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 SHEET 0
 OF 62

DIAGNOSTIC TEST

TITLE DIPAL MONITOR
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IBM 1620/1710 DIPAL MONITOR

This manual describes the features of the Disk Pack Library (DIPAL) and the operating procedure for the DIPAL Monitor as it is used with any 1620/1710 system having a 1311 Disk Storage Drive. Included is instruction for storing programs in DIPAL and for loading programs from DIPAL into 1620 core storage. Familiarity with the operation and terms associated with the 1311 Disk Storage Drive is assumed.

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1.0 INTRODUCTION

1.1 DIPAL Monitor is a 1620/1710 Customer Engineering utility program which enables a CE to generate a Disk Pack Library (DIPAL) for use on 1620/1710 systems having a 1311 Disk Storage Drive. The Monitor also provides two convenient methods for loading programs from DIPAL into 1620 core storage.

1.2 What Programs Can Be Stored In DIPAL? While DIPAL is primarily designed for convenient storage of maintenance programs, any program not using core positions 18000 through 19999 can be stored in DIPAL.

1.3 Using DIPAL Monitor the CE Can:

- a. Store programs on the Disk Pack, one program per cylinder.
- b. Add programs to the library at any time.
- c. Replace programs previously stored in the library.
- d. Obtain a list of all programs stored in the library together with their cylinder addresses.
- e. Run any program in the library by loading the Program Call card for the desired program.
- f. Run under monitor control any program or sequence of programs, requesting each program by a name assigned when that program was stored in DIPAL.

1.4 Equipment Requirements

- a. A 1620/1710 Mod I or II equipped with a 1311 Disk Storage Drive.
- b. A disk pack, usually the CE disk pack, on which the Monitor and the Library can be stored.

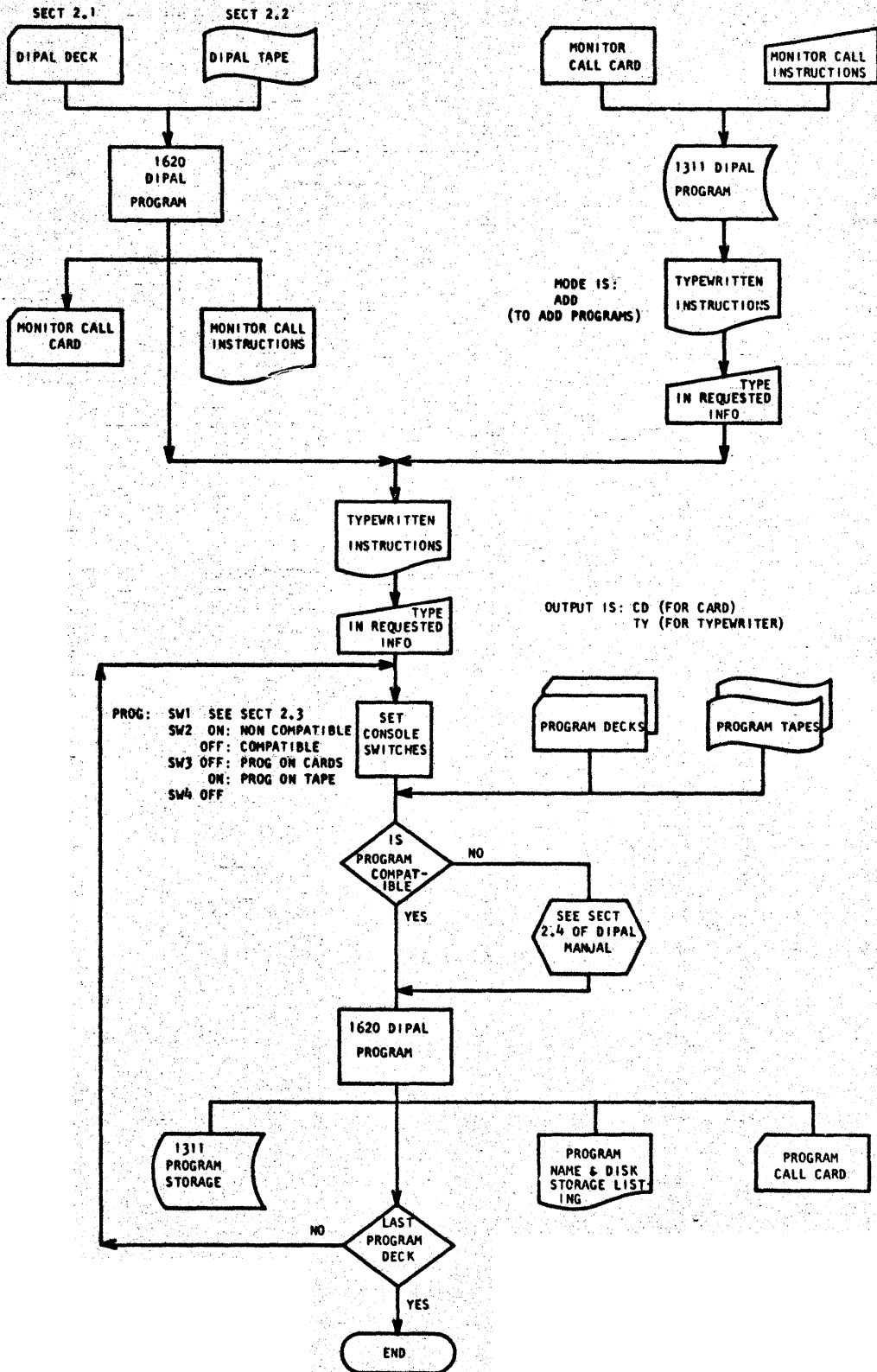
1.5 Storage Requirements

- a. On the disk pack
 1. The Monitor uses cylinders 4 and 5.
 2. The Library uses one cylinder per program -- starting at cylinder 6.
 3. Cylinders 0-3, 35-37 and 96-99 are not used.
- b. In 1620 core storage

The Monitor is stored in core at 18000 to 19999.

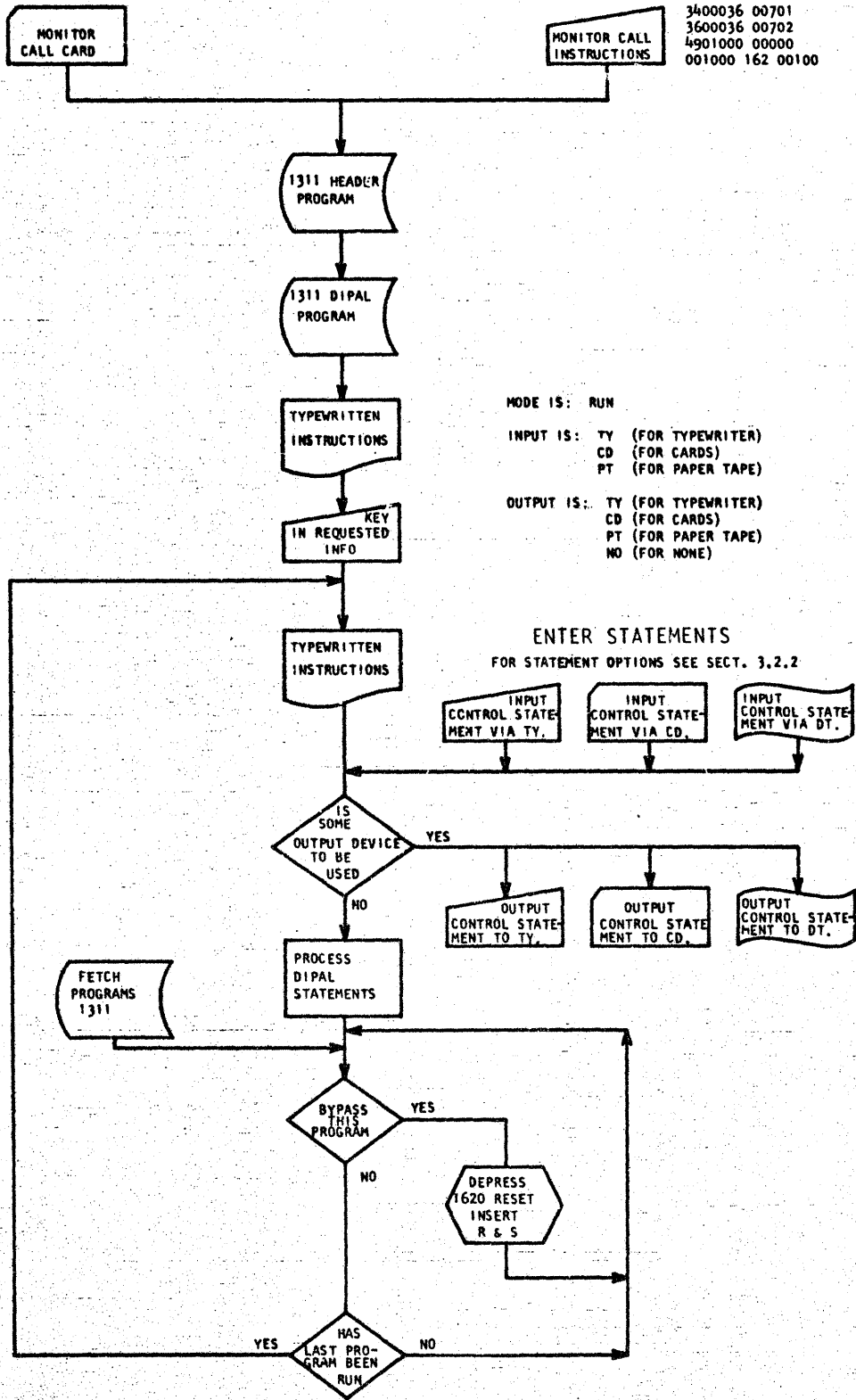
STORING DIPAL AND PROGRAMS ON THE DISK PACK SECT 2.0

ADDING PROGRAMS TO THE DISK PACK
REPLACING PROGRAMS ON THE DISK PACK
SEE SECT 2.3



SYSTEM OPERATION

RUNNING PROGRAMS UNDER MONITOR CONTROL SEE SECT 3.2
 FOR MANUAL CONTROL SEE SECT 3.1



3400036 00701
 3600036 00702
 4901000 00000
 001000 162 00100

2.0 STORING PROGRAMS IN DIPAL

The DIPAL Monitor is available in either card or tape versions. While the procedure will vary slightly depending on which version is used, the user is able to store card or paper tape programs in DIPAL using either version. Programs can be stored in DIPAL either right after the Monitor program is loaded or an ADD mode is provided in the Monitor which enables the user to store programs at any time or to replace programs previously stored.

Any program stored in DIPAL must have assigned to it a four digit DIPAL name. Also, certain "linkage" instructions must be added to the program to provide communication between the program and the monitor. Most 1620/1710 diagnostic programs have been modified to include a name and the required linkages. Programs that have been modified in this way are called DIPAL compatible programs. A list of the available compatible programs together with the names assigned these programs is included in Section 6. To store programs which are not DIPAL compatible, follow the instructions for non-compatible programs.

Any time a program is stored in DIPAL, the DIPAL name assigned to that program and the file address at which it was stored will be typed on the console typewriter. This is the Library List and it should be saved for future reference. This list is further explained in Section 2.5.

2.1 Using the Card Version of the DIPAL Monitor

Disk Pack Place a previously addressed Disk Pack (usually the CE Disk Pack) on Disk Drive 0 (if not addressed, use DT 0020 to address the pack).

Load Monitor Place the DIPAL Monitor program in the card hopper and press LOAD.

Check Switches Set to program

MONITOR LOAD WILL BE PUNCHED ON THE 1622
CARD PUNCH

One card will be punched. This card is the MONITOR LOAD card. Label and save this card.

MONITOR WILL LOAD TESTS ON THE 1311
PLACE DIAGNOSTIC PROGRAMS BEHIND MONITOR IN
CARD STACKER
REFER TO PROGRAM DOCUMENTATION TO BE SURE
PROGRAM IS COMPATIBLE
SW2 OFF IF PROGRAM IS COMPATIBLE

All 1620-II programs except DT 0100 are compatible. Other compatible programs are identified by a DIPAL name on the title page of the program documentation.

SW3 ON IF PROGRAM IS ON PAPER TAPE

- OUTPUT IS Key in: CD
- A program call card will be punched after each program is loaded. SAVE THIS CARD. For its use, refer to Section 3.1.
- Non-Compatible Programs To store non-compatible programs in DIPAL, turn Switch 2 on and go to Section 2.4.
- Compatible Card Programs To store compatible card programs both Switch 2 and 3 must be off. Place programs in 1622 read hopper and press 1622 start. All programs will automatically be loaded into core and stored on the file.
- Compatible tape programs To store compatible paper tape programs, Switch 3 must be on and Switch 2 off. Loading instructions will be printed on console typewriter.
- Note To store card programs after storing tape programs, turn Switch 3 off.
- Errors To recover from an operational error, refer to Section 4.

2.2 Using the Paper Tape Version of the DIPAL Monitor

- Disk Pack Place previously addressed Disk Pack (usually the CE Disk Pack) on Disk Drive 0 (If not addressed, use DT 0020 to address the pack).
- Load Monitor Place the DIPAL Monitor program on the paper tape reader. Key in 3600000 00300
- Check Switches Set to program

MONITOR LOAD WILL BE PRINTED ON TYPEWRITER

MONITOR WILL LOAD DIAGNOSTIC TESTS ON THE 1311 WHEN MONITOR HALTS WITH A 48 IN THE OP REGISTER PLACE THE DIAGNOSTIC ON THE APPROPRIATE INPUT DEVICE AND LOAD INTO CORE STORAGE FOLLOWING INSTRUCTIONS IN THE PROGRAM DOCUMENTATION. SW2 OFF IF PROGRAM IS COMPATIBLE

All 1620-II programs except DT 0100 are compatible. Other compatible programs are identified by a DIPAL name on the title page of the program documentation.

OUTPUT IS Key in: CD (if no 1622 - key in TY)

 A Program Call Card or series of instructions will be punched/printed after each program is loaded. SAVE THESE CARDS/INSTRUCTIONS. For their use, refer to Section 3.1.

Non-Compatible Programs To store non-compatible programs in DIPAL, turn Switch 2 on and go to Section 2.4.

Compatible Card or Tape Programs To store compatible card or tape programs, use standard loading procedures do not clear core.

Errors To recover from an operational error, refer to Section 4.

2.3 To Add Programs to the DIPAL Library or Replace Programs Already in the Library.

Disk Pack Place the DIPAL Disk Pack on Disk Drive 0.

Call Monitor Use the Monitor Load Card to call the DIPAL Monitor into core storage. If using a tape system, key in:

 340003600701
 360003600702
 490100000000
 001000 16200100

Check Switches Set to program

Delay There will be a delay due to the running of the header test.

MODE IS To select the ADD mode, key in ADD

SW1 ON TO REPLACE PROGRAM

If SW1 is turned on the Monitor will request a sector address at which the next program will be stored. Using this option, any previously stored programs can be replaced with an updated program having the same DIPAL name or with a new program having a different DIPAL name. With Sw1 off, the program will be stored starting at the next available cylinder.

SW2 OFF IF PROGRAM IS COMPATIBLE
SW3 ON IF PROGRAM IS ON PAPER TAPE (Card Version only)

OUTPUT IS This message requests the user to specify an output device for Program Call instructions.

Card System key in CD

Tape System key in TY

SEC ADD If replacing a program (SW1 on)the sector address of that program must be entered.

This address is given on the Library List generated during loading (for explanation of format or instructions for generating a new list, see Section 2.5).

Note To terminate program replacement disregard the last request for SEC ADD, press RESET and turn SW1 off. Additional programs can then be added starting at the next available cylinder in the Library.

Non-Compatible Programs To add non-compatible programs, turn SW2 on and go to Section 2.4.

Compatible Card Programs To add compatible card programs, SW2 and 3 must be off. Use standard card loading procedure - do not clear core.

Compatible Tape Programs To add compatible paper tape programs, SW3 must be on and SW2 off. Use standard paper tape loading procedure - do not clear core.

Errors To recover from an operational error, refer to Section 4.

2.4 To Store NON-COMPATIBLE Programs

Follow the DIPAL Store or Add procedure until directed to this section.

Load Program in- Use standard load procedure for that to Core Storage program, card or tape (do not clear core). The program must not exceed core location 17999.

ADD LINKAGE Non-compatible programs lack the program linkage necessary to communicate with the Monitor, therefore, to run under Monitor Control, this linkage must

be provided before the program is stored on the Disk Pack. If the non-compatible program is to be run only under manual control no linkage is required.

To add the linkage, in place of the HALT at the end of the program, insert a branch to some available core location less than 17952. At that location, insert the following instructions:

```
                45 YYYY 18117
                49 18000 00000
YYYYYY          48 00000 00000
                49 START of program
```

Where 18000 and 18117 are addresses in the Monitor program, YYYYYY is the address of the HALT in this sequence of instructions and START is the starting address of the non-compatible program.

EXAMPLE

Assume the last instructions in the program are as follows:

```
02000 46 01000 00400 LOOP TEST. .: SW4
02012 48 00000 00000 HALT
02024 49 01000 00000 GO TO START
02036 12 34567 890 DATA
      33 4445
```

If storage space is available at address 16000 the linkage instructions could be added as follows:

- a. Change the Halt at 02012 to 49 16000 00000
- b. At 16000 enter:

```
16000 45 01000 18117
16012 49 18000 00000
16024 48 00000 00000
16036 49 01000 00000
```

Return to
Monitor Control

Branch to 18000

FIRST ADDRESS

Key in the START address of the non-compatible program.

4 CHAR NAME FOLLOWED BY RM

Key in an unique four character name for this test. Any alphameric characters except the Record Mark and Group Mark can be used.

- Note
1. Follow the above procedures for each non-compatible test to be loaded.
 2. To next load compatible tests, turn SW2 off.

Error To recover from an operational error, refer to Section 4.

2.5 The DIPAL Library Listing

2.5.1 Listing Description

During DIPAL storage, the DIPAL name and disk storage address of each program stored is printed on the console typewriter. When adding programs to the library, a list is also printed of names and addresses of those programs which are added.

In this list, the disk storage address of the program is given as a disk control field. The form is as follows:

```
NAME      A   BBBBB   CCC   00000
```

where A is the drive code
BBBBB is the first sector address
CCC is the sector count

If output to the typewriter is requested during DIPAL Load or ADD operations, Program Call instructions will also be typed for each program loaded. These instructions will appear on the Library List immediately following the program name and disk address. This series of instructions can be used to call the program directly from the DIPAL Library independent of Monitor Control.

2.5.2 To Obtain a New List

Call Monitor Use Monitor Load Card or key in

```
34 00036 00701  
36 00036 00702  
49 01000 00000  
001000 162 00100
```

Delay There will be a delay due to the running of a header test.

MODE IS Key in: LIST

3.0 RUNNING PROGRAMS STORED IN DIPAL

Programs stored in DIPAL can be called into core under either Manual or Monitor Call Control. Under Manual Control, each program is called into core by its own read file routine. This routine must be read into core through either the console typewriter or the card reader prior to calling each program. Using Monitor Control any series of programs can be requested. Each program called will run the number of times specified by its control statement then the next program in the series will be called into core.

3.1 Manual Control

Any program stored in DIPAL can be called into core storage by a read file from the cylinder on which that program is stored. As each program was stored in DIPAL a read file routine for the program was either punched on a Program Call Card or typed as part of the Library Listing. Any program stored in DIPAL can be called directly into core storage by the Call Card for that program or by typing in the appropriate read file routine.

Call Card To call a program using the Program Call Card, place the Monitor pack on Disk Drive 0 then load the Call Card. The program will be read into core storage, then a branch will be executed to the program START address.

Typewriter To call a program using the console typewriter, key in:

```
340003600701
360003600702
490000000000
ABBBBCCCC00000
```

Where ABBBBBCCC is the DIPAL address of this program as given in the program listing.

A is the Drive Code
BBBBB is the Sector Address
CCC is the Sector Count

If not using Disk Drive 0 The Disk Drive Code must correspond to the Disk Drive on which the pack is located.

<u>Drive Code</u>	<u>Disk Drive No.</u>
0	0
3	1
5	2
7	3

3.2 Monitor Control

Any program or group of programs can be run under monitor control. Programs can be run in any order and can be looped, either individually or as a group.

Each program in DIPAL is identified by a four digit name. To run a series of programs under monitor control, the DIPAL name of each program must be entered as a Control Statement. Statements can be keyed in on the console typewriter or frequently used statement sequences can be read in from cards or paper tape. Provision is provided in the program to conveniently punch these cards or tapes.

3.2.1 Monitor Control Set Up Procedure

Disk Pack Place the DIPAL Disk Pack on Disk Drive 0. Manual control must be used to run from any other drive.

Call Monitor Use the Monitor Load Card to call the DIPAL Monitor into core storage. This card was punched when the DIPAL Monitor was loaded onto the disk pack.

If using a tape system, key in:

340003600701
360003600702
490100000000
00100016200100

Header Test Before the monitor program is read into core, a test is made of all functions required by the monitor. This runs approximately:

1620 I - 30 sec.

1620 II - 8 sec.

If a failure is detected by this test, refer to Section 5 for suggested service procedures.

MODE IS To select the run mode, key in RUN

INPUT IS This message requests the user to specify the input device from which the control statements will be entered.

<u>Options</u>	<u>Key in</u>
Typewriter	TY
Card Reader	CD
Paper Tape	PT (after loading tape)

OUTPUT IS

This message requests the user to specify one of four options:

<u>Options</u>	<u>Key in</u>
a. Punch Control Statement Cards	CD
b. Punch Control Statement Tape	PT
c. List Control Statements	TY
d. No Output	NO

With this option the user can simplify future set up by punching control statements on card or tape.

ENTER STATEMENTS

The user is requested to specify the programs to be run by entering the appropriate control statements.

The basic control statement is the DIPAL name. This is the four digit name used to identify the program in the Library Listing. For other Control Statements and statement options refer to Control Statement Options, Section 3.2.2.

Typewriter Entry

To enter control statements from the typewriter (TY keyed in following INPUT IS):

- a. Key in statement (no spaces allowed)
- b. Press R-S after each statement.
- c. After last statement, key in GO

Card Entry

To enter control statements from cards (CD keyed in following INPUT IS):

- a. Place cards in 1622 read hopper
- b. Press 1622 START

Tape Entry To enter control statements from paper tape (PT keyed in following INPUT IS):

If tape was not previously loaded, the 1620 will hang with a Reader-No-Feed. To recover, mount the tape, then branch to 10,000.

To Bypass a Program Any program can be bypassed after it is called into core by branching to 18000.

To Call More Programs When all programs requested have been executed, the message ENTER STATEMENTS is typed. A new sequence of statements can then be entered.

To Correct Errors If a typing error is made:

- a. Turn Switch 4 on
- b. Press R-S
- c. Enter corrected statement
- d. Turn Switch 4 off
- e. Press R-S

If an error message is typed:

- a. Check Section 4 for explanation of error.
- b. Press START
- c. Enter corrected statement
- d. Press R-S

3.2.2 Control Statement Options

While the basic control statement is the DIPAL name, additional statements are available to increase the versatility of Monitor Control.

<u>Option</u>	<u>Control Statement</u>
Loop a Program	Follow the DIPAL name with a coma and any number between 1 and 99999. The requested program will be executed the number of times specified before the next program is called into core. Example: DT11, 25 DT17 GO

<u>Option</u>	<u>Control Statement</u>
	Note: DT 0018 can not be looped.
Loop a series of programs	Follow the last test name in the series with the statement LOOP, n, where n is any number between 1 and 99999. Example: 0101 0102 0103 LOOP, 10 0104 The test series DT0101, 0102, and 0103 will loop 10 times before DT0104 is executed.
	Note: Loop statements must be separated by a GO statement.
To halt after any program	Enter the statement HALT. The computer will halt with the last executed program still in core. Example: DT 11 DT 17, 5 HALT DT 18 GO After running DT0011 five times, the computer will halt with DT0017 still in core. Press START to call and run DT0018.
To run all programs	Enter the statement ALL. All programs in DIPAL will be executed once in the order they were stored in the library. ALL must be the first instruction in the control sequence. GO is not required following ALL.

3.2.3 Control Statement Input From Card or Tape

Set up of frequently run test sequences can be simplified by placing the control statements for those test sequences on cards or paper tape. Control statement cards or tapes can easily be prepared any time a sequence of statements is entered during the RUN set up procedure.

3.2.3.1 To generate Control Statement Cards or Tapes

Following the message OUTPUT IS: key in CD or PT

3.2.3.2 To enter statements from Cards or Tapes

Following the message INPUT IS: key in CD or PT

Note: If entering from tape, mount tape before continuing. If the tape is not mounted before the message ENTER STATEMENTS is typed, the 1620 will hang up with a reader-no-feed. To recover, mount tape then branch to 10,000.

3.2.3.3 To get a typewriter listing of statements entered via card or paper tape

Following the message OUTPUT IS: key in TY

3.2.3.4 Stacking Control Sequences

When entering statements from card or paper tape the statements will read in until either a GO command is encountered or the monitor execution area is full. After all tests have run the message ENTER STATEMENTS is typed and the program will immediately attempt to read additional statements from the designated input device. This feature allows you to stack statement sequences, each sequence separated by a GO command, or to stack an unlimited number of statements without exceeding the capacity of the Monitor program.

4.0 RECOVERY FROM OPERATIONAL ERRORS

4.1 Typing Errors

If a typing error is made when entering any requested information in either the store or run modes:

- a. Turn switch 4 on
- b. Press R-S
- c. Key in correct data
- d. Turn switch 4 off
- e. Press R-S

4.2 Loading Errors

If an error, a parity check for example, should occur while loading a program into core:

- a. If this error is detected before the program is stored on the file, just reload the program.
- b. If the program has been placed on the file (in this case the name and address of the program will have been typed on the program list) continue loading programs. Replace the bad program later using the Add operation.

4.3 Error Messages

Each reading or writing operation performed by the Monitor is verified. If an error is detected, an error message will be printed out on the typewriter. Also, each DIPAL statement and control function entered during set up of STORE or RUN operations is examined for proper format and correct order of input.

If a file operation results in a file check, the monitor program will automatically re-execute that operation. No operator action is required to correct this error. If, however, the error is due to improper entry of a control statement or other illegal operator action, the computer will HALT. To continue, press START and re-enter the statement in which the error occurred.

Error Messages/Reason

ER002	Read-back check for either a read or write disk operation.
ER003	Format error; a Dipal Statement is formatted improperly or out of sequence.
ER004	More than one LOOP statement has been entered. (LOOP statements must be separated by a GO command.)
ER005	Not Used.

Error Messages/Reason (continued)

- ER006 NAME statement contains more than four alphanumeric characters.
- ER007 An illegal statement has been entered. This is probably the result of mis-spelling or referring to a program name improperly.
- ER008 No more cylinders are available on the Customer Engineer's disk pack to accept new programs.
- ER010 LOOP statement contains more than ten characters.
- ER011 A read-back check error occurred when Monitor Control subroutine attempted to write itself on the 1311 during the initial loading operation.
- ER012 A read-back check error occurred when the Load add subroutine attempted to write itself on the 1311 during an initial loading operation.
- ER013 A read-back check error occurred when the Run subroutine attempted to write itself on the 1311 during the initial loading operation.
- ER014 A read-back check error occurred when the subroutines required by the DIPAL statements GO, LOOP, or NAME, were written on the 1311 during the initial loading operation.
- ER015 A read-back check error occurred when the updated areas of Monitor Control subroutine were written on the 1311 during the initial loading operation. The updated areas contain the disk control fields of the RUN and Monitor Control subroutines.
- ER016 (1) A read-back check occurred when the math tables were written on the 1311 during the initial loading operation.
(2) If replacing programs, then the operator is attempting to replace programs that are not loaded.
- ER017 A read-back check occurred when the math tables were read from the 1311 after a Monitor call.

Error Messages/Reason (continued)

- ER018 A read-back check error occurred when reading from the 1311 those subroutines required by a DIPAL statement.
- ER019 No comma in the LOOP statement.
- ER020 The last core position of a program written into core storage exceeded location 18000. (This condition has clobbered the Monitor program; use ADD mode Section 2.3 to restart.)
- ER022 An ALL statement is improperly use; the ALL statement was entered following a statement other than GO.
- ER023 Name statement with loop control contains more than 10 characters.
- ER024 Illegal character in number field of LOOP statement.
- ER025 Illegal character in number field of NAME statement.
- ER026 An address check occurring when the header test is reading Monitor Control subroutine from the 1311.
- ER027 An address check occurred when the Header Test attempts to write itself on the 1311 during the initial loading operation.
- ER110 A read-back check occurred when the updated portions of Monitor Control were written on the 1311 during initial load time.

5.0 HEADER TEST

When the DIPAL Monitor is called it is preceeded into core by a fault detection test. This test, called the Header Test, checks the operation of those 1620 functions which are required by the DIPAL Monitor. This test will loop 100 times before transferring control to the monitor program. Since this test is not intended to be a trouble shooting tool, no switch control options are available.

5.1 Header Test Error Procedure

If a failure is detected by the header test, the program will either hang up or type an error message. Since this test is not designed to be a diagnostic tool, the CPU diagnostic should be called from DIPAL before attempting to continue. To call this directly from the disk file, use the Program Call Card or type in a read file routine as described in Section 3.1.

5.2 To Trouble Shoot Using The Header Test

The header test consists of a series of short routines. In each routine, a single function is performed and checked. If an error is detected, the program will type a message and HALT at the end of the routine in which the error was detected. The MAR register will contain the Q11 address of this HALT instruction. Using this address, the specific routine detecting the error can be located in the header test listing (the HALT is the last instruction in each routine).

The first instruction in a test routine is identified by an SPS label of the form RXX or RXXX. This instruction is followed by a comment describing the test performed by that routine.

Example: R4B BD *+60,DT+4,,
 RCTY
 WATY ER04
 WATY D80
 H

		ROUTINE 02					
00470*		THIS ROUTINE TEST BI(46) AND BNI(47) ON SW 4					
00480*		BI (46) ON SWITCH 4					
00490 RTO2	BC4	*+72...	BNI (47) ON SWITCH 4	01178	46	01250	00400
00500	BNC4	RTO4...		01190	47	01354	00400
00510	RCTY			01202	34	00000	00102
00520	WATY	R2ER1...		01214	39	01323	00100
00530	H	...		01226	48	00000	00000
00540	B	RTO4...		01238	49	01354	00000
00550	BNC4	*+24...	BNI (47) ON SWITCH 4	01250	47	01274	00400
00560	B	RTO4...		01262	49	01354	00000
00570	RCTY			01274	34	00000	00102
00580	WATY	R2ER1...		01286	39	01323	00100
00590	H	...		01298	48	00000	00000
00600	B	RTO4...		01310	49	01354	00000
00610*		CONSTANTS USED IN ROUTINE 2					
00620 R2ER1	DAC	16,B ON SW4 FAILED		01323		00032	
00630*		ROUTINE 04					
00640*		THIS ROUTINE TESTS BRANCH ON DIGIT (43)					
00650 RTO4	BD	*+60,DT...	BRANCH ON DIGIT ON A 1 ODD	01354	43	01414	02135
00660	RCTY	...		01366	34	00000	00102
00670	WATY	ERO4...		01378	39	02155	00100
00680	WATY	D10...		01390	39	02267	00100
00690	H	...		01402	48	00000	00000
00700*							
00710 R4A	BD	*+60,DT+2...	BRANCH ON DIGIT ON A 2 ODD	01414	43	01474	02137
00720	RCTY	...		01426	34	00000	00102
00730	WATY	ERO4...		01438	39	02155	00100
00740	WATY	D20...		01450	39	02279	00100
00750	H	...		01462	48	00000	00000
00760*							
00770 R4B	BD	*+60,DT+4...	BRANCH ON DIGIT ON A 4 ODD	01474	43	01534	02139
00780	RCTY	...		01486	34	00000	00102
00790	WATY	ERO4...		01498	39	02155	00100
00800	WATY	D40...		01510	39	02291	00100
00810	H	...		01522	48	00000	00000
00820*							
00830 R4C	BD	*+60,DT+6...	BRANCH ON DIGIT ON AN 8 ODD	01534	43	01594	02141
00840	RCTY	...		01546	34	00000	00102
00850	WATY	ERO4		01558	39	02155	00100
00860	WATY	D80...		01570	39	02303	00100
00870	H	...		01582	48	00000	00000
00880*							
00890 R4D	BD	*+60,DT+7...	BRANCH ON DIGIT ON A 1 EVEN	01594	43	01654	02142
00900	RCTY	...		01606	34	00000	00102
00910	WATY	ERO4...		01618	39	02155	00100
00920	WATY	D1E...		01630	39	02315	00100
00930	H	...		01642	48	00000	00000
00940*							
00950 R4E	BD	*+60,DT+9...	BRANCH ON DIGIT ON A 2 EVEN	01654	43	01714	02144
00960	RCTY	...		01666	34	00000	00102

00970	WATY	ERO4...		01678	39	02155	00100
00980	WATY	D2E...		01690	39	02329	00100
00990	H	...		01702	48	00000	00000
01000*							
01010	R4F	BD	*+60,DT+11..	BRANCH ON DIGIT ON A 4 EVEN			
				01714	43	01774	02146
01020	RCTY	...		01726	34	00000	00102
01030	WATY	ERO4...		01738	39	02155	00100
01040	WATY	D4E...		01750	39	02343	00100
01050	H	...		01762	48	00000	00000
01060*							
01070	R4G	BD	*+60,DT+13..	BRANCH ON DIGIT ON AN 8 EVEN			
				01774	43	01834	02148
01080	RCTY	...		01786	34	00000	00102
01090	WATY	ERO4...		01798	39	02155	00100
01100	WATY	D8E...		01810	39	02357	00100
01110	H	...		01822	48	00000	00000
01120*							
01130	R4H	BD	*+24,DT+15..	BRANCH DIGIT ON A 0 EVEN WITH A 7 IN ODD			
				01834	43	01858	02150
01140	B	R4I...		01846	49	01906	00000
01150	RCTY	...		01858	34	00000	00102
01160	WATY	ERO5...		01870	39	02215	00100
01170	WATY	D070		01882	39	02371	00100
01180	H	...		01894	48	00000	00000
01190*							
01200	R4I	BD	*+24,DT+5..	BRANCH DIGIT ON A 0 EVEN WITH AN 8 IN ODD			
				01906	43	01930	02140
01210	B	R4J...		01918	49	01978	00000
01220	RCTY	...		01930	34	00000	00102
01230	WATY	ERO5...		01942	39	02215	00100
01240	WATY	D080...		01954	39	02407	00100
01250	H	...		01966	48	00000	00000
01260*							
01270	R4J	BD	*+24,DT+18..	BRANCH ON DIGIT ON A 0 ODD WITH A 7 IN EVEN			
				01978	43	02002	02153
01280	B	R4K...		01990	49	02050	00000
01290	RCTY	...		02002	34	00000	00102
01300	WATY	ERO5...		02014	39	02215	00100
01310	WATY	D07E...		02026	39	02445	00100
01320	H	...		02038	48	00000	00000
01330*							
01340	R4K	BD	*+24,DT+14..	BRANCH ON DIGIT ON A 0 ODD WITH AN 8 IN EVEN			
				02050	43	02074	02149
01350	B	RT05...		02062	49	02518	00000
01360	RCTY	...		02074	34	00000	00102
01370	WATY	ERO5...		02086	39	02215	00100
01380	WATY	D08E...		02098	39	02481	00100
01390	H	...		02110	48	00000	00000
01400	B	RT05...		02122	49	02518	00000
01410*							
			CONSTANTS USED IN ROUTINE 04				
01420	DT	DC	2,01	02135	00002		
01430		DC	18,020408102040800770	02153	00018		

01440	ERO4	DAC	30, BD (43) DID NOT BRANCH ON A	02155	00060
01450	ERO5	DAC	26, BD (43) BRANCHED ON A 0	02215	00052
01460	D10	DAC	6,1 ODD	02267	00012
01470	D20	DAC	6,2 ODD	02279	00012
01480	D40	DAC	6,4 ODD	02291	00012
01490	D80	DAC	6,8 ODD	02303	00012
01500	D1E	DAC	7,1 EVEN	02315	00014
01510	D2E	DAC	7,2 EVEN	02329	00014
01520	D4E	DAC	7,4 EVEN	02343	00014
01530	D8E	DAC	7,8 EVEN	02357	00014
01540	D070	DAC	18,EVEN WITH A 7 ODD	02371	00036
01550	D080	DAC	19,EVEN WITH AN 8 ODD	02407	00038
01560	D07E	DAC	18,ODD WITH A 7 EVEN	02445	00036
01570	D08E	DAC	19,ODD WITH AN 8 EVEN	02481	00038
01580*			ROUTINE 05		
01590*			THIS ROUTINE TESTS BRANCH NO FLAG (44)		
01600	RT05	BNF	*+60,FT-1,, BRANCH NO FLAG ON 0 EVEN WITH NO FLAG		
				02518	44 02578 02796
01610		RCTY	...	02530	34 00000 00102
01620		WATY	ERO6...	02542	39 02799 00100
01630		WATY	EVEN...	02554	39 02921 00100
01640		H	...	02566	48 00000 00000
01650*					
01660	R5A	BNF	*+60,FT-2,, BRANCH NO FLAG ON 0 ODD WITH NO FLAG		
				02578	44 02638 02795
01670		RCTY	...	02590	34 00000 00102
01680		WATY	ERO6...	02602	39 02799 00100
01690		WATY	ODD...	02614	39 02931 00100
01700		H	...	02626	48 00000 00000
01710*					
01720	R5B	BNF	*+24,FT-3,, BRANCH NO FLAG ON FLAG 0 EVEN		
				02638	44 02662 02794
01730		B	R5C...	02650	49 02710 00000
01740		RCTY	...	02662	34 00000 00102
01750		WATY	ERO7...	02674	39 02861 00100
01760		WATY	EVEN...	02686	39 02921 00100
01770		H	...	02698	48 00000 00000
01780*					
01790	R5C	BNF	*+24,FT,, BRANCH NO FLAG ON FLAG 0 ODD		
				02710	44 02734 02797
01800		B	RT06...	02722	49 02938 00000
01810		RCTY	...	02734	34 00000 00102
01820		WATY	ERO7...	02746	39 02861 00100
01830		WATY	ODD...	02758	39 02931 00100
01840		H	...	02770	48 00000 00000
01850		B	RT06...	02782	49 02938 00000
01860*			CONSTANTS USED IN ROUTINE 05		
01870	FT	DC	4,-0000	02797	00004
01880	ERO6	DAC	31, BNF (44) DID NOT BRANCH ON 0	02799	00062
01890	ERO7	DAC	30, BNF (44) BRANCHED ON FLAG 0	02861	00060
01900	EVEN	DAC	5,EVEN	02921	00010
01910	ODD	DAC	4,ODD	02931	00008
01920*			ROUTINE 06		

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01930*          THIS ROUTINE TESTS BRANCH NO RECORD MARK (45)
01940 RTO6     BNR  *+60, RM-5,,   BRANCH NO RECORD MARK ON A 9 EVEN
                                02938 45 02998 03334
01950          RCTY  ,,,
                                02950 34 00000 00102
01960          WATY  ERO8,,,
                                02962 39 03341 00100
01970          WATY  D9E,,,
                                02974 39 03459 00100
01980          H      ,,,
                                02986 48 00000 00000
01990*
02000 R6A     BNR  *+60, RM-4,,   BRANCH NO RECORD MARK ON A 9 ODD
                                02998 45 03058 03335
02010          RCTY  ,,,
                                03010 34 00000 00102
02020          WATY  ERO8,,,
                                03022 39 03341 00100
02030          WATY  D9O,,,
                                03034 39 03473 00100
02040          H      ,,,
                                03046 48 00000 00000
02050*
02060 R6B     BNR  *+60, RM-3,,   BRANCH NO RECORD MARK ON A 3 EVEN
                                03058 45 03118 03336
02070          RCTY  ,,,
                                03070 34 00000 00102
02080          WATY  ERO8,,,
                                03082 39 03341 00100
02090          WATY  D3E,,,
                                03094 39 03485 00100
02100          H      ,,,
                                03106 48 00000 00000
02110*
02120 R6C     BNR  *+60, RM,,     BRANCH NO RECORD MARK ON A 3 ODD
                                03118 45 03178 03339
02130          RCTY  ,,,
                                03130 34 00000 00102
02140          WATY  ERO8,,,
                                03142 39 03341 00100
02150          WATY  D3O,,,
                                03154 39 03499 00100
02160          H      ,,,
                                03166 48 00000 00000
02170*
02180 R6D     BNR  *+24, RM-1,,   BRANCH NO RECORD MARK ON RECORD MARK EVEN
                                03178 45 03202 03338
02190          B      R6E,,,
                                03190 49 03250 00000
02200          RCTY  ,,,
                                03202 34 00000 00102
02210          WATY  ERO9,,,
                                03214 39 03403 00100
02220          WATY  EVEN,,,
                                03226 39 02921 00100
02230          H      ,,,
                                03238 48 00000 00000
02240*
02250 R6E     BNR  *+24, RM-2,,   BRANCH NO RECORD MARK ON RECORD MARK ODD
                                03250 45 03274 03337
02260          B      RTO7,,,
                                03262 49 03510 00000
02270          RCTY  ,,,
                                03274 34 00000 00102
02280          WATY  ERO9,,,
                                03286 39 03403 00100
02290          WATY  ODD,,,
                                03298 39 02931 00100
02900          H      ,,,
                                03310 48 00000 00000
02910          B      RTO7
                                03322 49 03510 00000
02920*          CONSTANTS USED IN ROUTINE 06
02930          DSC  4,993'
                                03334 00004
02940          DC   1,1'
                                03338 00001
02950 RM       DSC  1,3
                                03339 00001
02960 ERO8     DAC   31, BNR (45) DID NOT BRANCH ON A '
                                03341 00062
02970 ERO9     DAC   28, BNR (45) BRANCHED ON A RM '
                                03403 00056
02980 D9E      DAC   7,9 EVEN'
                                03459 00014
02990 D9O      DAC   6,9 ODD'
                                03473 00012

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02400	D3E	DAC	7,3	EVEN'		03485	00014
02410	D3O	DAC	6,3	ODD'		03499	00012
02420*					ROUTINE 07		
02430*					THIS ROUTINE TESTS TRANSMIT DIGIT IMMEDIATE (15)		
02440	RT07	TDM	**34,701,9,		TRANSMIT DIGIT IMMEDIATE 1 TO EVEN		
						03510	15 03544 00P01
02450		BD	**36,**20,,		CHECK TRANSMIT DIGIT LIKE TRANSMIT FIELD		
						03522	43 03558 03542
02460		BD	E7A,601,,		CHECK THAT 1 WAS TRANSMITTED PROPERLY		
						03534	43 03594 00601
02470		B	R7A,,,			03546	49 03642 00000
02480		RCTY	,,,			03558	34 00000 00102
02490		WATY	ER35,,,			03570	39 03991 00100
02500		H	,,,			03582	48 00000 00000
02510	E7A	RCTY	,,,			03594	34 00000 00102
02520		WATY	ONE,,,			03606	39 04125 00100
02530		WATY	ER36			03618	39 04049 00100
02540		H	,,,			03630	48 00000 00000
02550*							
02560	R7A	TDM	**23,2,10,		TRANSMIT DIGIT 2 TO ODD	03642	15 03665 000-2
02570		BD	**24,620,,			03654	43 03678 00620
02580		B	R7B,,,			03666	49 03726 00000
02590		RCTY	,,,			03678	34 00000 00102
02600		WATY	TWO,,,			03690	39 04135 00100
02610		WATY	ER36,,,			03702	39 04049 00100
02620		H	,,,			03714	48 00000 00000
02630*							
02640	R7B	TDM	**23,4,10,		TRANSMIT DIGIT 4 TO ODD	03726	15 03749 000-4
02650		BD	**24,640,,			03738	43 03762 00640
02660		B	R7C,,,			03750	49 03810 00000
02670		RCTY	,,,			03762	34 00000 00102
02680		WATY	FOR,,,			03774	39 04145 00100
02690		WATY	ER36,,,			03786	39 04049 00100
02700		H	,,,			03798	48 00000 00000
02710*							
02720	R7C	TDM	**23,8,10,		TRANSMIT DIGIT 8 TO ODD	03810	15 03833 000-8
02730		BD	**24,680,,			03822	43 03846 00680
02740		B	R7D,,,			03834	49 03894 00000
02750		RCTY	,,,			03846	34 00000 00102
02760		WATY	ATE,,,			03858	39 04155 00100
02770		WATY	ER36,,,			03870	39 04049 00100
02780		H	,,,			03882	48 00000 00000
02790*							
02800	R7D	TDM	**22,,10,		TRANSMIT DIGIT 0 TO EVEN	03894	15 03916 000-0
02810		BD	**24,670,,			03906	43 03930 00670
02820		B	END7,,,			03918	49 04176 00000
02830		RCTY	,,,			03930	34 00000 00102
02840		WATY	ZRO,,,			03942	39 04167 00100
02850		WATY	ER36,,,			03954	39 04049 00100
02860		H	,,,			03966	48 00000 00000
02870		B	END7,,,			03978	49 04176 00000
02880*					CONSTANTS USED IN ROUTINE 07		
02890	ER35	DAC	29,	TDM (15) ACTS LIKE TFM (16)'		03991	00058

02900	ER36	DAC	38, NOT TRANSMITTED PROPERLY BY TDM (15)'	04049	00076		
02910	ONE	DAC	5, A 1'	04125	00010		
02920	TWO	DAC	5, A 2'	04135	00010		
02930	FOR	DAC	5, A 4'	04145	00010		
02940	ATE	DAC	6, AN 8'	04155	00012		
02950	ZRO	DAC	5, A 0'	04167	00010		
02960*							
02970	END7	TDM	RT07+32,0,10	04176	15	03542	000-0
02980		TDM	RT07+33,6,10	04188	15	03543	000-6
02990		TDM	RT07+34,0,10	04200	15	03544	000-0
03000		TDM	RT07+35,1,10	04212	15	03545	000-1
03010		TDM	R7A+23,0,10	04224	15	03665	000-0
03020		TDM	R7B+23,0,10	04236	15	03749	000-0
03030		TDM	R7C+23,0,10,	04248	15	03833	000-0
03040		TDM	R7D+22,7,10,	04260	15	03916	000-7
03050*			ROUTINE 08				
03060*			THIS ROUTINE CHECKS TRANSMIT DIGIT (25)				
03070	RT08	TDM	*+47,7,, INITIALIZE	04272	15	04319	00007
03080		TDM	*+59,0,, INITIALIZE	04284	15	04343	00000
03090		TD	*+23,NO,, TRANSMIT 0	04296	25	04319	04550
03100		BD	*+48,607,,	04308	43	04356	00607
03110		TD	*+23,N8,, TRANSMIT 8	04320	25	04343	04552
03120		BD	E8A,680,,	04332	43	04416	00680
03130		B	RT09,,,	04344	49	04554	00000
03140		RCTY		04356	34	00000	00102
03150		WATY	ZRO,,,	04368	39	04167	00100
03160		WATY	ER37,,,	04380	39	04477	00100
03170		B	RT09,,,	04392	49	04554	00000
03180		H	,,,	04404	48	00000	00000
03190	E8A	RCTY	,,,	04416	34	00000	00102
03200		WATY	ATE,,,	04428	39	04155	00100
03210		WATY	ER37,,,	04440	39	04477	00100
03220		H	,,,	04452	48	00000	00000
03230		B	RT09,,,	04464	49	04554	00000
03240*			CONSTANTS USED IN ROUTINE 08				
03250	ER37	DAC	37, NOT TRANSMITTED PROPERLY BY TD (25)'	04477	00074		
03260	NO	DSC	02,0'	04550	00002		
03270	N8	DSC	02,8'	04552	00002		
03280*			ROUTINE 09				
03290*			THIS ROUTINE TESTS SET FLAG (32)				
03300	RT09	TDM	WA9,2,, SET 2 IN EVEN WORK AREA	04554	15	05526	00002
03310		SF	WA9,,, TEST INSTRUCTION	04566	32	05526	00000
03320		BNF	*+24,WA9,,	04578	44	04602	05526
03330		B	R9A,,,	04590	49	04650	00000
03340		RCTY	,,,	04602	34	00000	00102
03350		WATY	ER38,,,	04614	39	05529	00100
03360		WATY	DZE,,,	04626	39	02329	00100
03370		H	,,,	04638	48	00000	00000
03380*							
03390	R9A	TDM	WA9+1,3,, SET 3 IN ODD WORK AREA	04650	15	05527	00003
03400		SF	WA9+1,,, TEST SF	04662	32	05527	00000
03410		BNF	*+24,WA9+1,,	04674	44	04698	05527
03420		B	R9B,,,	04686	49	04746	00000

03430	RCTY	...		04698	34	00000	00102
03440	WATY	ER38...		04710	39	05529	00100
03450	WATY	D30...		04722	39	03499	00100
03460	H	...		04734	48	00000	00000
03470*							
03480 R9B	TDM	WA9.2.11.	SET FLAG 2 IN EVEN WORK AREA				
				04746	15	05526	0000K
03490	SF	WA9...	TEST SF	04758	32	05526	00000
03500	BNF	*+24,WA9..		04770	44	04794	05526
03510	B	R9C...		04782	49	04842	00000
03520	RCTY	...		04794	34	00000	00102
03530	WATY	ER38SF...		04806	39	05601	00100
03540	WATY	F2E...		04818	39	05677	00100
03550	H	...		04830	48	00000	00000
03560*							
03570 R9C	TDM	WA9+1.3.11.	SET FLAG 3 IN ODD WORK AREA				
				04842	15	05527	0000L
03580	SF	WA9+1...	TEST SF	04854	32	05527	00000
03590	BNF	*+24,WA9+1..		04866	44	04890	05527
03600	B	R9D...		04878	49	04938	00000
03610	RCTY	...		04890	34	00000	00102
03620	WATY	ER38SF...		04902	39	05601	00100
03630	WATY	F30...		04914	39	05701	00100
03640	H	...		04926	48	00000	00000
03650*							
03660 R9D	TDM	WA9...	SET RECORD MARK IN EVEN WORK AREA				
				04938	15	05526	00000
03670	DC	1.0.*.	DEFINE RECORD MARK IN Q11 ON PREVIOUS INST.	04949		00001	
				04950	32	05526	00000
03680	SF	WA9...	TEST SF	04962	44	04986	05526
03690	BNF	*+24,WA9..		04974	49	05034	00000
03700	B	R9E...		04986	34	00000	00102
03710	RCTY	...		04998	39	05529	00100
03720	WATY	ER38...		05010	39	05723	00100
03730	WATY	RME...		05022	48	00000	00000
03740	H	...					
03750*							
03760 R9E	TD	WA9+1,WA9..	SET FLAG RECORD MARK IN ODD WORK AREA				
				05034	25	05527	05526
03770	SF	WA9+1...	TEST SF	05046	32	05527	00000
03780	BNF	*+24,WA9+1...		05058	44	05082	05527
03790	B	R9F...		05070	49	05130	00000
03800	RCTY	...		05082	34	00000	00102
03810	WATY	ER38SF...		05094	39	05601	00100
03820	WATY	FRMO...		05106	39	05757	00100
03830	H	...		05118	48	00000	00000
03840*							
03850 R9F	TDM	WA9+1.2..	SET 2 IN ODD WORK AREA				
				05130	15	05527	00002
03860	SF	WA9+1...	TEST SF	05142	32	05527	00000
03870	BNF	*+24,WA9+1..		05154	44	05178	05527
03880	B	R9G...		05166	49	05226	00000
03890	RCTY	...		05178	34	00000	00102
03900	WATY	ER38...		05190	39	05529	00100

03910	WATY	D20...		05202	39	02279	00100
03920	H	...		05214	48	00000	00000
03930*							
03940	R9G	TDM	WA9.3..	SET 3 IN EVEN WORK AREA			
03950		SF	WA9...	TEST SF	05226	15	05526 00003
03960		BNF	*+24,WA9..		05238	32	05526 00000
03970		B	R9H...		05250	44	05274 05526
03980		RCTY	...		05262	49	05322 00000
03990		WATY	ER38...		05274	34	00000 00102
04000		WATY	D3E...		05286	39	05529 00100
04010		H	...		05298	39	03485 00100
04020*					05310	48	00000 00000
04030	R9H	TDM	WA9+1.2.11.	SET FLAG 2 IN ODD WORK AREA			
04040		SF	WA9+1..	TEST SF	05322	15	05527 0000K
04050		BNF	*+24,WA9+1..		05334	32	-N5KP 00000
04060		B	R9I...		05346	44	05370 05527
04070		RCTY	...		05358	49	05418 00000
04080		WATY	ER38SF...		05370	34	00000 00102
04090		WATY	F20...		05382	39	05601 00100
04100		H	...		05394	39	05799 00100
04110*					05406	48	00000 00000
04120	R9I	TDM	WA9.3.11.	SET FLAG 3 IN EVEN WORK AREA			
04130		SF	WA9...	TEST SF	05418	15	05526 0000L
04140		BNF	*+24,WA9..		05430	32	05526 00000
04150		B	RTO10...		05442	44	05466 05526
04160		RCTY	...		05454	49	05844 00000
04170		WATY	ER38SF...		05466	34	00000 00102
04180		WATY	F3E...		05478	39	05601 00100
04190		H	...		05490	39	05821 00100
04200		B	RTO10...		05502	48	00000 00000
04210*					05514	49	05844 00000
04220	WA9	DSC	2.00	CONSTANTS USED IN ROUTINE 09	05526		00002
04230	ER38	DAC	36, SET FLAG (32) DID NOT SET FLAG ON		05529		00072
04240	ER38SF	DAC	38,SF (32) DID NOT FUNCTION PROPERLY ON		05601		00076
04250	F2E	DAC	12,FLAG 2 EVEN		05677		00024
04260	F3O	DAC	11,FLAG 3 ODD		05701		00022
04270	RME	DAC	17,RECORD MARK EVEN		05723		00034
04280	FRMO	DAC	21,FLAG RECORD MARK ODD		05757		00042
04290	F2O	DAC	11,FLAG 2 ODD		05799		00022
04300	F3E	DAC	12,FLAG 3 EVEN		05821		00024
04310*				ROUTINE 10			
04320*				THIS ROUTINE TESTS CLEAR FLAG (33)			
04330	RTO10	TDM	WA9.2..	SET 2 IN WORK AREA EVEN	05844	15	05526 00002
04340		CF	WA9...	TEST CF	05856	33	05526 00000
04350		BNF	*+60,WA9..		05868	44	05928 05526
04360		RCTY	...		05880	34	00000 00102
04370		WATY	ER39CF...		05892	39	06793 00100
04380		WATY	D2E...		05904	39	02329 00100
04390		H	...		05916	48	00000 00000
04400*							
04410	R10A	TDM	WA9+1.2..	SET 2 IN WORK AREA ODD	05928	15	05527 00002

04420	CF	WA9+1...		05940	33	05527	00000
04430	BNF	*+60,WA9+1..		05952	44	06012	05527
04440	RCTY	...		05964	34	00000	00102
04450	WATY	ER39CF...		05976	39	06793	00100
04460	WATY	D20...		05988	39	02279	00100
04470	H	...		06000	48	00000	00000
04480*							
04490 R10B	TDM	WA9.3..	SET 3 IN WORK AREA EVEN	06012	15	05526	00003
04500	CF	WA9...		06024	33	05526	00000
04510	BNF	*+60,WA9..		06036	44	06096	05526
04520	RCTY	...		06048	34	00000	00102
04530	WATY	ER39CF...		06060	39	06793	00100
04540	WATY	D3E...		06072	39	03485	00100
04550	H	...		06084	48	00000	00000
04560*							
04570 R10C	TDM	WA9+1.3..	SET 3 IN WORK AREA ODD	06096	15	05527	00003
04580	CF	WA9+1...		06108	33	05527	00000
04590	BNF	*+60,WA9+1..		06120	44	06180	05527
04600	RCTY	...		06132	34	00000	00102
04610	WATY	ER39CF...		06144	39	06793	00100
04620	WATY	D30...		06156	39	03499	00100
04630	H	...		06168	48	00000	00000
04640*							
04650 R10D	TDM	WA9.2.11.	SET FLAG 2 IN EVEN WORK AREA	06180	15	05526	0000K
04660	CF	WA9...		06192	33	05526	00000
04670	BNF	*+60,WA9..		06204	44	06264	05526
04680	RCTY	...		06216	34	00000	00102
04690	WATY	ER39...		06228	39	06709	00100
04700	WATY	F2E...		06240	39	05677	00100
04710	H	...		06252	48	00000	00000
04720*							
04730 R10E	TDM	WA9+1.2.11.	SET FLAG 2 IN ODD WORK AREA	06264	15	05527	0000K
04740	CF	WA9+1...		06276	33	05527	00000
04750	BNF	*+60,WA9+1		06288	44	06348	05527
04760	RCTY	...		06300	34	00000	00102
04770	WATY	ER39...		06312	39	06709	00100
04780	WATY	F20...		06324	39	05799	00100
04790	H	...		06336	48	00000	00000
04800*							
04810 R10F	TDM	WA9.3.11.	SET FLAG 3 IN EVEN WORK AREA	06348	15	05526	0000L
04820	CF	WA9...		06360	33	05526	00000
04830	BNF	*+60,WA9..		06372	44	06432	05526
04840	RCTY	...		06384	34	00000	00102
04850	WATY	ER39...		06396	39	06709	00100
04860	WATY	F3E...		06408	39	05821	00100
04870	H	...		06420	48	00000	00000
04880*							
04890 R10G	TDM	WA9+1.3.11.	SET FLAG 3 IN ODD WORK AREA	06432	15	05527	0000L
04900	F	WA9+1...		06444	33	05527	00000

04910	BNF	*+60,WA9+1,,		06456	44	06516	05527
04920	RCTY	...		06468	34	00000	00102
04930	WATY	ER39,...		06480	39	06709	00100
04940	WATY	F30,...		06492	39	05701	00100
04950	H	...		06504	48	00000	00000
04960*							
04970	R10H	TDM	WA9+1,...	SET RECORD MARK IN ODD WORK AREA			
				06516	15	05527	00000
04980	DC	1,,*		06527	00001		
04990	CF	WA9+1,...		06528	33	05527	00000
05000	BNF	*+60,WA9+1		06540	44	06600	05527
05010	RCTY	...		06552	34	00000	00102
05020	WATY	ER39CF,...		06564	39	06793	00100
05030	WATY	RMO,...		06576	39	06869	00100
05040	H	...		06588	48	00000	00000
05050*							
05060	R10I	TDM	WA9,...	SET RECORD MARK IN EVEN WORK AREA			
				06600	15	05526	00000
05070	DC	1,,*		06611	00001		
05080	SF	WA9,...		06612	32	05526	00000
05090	CF	WA9,...		06624	33	05526	00000
05100	BNF	*+60,WA9,.		06636	44	06696	05526
05110	RCTY	...		06648	34	00000	00102
05120	WATY	ER39,...		06660	39	06709	00100
05130	WATY	FRME,...		06672	39	06901	00100
05140	H	...		06684	48	00000	00000
05150	B	RTO12		06696	49	06944	00000
05160*		CONSTANTS USED IN ROUTINE 10					
05170	ER39	DAC	42,CLEAR FLAG (33) DID NOT CLEAR FLAG FROM :	06709	00084		
05180	ER39CF	DAC	38,CF (33) DID NOT FUNCTION PROPERLY ON :	06793	00076		
05190	RMO	DAC	16,RECORD MARK ODD'	06869	00032		
05200	FRME	DAC	22,FLAG RECORD MARK EVEN'	06901	00044		
05210*							
05220*		ROUTINE 12					
05230*		THIS ROUTINE TESTS TRANSMIT FIELD IMMEDIATE (16)					
05240	RTO12	TDM	WA12,7,,	RESET WORK AREA	06944	15	08065 00007
05250		TDM	WA12-2,...	RESET WORK AREA	06956	15	08063 00000
05260		TFM	WA12,77712,710,	TRANSMIT 2 DIGIT POSITIVE FIELD	06968	16	08065 P77J2
05270		BD	E12A,WA12-2,...	CHECK TRANSMISSION TERMINATION	06980	43	07064 08063
05280		TD	*+23,WA12,.		06992	25	07015 08065
05290		BD	E12B,620,.		07004	43	07112 00620
05300		TD	*+35,WA12-1,.		07016	25	07051 08064
05310		CF	*+23,...		07028	33	07051 00000
05320		BD	E12B,610,.		07040	43	07112 00610
05330		B	R12B,...		07052	49	07184 00000
05340	E12A	RCTY	...		07064	34	00000 00102
05350		WATY	ER41,...		07076	39	08069 00100
05360		H	...		07088	48	00000 00000
05370		B	R12B,...		07100	49	07184 00000
05380	E12B	RCTY	...		07112	34	00000 00102

05390	WATY	ER42,...	07124	39	08145	00100	
05400	WNTY	TFM1-2,...	07136	38	08462	00100	
05410	WATY	WAS,...	07148	39	08451	00100	
05420	WNTY	WA12-1,...	07160	38	08064	00100	
05430	H	...	07172	48	00000	00000	
05440*							
05450	R12B	TDM	WA12,7,...	07184	15	08065	00007
05460		TDM	WA12-3,...	07196	15	08062	00000
05470		TFM	WA12,77124,9, TRANSMIT 3 DIGIT POSITIVE FIELD				
			07208	16	08065	77J24	
05480	BD	E12C,WA12-3,...	07220	43	07328	08062	
05490	TD	*+23,WA12,...	07232	25	07255	08065	
05500	BD	E12D,640,...	07244	43	07376	00640	
05510	TD	*+23,WA12-1,...	07256	25	07279	08064	
05520	BD	E12D,620,...	07268	43	07376	00620	
05530	TD	*+35,WA12-2,...	07280	25	07315	08063	
05540	CF	*+23,...	07292	33	07315	00000	
05550	BD	E12D,610,...	07304	43	07376	00610	
05560	B	R12C,...	07316	49	07448	00000	
05570*							
05580	E12C	RCTY	...	07328	34	00000	00102
05590		WATY	ER41,...	07340	39	08069	00100
05600		H	...	07352	48	00000	00000
05610		B	R12C,...	07364	49	07448	00000
05620	E12D	RCTY	...	07376	34	00000	00102
05630		WATY	ER42,...	07388	39	08145	00100
05640		WNTY	TFM2-3,...	07400	38	08465	00100
05650		WATY	WAS,...	07412	39	08451	00100
05660		WNTY	WA12-2,...	07424	38	08063	00100
05670		H	...	07436	48	00000	00000
05680*							
05690	R12C	TDM	WA12,7,...	07448	15	08065	00007
05700		TFM	WA12,1248,811, TRANSMIT 4 DIGIT NEGATIVE FIELD				
			07460	16	08065	0J24Q	
05710	BNF	E12E,WA12-3,...	07472	44	07628	08062	
05720	BNF	E12F,WA12,...	07484	44	07676	08065	
05730	TD	*+35,WA12,...	07496	25	07531	08065	
05740	CF	*+23,...	07508	33	07531	00000	
05750	BD	E12G,680,...	07520	43	07724	00680	
05760	TD	*+23,WA12-1,...	07532	25	07555	08064	
05770	BD	E12G,640,...	07544	43	07724	00640	
05780	TD	*+23,WA12-2,...	07556	25	07579	08063	
05790	BD	E12G,620,...	07568	43	07724	00620	
05800	TD	*+35,WA12-3,...	07580	25	07615	08062	
05810	CF	*+23,...	07592	33	07615	00000	
05820	BD	E12G,610,...	07604	43	07724	00610	
05830	B	R12D,...	07616	49	07796	00000	
05840	E12E	RCTY	...	07628	34	00000	00102
05850		WATY	ER43,...	07640	39	08255	00100
05860		H	...	07652	48	00000	00000
05870		B	R12D,...	07664	49	07796	00000
05880	E12F	RCTY	...	07676	34	00000	00102
05890		WATY	ER44,...	07688	39	08357	00100

05900	H	...	07700	48	00000	00000
05910	B	R12D...	07712	49	07796	00000
05920	E12G	RCTY ...	07724	34	00000	00102
05930	WATY	ER42...	07736	39	08145	00100
05940	WNTY	TFM3-4...	07748	38	08469	00100
05950	WATY	WAS...	07760	39	08451	00100
05960	WNTY	WA12-3...	07772	38	08062	00100
05970	H	...	07784	48	00000	00000
05980*						
05990	R12D	TDM WA12.7...	07796	15	08065	00007
06000	TFM	WA12.12480.711. TRANSMIT 5 DIGIT NEGATIVE FIELD				
			07808	16	08065	J248-
06010	TD	*+35.WA12...	07820	25	07855	08065
06020	CF	*+23...	07832	33	07855	00000
06030	BD	E12H.607...	07844	43	07976	00607
06040	TD	*+23.WA12-1...	07856	25	07879	08064
06050	BD	E12H.680...	07868	43	07976	00680
06060	TD	*+23.WA12-2...	07880	25	07903	08063
06070	BD	E12H.640...	07892	43	07976	00640
06080	TD	*+23.WA12-3...	07904	25	07927	08062
06090	BD	E12H.620...	07916	43	07976	00620
06100	TD	*+35.WA12-4...	07928	25	07963	08061
06110	CF	*+23...	07940	33	07963	00000
06120	BD	E12H.610...	07952	43	07976	00610
06130	B	RTO13...	07964	49	08480	00000
06140	E12H	RCTY ...	07976	34	00000	00102
06150	WATY	ER42...	07988	39	08145	00100
06160	WNTY	TFM4-5...	08000	38	08474	00100
06170	WATY	WAS...	08012	39	08451	00100
06180	WNTY	WA12-4...	08024	38	08061	00100
06190	H	...	08036	48	00000	00000
06200	B	RTO13...	08048	49	08480	00000
06210*		CONSTANTS USED IN ROUTINE 12				
06220	WA12	DC 6.000000	08065	00006		
06230	DC	1.0...	08066	00001		
06240	ER41	DAC 38. TFM (16) WAS NOT TERMINATED PROPERLY.	08069	00076		
06250	ER42	DAC 36. TFM (16) DID NOT TRANSMIT PROPERLY.	08145	00072		
06260	DAC	19. SHOULD HAVE BEEN :	08217	00038		
06270	ER43	DAC 41. TFM (16) DID NOT SET FIELD DEFINING FLAG				
			08255	00082		
06280	DAC	10. PROPERLY.	08337	00020		
06290	ER44	DAC 47. TFM (16) DID NOT SET FIELD SIGN FLAG PROPERLY.	08357	00094		
			08451	00012		
06300	WAS	DAC 6. WAS :	08464	00003		
06310	TFM1	DC 3.12.	08468	00004		
06320	TFM2	DC 4.124.	08473	00005		
06330	TFM3	DC 5.-1248.	08479	00006		
06340	TFM4	DC 6.-12480.				
06350*		ROUTINE 13				
06360*		THIS ROUTINE TESTS TRANSMIT FIELD (26)				
06370	RTO13	TDM WA13.01207.8.	08480	15	08661	0J207
06380	TF	WA13.*-3. TRANSMIT 2 DIGIT POSITIVE FIELD	08492	26	08661	08489

06390	TD	*+23,WA13,,	08504	25	08527	08661
06400	BD	E13A,620,,	08516	43	08576	00620
06410	TD	*+35,WA13-1,,	08528	25	08563	08660
06420	CF	*+23,,,	08540	33	08563	00000
06430	BD	E13A,610,,	08552	43	08576	00610
06440	B	RT015,,,	08564	49	08776	00000
06450	E13A	RCTY	08576	34	00000	00102
06460	WATY	ER45,,,	08588	39	08665	00100
06470	WNTY	TF1-2,,,	08600	38	08772	00100
06480	WATY	WAS,,,	08612	39	08451	00100
06490	WNTY	WA13-1,,	08624	38	08660	00100
06500	H	,,,	08636	48	00000	00000
06510	B	RT015,,,	08648	49	08776	00000
06520*	CONSTANTS USED IN ROUTINE 13					
06530	WA13	DC	2,00	08661	00002	
06540		DC	1,1	08662	00001	
06550	ER45	DAC	47, TF (26) DID NOT TRANSMIT PROPERLY. SHOULD HAVE	08665	00094	
06560		DAC	7, BEEN	08759	00014	
06570	TF1	DC	3,12	08774	00003	
06580*	ROUTINE 15					
06590*	THIS ROUTINE CHECKS BRANCH AND TRANSMIT IMMEDIATE (17)					
06600*	AND BRANCH BACK (42)					
06610	RT015	TFM	GO15-1,0,10,	08776	16	08871 000-0
06620		TDM	*+25,1,, MAKE INST. BELOW A NOP (41)			
06630		BTM	GO15,12,10,	08788	15	08813 00001
06640		40	*+48,,, CHANGED TO NOP (41) OR BRANCH (49)	08800	17	08872 000J2
06650		RCTY	,,, 08812	40	08860	00000
06660		WATY	ER48,,, 08824	34	00000	00102
06670		H	,,, 08836	39	09053	00100
06680		B	CKK5,,, 08848	48	00000	00000
06690	GO15	TDM	RT015+37,9,, MAKE INSTRUCTION ABOVE A BRANCH (49)	08860	49	09244 00000
06700		TD	*+23,GO15-1,, 08872	15	08813	00009
06710		BD	E15,620,, 08884	25	08907	08871
06720		TD	*+35,GO15-2,, 08896	43	09004	00620
06730		CF	*+23,,, 08908	25	08943	08870
06740		BD	E15,610,, 08920	33	08943	00000
06750		BB	*+12,,, BRANCH BACK 08932	43	09004	00610
06760		RCTY	,,, 08944	42	08956	00000
06770		WATY	ER49,,, 08956	34	00000	00102
06780		H	,,, 08968	39	09107	00100
06790		B	CKK5,,, 08980	48	00000	00000
06800	E15	RCTY	,,, 08992	49	09244	00000
06810		WATY	ER50,,, 09004	34	00000	00102
06820		H	,,, 09016	39	09173	00100
06830		B	CKK5,,, 09028	48	00000	00000
06840*	CONSTANTS USED IN ROUTINE 15			09040	49	09244 00000
06850	ER48	DAC	27, BTM (17) FAILED TO BRANCH	09053	00054	
06860	ER49	DAC	33, BB (42) DID NOT BRANCH PROPERLY	09107	00066	
06870	ER50	DAC	36, BTM (17) DID NOT TRANSMIT PROPERLY	09173	00072	

06880*

ROUTINE 18

06890*

THIS ROUTINE CHECKS ADD (21)

06900 CKK5

TFM CKK1+11,00400

09244 16 09459 -0400

06910

TDM CKK1+23,00000

09256 15 09471 00000

06920

TDM RZ1+1,1

09268 15 09821 00001

06930

TDM RZ2+1,1

09280 15 09881 00001

06940

TDM RZ3+1,1

09292 15 09941 00001

06950

TDM RZ4+1,1

09304 15 10001 00001

06960

TDM RZ5+1,1

09316 15 10061 00001

06970

TDM RZ6+1,1

09328 15 10121 00001

06980

TDM RZ7+1,1

09340 15 10181 00001

06990

TDM RZ8+1,1

09352 15 10241 00001

07000

TDM RZ9+1,1

09364 15 10301 00001

07010

TFM *+18,SUM

09376 16 09394 -0800

07020*

07030 CKK

TR 00800,B-19

09388 31 00800 00511

07040

A SUM+19,A

09400 21 00819 00509

07050

CF SUM+10

09412 33 00810 00000

07060

BNF *+24,SUM+10

09424 44 09448 00810

07070

B ERROR

09436 49 10696 00000

07080*

07090 CKK1

TFM *+47,00400

09448 16 09495 -0400

07100

TDM *+34,00000

09460 15 09494 00000

07110*

07120

TD *+23,SUM+10

09472 25 09495 00810

07130

BD ERROR,00400

09484 43 10696 00400

07140

TF *+35,*-1

09496 26 09531 09495

07150*

07160

TD *+23,SUM+11

09508 25 09531 00811

07170

BD ERROR,00400

09520 43 10696 00400

07180

TF *+35,*-1

09532 26 09567 09531

07190*

07200

TD *+23,SUM+12

09544 25 09567 00812

07210

BD ERROR,00400

09556 43 10696 00400

07220

TF *+35,*-1

09568 26 09603 09567

07230*

07240

TD *+23,SUM+13

09580 25 09603 00813

07250

BD ERROR,00400

09592 43 10696 00400

07260

TF *+35,*-1

09604 26 09639 09603

07270*

07280

TD *+23,SUM+14

09616 25 09639 00814

07290

BD ERROR,00400

09628 43 10696 00400

07300

TF *+35,*-1

09640 26 09675 09639

07310*

07320

TD *+23,SUM+15

09652 25 09675 00815

07330

BD ERROR,00400

09664 43 10696 00400

07340

TF *+35,*-1

09676 26 09711 09675

07350*

07360

TD *+23,SUM+16

09688 25 09711 00816

07370

BD ERROR,00400

09700 43 10696 00400

07380

TF *+35,*-1

09712 26 09747 09711

07390*

07400

TD *+23,SUM+17

09724 25 09747 00817

07410	BD	ERROR,00400	09736	43	10696	00400
07420	TF	*+35,*-1	09748	26	09783	09747
07430*						
07440	TD	*+23,SUM+18	09760	25	09783	00818
07450	BD	ERROR,00400	09772	43	10696	00400
07460	TF	*+35,*-1	09784	26	09819	09783
07470*						
07480	TD	*+23,SUM+19	09796	25	09819	00819
07490	BD	ERROR,00400	09808	43	10696	00400
07500*						
07510 RZ1	NOP	*+60	09820	41	09880	00000
07520	TDM	CKK+6,00001	09832	15	09394	00001
07530	TDM	CKK1+23,00001	09844	15	09471	00001
07540	TDM	*-35,00009	09856	15	09821	00009
07550	B	CKK	09868	49	09388	00000
07560*						
07570 RZ2	NOP	*+60	09880	41	09940	00000
07580	TDM	CKK+6,00002	09892	15	09394	00002
07590	TDM	CKK1+23,00002	09904	15	09471	00002
07600	TDM	*-35,00009	09916	15	09881	00009
07610	B	CKK	09928	49	09388	00000
07620*						
07630 RZ3	NOP	*+60	09940	41	10000	00000
07640	TDM	CKK+6,00003	09952	15	09394	00003
07650	TDM	CKK1+23,00003	09964	15	09471	00003
07660	TDM	*-35,00009	09976	15	09941	00009
07670	B	CKK	09988	49	09388	00000
07680*						
07690 RZ4	NOP	*+60	10000	41	10060	00000
07700	TDM	CKK+6,00004	10012	15	09394	00004
07710	TDM	CKK1+23,00004	10024	15	09471	00004
07720	TDM	*-35,00009	10036	15	10001	00009
07730	B	CKK	10048	49	09388	00000
07740*						
07750 RZ5	NOP	*+60	10060	41	10120	00000
07760	TDM	CKK+6,00005	10072	15	09394	00005
07770	TDM	CKK1+23,00005	10084	15	09471	00005
07780	TDM	*-35,00009	10096	15	10061	00009
07790	B	CKK	10108	49	09388	00000
07800*						
07810 RZ6	NOP	*+60	10120	41	10180	00000
07820	TDM	CKK+6,00006	10132	15	09394	00006
07830	TDM	CKK1+23,00006	10144	15	09471	00006
07840	TDM	*-35,00009	10156	15	10121	00009
07850	B	CKK	10168	49	09388	00000
07860*						
07870 RZ7	NOP	*+60	10180	41	10240	00000
07880	TDM	CKK+6,00007	10192	15	09394	00007
07890	TDM	CKK1+23,00007	10204	15	09471	00007
07900	TDM	*-35,00009	10216	15	10181	00009
07910	B	CKK	10228	49	09388	00000
07920*						
07930 RZ8	NOP	*+60	10240	41	10300	00000

07940	TDM	CKK+6,00008	10252	15	09394	00008
07950	TDM	CKK1+23,00008	10264	15	09471	00008
07960	TDM	*-35,00009	10276	15	10241	00009
07970	B	CKK	10288	49	09388	00000
07980*						
07990 RZ9	NOP	*+60	10300	41	10360	00000
08000	TDM	CKK+6,00009	10312	15	09394	00009
08010	TDM	CKK1+23,00009	10324	15	09471	00009
08020	TDM	*-35,00009	10336	15	10301	00009
08030	B	CKK	10348	49	09388	00000
08040*						
08050*						
08060	NOP	*+36	10360	41	10396	00000
08070	TDM	*-11,00009	10372	15	10361	00009
08080	B	CKK5	10384	49	09244	00000
08090*						
08100	NOP	*+36	10396	41	10432	00000
08110	TDM	*-11,00009	10408	15	10397	00009
08120	B	CKK5	10420	49	09244	00000
08130*						
08140	NOP	*+36	10432	41	10468	00000
08150	TDM	*-11,00009	10444	15	10433	00009
08160	B	CKK5	10456	49	09244	00000
08170*						
08180	NOP	*+36	10468	41	10504	00000
08190	TDM	*-11,00009	10480	15	10469	00009
08200	B	CKK5	10492	49	09244	00000
08210*						
08220	NOP	*+36	10504	41	10540	00000
08230	TDM	*-11,00009	10516	15	10505	00009
08240	B	CKK5	10528	49	09244	00000
08250*						
08260	NOP	*+36	10540	41	10576	00000
08270	TDM	*-11,00009	10552	15	10541	00009
08280	B	CKK5	10564	49	09244	00000
08290*						
08300	NOP	*+36	10576	41	10612	00000
08310	TDM	*-11,00009	10588	15	10577	00009
08320	B	CKK5	10600	49	09244	00000
08330*						
08340	NOP	*+36	10612	41	10648	00000
08350	TDM	*-11,00009	10624	15	10613	00009
08360	B	CKK5	10636	49	09244	00000
08370*						
08380	NOP	*+36	10648	41	10684	00000
08390	TDM	*-11,00009	10660	15	10649	00009
08400	B	CKK5	10672	49	09244	00000
08410*						
08420	B	RT019	10684	49	10760	00000
08430*						
08440 ERROR	RCTY		10696	34	00000	00102
08450	WATY	ERZ1	10708	39	10733	00100
08460	B	RT019	10720	49	10760	00000

08470*						
08480	ERZ1	DAC	14, ARITH TROUBLE			10733 00028
08490*			ROUTINE 19			
08500*			THIS ROUTINE CHECKS ADD IMMEDIATE (11) AND			
08510*			THE ARITHMETIC INDICATORS 11,12 AND 13			
08520	RT019	TFM	SUMC,3,10,			10760 16 12033 000-3
08530		AM	SUMC,1,10,	ADD 03 AND 01		10772 11 12033 000-1
08540		TD	**23,SUMC,,			10784 25 10807 12033
08550		BD	**24,640,,			10796 43 10820 00640
08560		B	**24,,,			10808 49 10832 00000
08570		BTM	E19,3001,,			10820 17 11732 -3001
08580		BH	**24,,,			10832 46 10856 01100
08590		BTM	E19N,3111,,			10844 17 11780 -3111
08600		BNE	**24,,,			10856 47 10880 01200
08610		BTM	E19F,3121,,			10868 17 11852 -3121
08620		BNL	**24,,,			10880 46 10904 01300
08630		BTM	E19N,3131,,			10892 17 11780 -3131
08640	R19A	TFM	SUMC,2,10,	ADD 02 AND 03		10904 16 12033 000-2
08650		AM	SUMC,3,10,			10916 11 12033 000-3
08660		TD	**23,SUMC,,			10928 25 10951 12033
08670		BD	**24,650,,			10940 43 10964 00650
08680		B	**24,,,			10952 49 10976 00000
08690		BTM	E19,2003,,			10964 17 11732 -2003
08700		BH	**24,,,			10976 46 11000 01100
08710		BTM	E19N,2113,,			10988 17 11780 -2113
08720		BNE	**24,,,			11000 47 11024 01200
08730		BTM	E19F,2123,,			11012 17 11852 -2123
08740	R19B	TFM	SUMC,4,10,	ADD 04 AND 02		11024 16 12033 000-4
08750		AM	SUMC,2,10,			11036 11 12033 000-2
08760		BNE	**24,,,			11048 47 11072 01200
08770		BTM	E19F,4122,,			(CHECK AND CIRCUIT
						11060 17 11852 -4122
08780	R19C	TFM	SUMC,2,1011,	ADD -02 AND 01		11072 16 12033 000-K
08790		AM	SUMC,1,10,			11084 11 12033 000-1
08800		BNH	**24,,,			11096 47 11120 01100
08810		BTM	E19F,2111,8,			11108 17 11852 0K111
08820		BL	**24,,,			11120 47 11144 01300
08830		BTM	E19F,2131,8,			11132 17 11852 0K131
08840	R19D	TFM	SUMC,1,1011,	ADD -01 AND 02		11144 16 12033 000-J
08850		AM	SUMC,2,10,			11156 11 12033 000-2
08860		BH	**24,,,			11168 46 11192 01100
08870		BTM	E19N,1112,8,			11180 17 11780 0J112
08880	R19E	TFM	SUMC,2,10,	ADD 02 AND -01		11192 16 12033 000-2
08890		AM	SUMC,1,1011,			11204 11 12033 000-J
08900		BH	**24,,,			11216 46 11240 01100
08910		BTM	E19N,2111,711,			11228 17 11780 -211J
08920	R19F	TFM	SUMC,1,10,	ADD 01 AND -02		11240 16 12033 000-1
08930		AM	SUMC,2,1011,			11252 11 12033 000-K
08940		BNH	**24,,,			11264 47 11288 01100
08950		BTM	E19F,1112,711,			11276 17 11852 -111K
08960		BL	**24,,,			11288 47 11312 01300
08970		BTM	E19F,1132,711,			11300 17 11852 -113K
08980	R19G	TFM	SUMC,2,1011,	ADD -02 AND -01		11312 16 12033 000-K

08990	AM	SUMC,1,1011,		11324	11	12033	000-J
09000	BNH	*+24,,,		11336	47	11360	01100
09010	BTM	E19F,2111,811,		11348	17	11852	0K11J
09020	R19H	TFM	SUMC,1,1011,	11360	16	12033	000-J
09030	AM	SUMC,2,1011,	ADD -01 AND -02	11372	11	12033	000-K
09040	BNH	*+24,,,		11384	47	11408	01100
09050	BTM	E19F,1112,811		11396	17	11852	0J11K
09060	R19I	TFM	SUMC,,1011,	11408	16	12033	000--
09070	AM	SUMC,,10,	ADD -00 AND 00	11420	11	12033	000-0
09080	BNH	*+24,,,		11432	47	11456	01100
09090	BTM	E19F,0110,8,		11444	17	11852	0-110
09100	BE	*+24,,,		11456	46	11480	01200
09110	BTM	E19N,0120,8,		11468	17	11780	0-120
09120	BNL	*+24,,,		11480	46	11504	01300
09130	BTM	E19N,0130,8,		11492	17	11780	0-130
09140	R19J	TFM	SUMC,,10,	11504	16	12033	000-0
09150	AM	SUMC,,10,	ADD 00 AND 00	11516	11	12033	000-0
09160	BNH	*+24,,,		11528	47	11552	01100
09170	BTM	E19F,0110,,		11540	17	11852	-0110
09180	BE	*+24,,,		11552	46	11576	01200
09190	BTM	E19N,0120,,		11564	17	11780	-0120
09200	R19K	TFM	SUMC,2,1011,	11576	16	12033	000-K
09210	AM	SUMC,2,10,	ADD -02 AND 02	11588	11	12033	000-2
09220	BNH	*+24,,,		11600	47	11624	01100
09230	BTM	E19F,2112,8,		11612	17	11852	0K112
09240	BE	*+24,,,		11624	46	11648	01200
09250	BTM	E19N,2122,8,		11636	17	11780	0K122
09260	R19L	TFM	SUMC,1,10,	11648	16	12033	000-1
09270	AM	SUMC,1,1011,	ADD 01 AND -01	11660	11	12033	000-J
09280	BNH	*+24,,,		11672	47	11696	01100
09290	BTM	E19F,1111,711,		11684	17	11852	-111J
09300	BE	*+24,,,		11696	46	11720	01200
09310	BTM	E19N,1121,711,		11708	17	11780	-112J
09320	B	RTO20,,,		11720	49	12298	00000
09330	E19	RCTY	,,,	11732	34	00000	00102
09340	WATY	ER55,,,		11744	39	12257	00100
09350	TF	DT19,E19-1		11756	26	12039	11731
09360	B	DOE19,,,		11768	49	11912	00000
09370	E19N	RCTY	,,,	11780	34	00000	00102
09380	TF	DT19,E19N-1,,		11792	26	12039	11779
09390	WATY	ER58,,,		11804	39	12175	00100
09400	TF	ET19-1,E19N-2,,		11816	26	12048	11778
09410	WNTY	ET19-2,,,		11828	38	12047	00100
09420	B	DOE19		11840	49	11912	00000
09430	E19F	RCTY	,,,	11852	34	00000	00102
09440	TF	DT19,E19F-1		11864	26	12039	11851
09450	WATY	ER57		11876	39	12093	00100
09460	TF	ET19-1,E19F-2,,		11888	26	12048	11850
09470	WNTY	ET19-2,,,		11900	38	12047	00100
09480	DOE19	RCTY	,,,	11912	34	00000	00102
09490	TD	ETA1-1,DT19,,		11924	25	12041	12039
09500	TD	ETA2-1,DT19-3,,		11936	25	12044	12036
09510	WATY	ER56,,,		11948	39	12051	00100

09520	WNTY	ETA2-2,,	11960	38	12043	00100
09530	WATY	PLS,,,	11972	39	12283	00100
09540	WNTY	ETA1-2,,,	11984	38	12040	00100
09550	WATY	EQ,,,	11996	39	12291	00100
09560	WNTY	SUMC-1,,,	12008	38	12032	00100
09570	BB	,,,	12020	A2	00000	00000
09580*	CONSTANTS FOR ROUTINE 19					
09590	SUMC	DC	2,00	12033	00002	
09600		DC	1,0	12034	00001	
09610	DT19	DC	5,00000	12039	00005	
09620	ETA1	DC	3,000	12042	00003	
09630	ETA2	DC	3,000	12045	00003	
09640	ET19	DC	4,0000	12049	00004	
09650	ER56	DAC	21, ADD IMMEDIATE (11) '	12051	00042	
09660	ER57	DAC	41, INDICATOR ON, SHOULD BE OFF, INDICATOR '	12093	00082	
09670	ER58	DAC	41, INDICATOR OFF, SHOULD BE ON, INDICATOR '	12175	00082	
09680	ER55	DAC	13, ADD ERROR, '	12257	00026	
09690	PLS	DAC	04, + '	12283	00008	
09700	EQ	DAC	04, = '	12291	00008	
09710*	ROUTINE 20					
09720*	THIS ROUTINE TESTS COMPARE IMMEDIATE (14)					
09730	RT020	TFM	WA20,15,10,	12298	16	12827 000J5
09740		CM	WA20,15,10,	12310	14	12827 000J5
09750		TD	*+23,WA20,,	12322	25	12345 12827
09760		BD	E20,650,,,	12334	43	12514 00650
09770		TD	*+35,WA20-1,,	12346	25	12381 12826
09780		CF	*+23,,,	12358	33	12381 00000
09790		BD	E20,610,,	12370	43	12514 00610
09800		BE	*+60,,,	12382	46	12442 01200
09810		RCTY	,,,	12394	34	00000 00102
09820		WATY	ER59,,,	12406	39	12829 00100
09830		WATY	ER60,,,	12418	39	12859 00100
09840		H	,,,	12430	48	00000 00000
09850		BNH	*+60,,,	12442	47	12502 01100
09860		RCTY	,,,	12454	34	00000 00102
09870		WATY	ER59,,,	12466	39	12829 00100
09880		WATY	ER61,,,	12478	39	12909 00100
09890		H	,,,	12490	48	00000 00000
09900		B	R20A,,,	12502	49	12550 00000
09910	E20	RCTY	,,,	12514	34	00000 00102
09920		WATY	ER62,,,	12526	39	12967 00100
09930		H	,,,	12538	48	00000 00000
09940*						
09950	R20A	TFM	WA20,15,10,	12550	16	12827 000J5
09960		CM	WA20,15,1011,	12562	14	12827 000JN
09970		BE	E20A,,,	12574	46	12610 01200
09980		BNH	E20B,,,	12586	47	12670 01100
09990		B	R20B,,,	12598	49	12718 00000
10000	E20A	RCTY	,,,	12610	34	00000 00102
10010		WATY	ER59,,,	12622	39	12829 00100
10020		WATY	ER63,,,	12634	39	13017 00100

10030	H	...	12646	48	00000	00000
10040	B	R20B...	12658	49	12718	00000
10050	E20B	RCTY	12670	34	00000	00102
10060	WATY	ER59...	12682	39	12829	00100
10070	WATY	ER64...	12694	39	13069	00100
10080	H	...	12706	48	00000	00000
10090*						
10100	R20B	TFM WA20,15,1011,	12718	16	12827	000JN
10110	CM	WA20,15,10,	12730	14	12827	000J5
10120	BNL	*+24...	12742	46	12766	01300
10130	B	RTO21	12754	49	13176	00000
10140	RCTY	...	12766	34	00000	00102
10150	WATY	ER59...	12778	39	12829	00100
10160	WATY	ER65...	12790	39	13125	00100
10170	H	...	12802	48	00000	00000
10180	B	RTO21...	12814	49	13176	00000
10190*		CONSTANTS USED IN ROUTINE 20				
10200	WA20	DC 02,00	12827		00002	
10210	ER59	DAC 15, CM (14) ERROR'	12829		00030	
10220	ER60	DAC 25, EQUAL ZERO SHOULD BE ON'	12859		00050	
10230	ER61	DAC 29, HIGH POSITIVE SHOULD BE OFF'	12909		00058	
10240	ER62	DAC 25, CM (14) ALTERED P FIELD'	12967		00050	
10250	ER63	DAC 26, EQUAL ZERO SHOULD BE OFF'	13017		00052	
10260	ER64	DAC 28, HIGH POSITIVE SHOULD BE ON'	13069		00056	
10270	ER65	DAC 26, HIGH/EQUAL SHOULD BE OFF'	13125		00052	
10280*		ROUTINE 21				
10290*		THIS ROUTINE TESTS COMPARE				
10300	RTO21	TF WA21,D21...	13176	26	13423	13410
10310	C	WA21,D21A...	13188	24	13423	13414
10320	TD	*+23,WA21-1...	13200	25	13223	13422
10330	BD	E21A,640...	13212	43	13260	00640
10340	BE	E21B...	13224	46	13308	01200
10350	BNH	E21C...	13236	47	13356	01100
10360	B	RTO24X...	13248	49	13602	00000
10370	E21A	RCTY ...	13260	34	00000	00102
10380	WATY	ER66...	13272	39	13425	00100
10390	H	...	13284	48	00000	00000
10400	B	RTO24X...	13296	49	13602	00000
10410	E21B	RCTY ...	13308	34	00000	00102
10420	WATY	ER67...	13320	39	13473	00100
10430	H	...	13332	48	00000	00000
10440	B	RTO24X...	13344	49	13602	00000
10450	E21C	RCTY ...	13356	34	00000	00102
10460	WATY	ER68...	13368	39	13539	00100
10470	H	...	13380	48	00000	00000
10480	B	RTO24X...	13392	49	13602	00000
10490*		CONSTANTS USED IN ROUTINE 21				
10500	D21	DC 7,1001248	13410		00007	
10510	D21A	DC 4,1248	13414		00004	
10520	WA21	DC 9,0	13423		00009	
10530	ER66	DAC 24, C (24) ALTERED P FIELD'	13425		00048	
10540	ER67	DAC 33, C (24) ERROR, E/Z SHOULD BE OFF'	13473		00066	
10550	ER68	DAC 32, C (24) ERROR, H/P SHOULD BE ON'	13539		00064	

		ROUTINE 24					
10560*							
10570	RTO24X	TFM	AAA,98765	13602	16	14070	R8765
10580		SM	AAA,22222	13614	12	14070	K2222
10590		CM	AAA,76543	13626	14	14070	P6543
10600		BE	*+48	13638	46	13686	01200
10610		RCTY		13650	34	00000	00102
10620		WATY	RTX1	13662	39	14035	00100
10630		H		13674	48	00000	00000
10640		TFM	AAA,56789	13686	16	14070	N6789
10650		SM	AAA,22222	13698	12	14070	K2222
10660		CM	AAA,34567	13710	14	14070	L4567
10670		BE	*+48	13722	46	13770	01200
10680		RCTY		13734	34	00000	00102
10690		WATY	RTX1	13746	39	14035	00100
10700		H		13758	48	00000	00000
10710		TFM	AAA,43210	13770	16	14070	M3210
10720		SM	AAA,22222	13782	12	14070	K2222
10730		CM	AAA,20988	13794	14	14070	K0988
10740		BE	*+48	13806	46	13854	01200
10750		RCTY		13818	34	00000	00102
10760		WATY	RTX1	13830	39	14035	00100
10770		H		13842	48	00000	00000
10780		TFM	AAA,12345	13854	16	14070	J2345
10790		SM	AAA,11111	13866	12	14070	J1111
10800		CM	AAA,01234	13878	14	14070	-1234
10810		BE	*+48	13890	46	13938	01200
10820		RCTY		13902	34	00000	00102
10830		WATY	RTX1	13914	39	14035	00100
10840		H		13926	48	00000	00000
10850		TFM	AAA,56789	13938	16	14070	N6789
10860		SM	AAA,11111	13950	12	14070	J1111
10870		CM	AAA,45678	13962	14	14070	M5678
10880		BE	*+48	13974	46	14022	01200
10890		RCTY		13986	34	00000	00102
10900		WATY	RTX1	13998	39	14035	00100
10910		H		14010	48	00000	00000
10920		B	RTO24	14022	49	14072	00000
10930	RTX1	DAC	16,SUBTRACT FAILED	14035	00032		
10940	AAA	DC	5,00000	14070	00005		
10950*			THIS ROUTINE TESTS TRANSMIT RECORD (31)				
10960	RTO24	TFM	WA24,...	14072	16	15360	-0000
10970		TR	WA24-3,D24A,, TRANSMIT 2 DIGITS ODD	14084	31	15357	15363
10980		BNR	ER24,WA24-1,,	14096	45	14228	15359
10990		BD	ER24A,WA24,,	14108	43	14276	15360
11000		CM	WA24-2,35,9,,	14120	14	15358	00-35
11010		BE	R24A,...	14132	46	14312	01200
11020		RCTY	...	14144	34	00000	00102
11030		WATY	ER74,...	14156	39	15381	00100
11040		WNTY	WA24-3,...	14168	38	15357	00100
11050		WATY	5B,...	14180	39	15463	00100
11060		WNTY	D24A,...	14192	38	15363	00100
11070		H	...	14204	48	00000	00000
11080		B	R24A,...	14216	49	14312	00000

11090	ER24	RCTY	...			14228	34	00000	00102
11100		WATY	ER75...			14240	39	15501	00100
11110		H	...			14252	48	00000	00000
11120		B	R24A...			14264	49	14312	00000
11130	ER24A	RCTY	...			14276	34	00000	00102
11140		WATY	ER76			14288	39	15567	00100
11150		H	...			14300	48	00000	00000
11160*									
11170	R24A	TFM	WA24...			14312	16	15360	-0000
11180		TR	WA24-2,D24B,,	TRANSMIT 2 DIGITS EVEN		14324	31	15358	15368
11190		BNR	ER24B,WA24...			14336	45	14468	15360
11200		BD	ER24C,WA24+1,,			14348	43	14516	15361
11210		CM	WA24-1,14,8,			14360	14	15359	0-014
11220		BE	R24B...			14372	46	14552	01200
11230		RCTY	...			14384	34	00000	00102
11240		WATY	ER74...			14396	39	15381	00100
11250		WNTY	WA24-2...			14408	38	15358	00100
11260		WATY	SB...			14420	39	15463	00100
11270		WNTY	D24B...			14432	38	15368	00100
11280		H	...			14444	48	00000	00000
11290		B	R24B...			14456	49	14552	00000
11300	ER24B	RCTY	...			14468	34	00000	00102
11310		WATY	ER75...			14480	39	15501	00100
11320		H	...			14492	48	00000	00000
11330		B	R24B...			14504	49	14552	00000
11340	ER24C	RCTY	...			14516	34	00000	00102
11350		WATY	ER76...			14528	39	15567	00100
11360		H	...			14540	48	00000	00000
11370*									
11380	R24B	TFM	WA24...			14552	16	15360	-0000
11390		TR	WA24-4,D24C,,			14564	31	15356	15372
11400		BNR	ER24D,WA24-1,,			14576	45	14696	15359
11410		CM	WA24-2,579,9,			14588	14	15358	00N79
11420		BE	R24C...			14600	46	14732	01200
11430		RCTY	...			14612	34	00000	00102
11440		WATY	ER74...			14624	39	15381	00100
11450		WNTY	WA24-4...			14636	38	15356	00100
11460		WATY	SB...			14648	39	15463	00100
11470		WNTY	D24C...			14660	38	15372	00100
11480		H	...			14672	48	00000	00000
11490		B	R24C...			14684	49	14732	00000
11500	ER24D	RCTY	...			14696	34	00000	00102
11510		WATY	ER75...			14708	39	15501	00100
11520		H	...			14720	48	00000	00000
11530*									
11540	R24C	TFM	WA24...			14732	16	15360	-0000
11550		TR	WA24-2,D24D,,			14744	31	15358	15376
11560		BNR	ER24E,WA24-1,,			14756	45	14876	15359
11570		CM	WA24-2,8,9,			14768	14	15358	00-08
11580		BE	R24D...			14780	46	14912	01200
11590		RCTY	...			14792	34	00000	00102
11600		WATY	ER74...			14804	39	15381	00100
11610		WNTY	WA24-2...			14816	38	15358	00100

11620		WATY	SB...	14828	39	15463	00100
11630		WNTY	D24D	14840	38	15376	00100
11640		H	...	14852	48	00000	00000
11650		B	R24D...	14864	49	14912	00000
11660	ER24E	RCTY	...	14876	34	00000	00102
11670		WATY	ER75...	14888	39	15501	00100
11680		H	...	14900	48	00000	00000
11690*							
11700	R24D	SF	D24E...	14912	32	15378	00000
11710		SF	D24E+1...	14924	32	15379	00000
11720		TFM	WA24...	14936	16	15360	-0000
11730		TR	WA24-1,D24E...	14948	31	15359	15378
11740		BNR	ER24F,WA24-1...	14960	45	15008	15359
11750		BD	ER24G,WA24...	14972	43	15056	15360
11760		BNF	ER24H,WA24-1...	14984	44	15104	15359
11770		B	R24E...	14996	49	15140	00000
11780	ER24F	RCTY	...	15008	34	00000	00102
11790		WATY	ER75...	15020	39	15501	00100
11800		H	...	15032	48	00000	00000
11810		B	R24E...	15044	49	15140	00000
11820	ER24G	RCTY	...	15056	34	00000	00102
11830		WATY	ER76...	15068	39	15567	00100
11840		H	...	15080	48	00000	00000
11850		B	R24E...	15092	49	15140	00000
11860	ER24H	RCTY	...	15104	34	00000	00102
11870		WATY	ER77...	15116	39	15639	00100
11880		H	...	15128	48	00000	00000
11890*							
11900	R24E	TFM	WA24...	15140	16	15360	-0000
11910		TR	WA24-2,D24E+1...	15152	31	15358	15379
11920		BNR	ER24I,WA24-2...	15164	45	15212	15358
11930		BD	ER24J,WA24-1...	15176	43	15260	15359
11940		BNF	ER24K,WA24-2...	15188	44	15308	15358
11950		B	END...	15200	49	15702	00000
11960	ER24I	RCTY	...	15212	34	00000	00102
11970		WATY	ER75...	15224	39	15501	00100
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11990		B	END...	15248	49	15702	00000
12000	ER24J	RCTY	...	15260	34	00000	00102
12010		WATY	ER76...	15272	39	15567	00100
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12040	ER24K	RCTY	...	15308	34	00000	00102
12050		WATY	ER77...	15320	39	15639	00100
12060		H	...	15332	48	00000	00000
12070		B	END...	15344	49	15702	00000
12080*			CONSTANTS USED IN ROUTINE 24				
12090	WA24	DC	5.0	15360	00005		
12100		DC	2.0	15362	00002		
12110	D24A	DSC	3.35	15363	00003		
12120		DC	1.0	15366	00001		
12130		DC	1.0	15367	00001		
12140	D24B	DSC	3.14	15368	00003		

12150		DC	1,1						15371	00001
12160	D24C	DC	1,5						15372	00001
12170		DSC	3,79						15373	00003
12180	D24D	DSC	2,8						15376	00002
12190	D24E	DSC	1,1						15378	00001
12200		DSC	1,1						15379	00002
12210	ER74	DAC	41, TR (31) DID NOT TRANSMIT PROPERLY, WAS						15381	00082
12220	SB	DAC	19, SHOULD HAVE BEEN						15463	00038
12230	ER75	DAC	33, TR (31) DID NOT SET RECORD MARK						15501	00066
12240	ER76	DAC	36, TR (31) DID NOT TERMINATE PROPERLY						15567	00072
12250	ER77	DAC	32, FLAG ON -RM NOT SET ON TR (31)						15639	00064
12260*			END ROUTINE							
12270	END	AM	COUNT,1,10,						15702	11 15880 000-1
12280		CM	COUNT,100,9,						15714	14 15880 00J00
12290		BE	*+24,...						15726	46 15750 01200
12300		B	RTO1,...						15738	49 01000 00000
12310		TFM	COUNT,9,						15750	16 15880 00-00
12320		K	DC1,00701						15762	34 15980 00701
12330		RN	DC1,00702						15774	36 15980 00702
12340		BNI	A1,03600						15786	47 18446 03600
12350		BTM	ERTO,00260						15798	17 15822 -0260
12360		DC	01,1,*						15809	00001
12370		J	*-48						15810	49 15762 00000
12380	ERTO	RCTY							15822	34 00000 00102
12390		WATY	ERT						15834	39 15871 00100
12400		WNTY	ERTO-3						15846	38 15819 00100
12410		BB							15858	42 00000 00000
12420	ERT	DAC	04,ER						15871	00008
12430	COUNT	DC	3,000						15880	00003
12450	WRITE1	NOP	,,2						15882	41 -0000 00000
12460		TDM	DC1-1,0						15894	15 15979 00000
12470		NOP							15906	41 00000 00000
12480		NOP							15918	41 00000 00000
12490		SF	DC1+1						15930	32 15981 00000
12500		A	DC1-1,DC1-1						15942	21 15979 15979
12510		AM	DC1-1,01,10						15954	11 15979 000-1
12520		TD	DC1,DC1-1						15966	25 15980 15979
12530		TFM	DC1A,WRITE+100						15978	16 16279 K0000
12540		SM	DC1A,X						15990	12 16279 J8000
12550		TF	DC1+8,DC1A-2						16002	26 15988 16277
12560		TD	HDC1,DC1-1						16014	25 16230 15979
12570		TFM	DC1A,LALAB						16026	16 16279 J6228
12580		TF	HDC1+8,DC1A-2						16038	26 16238 16277
12590		K	HDC1,00701						16050	34 16230 00701
12600		WN	HDC1,00702						16062	38 16230 00702
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12620		BTM	ERTO,00270						16086	17 15822 -0270
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12660		WATY	102						16122	39 16303 00100
12670		RCTY							16134	34 00000 00102

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12790	IO2	DAC	17,MONITOR LOAD WILL	16303	00034	
12800	DAC	19, BE PUNCHED ON 1622	16337	00038		
12810	DAC	12, CARD PUNCH'	16375	00024		
12820	DORG	15978	15978			
12830	DC	02,00	15979	00002		
12840	DC1	DSC	09,900806999	15980	00009	
12850	DSA	X	15993	00005	J8000	
12860	DC	01,'	15994	00001		
12870	LODIT8	DAC	15,SW3 ON IF PRO I	15997	00030	
12880	DAC	16,5 ON PAPER TAPE'	16027	00032		
12890	PROG	DAC	15,SW2 OFF IF PROG	16059	00030	
12900	DAC	18, RAM IS COMPATIBLE'	16089	00036		
12910	SW1	DAC	16,SW1 ON TO REPLAC	16125	00032	
12920	DAC	10,E PROGRAM'	16157	00020		
12930	IO	DAC	11,OUTPUT IS '	16177	00022	
12940	MODE	DAC	6,MODE '	16199	00012	
12950	IM	DAC	09,INPUT IS'	16211	00018	
12960	LALAB	DC	01,0	16228	00001	
12970	X	DS	,18000	18000	00000	
12980	WRITE	DS	,19900	19900	00000	
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6.0 RELEASED DIPAL COMPATIBLE TESTS

Diagnostic Name	DIPAL Name	Using System				Features Tested
		1620-I	1620-II	1710-I	1710-II	
CU 02	CU 02	X		X		Validity
DT 0010	DT 10			X	X	RTC/MES
DT 0011	DT 11			X	X	ADC
DT 0012	DT 12			X		TAS
DT 0013	DT 13			X		CO/PBI/AØ
DT 0014	DT 14			X	X	Interrupt
DT 0015	DT 15			X		Seek Complete
DT 0017	DT 17			X		MEU/DDU/SSU
DT 0018	DT 18			X		Output Printer
DT 0019	DT 19			X	X	HSCS
DT 0021	DT 21	X	X	X	X	1311
DT 0022	DT 22	X	X	X	X	1311
DT 0041	DT 41			X	X	PC/PD/LCØ/DI/ RTC/CM
DT 0042	DT 42			X	X	HSADC
DT 0043	DT 43	X	X	X	X	1443 Printer
DT 0101	0101		X		X) Central
DT 0102	0102		X		X) Processing
DT 0103	0103		X		X) Unit
DT 0104	0104		X		X	Validity
DT 0105	0105		X		X	Index Registers
DT 0106	0106	X	X	X	X	Floating Point
DT 0107	0107		X		X	Binary
DT 0108	0108		X		X	Capabilities
DT 0109	0109		X		X	Binary I/O
DT 0110	0110		X		X	Typewriter
DT 0112	D112				X	Paper Tape
DT 0113	D113				X	TAS
DT 0115	D115				X	CO/PBI/AØ
DT 0117	D117				X	SEEK Complete
DT 0118	D118				X	MEU/DDU/SSU
DTX 01	DX01	X		X		Output Printer
DTX 02	DX02	X		X		CPU Header
DTX 03	DX03	X		X		CPU Header
DTX 04	DX04	X		X		Typewriter
DTX 06	DX06	X		X		Special Instructions Indirect Addressing