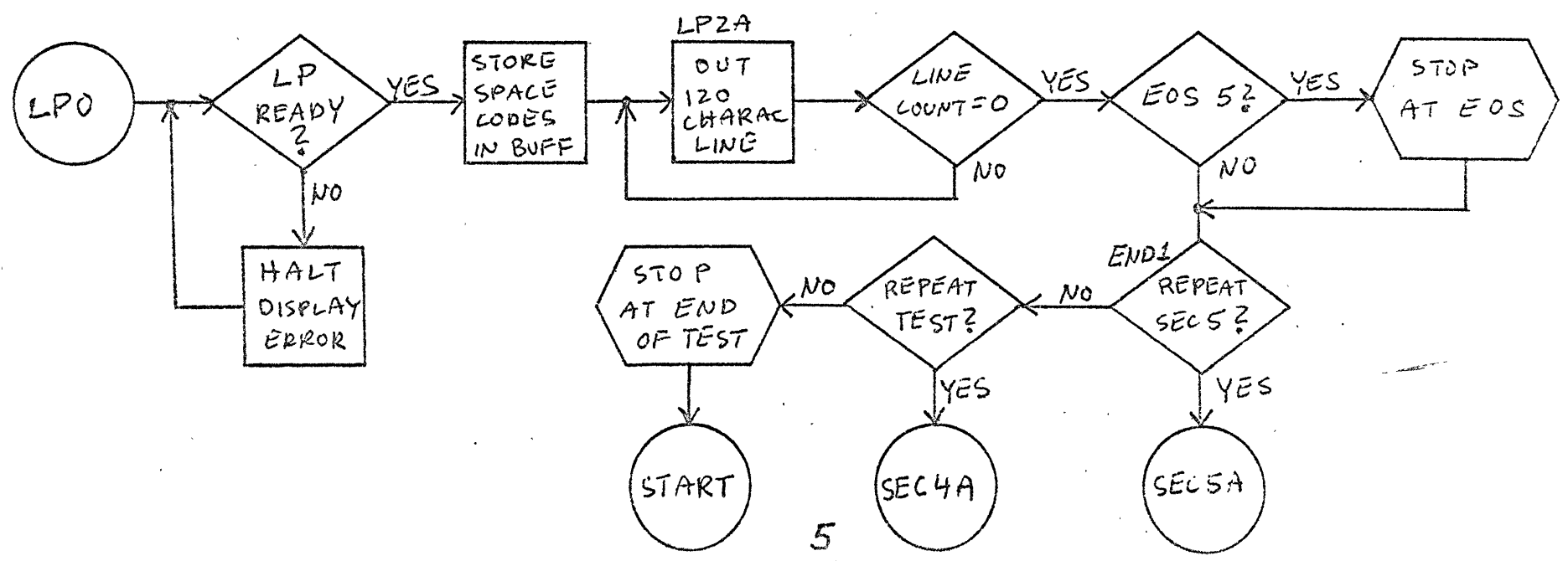
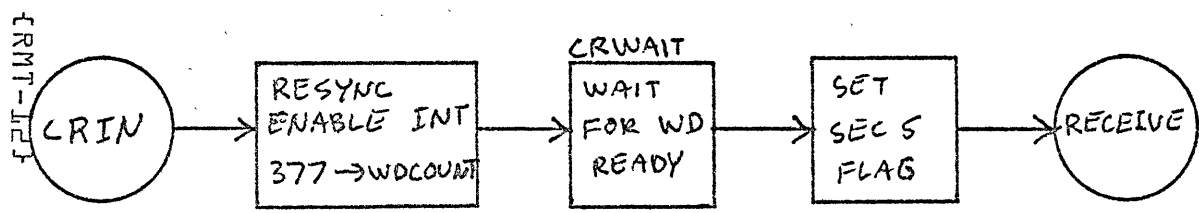
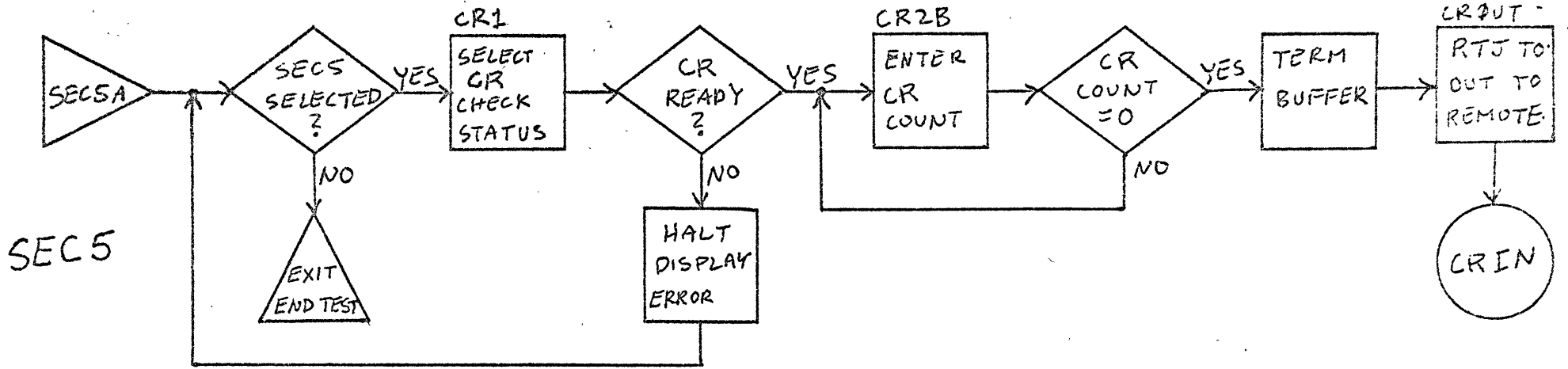
FRMT-9J

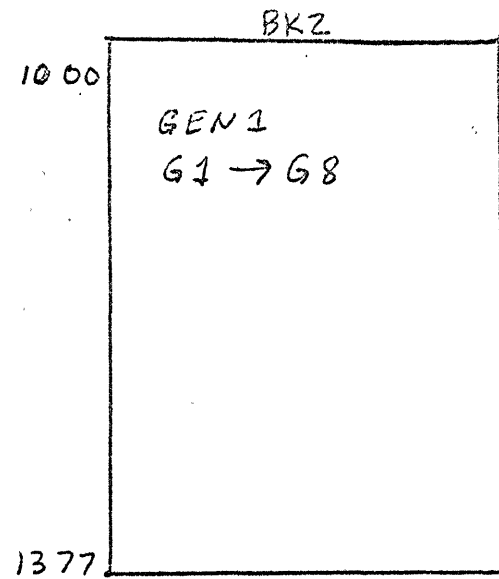
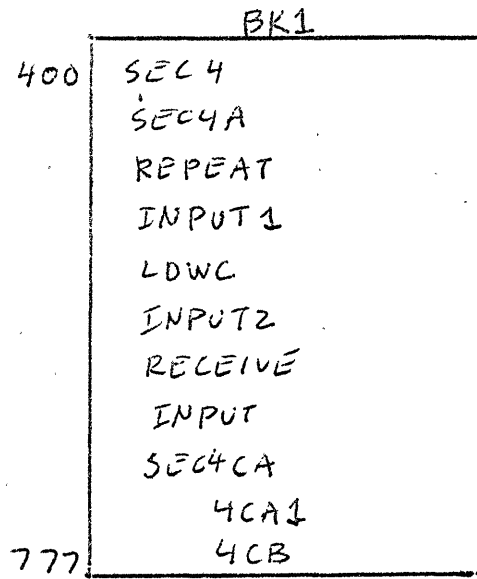
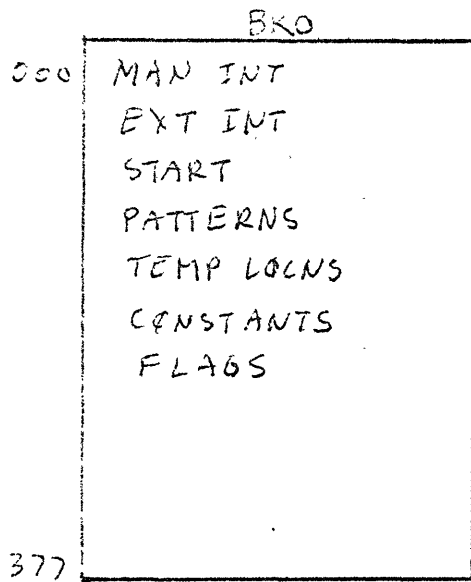
FRMT-103



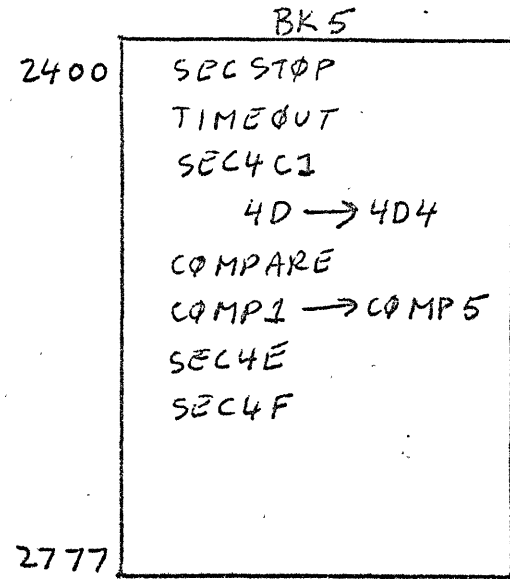
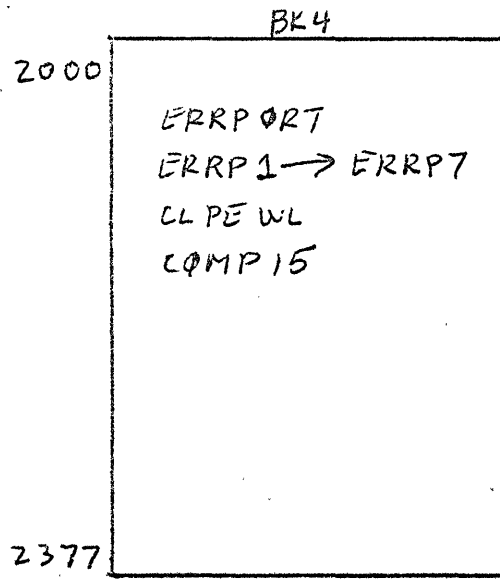
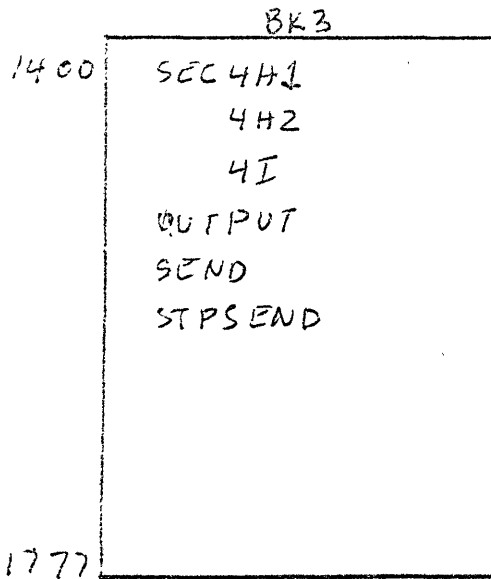
{RMT-11}

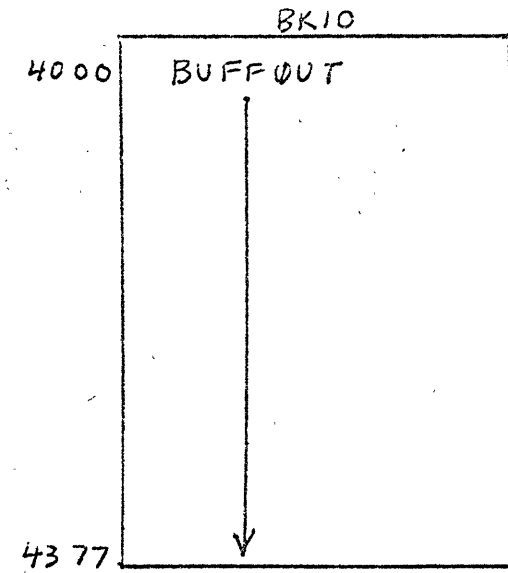
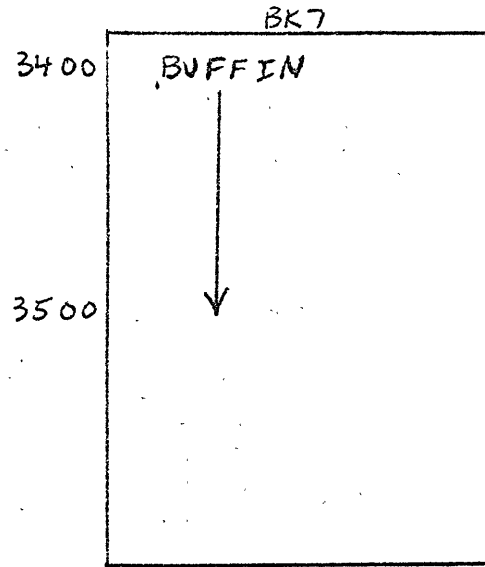
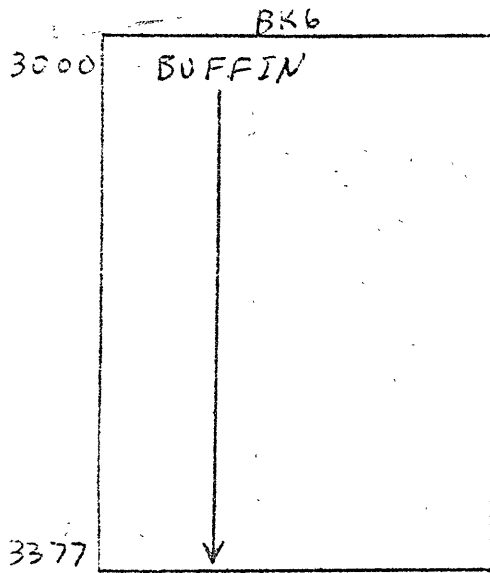






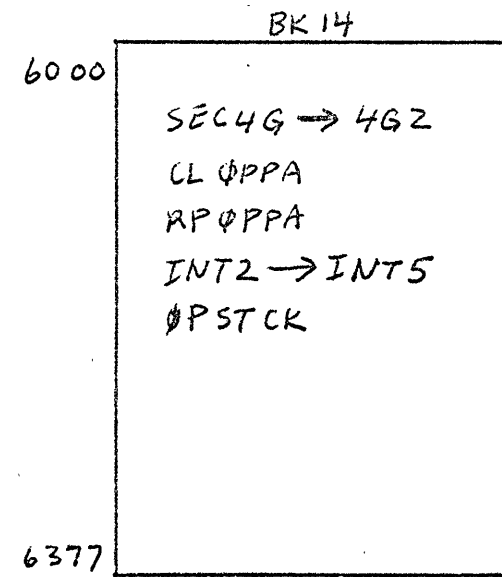
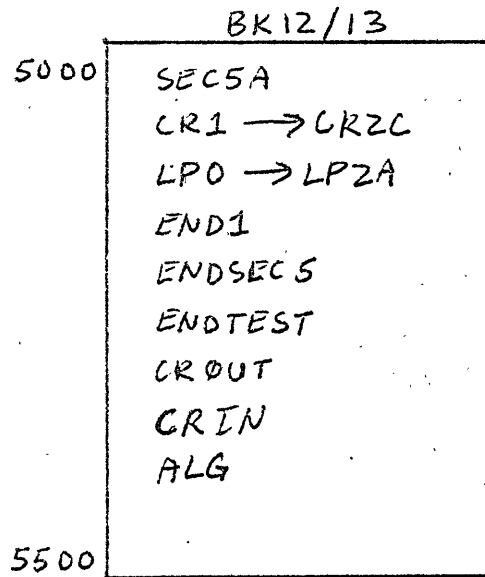
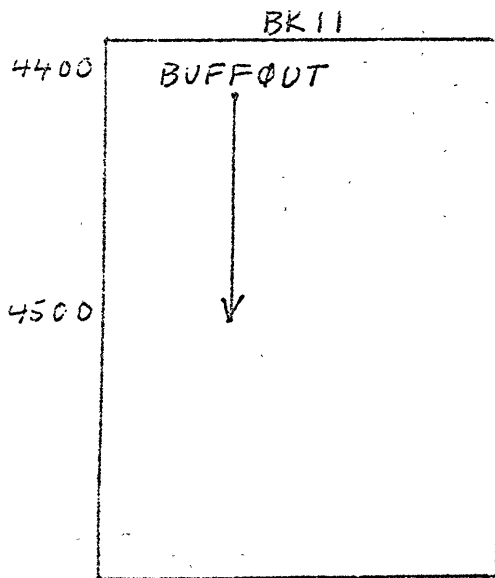
MEMORY MAP





MEMORY MAP

{RMT-14}



SOFTWARE INTERFACE SPECIFICATION

Between

6X00/6681/3266/311B COMMUNICATIONS TEST (SC2)

AND

A REMOTE COMPUTER COMMUNICATIONS TEST

Transfers in
Universal Mode

O. K. Olmstead
Engineering Software Department
April, 1967

The remote test should be divided into two sections. They are:

1. Data Transfer
2. System Demonstration

The sections should be numbered 4 and 5 so that errors occurring in respective sections of each test will indicate the same section number as those in the 6X00 test.

The parameters for both the 6X00 test and the remote test should be the same to provide synchronization between the execution of sections, parity mode, and one-half or full duplex.

A. ESTABLISHING COMMUNICATION

1. The remote test should be started before Section 4 of 6X00 test and after completion of Sections 1 through 3 of the 6X00 test.
2. After remote test received parameters from operator and completes its initialization, it should go into receive mode and wait for the first transmission from the 6X00. All communication is triggered on character request and character ready status.

B. DATA TRANSFER

1. Upon receiving the first transmission, the remote should check the transmission against a generated pattern (see pattern table) and transmit it to the 6X00 and place its controller in receive mode and wait for pattern two.

2. The exchange of patterns will continue until pattern number 44₈ is sent by the remote to the 6X00.

Up until this time, the 6X00 is the originator of each transmission. After this point, the remote will send the first transmission of each exchange.

This change of control will allow the remote computer to control the contents of the random patterns (pattern numbers 45₈ - 55₈).

a. After the remote sends pattern number 44₈ to the 6X00, the 6X00 will send a "wasted" transmission of one word to the remote to indicate that the remote now has control and should generate and send pattern 45₈ to the 6X00.

b. The remote program will have control until the 6X00 transmits pattern number 55₈. At this point, the remote program should transmit a "wasted" transmission of one word to the 6X00 to return control to the 6X00.

c. If errors occur in Section 4, they should be reported between the time the remote test receives a transmission and the time it returns a transmission.

NOTE: An exception to this case is when status bits indicate equipment failure (transmission line, data set, etc.). These errors should be reported when they occur.

3. Patterns Exchanged

- a. The remote program should contain Table 1.
Patterns sent to the 6X00 should be generated from this table. (The 6X00 has the same table and generates its patterns from its own table.)
- b. Each three word entry in the table is used to generate a pattern in the Data Transfer Format (see Fig. 2). The Word Count as found in the table entry is the length of the entire transmission (including the sequence word). The Base Word as found in the table will always be the second word of the transmission.
- c. The rest of the pattern will be generated according to bits b, c, d, e, and f (see Table Entry, Fig. 2).
- d. When the remote has control during the exchange of patterns 45_g to 55_g, the remote determines what the base word will be. The 6X00 program will use the random algorithm (Fig. 3) to generate its comparison pattern.

4. Status Checking

If the remote program does not have loop testing capabilities, pattern numbers 20_g through 27_g allow for checking parity error.

- a. Patterns 20_g through 30_g have incorrect parity on the base word.

5. Use of Sequence Bit

- a. Every transmission in Section 4 will contain a sequence bit as the first bit transmitted.
This bit will allow either the 6X00 or the remote to have the previous pattern re-transmitted to itself.
- b. The terminology used in the following paragraphs regarding the sequence bit technique is the same as that found in the IMPORT/EXPORT MANUAL (Pub. No. 38707300). All transmissions from the 6X00 to a remote are called "Status Transfers". The sequence bit in these transmissions is called the "Status Sequence Bit" or "S.S.B.". All transmissions from a remote to the 6X00 are called "Directive Transfers". The sequence bit in these transmissions is called the "Directive Sequence Bit" or "D.S.B.".
- c. The 6X00 only changes the state of the S.S.B. The remote computer only changes the state of the D.S.B.
- d. The remote program will see the S.S.B. change state on every transmission if the 6X00 does not want the remote to repeat a transmission.
- e. The remote should change the state of the D.S.B. on every transmission to the 6X00 unless the remote program wants the 6X00 to repeat its last transmission.
- f. The remote program should expect an S.S.B. of zero

on the first transmission it receives from the 6X00 and should therefore have a ghost J bit in its status Sequence Bit Storage location.

- g. The 6X00 will also expect a D.S.B. of zero on the first transmission from the remote program.
(Unless, of course, the remote program wants the first transmission from the 6X00 repeated).

C. SYSTEM DEMONSTRATION (Section 5)

1. This section of the test allows the remote to check the complete data turn around capabilities.
2. The 6X00 goes into receive mode and waits for a 377₈ word block of data from the remote. One transfer is made for each pass of the section.
3. The remote should input data from one of its input devices and send it to the 6X00. Upon receiving it from the 6X00, it can be sent to an output device.

TABLE ENTRY

a	_	_	b	c	d	e	f
g	g	g	g	g	g	g	g
h	h	h	h	h	h	h	d

- a - FLAG for word count greater than 377₈
- b - Random algorithm is used (figure 3)
- c - Opposite parity bit (if odd or even parity is selected)
- d - Each word is the complement of previous word
- e - Each word is left shifted one from previous word.
- f - Entire pattern is fixed (base word)
- g - Word count of transmission. (if a is set then word count is the number of words in the buffer greater than 377₈)
- h - Base word (NOTE: if parity is selected upper most bit will be altered to parity bit)

DATA FORMAT

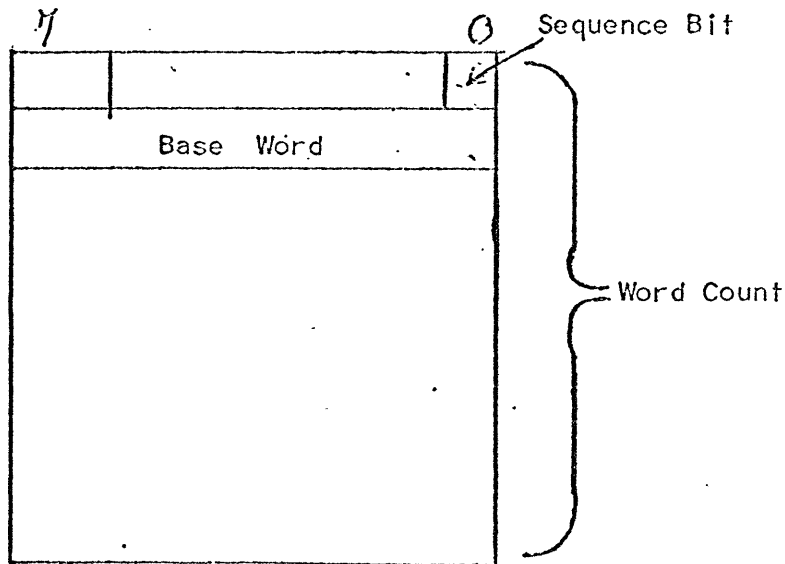


FIGURE 2

{RMT-21}

DECK 2 SPP MEMORY TEST ROUTINE

I. DESCRIPTION

Title: DECK 2 (T01A)

Type of Program: Test routine for SPP memory

Computer: 8130 Remote Terminal System

Programmer: Eugene S. Martinson, Industrial Data Processing Division, Control Data Corporation

Date: December, 1966

II. PURPOSE

This routine consists of a series of tests for checking reliability and retentivity of SPP memory. The DECK 2 routine accomplishes this by storing and accessing predetermined bit patterns, operating upon selected quadrants of memory.

III. OPERATING INSTRUCTIONS

A. Load DECK 2 test program at P = 0000.

The initial stop is at P = 2000.

B. MASTER CLEAR, RUN

The 8130 System stops at P = 113.

377 is displayed in the A register.

Clear the A register.

C. Set Test Selection parameter(s) - described in section IV, A - in the A register.

D. Place in RUN.

The 8130 System stops at P = 122.

377 is displayed in the A register.

Clear the A register.

- E. Set Test Control parameter(s) - described in section IV, B - in the A register.
- F. Place in RUN.

The end of test stop is at P = 1760.

If an error is detected, the 8130 System stops at P = 674, with pertinent diagnostic information displayed as follows in the indicated registers:

<u>Register</u>	<u>Contents</u>
Tag register 1	Test Control Bank Number, where: Bank 0: 0000 (Bank 0 = 0000-1777) Bank 1: 0100 (Bank 1 = 2000-3777) Bank 2: 1000 (Bank 2 = 4000-5777) Bank 3: 1100 (Bank 3 = 6000-7777)
Tag register 2	Upper four bits of failing address
A register	Lower eight bits of failing address
Tag register 3	Test Selection parameter(s), where: 0010 = Best Pattern Test 0011 = Complement Best Pattern Test 0100 = Worst Pattern Test 0101 = Complement Worst Pattern Test 0110 = 4096 Patterns Test
BER	Good data
BXR	Data in error

IV. OPERATING CHARACTERISTICS

A. Test Selection Parameter Specification

Test Selection parameters are established in the A register following the stop at P = 113. They are defined by bit positions in the A register as follows:

<u>Bit</u>	<u>Interpretation if Set</u>
0	Stop at end of test. This bit (if set) stops the selected routines after one pass of the tests. If it is not set, the tests recycle.
1	Repeat Read. This test (if set) causes each word pattern to be read 256 times to test accuracy and permanence of data. If only this bit is selected, cycling of instructions through memory occurs, but no testing takes place.
2	Best Pattern Test. This is an arrangement of bits that are easiest for memory to accommodate.
3	Complement Best Pattern Test
4	Worst Pattern Test. This is an arrangement of bits that are hardest for memory to accommodate.
5	Complement Worst Pattern Test
6	4096 Patterns Test. This checks all combinations of patterns (4096 patterns per plane). It should be noted that if this test is selected, a significant lengthening of running time occurs.
7	This bit is used as an internal flag.

B. Test Control Parameter Specification

1. Test Control parameters are also established in the A register following the stop at P = 122. They select the type of function to be performed and the bit pattern(s) to be utilized. The significance of the bit positions are as follows:

<u>Bit</u>	<u>Interpretation if Set</u>
1	Verify
2	Read
3	Write

2. Bits 1, 2, and 3 refer to operations taken by the selected tests and patterns. Either Read or Write is necessary for Verify to operate. Read or Write may be selected separately.

<u>Bit</u>	<u>Interpretation if Set</u>
4	Alternate word 2-bit shifted pattern. Varying 2-bit patterns of bits shifting to the left.
5	Alternate 2-bit patterns. Same as Bit 4, but no shifting.
6	Alternate bit pattern (alternate bits are set).
7	Zeros pattern (words of zeros are written).

In addition, if bit 0 is set, the selected tests are advanced through the four banks of memory. If bit 0 is not set, only the first bank is checked.

DECK 1
INTERNAL INSTRUCTION LOGIC AND TCP TEST ROUTINE

I. DESCRIPTION

Title: DECK 1 (T30, T02A)

Type of Program: Test routine for TCP and SPP command logic

Computer: 8130 Remote Terminal System

Programmer: James R. O'Melia, Industrial Data Processing Division, Control Data Corporation

Date: December, 1966

II. PURPOSE

This routine consists of two tests. The Logic test checks each instruction (exclusive of input/output) in the SPP of the 8130 Remote Terminal System. The Panel test checks the TCP indicator and alarm functions used by TERP-I, the 8130 System standard software.

III. OPERATING INSTRUCTIONS

A. Load DECK 1 test program at P = 0000.

The initial stop is at P = 6000.

B. MASTER CLEAR, enter Routine Selection code in the A register.

Routine Selection codes are:

Logic Test: 001

Panel Test: 011

C. Place in RUN.

The selected test runs according to its respective operating characteristics (described in section IV). An illegal Selection code (other than one of the two listed in step "B") in the A register results in a halt with 377 displayed in the A register. The ALARM RELEASE and LOCAL TROUBLE indicators light in the TCP and the audible alarm sounds. To recover, clear the A register and the ALARM RELEASE indicator. Repeat steps "B" and "C".

IV. OPERATING CHARACTERISTICS

A. Logic Test (T02A)

1. After the 8130 System is placed in RUN, the Logic test begins testing each instruction in the SPP. An initial halt occurs with 001 displayed in the A register. This check halt occurs on the first cycle and indicates that the LDN instruction has passed the test. Absence of this halt is an indication of an error condition.
2. The Logic test cycles through the instruction repertoire in the order specified in table 1. If there is a particular instruction test failure, the 8130 System halts and the appropriate Error code is displayed in the A register. The audible alarm sounds; the ALARM RELEASE and LOCAL TROUBLE indicators light. Re-placing in RUN results in recycling through the test series, repeating each instruction test starting at halt 001.
3. At the end of a successful test cycle, the 8130 System halts with 070 in the A register. The audible alarm sounds and the ALARM RELEASE indicator lights. Re-placing in RUN and pressing ALARM RELEASE results in a test recycle. The time for each test cycle (between stops 001 and 070) is approximately one minute.

B. Panel Test (T30)

1. After the 8130 System is placed in RUN, an initial check halt occurs with 125 displayed in the A register. The Panel test proceeds sequentially in three phases. Any recycling must recycle the complete Panel test. Internal and external actuation of TCP functions and alarms is tested in the following order:

a. Internal Actuation Tests

After the preliminary halt (125 in the A register), each replacement in RUN actuates a TCP indicator. A halt occurs with 000 in the A register. A test is successful if the respective indicator lights. Press the ALARM RELEASE button to clear the TCP after each halt. Note failures as they occur. The indicators, in the order in which they are tested, are:

- (1) LOCAL TROUBLE
- (2) REMOTE TROUBLE
- (3) THREE ATTEMPT FAILURE

- (4) ALARM RELEASE and buzzer
- (5) COME TO PHONE
- (6) END OF MESSAGE
- (7) STOP

Either the SEND, RECEIVE, or TRANSLATE indicator lights during this period, but does not affect the test. A final check, outputting zero (no lights should be lit) results in 000 in the A register.

b. External Actuation Tests

Indicators actuated (one at a time) by the operator are checked internally via panel status response words. If the panel responds properly, a halt occurs with 000 in the A register. Press the next button to be tested and RUN. If a malfunction occurs, the 8130 System halts with 377 in the A register. Activation of RUN following a malfunction causes the next button to be tested. Buttons are tested (and must be pressed) in the following order:

<u>Button</u>	<u>Indicators Lit</u>
(1) RECEIVE	RECEIVE
(2) SEND	SEND
(3) TRANSLATE	TRANSLATE
(4) COME TO PHONE	COME TO PHONE, TRANSLATE
(5) END OF MESSAGE	END OF MESSAGE, COME TO PHONE, TRANSLATE
(6) STOP	STOP, END OF MESSAGE, COME TO PHONE, TRANSLATE

c. Alarm Test

After pressing the ALARM RELEASE indicator, which clears (turns off) all lights except the TRANSLATE indicator, replace the 8130 System in RUN. A halt occurs with the alarm

sounding and the ALARM RELEASE indicator on, and with either 000 or 377 in the A register. The TCP responds properly to an alarm function if 000 is in the A register; 377 in the A register signifies failure.

2. The Panel test then recycles to the beginning (125 halt) if the 8130 System is placed in RUN.

TABLE 1. DECK 1 LOGIC TEST INSTRUCTION ERROR CODES

ERROR CODE	INSTRUCTION	INTERPRETATION
001	LDN, HLT	Halt instruction with LDN. Absence of this is an error
002	PJP	Jump did not occur with positive argument
003	TTA	Tag to <u>A</u> error on Tag 1
004	NJP	Jump did not occur with negative argument
005	UJP	Unconditional jump did not occur
006	ZJP	Jump did not occur with zero argument
007	NZP	A jump occurred with a zero argument
010	SHA	Shift <u>A</u> error
011	NZP	A jump did not occur with a non-zero argument
012	SBN	Subtract No-address error
013	ADN	Add No-address error
014	LDM	Load Memory - Store Memory error

TABLE 1. DECK 1 LOGIC TEST INSTRUCTION ERROR CODES (CONT)

ERROR CODE	INSTRUCTION	INTERPRETATION
015	PJP	A jump occurred with a negative argument
016	NJP	A jump occurred with a positive argument
017	ZJP	A jump occurred with a positive argument
020	ATT, TTA	<u>A</u> to Tag - Tag to <u>A</u> error on Tag 3
021	ATT, TTA	<u>A</u> to Tag - Tag to <u>A</u> error on Tag 2
022	TTA	Tag to <u>A</u> error on Tag 1
023	LPN	Logical Product No-address error on all ones
024	LPM	Logical Product from Memory error
025	LSN	Logical Sum No-address error
026	LSM	Logical Sum Memory error
027	LDI	Load <u>A</u> Indirect error
030	LCM	Load <u>A</u> Complement Memory error
031	LCI	Load <u>A</u> Complement Indirect error
032	ADM	Add Memory error
033	SBM	Subtract Memory error
034	SBI	Subtract Indirect error
035	STM	Store Memory error

TABLE 1. DECK 1 LOGIC TEST INSTRUCTION ERROR CODES (CONT)

ERROR CODE	INSTRUCTION	INTERPRETATION
036	STI	Store Indirect error
037	RAO	Replace Add One error
040	RAM	Replace Add Memory error
041	ADI	Add Indirect error
042	LSI	Logical Sum Indirect error
043	LPI	Logical Product Indirect error

NUMBER: T03

TITLE: I/O Writer Test

MINIMUM EQUIPMENT NEEDED: TeleProgrammer 161 writer

PURPOSE

This test checks those instructions not checked in the logic test as well as the operation of the 161 Input Output writer.

OPERATING INSTRUCTIONS

LOADING ADDRESS: 0000

TERMINAL ADDRESS: 1700

STARTING ADDRESS: 0000

DESCRIPTION: TeleProgrammer will output typewriter speed test on the normal channel. It will then accept 250 decimal characters on normal input. After the input operation is terminated, the information typed in will be typed out on the normal channel. After this operation, the test will be run through again with the Input/Output operations on the Buffer Channel instead of the normal channel.

The manual interrupt switch may be pushed at any time during the program. However, it will not be recognized until the normal Input/Output operations have been completed. After the interrupt routine is finished, the program will return to the beginning of the buffer portion of the main program (F=131)

HALTS

HALT #	"P" REGISTER	JMP FROM LOCATION	REMARKS
1	0006	----	Typewriter Not Ready On Initial Status Request
2	202	0127	Buffer Busy On ATE (Y04) @ P=0126
3	203	0136	Buffer Busy On ATX (Y05) @ P=0135
4	204	0143	Buffer Busy On IBO (Y71) @ P=0142
5	205	0157	Buffer Busy On ATE (X04) @ P=0156
6	206	0212	Buffer Busy On IBI (Y70) @ P=0211
7	207	0230	Buffer Busy On ATX (Y05) @ P=0227
8	210	0235	Buffer Busy On IBO (Y71) @ P=0234
9	352	----	ETA (X06) Instrn Failed @ P=0346
10	146	----	IBO (Y71) Failed to Jmp When Buffer Busy
11	220	----	IBI (Y70) " " " " " "
12	354	352	End of Test
13	221	224	Buffer Busy On ATE (X04) @ P=223
14	360	343	Buffer Busy On ATE (X04) @ P=342

0000	X75	EXC	
0001	042	Status	
0002	040	REQ	
0003	X76	INA	
0004	060	ZJD	
0005	012		
0006	000	Err Halt #1	
0007	000		
0010	064	JMP to Manual Interrupt	
0011	300	Routine	
0012	X20	LDN	
0013	001		
0014	102	ATI I =1	
0015	064	JMP	
0016	024		
0017	000		
0020	X06	ETA	Interrupt
0021	041	STD	20
0022	226	(BxR of 2nd out)	Routine
0023	113	CIL	
0024	X20	LDN	
0025	002		
0026	202	ATI I =2	
0027	X20	LDN	
0030	003		
0031	302	ATI I =3	
0032	X75	EXC	
0033	042	Select	
0034	010	Output	
0035	173	Out	
0036	000	FM 400	
0037	376	to 775	
0040	273	Out	
0041	000	FM 1000	
0042	376	to 1375	
0043	373	Out	
0044	000	FM 1400	
0045	106	to 1505	
0046	373	Out	
0047	227	FM 1627	
0050	236	to 1635	
0051	373	Out	
0052	115	FM 1515	
0053	223	to 1622	
0054	X20	LDN	
0055	004		
0056	102	ATI I =4	
0057	X75	EXC	

0060	042	Select
0061	020	Input
0062	X76	INA
0063	041	STD
0064	113	
0065	X76	INA
0066	041	STD
0067	115	
0070	172	INP
0071	000	FM 2000
0072	371	to 2370
0073	041	STD
0074	120	
0075	064	JMP
0076	107	
0077	000	
0100	X04	ATE
0101	262	Busy Jump
0102	X20	LDN
0103	000	
0104	064	JMP
0105	223	
0106	000	
0107	X75	EXC
0110	042	Select
0111	010	Output
0112	X74	OTN
0113	000	
0114	X74	OTN
0115	000	
0116	173	Out
0117	000	FM 2000
0120	371	to 2370
0121	X20	LDN (Buffer Start)
0122	001	
0123	302	ATI I =1
0124	X20	LDN
0125	000	
0126	004	ATE BER=400
0127	202	(Jmp to err #2)
0130	X20	LDN
0131	003	
0132	302	ATI I =3
0133	X20	LDN
0134	223	
0135	005	ATX BxR = 1622
0136	203	(Jmp to err #3)
0137	X75	EXC

0140	042	Select
0141	010	Output
0142	071	IBO
0143	204	(Jmp to err #4)
0144	071	IBO
0145	147	(JMP)
0146	000	Err Stop #10
0147	004	ATE
0150	254	Jmp to Busy Routine #1
0151	X20	LDN
0152	004	
0153	302	ATI I =4
0154	X20	LDN
0155	000	
0156	004	ATE BER = 2000
0157	205	JMP to ERR #5
0160	X20	LDN
0161	373	
0162	005	ATX B x R = 2373
0163	206	JMP to ERR #5
0164	X75	EXC
0165	042	Select
0166	020	Input
0167	064	JMP
0170	211	
0171	000	
0172	000	
0173	000	
0174	000	
0175	000	
0176	000	
0177	000	
0200	000	ERR # -FmP=
0201	000	"
0202	000	" 2
0203	000	" 3
0204	000	" 4
0205	000	" 5
0206	000	" 6
0207	000	" 7
0210	000	8
0211	070	IBI
0212	206	(JMP to ERR #6)
0213	X20	LDN
0214	000	
0215	202	ATI I =0
0216	270	IBI
0217	100	(JMP)

0220	000	ERR Halt #11	
0221	000	ERR Halt #13	
0222	000		
0223	004	ATE BER = 2000	
0224	221	Jump to Error #3	
0225	X20	LDN	
0226	373	Reset by Store Instn.@P=0021	
0227	005	ATX BxR = 2373	
0230	207	Jump to Err #7	
0231	X75	EXC	
0232	042	Select	
0233	010	Output	
0234	071	IBO	
0235	210	Jump to Err #8	
0236	X20	LDN 055	
0237	000	247	
		064	
0240	004	ATE 236	
0241	267	Jump to Busy Routine #3	
0242	064	Jump	
0243	340		
0244	000		
0245	000		
0246	000		
0247	000		
0250	000		
0251	000		
0252	000		
0253	000		
0254	055	RAO	
0255	274		Busy
0256	013	CIL (No Jump)	Routine #1
0257	064	JMP	
0260	147		
0261	000		
0262	055	RAO	Busy
0263	275		Routine #2
0264	013	CIL	
0265	064	JMP	
0266	100		
0267	055	RAO	
0270	276		Busy
0271	013	CIL (No Jump)	Routine #3
0272	064	JMP	
0273	236		
0274	000	Busy Count #1	
0275	000	" " #2	
0276	000	" " #3	
0277	000		

0300	007	CBC
0301	X75	EXC
0302	042	Select
0303	010	Output
0304	X74	OTN
0305	045	CR
0306	X74	OTN
0307	045	CR
0310	X74	
0311	045	CR
0312	X20	LDN
0313	003	
0314	202	ATI I =2
0315	273	Out
0316	125	FM 1525
0317	152	to 1551
0320	273	Out
0321	240	FM 1640
0322	300	to 1677
0323	X74	OTN
0324	045	
0325	X74	OTN
0326	045	
0327	X74	OTN
0330	045	
0331	064	JMP
0332	121	to start of Buffer
0333	000	
0334	000	
0335	000	
0336	000	
0337	000	
0340	X20	LDN
0341	377	
0342	004	ATE BER = 377
0343	360	Jmp to Err #14
0344	X20	LDN
0345	000	
0346	X06	ETA
0347	X34	SBN
0350	377	
0351	060	ZJD
0352	354	
0353	000	ERA #9
0354	077	Halt End of Test
0355	000	
0356	000	
0357	000	

0360	000	ERR #14
0361	000	
0362	000	
0363	000	
0364	000	
0365	000	
0366	000	
0367	000	
0370	000	
0371	000	
0372	000	
0373	000	
0374	000	
0375	000	
0376	000	
0377	000	
0400	045	CR
0401	047	Uppers
0402	001	T
0403	057	Lowers
0404	005	H
0405	014	i
0406	024	s
0407	004	Space
0410	014	i
0411	020	s
0412	004	Space
0413	030	a
0414	004	Space
0415	047	Uppers
0416	016	C
0417	057	Lowers
0420	003	o
0421	006	n
0422	001	t
0423	012	r
0424	003	o
0425	011	l
0426	004	Space
0427	047	Upper
0430	022	D
0431	057	Lower
0432	030	a
0433	001	t
0434	030	a
0435	004	Space
0436	047	Upper
0437	016	C

0440	057	Lower	
0441	003	o	
0442	012	r	
0443	015	p	
0444	003	o	
0445	012	r	
0446	030	a	
0447	001	t	
0450	014	i	
0451	003	o	
0452	006	n	
0453	004	Space	
0454	001	t	
0455	025	y	
0456	015	p	
0457	020	e	
0460	031	w	
0461	012	r	
0462	014	l	
0463	001	t	
0464	020	e	
0465	012	r	
0466	004	Space	
0467	024	s	
0470	015	p	
0471	020	e	
0472	020	e	
0473	022	d	
0474	004	Space	
0475	001	t	
0476	020	e	
0477	024	p	
0500	001	t	
0501	042	.	
0502	004	Space	
0503	004	Space	
0504	047	Uppers	
0505	001	T	
0506	057	Lower	
0507	005	h	
0510	020	e	
0511	012	r	
0512	020	e	
0513	045	C.R	40
0514	030	a	
0515	012	i	
0516	020	e	
0517	004	Space	00

0520	030	a
0521	015	p
0522	015	p
0523	012	r
0524	003	o
0525	027	x
0526	042	.
0527	004	Space
0530	060	7
0531	056	o
0532	004	Space
0533	022	d
0534	020	e
0535	016	c
0536	014	i
0537	007	m
0540	030	a
0541	011	l
0542	004	Space
0543	016	c
0544	005	h
0545	030	a
0546	012	r
0547	030	a
0550	016	c
0551	001	t
0552	020	o
0553	012	r
0554	024	s
0555	004	Space
0556	015	p
0557	020	e
0560	012	r
0561	004	Space
0562	011	l
0563	014	i
0564	006	n
0565	020	e
0566	042	.
0567	004	Space
0570	004	Space
0571	047	Uppers
0572	001	T
0573	057	Lowers
0574	005	h
0575	020	e
0576	004	Space
0577	024	s

0600	015	p
0601	020	e
0602	020	e
0603	022	d
0604	004	Space
0605	024	s
0606	005	h
0607	003	o
0610	034	u
0611	011	l
0612	022	d
0613	004	Space
0614	023	b
0615	020	e
0616	045	C.R.
0617	023	b
0620	020	e
0621	001	l
0622	031	w
0623	020	e
0624	020	e
0625	006	n
0626	004	Space
0627	074	l
0630	056	o
0631	004	Space
0632	030	a
0633	006	n
0634	022	d
0635	004	Space
0636	074	l
0637	070	2
0640	004	Space
0641	016	c
0642	005	h
0643	030	a
0644	012	i
0645	030	a
0646	016	c
0647	001	t
0650	020	0
0651	012	i
0652	024	s
0653	004	Space
0654	015	p
0655	020	e
0656	012	i
0657	004	Space

0660	024	s
0661	020	e
0662	016	c
0663	003	o
0664	006	n
0665	022	d
0666	042	.
0667	004	Space
0670	004	Space
0671	047	Uppers
0672	011	l
0673	057	Lower
0674	003	o
0675	031	w
0676	020	e
0677	012	r
0700	004	Space
0701	016	c
0702	030	a
0703	024	s
0704	020	e
0705	050	;
0706	004	Space
0707	030	a
0710	023	b
0711	016	c
0712	022	d
0713	020	e
0714	026	f
0715	013	g
0716	005	h
0717	014	i
0720	032	j
0721	036	h
0722	011	l
0723	007	m
0724	006	n
0725	045	C.R.
0726	003	o
0727	015	p
0730	035	q
0731	012	i
0732	024	s
0733	001	t
0734	034	u
0735	017	v
0736	031	w
0737	027	x

0740	025	y
0741	021	z
0742	056	o
0743	074	l
0744	070	2
0745	064	3
0746	062	4
0747	066	5
0750	072	6
0751	060	7
0752	033	8
0753	037	9
0754	052	-
0755	044	l
0756	054	l
0757	046	+
0760	042	.
0761	050	;
0762	040	,
0763	002	=
0764	004	SP
0765	047	Uppers
0766	034	u
0767	015	p
0770	015	p
0771	020	e
0772	012	r
0773	004	Space
0774	016	C
0775	030	A
0776	047	Uppers
0777	047	Uppers
1000	024	s
1001	020	e
1002	050	:
1003	004	Space
1004	030	A
1005	023	B
1006	016	C
1007	022	D
1010	020	E
1011	026	F
1012	013	G
1013	005	H
1014	014	I
1015	032	J
1016	036	K
1017	011	L

1020	007	M
1021	006	N
1022	003	O
1023	015	P
1024	035	Q
1025	012	R
1026	024	S
1027	001	T
1030	034	U
1031	017	V
1032	031	W
1033	027	X
1034	025	Y
1035	021	Z
1036	045	C.R.
1037	056)
1040	074	*
1041	070	@
1042	064	#
1043	062	\$
1044	066	%
1045	072	φ
1046	060	&
1047	033	$\frac{1}{2}$
1050	037	(
1051	052	¯
1052	044	?
1053	054	"
1054	046	0
1055	042	°
1056	050	:
1057	040	,
1060	002	+
1061	004	Space
1062	004	Space
1063	030	A
1064	057	Lowers
1065	011	l
1066	011	e
1067	004	Space
1070	036	
1071	020	e
1072	025	y
1073	024	s
1074	004	Space
1075	024	s
1076	005	h
1077	003	o

1100	034	u
1101	011	l
1102	022	d
1103	004	Space
1104	024	s
1105	001	t
1106	012	r
1107	014	i
1110	036	k
1111	020	e
1112	004	Space
1113	031	w
1114	014	i
1115	001	t
1116	005	h
1117	004	Space
1120	034	w
1121	006	n
1122	014	i
1123	026	f
1124	003	o
1125	012	u
1126	007	m
1127	004	Space
1130	026	f
1131	003	o
1132	012	u
1133	016	c
1134	020	e
1135	042	.
1136	004	Space
1137	004	Space
1140	047	U.C.
1141	030	A
1142	057	L.C.
1143	011	l
1144	011	l
1145	045	C.R.
1146	016	c
1147	005	h
1150	030	n
1151	012	u
1152	030	a
1153	016	c
1154	001	t
1155	020	o
1156	012	u
1157	024	s

1160	004	Space
1161	024	s
1162	005	h
1163	003	o
1164	034	u
1165	011	l
1166	022	d
1167	004	Space
1170	023	b
1171	020	e
1172	004	Space
1173	011	l
1174	020	e
1175	013	g
1176	014	i
1177	023	b
1200	011	l
1201	020	e
1202	004	Space
1203	031	w
1204	014	i
1205	001	t
1206	005	h
1207	004	Space
1210	001	t
1211	005	h
1212	020	e
1213	004	Space
1214	036	h
1215	020	e
1216	025	y
1217	004	Space
1220	015	p
1221	012	u
1222	020	e
1223	024	s
1224	024	s
1225	034	w
1226	012	u
1227	020	e
1230	004	Space
1231	016	c
1232	003	o
1233	006	n
1234	001	t
1235	012	u
1236	003	o
1237	011	l

1240	004	Space
1241	024	s
1242	020	e
1243	001	t
1244	004	Space
1245	030	a
1246	001	t
1247	004	Space
1250	021	z
1251	020	e
1252	012	u
1253	003	o
1254	042	.
1255	045	C.R.
1256	047	U.C.
1257	023	B
1260	057	L.C.
1261	030	a
1262	004	Space
1263	004	Space
1264	061	B.S.
1265	061	B.S.
1266	016	c
1267	036	k
1270	024	s
1271	015	p
1272	004	Space
1273	016	c
1274	020	e
1275	004	Space
1276	061	B.S.
1277	061	B.S.
1300	061	B.S.
1301	061	B.S.
1302	030	a
1303	016	c
1304	020	e
1305	004	Space
1306	003	o
1307	015	p
1310	020	e
1311	012	u
1312	030	a
1313	004	Space
1314	061	B.S.
1315	001	t
1316	014	i
1317	003	o

1320	006	n
1321	004	Space
1322	014	i
1323	024	s
1324	004	Space
1325	006	n
1326	004	Space
1327	004	Space
1330	004	Space
1331	004	Space
1332	004	Space
1333	061	B.S.
1334	061	B.S.
1335	061	B.S.
1336	061	B.S.
1337	061	B.S.
1340	003	o
1341	031	w
1342	004	Space
1343	023	b
1344	047	U.C.
1345	004	Space
1346	004	Space
1347	004	Space
1350	004	Space
1351	061	B.S.
1352	061	B.S.
1353	061	B.S.
1354	061	B.S.
1355	057	L.C.
1356	020	e
1357	014	i
1360	006	n
1361	013	g
1362	004	Space
1363	061	B.S.
1364	045	C.R.
1365	016	c
1366	004	Space
1367	004	Space
1370	004	Space
1371	004	Space
1372	004	Space
1373	004	Space
1374	004	Space
1375	004	Space
1376	057	L.C.
1377	057	L.C.

1400	004	Space
1401	061	B.S.
1402	061	B.S.
1403	061	B.S.
1404	061	B.S.
1405	061	B.S.
1406	061	B.S.
1407	061	B.S.
1410	061	B.S.
1411	061	B.S.
1412	057	L.C.
1413	005	h
1414	047	U.C.
1415	004	Space
1416	004	
1417	004	
1420	004	
1421	004	
1422	004	
1423	004	
1424	004	
1425	004	
1426	004	Space
1427	061	B.S.
1430	061	
1431	061	
1432	061	
1433	061	
1434	061	
1435	061	
1436	061	
1437	061	
1440	061	B.S.
1441	057	L.C.
1442	020	e
1443	004	Space
1444	036	k
1445	004	Space
1446	004	
1447	004	Space
1450	061	B.S.
1451	061	B.S.
1452	061	B.S.
1453	020	e
1454	004	Space
1455	061	B.S.
1456	022	d
1457	061	B.S.

1460	061	B.S.
1461	061	B.S.
1462	061	B.S.
1463	016	c
1464	004	Space
1465	004	Space
1466	004	Space
1467	042	.
1470	045	C.R.
1471	047	U.C.
1472	001	y
1473	005	h
1474	014	i
1475	024	s
1476	004	Space
1477	014	l
1500	024	s
1501	004	Space
1502	001	t
1503	005	h
1504	020	e
1505	004	Space
1506	023	B
1507	034	u
1510	026	f
1511	026	f
1512	020	E
1513	012	R
1514	004	Space
1515	016	C
1516	005	H
1517	030	A
1520	006	N
1521	006	N
1522	020	E
1523	011	L
1524	042	.
1525	045	C.R.
1526	047	U.C.
1527	001	T
1530	005	H
1531	020	E
1532	004	Space
1533	001	T
1534	020	E
1535	011	L
1536	020	E
1537	015	P

1540	012	R
1541	003	O
1542	013	G
1543	012	R
1544	030	A
1545	007	M
1546	007	M
1547	020	E
1550	012	R
1551	004	Space
1552	031	W
1553	014	i
1554	011	L
1555	011	L
1556	004	Space
1557	006	N
1560	003	O
1561	031	W
1562	004	Space
1563	030	A
1564	016	C
1565	016	C
1566	020	E
1567	015	P
1570	001	T
1571	004	Space
1572	057	L.C.
1573	070	2
1574	066	S
1575	056	O
1576	004	Space
1577	047	U.C.
1600	022	D
1601	020	E
1602	016	C
1603	014	i
1604	007	M
1605	030	A
1606	011	L
1607	004	Space
1610	016	C
1611	005	H
1612	030	A
1613	012	R
1614	030	A
1615	016	C
1616	001	T
1617	020	E

1620	012	R
1621	024	S
1622	042	.
1623	045	C.R.
1624	004	
1625	000	
1626	004	Space
1627	006	N
1630	003	O
1631	012	R
1632	007	M
1633	030	A
1634	011	L
1635	004	Space
1636	000	
1637	000	
1640	005	H
1641	030	A
1642	024	S
1643	004	Space
1644	012	R
1645	020	E
1646	016	C
1647	003	O
1650	013	G
1651	006	N
1652	014	i
1653	021	Z
1654	020	E
1655	022	D
1656	004	Space
1657	007	M
1660	030	A
1661	006	N
1662	034	U
1663	030	A
1664	011	L
1665	004	Space
1666	014	i
1667	006	N
1670	001	T
1671	020	E
1672	012	R
1673	012	R
1674	034	U
1675	015	P
1676	001	T
1677	042	.

NUMBER: T09

TITLE: Paper Tape Reader Variable Speed Test

MINIMUM EQUIPMENT NEEDED: 8092, 350, or 8098

PURPOSE

This program will test the reader at variable speeds.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for 8 level
011 for 7 level

TERMINAL ADDRESS: 154

Prepare a closed loop of paper tape with binary numbers of 1 through 377 in sequence, any number of times (for 8 level tape). For 7 level, the numbers would be 1 through 177. There may be any length of leader desired. Place the tape in reader (anywhere in leader). Start run at 000 for 8 level tape or 011 for 7 level tape.

DESCRIPTION

Test will start reading tape slowly then pick up speed after each set of numbers until full speed is reached, then back to slow speed and repeat. Program stops only if a bit error occurs. If an error occurs, look at location P = 151 to find out what the reader read. Look at location P = 150 to find out what it should have read.

HALTS

P = 105

Error in bits.

0000	020	LDN	
0001	001		
0002	041	STM	
0003	137		
0004	064	UJP	
0005	050		
0006			
0007			
0010	113	CIL	
0011	020	LDN	
0012	201		
0013	041	STM	
0014	137		
0015	064	UJP	
0016	050		
0017	?		
0020	113	CIL	
0030	113	CIL	
0040	113	CIL	
0050	075	EXF	Select Paper Tape Reader
0051	041		
0052	002		
0053	076	INA	Loop Until Find a 1 on Tape
0054	034	SBN	
0055	001		
0056	061	NZP	
0057	053		
0060	020	LDN	
0061	001		
0062	041	STM	
0063	150		
0064	064	UJP	
0065	074		
0074	076	INA	Test Each Character
0075	041	STM	
0076	151		
0077	055	RAO	
0100	150		
0101	035	SBM	
0102	151		
0103	060	ZJP	
0104	106		
0105	077	HLT	
0106	021	LDM	
0107	154		

0110	041	STM	
0111	152		
0112	64	UJP	
0113	126		
0126	055	RAO	Timing Delay
0127	153		
0130	055	RAO	
0131	152		
0132	061	NZP	
0133	112		
0134	021	LDM	
0135	150		
0136	030	ADN	
0137	001		
0140	061	NZP	
0141	074		Test Does Not Allow for 377 on
0142	020	LDN	8-Level Tape or 177 on 7-Level
0143	040		Tape
0144	051	RAM	
0145	154		
0146	064	UJP	
0147	053		
0150	001		
0151	000		
0152	000		
0153	000		
0154	000		

NUMBER: T10

TITLE: Paper Tape Reader Speed Test

MINIMUM EQUIPMENT NEEDED: 8092, 8299

PURPOSE

This program will test the reader at a speed dependent on number put in A.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000

TERMINAL ADDRESS: 303

Prepare a closed loop of tape with 52 and 125 on it alternately. This must be the only thing on it (no leader). Tape can be any length desired. Put in A any constant from 1 through 376 to determine delay between frames. The number very roughly approximates the number of milliseconds delay.

DESCRIPTION

The 52-125 tape will be read at a constant speed determined by number in A and will only stop if an error is detected.

HALTS

P = 075
P = 123

error in 52 read
error in 125 read

0000	041	STM	
0001	303		
0002	064	UJP	
0003	060		
0010	113	CIL	
0020	113	CIL	
0030	113	CIL	
0040	113	CIL	
0050			
0060	075	EXF	Select Paper Tape Reader
0061	041		
0062	002		
0063	076	INA	Check for 52
0064	034	SBN	
0065	052		
0066	060	ZJP	
0067	116		
0070	076	INA	
0071	034	SBN	
0072	052		
0073	060	ZJP	
0074	076		
0075	077	HLT	Stop if not Proper Sequence or
0076	025	LCM	Read Correctly
0077	303		
0100	041	STM	Delay before Reading next Frame
0101	302		
0102	021	LDM	
0103	301		
0104	041	STM	
0105	300		
0106	055	RAO	
0107	300		
0110	061	NZP	
0111	106		
0112	055	RAO	
0113	302		
0114	061	NZP	
0115	102		
0116	076	INA	
0117	034	SBN	

0120	125		Check for 125
0121	060	ZJP	
0122	124		
0123	077	HLT	Stop if 52 not Followed by 125
0124	025	LCM	
0125	303		
0126	041	STM	Delay Before Reading Next Frame
0127	302		
0130	021	LDM	
0131	301		
0132	041	STM	
0133	300		
0134	055	RAO	
0135	300		
0136	061	NZP	
0137	134		
0140	055	RAO	
0141	302		
0142	061	NZP	
0143	130		
0144	064	UJP	
0145	070		

0300	040
0301	340
0302	376
0303	001

NUMBER: T11

TITLE: Paper Tape Punch and Reader Test

MINIMUM EQUIPMENT NEEDED: 8092, 8299, 8291, BRPE-11

PURPOSE

To test the Paper Tape Punch and Reader for reliability.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 002

TERMINAL ADDRESS 1337

Part 1: Turn punch on and punch out a small amount of leader. Master clear, set P = 002, and put computer in run. The punch will run out enough tape to reach the reader and stop.

Part 2: Insert tape into reader anywhere in leader and start run at P = 000. The test will continue to punch and read until an error occurs.

NOTE: To change length of loop, change number in location 100.

DESCRIPTION

This test will punch out the words "THIS IS A TEST" followed by a binary count from 1 to 177. This entire bit pattern will then be read and checked for accuracy by the reader.

HALTS

P = 103	End of Part 1. Proceed as in Part 2.
P = 131	Error in bits. Character will be in A. If the error is visible on tape, it is a punch error, otherwise it is a reader error.

0000	064	UJP	
0001	104		
0002	064	UJP	
0003	060		
0010	113	CIL	
0020	113	CIL	
0030	113	CIL	
0040	113	CIL	
0041	000		
0042	000		
0043	000		
0044	000		
0045	000		
0046	000		
0047	000		
0050	000		
0051	000		
0052	000		
0053	000		
0054	000		
0055	000		
0056	000		
0057	000		
0060	020	LDN	
0061	000		
0062	041	STM	
0063	041		
0064	020	LDN	
0065	002		
0066	102	ATT	
0067	075	EXF	Select Paper Tape Punch
0070	041		
0071	004		
0072	173	OUT	Punch Out Test Message 3 Times and Stop
0073	000		
0074	340		
0075	055	RAO	
0076	041		
0077	034	SBN	
0100	003		
0101	063	NJP	
0102	072		
0103	077	HLT	End Part 1

0104	075	EXF	Select Paper Tape Reader
0105	041		
0106	002		
0107	076	INA	Loop Until End of Leader
0110	060	ZJP	
0111	107		
0112	020	LDN	Read and Compare Message
0113	001		
0114	041	STM	
0115	124		
0116	064	UJP	
0117	122		
0120	000		
0121	000		
0122	076	INA	
0123	135	SBM	
0124	001		
0125	060	ZJP	
0126	132		
0127	122	LDI	
0130	124		
0131	077	HLT	Halt if Any Word Does Not Compare
0132	021	LDM	
0133	124		
0134	030	ADN	
0135	040		
0136	060	ZJP	
0137	144		
0140	055	RAO	
0141	124		
0142	064	UJP	
0143	122		
0144	075	EXF	Output Message Every Time
0145	041		Testing of Message is Ended
0146	004		
0147	173	OUT	
0150	000		
0151	340		
0152	075	EXF	
0153	041		
0154	002		
0155	064	UJP	
0156	104		
1000	001		Message to be Punch and Read
1001	001		
1002	001		
1003	177		
1004	001		
1005	001		
1006	001		
1007	000		

1010	000
1011	177
1012	010
1013	010
1014	010
1015	177
1016	000
1017	000
1020	177
1021	000
1022	000
1023	106
1024	111
1025	111
1026	111
1027	061
1030	000
1031	000
1032	000
1033	000
1034	177
1035	000
1036	000
1037	106
1040	111
1041	111
1042	111
1043	061
1044	000
1045	000
1046	000
1047	000
1050	177
1051	005
1052	005
1053	005
1054	177
1055	000
1056	000
1057	000
1060	000
1061	001
1062	001
1063	001
1064	177
1065	001
1066	001
1067	001
1070	000
1071	000
1072	177
1073	111

1074	111
1075	111
1076	101
1077	000
1100	000
1101	106
1102	111
1103	111
1104	111
1105	061
1106	000
1107	000
1110	001
1111	001
1112	001
1113	177
1114	001
1115	001
1116	001
1117	000
1120	010
1121	010
1122	010
1123	010
1124	010
1125	010
1126	010
1127	010
1130	010
1131	001
1132	002
1133	003
1134	004
1135	005
1136	006
1137	007
1140	010
1141	011
1142	012
1143	013
1144	014
1145	015
1146	016
1147	017
1150	020
1151	021
1152	022
1153	023
1154	024
1155	025
1156	026
1157	027

1160	030
1161	031
1162	032
1163	033
1164	034
1165	035
1166	036
1167	037
1170	040
1171	041
1172	042
1173	043
1174	044
1175	045
1176	046
1177	047
1200	050
1201	051
1202	052
1203	053
1204	054
1205	055
1206	056
1207	057
1210	060
1211	061
1212	062
1213	063
1214	064
1215	065
1216	066
1217	067
1220	070
1221	071
1222	072
1223	073
1224	074
1225	075
1226	076
1227	077
1230	100
1231	101
1232	102
1233	103
1234	104
1235	105
1236	106
1237	107
1240	110
1241	111
1242	112
1243	113
1244	114
1245	115
1246	116
1247	117

1250	120
1251	121
1252	122
1253	123
1254	124
1255	125
1256	126
1257	127
1260	130
1261	131
1262	132
1263	133
1264	134
1265	135
1266	136
1267	137
1270	140
1271	141
1272	142
1273	143
1274	144
1275	145
1276	146
1277	147
1300	150
1301	151
1302	152
1303	153
1304	154
1305	155
1306	156
1307	157
1310	160
1311	161
1312	162
1313	163
1314	164
1315	165
1316	166
1317	167
1320	170
1321	171
1322	172
1323	173
1324	174
1325	175
1326	176
1327	177
1330	000
1331	000
1332	000
1333	000
1334	000
1335	000
1336	000
1337	000

NUMBER: T12

TITLE: Paper Tape Punch Test

MINIMUM EQUIPMENT NEEDED: 8092, 8091 (BRPE-11)

PURPOSE

This program will test the Paper Tape Punch without using the reader.

OPERATING INSTRUCTIONS

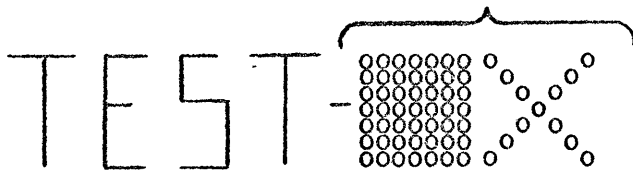
LOAD ADDRESS: 000

STARTING ADDRESS: 000

TERMINAL ADDRESS: 1107

Start this test at 000 and visually inspect tape punched out. It should look like this:

10 times, then repeats whole sequence



The test will run until manually stopped. This test will work on either 7 level or 8 level, but only 7 channels are used in either case.

HALTS

None.

0000	064	UJP	
0001	060		
0010	113	CIL	
0020	113	CIL	
0030	113	CIL	
0040	113	CIL	
0041	012		
0042	365		
0060	020	LDN	
0061	002		
0062	202	ATT	
0063	075	EXF	
0064	041		
0065	004		
0066	273	OUT	Select Paper Tape Punch
0067	000		
0070	070		
0071	025	LCM	
0072	041		
0073	041	STM	
0074	042		
0075	273	OUT	Punch Out Word Test
0076	070		
0077	110		
0100	055	RAO	
0101	042		
0102	060	ZJP	
0103	066		
0104	064	UJP	
0105	075		
1000	001		Punch Out Test Pattern 10 Times
1001	001		(Test Pattern as Shown on 1st page
1002	001		
1003	177		
1004	001		
1005	001		
1006	001		
1007	000		

1010	000
1011	000
1012	000
1013	177
1014	111
1015	111
1016	101
1017	101
1020	000
1021	000
1022	000
1023	000
1024	106
1025	111
1026	111
1027	111
1030	061
1031	000
1032	000
1033	000
1034	000
1035	001
1036	001
1037	001
1040	177
1041	001
1042	001
1043	001
1044	000
1045	000
1046	000
1047	000
1050	000
1051	000
1052	000
1053	000
1054	010
1055	010
1056	010
1057	010
1060	000
1061	000
1062	000
1063	000
1064	000
1065	000
1066	000
1067	000

1070	177
1071	177
1072	177
1073	177
1074	177
1075	177
1076	177
1077	000
1100	101
1101	042
1102	024
1103	010
1104	024
1105	042
1106	101
1107	000

NUMBER: T13

TITLE: Paper Tape Punch Residual Magnetism Test

MINIMUM EQUIPMENT NEEDED: 8092, 8091 (BRPE-11)

PURPOSE

This program will test the punch power supply load down and punch residual magnetism.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

START ADDRESS: 011 for 7 level
000 for 8 level

TERMINAL ADDRESS: 310

Run out enough leader to reach the reader. Put tape in reader anywhere in the leader. Put computer in run and test will continue until an error occurs.

DESCRIPTION

Patterns are punched such that good transient response is required. These patterns are then read to check accuracy.

HALTS

P = 150	Error in channel. Location 302 shown particular channel
P = 160	Error on 0 (no punch).
P = 203	Error in 177 #

0000	020	LDN	Set up for 8-Level Punc
0001	377		
0002	041	STM	
0003	301		
0004	064	UJP	
0005	050		
0010	113	CIL	
0011	020	LDN	Set up for 7-Level Punch Test
0012	177		
0013	041	STM	
0014	301		
0015	064	UJP	
0016	050		
0017			
0020	113	CIL	
0030	113	CIL	
0040	113	CIL	
0050	020	LDN	
0051	001		
0052	041	STM	
0053	300		
0054	041	STM	
0055	302		
0056	075	EXF	Select Paper Tape Punch
0057	041		
0060	004		
0061	074	OTN	Punch Zero Word
0062	000		
0063	025	LCM	
0064	304		
0065	041	STM	
0066	305		
0067	073	OUT	Punch Out 377 Words = 1 (2,4,10, 20, 100)
0070	300		
0071	301		
0072	055	RAO	
0073	305		
0074	061	NZP	
0075	067		
0076	055	RAO	(Increment Location 310 by 2)
0077	310		377 Times
0100	055	RAO	
0101	310		
0102	055	RAO	
0103	307		

0104	061	NZP	
0105	076		
0106	074	OTN	Punch Out Zero Word
0107	000		
0110	021	LDM	
0111	300		
0112	001	SHA	Shift Level Being Punched
0113	011	LPM	
0114	301		
0115	064	UJP	
0116	213		
0117	025	LCM	
0120	304		
0121	041	STM	
0122	305		
0123	073	OUT	Punch Out 177 Word 377 Times
0124	301		
0125	302		
0126	055	RAO	
0127	305		
0130	061	NZP	
0131	123		
0132	064	UJP	
0133	221		
0134	000		
0135	025	LCM	
0136	304		
0137	041	STM	
0140	305		
0141	076	INA	Loop Through Leader
0142	060	ZJP	
0143	141		
0144	035	SBM	Check for 377 1's (2,4,10,40,100)
0145	302		
0146	060	ZJP	
0147	151		
0150	000	ERR	Error in Particular Channel Level
0151	055	RAO	(could be either punch or reader)
0152	305		
0153	061	NZP	
0154	141		
0155	076	INA	
0156	060	ZJP	
0157	161		
0160	000	ERR	Error if no Zero Word After Each
0161	021	LDM	Phase of Pattern
0162	302		
0163	001	SHA	Shift Level Being Checked
0164	011	LPM	
0165	301		
0166	041	STM	
0167	302		

0170	061	NZP	
0171	135		
0172	025	LCM	
0173	304		
0174	041	STM	
0175	305		
0176	076	INA	Check 177 (377) Words
0177	035	SBM	
0200	301		
0201	060	ZJP	
0202	204		
0203	000	ERR	Error in 177 or 377
0204	055	RAO	
0205	305		
0206	061	NZP	
0207	176		
0210	064	UJP	
0211	050		
0212			
0213	041	STM	
0214	300		
0215	061	NZP	
0216	063		
0217	064	UJP	
0220	117		
0221	074	OTN	Punch Out Good Length Leader
0222	000		After Pattern
0223	055	RAO	
0224	234		
0225	061	NZP	
0226	235		
0227	075	EXF	Select Paper Tape Reader
0230	041		
0231	002		
0232	064	UJP	
0233	135		
0234	000		
0235	074	OTN	
0236	000		
0237	074	OTN	
0240	000		
0241	074	OTN	
0242	000		
0243	064	UJP	
0244	221		
0300	001		
0301	377		
0302	001		
0303			
0304	000		
0305	000		

0306	000
0307	000
0310	000

NUMBER: T14

TITLE: Timing Test for 167-2 Card Reader

MINIMUM EQUIPMENT NEEDED: 8092, 167-2, 8094

PURPOSE

This program will check Card Reader for proper timing between columns and between cards.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000

TERMINAL ADDRESS: 376 (destroys locations 1000 - 1117)

Put a deck of Hollerith cards (with any legal information on them) in the hopper and turn computer on run. Program will run until cards run out.

DESCRIPTION

This program introduces delays between reading columns and cards to see that an input disconnect does not occur if timing is correct.

HALTS

P = 72

Status halt. A = Status

P = 75

Available time between cards is less than 75 ms.

P = 127

Available time between columns is less than 1.5 ms.

0000	064	UJP
0001	050	
0010	113	CIL
0020	113	CIL
0030	113	CIL
0040	113	CIL
0050	075	EXF
0051	063	
0052	001	
0053	020	LDN
0054	002	
0055	202	ATT
0056	064	UJP
0057	163	
0060	076	INA
0061	076	INA
0062	060	ZJP
0063	100	
0064	034	SBN
0065	010	
0066	060	ZJP
0067	075	
0070	030	ADN
0071	010	
0072	077	HLT
0073	064	UJP
0074	056	
0075	077	HLT
0076	064	UJP
0077	056	
0100	075	EXF
0101	045	
0102	006	
0103	272	INN
0104	000	
0105	012	
0106	020	LDN
0107	313	
0110	041	STM
0111	376	
0112	055	RAO
0113	376	

0114	061	NZP
0115	112	
0116	272	INN
0117	000	
0120	106	
0121	064	UJP
0122	170	
0123	076	INA
0124	076	INA
0125	060	ZJP
0126	132	
0127	077	HLT
0130	064	UJP
0131	056	
0132	075	EXF
0133	045	
0134	006	
0135	020	LDN
0136	000	
0137	041	STM
0140	376	
0141	020	LDN
0142	365	
0143	041	STM
0144	375	
0145	055	RAO
0146	376	
0147	061	NZP
0150	145	
0151	055	RAO
0152	375	
0153	061	NZP
0154	145	
0155	272	INN
0156	000	
0157	120	
0160	064	UJP
0161	056	
0162		
0163	075	EXF
0164	045	
0165	040	
0166	064	UJP
0167	060	
0170	075	EXF
0171	045	
0172	040	
0173	064	UJP
0174	123	
0376	000	

NUMBER: T15

TITLE: 167-2 Card Reader Test

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 167-2

PURPOSE

This program will test the card reader for each mode.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for Status Check (Section 1)
002 for Single Cycle Read (Section 2)
004 for Free Run Read (Section 3)
006 for H→BCD (Section 4)

TERMINAL ADDRESS: 1357 (destroys locations up to 1637)

Section 1: Status Check. Status responses can be checked by simulating conditions. A halt will appear at 062 and A will display the status code. Reset run switch to continue this section.

Section 2: Single Cycle binary read. Use any size deck of binary cards all with identical information. One card will be read and a halt will occur at P = 117. Reset run switch and test will continue checking each card against the original one.

Section 3: Free Run binary read. Works just like Section 2, only in free run mode.

Section 4: H→BCD. Requires a deck of Hollerith cards exactly like program from (1240 - 1357). These cards will be checked against information in storage.

HALTS

P = 062	Status halt section 1. A = status.
P = 110 or 127	Status halt. A = status.
P = 117	End of buffer card read. Reset run switch.
P = 144	Error in read.

0000	064	UJP
0001	050	
0002	064	
0003	211	
0004	064	
0005	233	
0006	064	
0007	255	
0010	113	CIL
0020	113	CIL
0030	113	CIL
0040	113	CIL
0050	075	EXF
0051	063	
0052	001	
0053	075	EXF
0054	045	
0055	040	
0056	076	INA
0057	076	INA
0060	060	ZJP
0061	053	
0062	077	HLT
0063	064	UJP
0064	053	
0065	075	EXF
0066	063	
0067	001	
0070	020	LDN
0071	001	
0072	102	ATT
0073	020	LDN
0074	002	
0075	202	ATT
0076	020	LDN
0077	003	
0100	302	ATT
0101	075	EXF
0102	045	
0103	040	
0104	076	INA
0105	076	INA
0106	060	ZJP
0107	111	

0110	077	HLT
0111	075	EXF
0112	045	
0113	002	
0114	272	INN
0115	000	
0116	240	
0117	077	HLT
0120	075	EXF
0121	045	
0122	040	
0123	076	INA
0124	076	INA
0125	060	ZJP
0126	130	
0127	077	
0130	075	EXF
0131	045	
0132	002	
0133	372	INN
0134	000	
0135	240	
0136	221	LDM
0137	000	
0140	335	SBM
0141	000	
0142	060	ZJP
0143	314	
0144	077	HLT
0145	034	SBN
0146	001	
0147	035	SBM
0150	141	
0151	060	ZJP
0152	157	
0153	055	RAO
0154	137	
0155	064	UJP
0156	310	
0157	020	LDN
0160	000	
0161	041	STM
0162	137	
0163	041	STM
0164	141	
0165	064	UJP
0166	120	
0167	020	LDN
0170	000	
0171	041	STM

0172	137	
0173	041	STM
0174	141	
0175	064	UJP
0176	120	
0177	020	LDM
0200	240	
0201	041	STM
0202	137	
0203	020	LDN
0204	000	
0205	041	STM
0206	141	
0207	064	UJP
0210	120	
0211	020	LDN
0212	002	
0213	041	STM
0214	132	
0215	020	LDN
0216	240	
0217	041	STM
0220	135	
0221	020	LDN
0222	000	
0223	041	STM
0224	137	
0225	020	LDN
0226	157	
0227	041	STM
0230	152	
0231	064	UJP
0232	065	
0233	020	LDN
0234	001	
0235	041	STM
0236	132	
0237	020	LDN
0240	240	
0241	041	STM
0242	135	
0243	020	LDN
0244	000	
0245	041	STM
0246	137	
0247	020	LDN
0250	167	
0251	041	STM
0252	152	
0253	064	UJP
0254	065	
0255	020	LDN
0256	006	
0257	041	STM

0260	132	
0261	020	LDN
0262	120	
0263	041	STM
0264	135	
0265	020	LDN
0266	240	
0267	041	STM
0270	137	
0271	020	LDN
0272	177	
0273	041	STM
0274	152	
0275	064	UJP
0276	320	
0277		

0310	055	RAO
0311	141	
0312	064	UJP
0313	136	
0314	021	LDM
0315	135	
0316	064	UJP
0317	145	
0320	075	EXF
0321	063	
0322	001	
0323	064	UJP
0324	120	

1240	061	A
1241	062	B
1242	063	C
1243	064	D
1244	065	E
1245	066	F
1246	067	G
1247	070	H
1250	071	I
1251	041	J
1252	042	K
1253	043	L
1254	044	M
1255	045	N
1256	046	O
1257	047	P

1260	050	Q
1261	051	R
1262	022	S
1263	023	T
1264	024	U
1265	025	V
1266	026	W
1267	027	X
1270	030	Y
1271	031	Z
1272	001	1
1273	002	2
1274	003	3
1275	004	4
1276	005	5
1277	006	6
1300	007	7
1301	010	8
1302	011	9
1303	012	0
1304	014	-
1305	034	(
1306	054	*
1307	074)
1310	021	/
1311	013	=
1312	033	,
1313	053	\$
1314	073	.
1315	060	+
1316	061	A
1317	062	B
1320	063	C
1321	064	D
1322	065	E
1323	066	F
1324	067	G
1325	070	H
1326	071	I
1327	041	J
1330	042	K
1331	043	L
1332	044	M
1333	045	N
1334	046	O
1335	047	P
1336	050	Q
1337	051	R
1340	022	S
1341	023	T

1342	024	U
1343	025	V
1344	026	W
1345	027	X
1346	030	Y
1347	031	Z
1350	001	1
1351	002	2
1352	003	3
1353	004	4
1354	005	5
1355	006	6
1356	007	7
1357	010	8
1360		

NUMBER: T16

TITLE: 167-2 Card Reader Test

MINIMUM EQUIPMENT NEEDED: 8092, 8094, 167-2

PURPOSE

This program will test the card reader for reliability.

OPERATING INSTRUCTIONS

LOAD ADDRESS: 000

STARTING ADDRESS: 000 for Section 1 (binary FR, SC)
004 for Section 2 (H→BCD FR, SC)
055 for Section 3 (Status Check)

TERMINAL ADDRESS: 1774

Section 1: Put 000 in A and start at 000 for single cycle read. Put 377 in A and start at 000 for free run read. Put 252 in A and start at 000 for alternating SC and FR read. A deck of 5252 and 2525 cards are required (can be mixed).

Section 2: Same instructions as in Section 1 apply except the starting address is 004. A deck of Hollerith cards are required with information exactly like the program from locations 1655 through 1774.

Section 3: Status Check. Start at 055 and manually simulate status responses. Program will halt at 067 and A will display the status code. To continue reset run switch.

DESCRIPTION

In Section 1 each card is read and determined whether it is a 2525 or a 5252 card. The card is then checked for accuracy. In Section 2 each card is read and compared to a stored list for accuracy.

HALTS

P = 067	Status halt (Section 3). Reset run switch to continue.
P = 204, 267	Wrong card used or all cards have been read.
P = 233, 316	Error in 2525 read.
P = 236, 321	Error in 5252 read.
P = 512	Error in Hollerith card.

0000	041	STM
0001	376	
0002	064	UJP
0003	072	
0004	041	STM
0005	375	
0006	064	UJP
0007	011	
0010	113	CIL
0011	020	LDN
0012	001	
0013	102	ATT
0014	164	UJP
0015	020	
0016		
0017		
0020	113	CIL
0030	113	CIL
0040	113	CIL
0055	075	EXF
0056	063	
0057	001	
0060	075	EXF
0061	045	
0062	040	
0063	076	INA
0064	076	INA
0065	060	ZJP
0066	060	
0067	077	HLT
0070	064	UJP
0071	060	
0072	075	EXF
0073	063	
0074	001	
0075	020	LDN
0076	002	
0077	202	ATT
0100	020	LDN
0101	003	
0102	302	ATT
0103	021	LDM
0104	376	
0105	001	SHA
0106	041	STM
0107	376	

0110	062	PJP
0111	134	
0112	020	LDN
0113	001	
0114	041	STM
0115	161	
0116	020	LDN
0117	372	
0120	041	STM
0121	165	
0122	020	LDN
0123	000	
0124	041	STM
0125	166	
0126	020	LDN
0127	253	
0130	041	STM
0131	246	
0132	064	UJP
0133	152	
0134	020	LDN
0135	002	
0136	041	STM
0137	161	
0140	020	LDN
0141	064	
0142	041	STM
0143	165	
0144	020	LDN
0145	170	
0146	041	STM
0147	166	
0150	064	UJP
0151	362	
0152	075	EXF
0153	045	
0154	040	
0155	076	INA
0156	076	INA
0157	075	EXF
0160	045	
0161	001	
0162	272	INN
0163	000	
0164	240	
0165	372	INN
0166	000	
0167	240	
0170	221	LDM
0171	000	
0172	034	SBN
0173	052	

0174	060	ZJP
0175	350	
0176	221	LDM
0177	000	
0200	034	SBN
0201	025	
0202	060	ZJP
0203	207	
0204	077	HLT
0205	064	UJP
0206	152	
0207	020	LDN
0210	000	
0211	041	STM
0212	220	
0213	020	LDN
0214	025	
0215	041	STM
0216	222	
0217	221	LDM
0220	000	
0221	034	SBN
0222	052	
0223	060	ZJP
0224	241	
0225	021	LDM
0226	222	
0227	034	SBN
0230	052	
0231	060	ZJP
0232	236	
0233	077	HLT
0234	064	UJP
0235	152	
0236	077	HLT
0237	064	UJP
0240	152	
0241	021	LDM
0242	220	
0243	030	ADN
0244	141	
0245	060	ZJP
0246	253	
0247	055	RAO
0250	220	
0251	064	UJP
0252	217	
0253	321	LDM
0254	000	
0255	034	SBN
0256	052	
0257	060	ZJP

0260	336	
0261	321	LDM
0262	000	
0263	034	SBN
0264	025	
0265	060	ZJP
0266	272	
0267	077	HLT
0270	064	UJP
0271	152	
0272	020	LDN
0273	000	
0274	041	STM
0275	303	
0276	020	LDN
0277	025	
0300	041	STM
0301	305	
0302	321	LDM
0303	000	
0304	034	SBN
0305	052	
0306	060	ZJP
0307	324	
0310	021	LDM
0311	305	
0312	034	SBN
0313	052	
0314	060	ZJP
0315	321	
0316	077	HLT
0317	064	UJP
0320	152	
0321	077	HLT
0322	064	UJP
0323	152	
0324	021	LDM
0325	303	
0326	030	ADN
0327	141	
0330	060	ZJP
0331	103	
0332	055	RAO
0333	303	
0334	064	UJP
0335	302	
0336	020	LDN
0337	000	
0340	041	STM
0341	303	
0342	020	LDN
0343	052	

0344	041	STM
0345	305	
0346	064	UJP
0347	302	
0350	020	LDN
0351	000	
0352	041	STM
0353	220	
0354	020	LDN
0355	052	
0356	041	STM
0357	222	
0360	064	UJP
0361	217	
0362	020	LDN
0363	103	
0364	041	STM
0365	246	
0366	064	UJP
0367	152	
0375	252	
0376	252	
0400		
0410		
0420	075	EXF
0421	063	
0422	001	
0423	020	LDN
0424	001	
0425	102	ATT
0426	020	LDN
0427	002	
0430	202	ATT
0431	020	LDN
0432	003	
0433	302	ATT
0434	021	LDM
0435	375	
0436	001	SHA
0437	041	STM
0440	375	
0441	162	PJP
0442	131	
0443	020	LDN

{T}E-6}

0444	005	
0445	141	STM
0446	100	
0447	020	LDN
0450	240	
0451	141	STM
0452	103	
0453	020	LDN
0454	261	
0455	141	STM
0456	120	
0457	020	LDN
0460	000	
0461	141	STM
0462	105	
0463	020	LDN
0464	255	
0465	141	STM
0466	107	
0467	075	EXF
0470	045	
0471	040	
0472	076	INA
0473	076	INA
0474	161	NZP
0475	067	
0476	075	EXF
0477	045	
0500	006	
0501	272	INN
0502	000	
0503	120	
0504	221	LDM
0505	000	
0506	335	SBM
0507	255	
0510	160	ZJP
0511	115	
0512	077	HLT
0513	164	UJP
0514	067	
0515	121	LDM
0516	105	
0517	030	ADN
0520	261	
0521	160	ZJP
0522	034	
0523	155	RAO
0524	105	
0525	155	RAO
0526	107	
0527	164	UJP

0530	104	
0531	020	LDN
0532	006	
0533	141	STM
0534	100	
0535	020	LDN
0536	120	
0537	141	STM
0540	103	
0541	020	LDN
0542	261	
0543	141	STM
0544	120	
0545	164	UJP
0546	057	

1655	061	A
1656	062	B
1657	063	C
1660	064	D
1661	065	E
1662	066	F
1663	067	G
1664	070	H
1665	071	I
1666	041	J
1667	042	K
1670	043	L
1671	044	M
1672	045	N
1673	046	O
1674	047	P
1675	050	Q
1676	051	R
1677	022	S
1700	023	T
1701	024	U
1702	025	V
1703	026	W
1704	027	X
1705	030	Y
1706	031	Z
1707	001	1
1710	002	2
1711	003	3
1712	004	4
1713	005	5
1714	006	6
1715	007	7
1716	010	8
1717	011	9

1720	012	0
1721	014	-
1722	034	(
1723	054	*
1724	074)
1725	021	/
1726	013	=
1727	033	,
1730	053	\$
1731	073	.
1732	060	+
1733	061	A
1734	062	B
1735	063	C
1736	064	D
1737	065	E
1740	066	F
1741	067	G
1742	070	H
1743	071	I
1744	041	J
1745	042	K
1746	043	L
1747	044	M
1750	045	N
1751	046	O
1752	047	P
1753	050	Q
1754	051	R
1755	022	S
1756	023	T
1757	024	U
1760	025	V
1761	026	W
1762	027	X
1763	030	Y
1764	031	Z
1765	001	1
1766	002	2
1767	003	3
1770	004	4
1771	005	5
1772	006	6
1773	007	7
1774	010	8

DECK 3 8130 SYSTEM PERIPHERAL EQUIPMENT TEST ROUTINE

I. DESCRIPTION

Title: DECK 3 (T31, T32, T33)

Type of Program: Test routine for 8130 System Peripheral Equipment

Computer: 8130 Remote Terminal System

Programmer: James R. O'Melia, Industrial Data Processing Division, Control Data Corporation

Date: December, 1966

II. PURPOSE

This routine tests the reliability of physical operations of the 8130 System Card Reader, Line Printer, and Data Set Controller.

III. OPERATING INSTRUCTIONS

A. Load DECK 3 test program at P = 0000.

The initial stop is at P = 7000.

B. MASTER CLEAR, enter Routine Selection code in the A register.

Routine Selection codes are:

Card Reader test (T31): 100

Line Printer tests (T32)

Vertical Print test: 201

Triangular Print test: 202

Slant Print test: 203

Spacing Performance test: 204

Data Set Controller test (T33): 300

C. Place in RUN.

The selected test runs according to its respective operating characteristics (described in section IV). An illegal Selection code (other than one of those listed in step "B") in the A register results in a halt with 377 displayed in the A register. The ALARM RELEASE and LOCAL TROUBLE indicators light in the TCP and the audible alarm sounds. To recover, clear the A register and the ALARM RELEASE indicator. Repeat steps "B" and "C".

IV. OPERATING CHARACTERISTICS

After the Routine Selection code is entered in the A register and the 8130 System is placed in RUN, the selected test is performed in accordance with its operating characteristics. Each test proceeds until RUN is released. Select a new test by performing MASTER CLEAR and entering another Routine Selection code in the A register (as specified in section III, B).

A. Card Reader Test (T31)

1. This test reads a test deck of 52-25 or 25-52 binary cards. The cards are punched "1010101010" and "0101010101" in alternating columns, alternating rows, resembling a checkerboard pattern. The card reader reads at the rate of 100 cards per minute via the buffered data channel. In the event of an error stop, one of the following codes is displayed in the A register:

<u>Error Code</u>	<u>Interpretation</u>	<u>Recovery</u>
101	Status halt. Status on the card reader is bad.	Repair status, MASTER CLEAR, follow instructions at III, B.
103	Timeout error. The card reader has not been able to restore a ready status in 600 ms or less; that is, the card reader is not operating at its rated speed of 100 cards per minute.	Re-place in RUN.

107 Error in reading Ready deck in card reader,
 a card. The re-place in RUN.
 affected card is the
 second to the last
 one passed through
 the card reader.

2. The error location is indicated as follows:

The upper four bits are in Tag Register 3.

The lower 8 bits are in the BER.

B. Line Printer Tests (T32)

1. Vertical Print Test

- a. This test emits a series of character sets across all printing hammers of the printer so that a row of each character appears vertically. The buffered data channel is used. If a timeout error occurs, 201 is displayed in the A register. This means that the printer has not restored ready status within 200 ms (that is, not printing at the rated speed of 300 lines per minute). To restart, re-place in RUN.
- b. If status becomes not ready, either a 201 halt occurs, with the ALARM RELEASE and LOCAL TROUBLE indicators lit, or the SPP enters a tight loop polling for ready status, which (when received) re-initiates the printing.

2. Triangular Print Test

- a. This test prints a series of alternating triangles pointed down on the page. The normal data channel is used.
- b. If a not-ready status is encountered, the SPP cycles until a ready status is received.

3. Slant Print Test

- a. This test emits a series of character sets across all printer hammers in a format similar to that for the vertical print test, except that as lines are printed each line is slanted one position to the left. The buffered data channel is used.

- b. Not-ready status causes the SPP to cycle until a ready status is received.

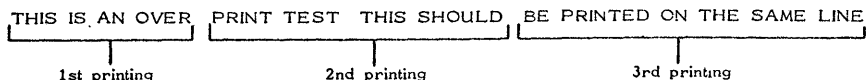
4. Spacing Performance Test

- a. If this test is selected, a halt occurs with 000 in the A register. The desired number of spaces between lines of print is entered in the A register. In this way, up to and including 63₁₀ (77₈) spaces may be designated. If more than 77₈ spaces are requested, the A register is cleared to allow a legal designation. If 000 is allowed to remain in the A register, up to 10 spaces are tested.
- b. When the 8130 System is placed in RUN, the printer spaces as specified after printing the following line:

THIS IS A SPACING TEST. THERE SHOULD BE xx LINES SKIPPED BEFORE THE NEXT LINE

- c. A not-ready status results in a halt with 207 displayed in the A register, the ALARM RELEASE and LOCAL TROUBLE indicators lit. The audible alarm also sounds.

Upon completion of the first phase of the Spacing Performance test, a halt occurs. After re-placing in RUN, the overprint test starts. This uses three separate printings to print one line as follows:



After the third printing, a separate operation raises the paper one line.

- d. Upon completion of the overprint phase, a halt occurs. The printer carriage control channel is now tested. Enter the channel to be tested in the A register by setting each bit corresponding to the channel to be tested. For example, actuating bit 0 causes channel 1 to be tested; bit 6 causes channel 7 to be tested, etc. The following line prints, followed by intermediate channel skipping (this occurs 10 times):

THIS IS A CHANNEL SPACING TEST ON CHANNEL x

Upon completion of this phase, the test recycles to the beginning of the Spacing Performance test.

C. Data Set Controller Test

This routine tests the reliability of the 8197 Data Set Controller by sending and receiving sequential combinations of 8-bit patterns to determine the accuracy of the DSC as well as its timing. This test operates only in full duplex mode. Error halts display the following codes in the A register:

<u>Error code</u>	<u>Interpretation</u>
315	A timeout error has occurred. The DSC has not responded within the proper time span.
317	A compare error has occurred. The DSC has returned a character which differs from the one sent to it.

The DSC test is restarted by re-placing in RUN.