

IDENTIFICATION

Product Code: MAINDEC-08-D72A-D

Product Name: 680 DCS Data and Control Test

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Maintainer: Diagnostic Group

Author: E. Kenney



1. ABSTRACT

The 680 DCS (Data Communication System) Data and Control Test consists of three independent test groups which will be referred to as operational modes 0, 1 and 2.

The following is a brief description of each operational mode. A detailed description of each mode is presented with the operating instructions and error reporting explanations for the respective operational mode.

- a. Operational Mode 0 consists of three test phases designed to verify correct operation of the line selection register (LSR) decoding logic, data transfer between the computer and each W750 Data Line Interface Module, and power clear.
- b. Operational Mode 1 sequentially outputs a fixed 8-level ASCII or 5-level Baudot code message on each active data line. The input/output terminals of the W750, associated with any of the active lines, may be connected together, or to an on-line Teletype (or Modem).
- c. Operational Mode 2 is a receive/transmit routine which will receive and assemble data characters from an on-line Teletype, and transmit the resulting message back to the originating Teletype upon recognition of a period.

2. REQUIREMENTS

2.1 Storage

<u>Operational Mode</u>	<u>Starting Address</u>	<u>End Address</u>
0	0400	1175
1	2000	2337
2	3000	3152
<u>Subroutine</u>	<u>Starting Address</u>	<u>End Address</u>
Transmit (modes 1 & 2)	4000	4127
Receive (mode 2)	4200	4520

2.2 Equipment

Minimum configuration PDP-8

Minimum configuration 680 DCS, (i.e., 681 Data Line Interface and 685 Multiplexer

Control).

3. PROGRAM LOADING

- a. If the Binary Loader is resident in memory, proceed to step b, otherwise load the Binary Loader into memory.

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- b. Set the AC SWITCH register to 7777 and depress the LOAD ADDRESS key. Then depress the START key.
- c. Place the 680 DCS Data and Control Test in the keyboard reader and turn the reader on.
- d. When the program has been read into memory, the AC should contain 0, indicating correct program tape checksum.

4. OPERATIONAL MODE 0

4.1 Operating Procedure

NOTE: All W750 modules must be jumpered input to output: L-N and U-H, with PIN H jumpered to the Inverter Input.

- a. Set SR to 0200 and depress LOAD ADDRESS.
- b. Select the base (i.e., lowest) active line number in SR 5-11 and depress START. The program will store this number and halt at location 204.
- c. Select the number of active lines to be tested in SR 5-11 and depress CONTINUE. The program will store this number and halt at location 211.
- d. Select operational mode 0 (SR 10 and 11 reset) and depress CONTINUE. The program will begin EXECUTION of operational mode 0 at location 400.

4.2 Summary of Switch Register Controls

SR0	<u>Set</u> - Halt on error <u>Reset</u> - Bypass error halt
SR1	<u>Set</u> - Scope mode, (described in detail for each phase) <u>Reset</u> - No scope mode
SR2	<u>Set</u> - Verify mode (continuously cycle through the current phase) <u>Reset</u> - Cycle through all three phases
SR3	<u>Set</u> - Type status reports <u>Reset</u> - Don't type reports
SR4	<u>Set</u> - Ring bell on error <u>Reset</u> - Bypass bell
SR5	<u>Set</u> - Halt at completion of phase 3 <u>Reset</u> - Repeat phases 1, 2 and 3

4.3 Detailed Description of Test Phases

All 680 Clocks are disabled.

4.3.1 Phase 1 Test Sequence Location 400

Lines 0 through 177 are scanned to verify that all input data lines present a mark level.

In addition to the data line check, a program scan counter is maintained to verify correct incrementation of the line selection register.

4.3.2 Phase 1 Status Reporting

- a. 01 TEST COMPLETE: Reports completion of mode 0, Phase 1 test sequence.
- b. 01 ERROR 1 XXX: (Halt location 540-MOP1E1-AC=Line number)  
Line number XXX presented a start (i.e., space) level when sampled, (i.e., IOT 6402).

When CONTINUE is depressed, the program will attempt to set line XXX to a mark and then retest the data line. If the data line is now at a mark, the scan will resume. (Note: Indicates incorrect operation of power clear line preset).

- c. 01 CYCER E XXX 000: (Halt location 475 - CYER1 - AC = 0)  
The line selection register has cycled from line 001 to line 000 before the program scan counter has counted 200<sub>8</sub> scans. The contents of the line selection register should have been XXX, the actual contents are 000.

Depress CONTINUE to restart phase 1 at location 403.

- d. 01 CYCER L 000 XXX: (Halt Location 475 - CYER1 - AC = 1).  
The program scan counter has counted 200<sub>8</sub> scans but the line selection register has not yet cycled from line 001 to line 000. The contents of the LSR should be 000, the actual contents are XXX.

Depress CONTINUE to restart phase 1 at location 403.

4.3.3 Phase 1 Scope Mode Sequence (SR1)

Selection of phase 1 scope mode causes the line number currently being scanned to be set continuously to a mark (IOT 6404) and sampled (IOT 6402). Error reporting and error halt may still be selected if desired, (SR3 and SR0, respectively).

4.3.4 Phase 2 Test Sequence (Location 600)

Starting with the specified base line number, one active line is set to a start (i.e., space) level. The remaining 177<sub>8</sub> lines are then scanned and sampled to verify that all other lines are at a mark level. The active line under test is then tested for a start level.

This test sequence is repeated for each specified active line.

4.3.5 Phase 2 Status Reporting

- a. 02 TEST COMPLETE: Reports completion of mode 0, phase 2 test sequence.
- b. 02 ERROR 1 XXX: (Halt location 700-M0P2E1 - AC = 0 if error 1, or AC = 1 if error 1 and early cycle error)

The active line under test (XXX) was detected at a mark level. If no other phase 2 errors were reported, this error indicates a faulty W750 Module or incorrect generation of 0 to line out.

Depress CONTINUE to repeat phase 2 with the same active line. (Location 610)

- c. 02 CYCER E XXX YYY: (Halt location 755 if early cycle error or location 677 if early cycle error and error 1)

The line selection register has cycled to the active line under test (YYY) before the program scan counter has counted  $200_8$  scans. The line being scanned should have been XXX.

Depress CONTINUE to repeat phase 2 with the same active line. (Location 610)

- d. 02 CYCER L XXX YYY: (Halt location 660 - CYER2L - AC = 1)

The program scan counter has counted  $200_8$  scans but the line selection register has not yet cycled to the active line under test, (XXX). The incorrect contents of the LSR are YYY.

Depress CONTINUE to repeat phase 2 with the same active line. (Location 610)

- e. 02 ERROR 2 XXX YYY: (Halt location 1461 - M0P2E2-AC = 0)

Line YYY has been detected at a space. Line XXX is the active line under test which was set to a space. This error usually indicates incorrect LSR or W750 Module line number decoding.

When CONTINUE is depressed, the program will attempt to set line YYY to a mark and then retest the data line. If line YYY is now at a mark, the scan will resume. (Note: If incorrect line number decoding is involved, the active line under test (XXX), as well as line YYY may now be at a mark, thus resulting in error 1 detection at the completion of the line scan.)

4.3.6 Phase 2 Scope Mode Sequence (SR1)

Selection of phase 2 scope mode causes the current active line under test to be continuously

- a. Set to a space (IOT 6404)
- b. Sampled (IOT 6402)
- c. Set to a mark (IOT 6404)

All error checks and reporting are disabled while this loop is selected.

4.3.7 Phase 3 Test Sequence (Location 1000) (Test involves only the specified active lines.)

Initially, all specified active lines are set to a space. Starting with the specified base line number, one active line is set to a mark level and tested. The remaining active lines are then scanned and sampled to verify that all are at a space level.

This test sequence is repeated for each specified active line.

4.3.8 Phase 3 Status Reporting

a. 03 TEST COMPLETE: (Halt location 1134 - ENDMD0)

Reports completion of mode 0, phase 3 test sequence. Halt will occur with SR 5 set, otherwise mode 0 will be repeated, (location 400). If halt is selected, depress CONTINUE to repeat mode 0.

b. 03 ERROR 1 XXX YYY: (Halt location 1152-M0P3E1-AC = 0)

Line YYY has been detected at a mark. Line XXX is the active line under test which was set to a mark.

This error usually indicates incorrect LSR or W750 Module line number decoding.

When CONTINUE is depressed, the program will attempt to set line YYY to a space and then retest the data line. If line YYY is now at a space, the scan of the remaining active lines will resume.

c. 03 ERROR 2 XXX: (Halt location 1173 - M0P3E2 - AC = 0)

The active line under test (XXX) was detected at a space level.

This error usually indicates a faulty W750 Module or incorrect generation of 1 to Line Out.

Depress CONTINUE to repeat phase 3 with the same active line, (location 1022).

4.3.9 Phase 3 Scope Mode Sequence (SR1)

Selection of phase 3 scope mode causes the current active line under test to be alternately set to a mark level and a space level.

All error checks and reporting are disabled while this loop is selected.

5. OPERATIONAL MODES 1 AND 2

5.1 Operating Procedure

NOTE: All W750 Modules not connected to an on-line Teletype must be jumpered input to output: L-N and U-H, with pin H jumpered to the Inverter Input.

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- a. Set SR to 0200 and depress LOAD ADDRESS.
- b. Select the base (lowest) active line number in SR 5-11 and depress START. The program will store this number and halt at location 204.
- c. Select the number of active lines to be tested in SR 5-11 and depress CONTINUE. The program will store this number and halt at location 211.
- d. Select operation mode 1 or 2 and depress CONTINUE.  
Operational Mode 1 - SR10 reset, SR11 set  
Operational Mode 2 - SR10 set, SR11 reset.  
The program will halt at location 221.
- e. Select 680 Clock No. 1, 2, 3 or 4 in SR 9, 10 and 11.  
Clock No. 1 - SR11 set; SR 9 and 10 reset  
Clock No. 2 - SR10 set; SR 9 and 11 reset  
Clock No. 3 - SR 10 and 11 set; SR 9 reset  
Clock No. 4 - SR 9 set; SR 10 and 11 reset  
Depress CONTINUE; the program should halt at location 253. (Note: If halt occurs at location 230, (CLOCKER), a clock number other than 1, 2, 3 or 4 has been selected. Select correct clock number and depress CONTINUE.)
- f. Select desired code level:  
SR 11 reset - 8-level ASCII Code, (Model 33 or 35 Teletype)  
SR 11 set - 5-level Baudot Code, (Model 28 Teletype)  
Depress CONTINUE, the program will enter the selected operational mode, (see section 5.2.2 and 5.3.2 for mode 1 switch register control and mode 2 switch register control, respectively).

5.2 Operational Mode 1:

Restart at location 2000

5.2.1 Program Sequence - Starting at the base line number, the program sequentially outputs a fixed test message \* on each active line in the specified code level. Three error checks are performed during the transmission of each character of the message and any errors are reported following transmission of that character.

Half duplex operation, (or appropriate common input/output connection), is assumed on all active lines. Transmission on a full duplex line will result in data-echo errors (status report d).

The data-echo error check may be bypassed while retaining the other error checks by setting SR 6.

- \* THE QUICK BROWN FOX JUMPED OVER (CR)(LF)  
THE LAZY DOG'S BACK! 1234567890 (BELL)(CR)(LF)



5.2.2 Switch Register Program Control (Mode 1)

SR0	<u>Set</u> - Halt on error <u>Reset</u> - Bypass error halt
SR1	<u>Set</u> - Continuously transmit the current character <u>Reset</u> - Transmit message in normal sequence
SR2	<u>Set</u> - Continuously transmit the complete test message on the current active line <u>Reset</u> - Sequentially transmit the complete test message on all active lines
SR3	<u>Set</u> - Type status reports <u>Reset</u> - Don't type reports
SR4	<u>Set</u> - Ring bell on error <u>Reset</u> - Bypass bell
SR5	<u>Set</u> - Halt when all active lines have transmitted <u>Reset</u> - Continuously cycle through all active lines
SR6	<u>Set</u> - Bypass data-echo check (full duplex operation) <u>Reset</u> - Check data-echo (half duplex or common input/output connection)

5.2.3 Status Reporting

- a. 11 TEST COMPLETE XXX YYY - Report completion of mode 1 phase 1. XXX is the base line number, YYY is the final transmit line number. (Halt location 2172-ENDMD1-AC = final transmit line number). If halt was selected, depress CONTINUE to restart mode 1 at location 2000.
- b. 11 ERROR 1 XXX YYY - (Halt location 2330-M12ERR-AC = 1)  
After outputting the start bit for each character on the active transmit line, the program scans and samples the remaining 177<sub>g</sub> lines to verify that they are at a mark level. This report indicates that line YYY was detected at a space (start) level. Line XXX is the active transmit line number.  
Depress CONTINUE to resume transmission.
- c. 11 CYCER E XXX YYY - (Halt location 2330 - M12ERR-AC = 1)  
The active transmit line was scanned during the start bit scan, (described for status report b), indicating incorrect line selection register incrementation. Since the start bit scan is interrupted by at least one clock interrupt, it is possible that one or more of the clock IOT instructions may have affected the contents of the line selection register.  
Depress CONTINUE to resume transmission.

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- d. 11 ERROR 2 XXX YYY ZZZ - (Halt 2330 - M12ERR-AC = 2)  
This status report indicates a data-echo error. XXX is the active transmit line, YYY is the character transmitted, ZZZ is the corresponding echo character. (Note: For full duplex operation this data-echo check may be bypassed while retaining the other error checks by setting SR 6.)  
Depress CONTINUE to resume transmission.
- e. 11 ERROR 3 XXX YYY ZZZ - (Halt 2330-M12ERR - AC = 3)  
This status report indicates detection of an AC rotate error following execution of IOT 6404 (TTO). XXX is the active transmit line, YYY is the character transmitted, ZZZ is the corresponding echo character, (000, if SR 6 is set).  
Depress CONTINUE to resume transmission.
- f. 11 ERROR 4 XXX YYY ZZZ - (Halt 2330-M12ERR-AC = 4)  
Indicates detection of data-echo error and AC rotate error, (status reports d and e, respectively).  
Depress CONTINUE to resume transmission.

NOTE: The 8-level ASCII code test message starts at location 2400.  
The 5-level Baudot code test message starts at location 2600.  
Message transmission terminates upon recognition of an all zero character, (0000).

5.3 Operational Mode 2

Restart at location 3000

5.3.1 Program Sequence - Phase 1, the data receive portion of mode 2, operates on a single active-line per message basis. In other words, when a start level has been detected on a line, the program defines that line as the active line until the message is terminated through recognition of a period and transmitted back to the originating device. Start levels detected on any other line following designation of an active line will be reported as an error, (status report a).

Following transmission of the received message the program will accept data from any of the specified lines. (Note: Restarting mode 2 at location 3000 will clear the active line designation and enable a new active line designation).

The received message is assembled starting at location 3200 and cannot exceed  $177_8$  characters. (Phase 1 is terminated and the message transmitted upon reception of the 177th character).

Any errors detected in phase 1 will be reported following reception of a complete character on the designated active line. Error halts are not executed during phase 1.

Phase 2, the transmit portion of mode 2, transmits the received message on the designated active line. Three error checks are performed during the transmission of each character of the message and any errors are reported following transmission of that character.

Since half duplex operation is assumed, transmission on a full duplex line will result in data-echo errors, (status report g). The data-echo error check may be bypassed while retaining the other error checks by setting SR 6.

### 5.3.2 Switch Register Program Control (Mode 2)

SR0	<u>Set</u> - Halt on error (phase 2 only) <u>Reset</u> - Bypass error halt
SR1	<u>Set</u> - Continuously transmit the current character <u>Reset</u> - Transmit message in normal sequence
SR2	<u>Set</u> - Continuously transmit the received message on the designated active line <u>Reset</u> - Return to phase 1 after transmitting the received message
SR3	<u>Set</u> - Type status reports <u>Reset</u> - Don't type
SR4	<u>Set</u> - Ring bell on error (phase 2 only) <u>Reset</u> - Bypass bell
SR5	Not used
SR6	<u>Set</u> - Full duplex operation (bypass data-echo check) <u>Reset</u> - Half duplex operation (perform data-echo check)

### 5.3.3 Status Reporting

- a. 21 ERROR 1 XXX YYY Phase 1 (receive)  
A start level was detected on an undesignated line. XXX is the designated line, YYY is the line number detected at a space.
- b. 21 ERROR 2 XXX YYY Phase 1 (receive)  
The CAW associated with the receive IOT instruction (6402) was modified before eight clock interrupts were executed. XXX is the active line number, YYY is the received character.
- c. 21 ERROR 3 XXX YYY Phase 1 (receive)  
No stop bit (i.e., mark level) was detected on the active line on the eighth clock interrupt after the last data bit was received. XXX is the active line number, YYY is the received character.
- d. 21 ERROR 4 XXX YYY Phase 1 (receive)  
Errors 2 and 3 (status reports b and c, respectively) were detected.

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- e. 22 ERROR 1 XXX YYY Phase 2 (transmit)

(Halt location 2330-M12ERR-AC = 1)

After outputting the start bit for each character on the active line, the program scans and samples the remaining 177<sub>g</sub> lines to verify that they are at a mark level. This report indicates that line YYY was detected at a space level. Line XXX is the active line.

Depress CONTINUE to resume transmission.

- f. 22 CYCER E XXX YYY Phase 2 (transmit)

(Halt location 2330-M12ERR-AC = 1)

The active transmit line was scanned during the start bit scan (described for status report e) indicating incorrect line selection register incrementation. Since the start bit scan is interrupted by at least one clock interrupt, it is possible that one or more of the clock IOT instructions may have affected the contents of the line selection register.

Depress CONTINUE to resume transmission.

- g. 22 ERROR 2 XXX YYY ZZZ Phase 2 (transmit)

(Halt location 2330-M12ERR-AC = 2)

A data echo error has been detected. XXX is the active transmit line, YYY is the character transmitted, ZZZ is the corresponding echo character. (Note: For full duplex operation this data echo check may be bypassed while retaining the other error checks by setting SR 6.)

Depress CONTINUE to resume transmission.

- h. 22 ERROR 3 XXX YYY ZZZ Phase 2 (transmit)

(Halt location 2330-M12ERR-AC = 3)

This status report indicates detection of an AC rotate error following execution of IOT 6404 (TTO). XXX is the active transmit line number, YYY is the character transmitted, ZZZ is the corresponding echo character (000 if SR 6 is set).

Depress CONTINUE to resume transmission.

- i. 22 ERROR 4 XXX YYY ZZZ Phase 2 (transmit)

(Halt location 2330-M12ERR-AC = 4)

A data echo error and AC rotate error have been detected (status report number g and h, respectively).

6. MISCELLANEOUS

Mode 1 execution time for 32 active lines (8-level code) is approximately 9 minutes. This lengthy execution time is a result of the character transmission rate associated with the Model 33 and 35 Teletype (i.e., 10 characters per second). When all W750 Modules are jumpered input to output, 5-level code transmission may be selected, thus decreasing mode 1 execution time.

7. PROGRAM LISTING

```
TT3OFF 6442
TT4OFF 6452
TYPCNT 0111
VERPT 1004
WAIT1 2062
WAIT2 3032
WAIT2A 4510
WORK 1302
```

```
/680 DCS DATA AND CONTROL TEST
/ TAPE 1
/IOT DEFINITIONS

TT1OFF=6422 /RESET AND DISABLE CLOCK FLAG
TT2OFF=6432
TT3OFF=6442
TT4OFF=6452

TT10N=6424 /RESET AND ENABLE CLOCK FLAG

TTCL=6411 /CLEAR LINE SELECTION REG. (LSR), TO ZERO
TTSL=6412 /INCLUSIVE OR AC 5-11 WITH LSR 0-6
TTRL=6414 /INCLUSIVE OR LSR 0-6 WITH AC 5-11

TTINCR=6401 /INCREMENT LSR BY ONE

TTI=6402 /RECEIVE DATA
TTO=6404 /TRANSMIT DATA
```

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\*0000

```

0000 0000 0
0001 3066 INTRPT, DCA KEEPAC /STORE CONTENTS OF AC
0002 7010 RAR
0003 3060 DCA SIORL /STORE LINC BIT
0004 5020 JMP CHPTR /TEST FOR TELEPRINTER FLAG

*10
0010 0000 AUTO, 0 /TYPE ROUTINE ADDRESS COUNTER

*20
0020 6041 CHPTR, TSF /SKIP IF TELEPRINTER FLAG SET
0021 5031 JMP CHKINT
0022 6042 TCF /CLEAR TELEPRINTER FLAG

/RESUME NORMAL PROGRAM SEQUENCE
0023 7300 RNPS, CLA CLL
0024 1060 TAD STORL
0025 7004 RAL /RESTORE LINC BIT
0026 1066 TAD KEEPAC /RESTORE AC
0027 6001 ION
0030 5400 JMP I INTRPT-1 /RETURN TO NORMAL PROGRAM

/TEST INTERRUPT STATUS
0031 1061 CHKINT, TAD INTSTA
0032 7500 SMA /SKIP IF INTERRUPT EXPECTED
0033 5035 JMP STAT0 /INTERRUPT NOT EXPECTED
0034 5067 JMP CLSKP /GO TEST FOR CORRECT CLOCK FLAG

/COME HERE IF INTERRUPT NOT EXPECTED
0035 4504 STA10, JMS I ASR0 /HALT ON ERROR? (SR0 SET)
0036 5040 JMP .+2 /NO
0037 7402 HLT

/CLEAR AND DISABLE ALL 680 CLOCK FLAGS
0040 6422 TT10FF
0041 6432 TT20FF
0042 6442 TT30FF
0043 6452 TT40FF
0044 5023 JMP RNPS /RESUME NORMAL SEQUENCE

/COMMON SUBROUTINE TO ENABLE SELECTED CLOCK
0045 0000 CLKON, 0
0046 6424 TT10N /INSTRUCTION PRESET TO SPECIFIC CLOCK
0047 5445 JMP I CLKON

/COMMON SUBROUTINE TO DISABLE SELECTED CLOCK
0050 0000 CLKOFF, 0
0051 6422 TT10FF /INSTRUCTION PRESET TO SPECIFIED CLOCK
0052 5450 JMP I CLKOFF

```

```

0053 0000 BGL,      0
0054 0000 NAL,      0
0055 0000 OPMODE,   0
0056 0000 CLOCK,   0
0057 0000 STORAC,   0
0060 0000 STORL,   0
0061 0000 INTSTA,   0
0062 0000 CODE,    0
0063 0000 LUT,     0
0064 0000 ACLUT,   0
0065 0000 PHASE,   0
0066 0000 KEEPAC,  0

/COMMON SUBROUTINE TO TEST FOR SELECTED CLOCK FLAG
0067 6421 CLKSKP,   6421 /INSTRUCTION PRESET TO SPECIFIED CLOCK
0070 5073     JMP .+3 /UNIDENTIFIED INTERRUPT
0071 7300     CLA CLL /CORRECT CLOCK FLAG SET
0072 5461     JMP I INTSTA /GO SERVICE INTERRUPT
0073 4504     JMS I ASR0 /HALT ON ERROR?
0074 5076     JMP .+2 /NO
0075 7402     HLT /HALT DUE TO UNIDENTIFIED INTERRUPT

/CLEAR AND DISABLE ALL 680 CLOCK FLAGS
0076 6422     TT10FF
0077 6432     TT20FF
0100 6442     TT30FF
0101 6452     TT40FF
0102 4045     JMS CLKON /ENABLE SELECTED CLOCK
0103 5023     JMP RNPS

0104 0301 ASR0,      SR0
0105 0326 ASR1,      SR1
0106 0335 ASR2,      SR2
0107 0344 ASR3,      SR3
0110 0353 ASR5,      SR5

/REFERENCE ADDRESSES FOR TYPE ROUTINES
0111 0000 TYPCNT,   0
0112 0000 ERRNUM,   0
0113 1304 ATSTER,   TSTER
0114 1246 ACYCE,    CYCE
0115 1266 ACYCL,    CYCL
0116 1214 AFORM,    FORMAT
0117 1425 AFINIS,   FINIS

0120 0000 MINAL,    0
0121 0000 CHKCYC,   0

```

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\*200

/START HERE FOR ALL OPERATIONAL MODES  
/TAKE BASE LINE NUMBER FROM S.R. 5-11

```
0200 7604   CLA  OSR
0201 0265   AND  MSK177
0202 3053   DCA  Z BGL           /STORE BASE LINE # IN BGL
0203 1053   TAD  Z BGL           /HALT AND DISPLAY BASE LINE #
0204 7402   HLT
```

/TAKE NUMBER OF ACTIVE LINES FROM S.R. 5-11

```
0205 7604   CLA  OSR
0206 0265   AND  MSK177
0207 3054   DCA  Z NAL           /STORE # OF ACTIVE LINES IN NAL
0210 1054   TAD  Z NAL           /HALT AND DISPLAY # OF ACTIVE LINES
0211 7402   HLT
```

/TAKE OPERATIONAL MODE FROM S.R. 10 & 11 AND SELECT PROGRAM CONTROL

```
0212 7604   CLA  OSR
0213 0267   AND  MSK3
0214 3055   DCA  Z OPMODE       /STORE OPERATIONAL MODE SELECTION
0215 1055   TAD  Z OPMODE
0216 7440   SZA                /OPERATION MODE 0?
0217 5221   JMP  .+2             /NO
0220 5676   JMP  I AMODE0         /YES, ENTER MODE 0
0221 7402   HLT                /HALT AND DISPLAY OPER. MODE, (1,2 OR 3)
```

/TAKE CLOCK NUMBER FROM S.R. (CLOCK 1,2,3 OR 4)

```
0222 7604   GETCLK,   CLA  OSR
0223 0266   AND  MSK7
0224 3056   DCA  Z CLOCK       /STORE CLOCK #
```

/VERIFY THAT CLOCK 1,2,3 OR 4 IS SELECTED

```
0225 1056   TAD  Z CLOCK
0226 7440   SZA
0227 5232   JMP  .+3
0230 7402   CLOKER,   HLT           /OPERATOR SELECTED NON EXISTANT CLOCK #
0231 5222   JMP  GETCLK
0232 1272   TAD  MINUS5
0233 7700   SMA  CLA           /SKIP IF CLOCK 1-4 IS SELECTED
0234 5230   JMP  .-4
```



```

/PRESET COMMON CLOCK ENABLE, DISABLE AND SKIP INSTRUCTIONS
0235 1056 TAD Z CLOCK
0236 7106 CLL RIL
0237 7004 RAL
0240 3057 DCA Z STORAC
0241 1057 TAD Z STORAC
0242 1273 TAD FLGON /PRESET CLOCK ENABLE INSTRUCTION
0243 3046 DCA Z CLKON+1
0244 1057 TAD Z STORAC
0245 1274 TAD FLGOFF /PRESET CLOCK DISABLE INSTRUCTION
0246 3051 DCA Z CLKOFF+1
0247 1057 TAD Z STORAC
0250 1275 TAD FLGSKP /PRESET CLOCK SKIP INSTRUCTION
0251 3067 DCA Z CLKSKP
0252 1056 TAD Z CLOCK /HALT AND DISPLAY CLOCK #
0253 7402 HLT

/(SR11 (0) - 8 LEVEL CODE, SR11 (1) - 5 LEVEL CODE)
0254 7604 CLA OSR /TAKE CODE LEVEL DESIGNATION FROM S.R.
0255 0270 AND MSK1
0256 3062 DCA Z CODE /STORE CODE LEVEL DESIGNATION

/ENTER SPECIFIED OPERATIONAL MODE
0257 1055 TAD Z OPMODE
0260 1271 TAD MINUS1
0261 7440 SZA /SKIP IF OPER. MODE 1 SELECTED
0262 5264 JMP .+2
0263 5677 JMP I AMODE1 /ENTER MODE 1
0264 5700 JMP I AMODE2 /ENTER OPER. MODE 2

0265 0177 MSK177, 0177
0266 0007 MSK7, 0007
0267 0003 MSK3, 0003
0270 0001 MSK1, 0001
0271 7777 MINUS1, -0001
0272 7773 MINUS5, -0005
0273 6414 FLGON, 6414
0274 6412 FLGOFF, 6412
0275 6411 FLGSKP, 6411
0276 0400 AMODE0, MODE0
0277 2000 AMODE1, MODE1
0300 3000 AMODE2, MODE2

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```

/DECODE SWITCH REGISTER 0 AND 4
0301 0000 SR0, 0
0302 7604 CLA OSR
0303 0324 AND MSKSR0
0304 7640 SZA CLA
0305 2301 ISZ SR0 /ADD ONE TO RETURN ADDRESS IF SR0 IS SET
0306 7604 CLA OSR /DO WE SIGNAL ERROR? (SR4 SET)
0307 0325 AND MSKSR4
0310 7640 SZA CLA
0311 5313 JMP .+2 /YES
0312 5701 JMP I SR0 /NO
0313 6002 IOF
0314 1323 TAD BELL
0315 6046 TLS /RING BELL
0316 6041 TSF /SKIP ON TELEPRINTER FLAG
0317 5316 JMP .-1
0320 7300 CLA CLL
0321 6001 ION
0322 5701 JMP I SR0

```

```

0323 0207 BELL, 0207
0324 4000 MSKSR0, 4000
0325 0200 MSKSR4, 0200

```

```

/DECODE SWITCH REGISTER 1
0326 0000 SR1, 0
0327 7604 CLA OSR
0330 0334 AND MSKSR1
0331 7640 SZA CLA
0332 2326 ISZ SR1
0333 5726 JMP I SR1
0334 2000 MSKSR1, 2000

```

```

/DECODE SWITCH REGISTER 2
0335 0000 SR2, 0
0336 7604 CLA OSR
0337 0343 AND MSKSR2
0340 7640 SZA CLA
0341 2335 ISZ SR2
0342 5735 JMP I SR2
0343 1000 MSKSR2, 1000

```

```

/DECODE SWITCH REGISTER 3
0344 0000 SR3, 0
0345 7604 CLA OSR
0346 0352 AND MSKSR3
0347 7640 SZA CLA
0350 2344 ISZ SR3
0351 5744 JMP I SR3
0352 0400 MSKSR3, 0400

```

```
      /DECODE SWITCH REGISTER 5
0353 0000 SR5,      0
0354 7604      CLA  OSR
0355 0361      AND  MSKSR5
0356 7640      SZA  CLA
0357 2353      ISZ  SR5
0360 5753      JMP  I SR5
0361 0100 MSKSR5,  0100
```

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/OPERATIONAL MODE 0, [ACTIVE LINES JUMPERED INPUT-OUTPUT]
0400 7301  MODE0,      CLA CLL IAC
0401 3065      DCA Z PHASE      /PRESET PHASE COUNT TO ONE
0402 3061      DCA Z INTSTA     /RESET INTERRUPT STATUS
0403 6001  PHASE1,      ION
0404 6411      TTCL          /RESET LSR TO ZERO
0405 1235  PHAS12,      TAD M200
0406 3121      DCA Z CHKCYC     /PRESET PROGRAM LSR CYCLE COUNTER

0407 1247  SCAN,        TAD PR4003
0410 3214      DCA TTI1+1     /PRESET LSW TO SAMPLE DATA LINE
0411 3215      DCA TTI1+2     /RESET CAW

0412 6401      TTINCR         /+1 TO LSR

0413 6402  TTI1,        TTI          /SAMPLE INPUT DATA LINE
0414 4003      4003           /LSW
0415 0000      0000           /CAW

0416 6414      TTRL
0417 3063      DCA Z LUT          /STORE NUMBER OF LINE UNDER TEST

/DETERMINE IF DATA LINE WAS MARK OR SPACE
0420 1215      TAD TTI1+2     /GET CAW
0421 7700      SMA CLA        /SKIP IF DATA LINE AT MARK
0422 5236      JMP LNSPCE     /LINE IS AT SPACE

/LINE IS MARK, CHECK PHASE COUNT
0423 1065      TAD Z PHASE
0424 1234      TAD MNUS1
0425 7450      SNA            /SKIP IF AC NOT ZERO
0426 5250      JMP MRKPH1
0427 1234      TAD MNUS1
0430 7450      SNA            /SKIP ON NON-ZERO AC
0431 5633      JMP I AMKPH2
0432 7402      HLT            /PROGRAM DEBUG HALT

0433 0633  AMKPH2,      MRKPH2
0434 7777  MNUS1,      -0001
0435 7600  M200,       -0200

/LINE IS AT SPACE, CHECK PHASE COUNT
0436 1065  LNSPCE,     TAD Z PHASE
0437 1234      TAD MNUS1
0440 7450      SNA            /SKIP ON NON-ZERO AC
0441 5326      JMP SPCPH1
0442 1234      TAD MNUS1
0443 7450      SNA
0444 5646      JMP I ASPH2
0445 7402      HLT            /PROGRAM DEBUG HALT

0446 0721  ASPH2,      SPCPH2
0447 4003  PR4003,     4003

```

```

/ DATA LINE IS AT MARK, PHASE 1
0450 4505 MRKPH1,      JMS I Z ASR1      /SCOPE LOOP? (SR1 SET)
0451 5253      JMP .+2          /NO
0452 5341      JMP SCOPE1        /YES
0453 2121      ISZ Z CHKCYC      /+1 TO LSR CYCLE COUNTER
0454 7000      NOP
0455 1063      TAD Z LUT          /GET PRESENT LINE NUMBER
0456 7640      SZA CLA          /LINE 0?
0457 5310      JMP SCANON       /NO, CONTINUE SCAN
0460 1121      TAD Z CHKCYC      /HAS PROGRAM LSR COUNTER CYCLED?
0461 7650      SNA CLA          /SKIP IF LSR COUNTER NOT 0
0462 5277      JMP EXPH1        /EXIT FROM PHASE 1

/LSR HAS CYCLED EARLY
0463 4507      JMS I Z ASR3      /SHOULD WE REPORT CYCLE ERROR?
0464 5273      JMP HLTPH1       /NO

/REPORT EARLY CYCLE ERROR
0465 4514      JMS I Z ACYCE
0466 1121      TAD Z CHKCYC
0467 1307      TAD C200          /AC CONTAINS CORRECT LINE NUMBER
0470 4516      JMS I Z AFORM      /TYPE CORRECT LINE NUMBER
0471 1063      TAD Z LUT          /AC CONTAINS ACTUAL LINE # (000)
0472 4516      JMS I Z AFORM      /TYPE ACTUAL LINE #

0473 4504      HLTPH1,      JMS I Z ASR0      /DO WE HALT ON ERROR? (SR0 SET)
0474 5203      JMP PHASE1      /NO, REPEAT PHASE 1 TEST
0475 7402      CYER1,      HLT          /YES - AC=1 - LSR CYCLING LATE
0476 5203      JMP PHASE1      / AC=0 -LSR CYCLED EARLY

/LSR CYCLED CORRECTLY - EXIT FROM PHASE 1
0477 4507      EXPH1,      JMS I Z ASR3      /SHOULD WE REPORT PHASE 1 COMPLETE?
0500 5302      JMP EXPH1A     /NO

/REPORT PHASE 1 COMPLETE
0501 4517      JMS I Z AFINIS

0502 4506      EXPH1A,      JMS I Z ASR2      /SHALL WE REPEAT PHASE 1?
0503 5305      JMP .+2          /NO
0504 5203      JMP PHASE1        /YES

0505 5706      JMP I APHSE2     /ENTER PHASE 2 TEST

0506 0600      APHSE2,      PHASE2
0507 0200      C200,      0200

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```

/PHASE 1 - SAMPLE NEXT DATA LINE
0510 1121 SCANON, TAD Z CHKCYC
0511 7640 SZA CLA /HAS LSR COUNTER REACHED ZERO?
0512 5207 JMP SCAN /NO, SAMPLE NEXT LINE

/LSR IS CYCLING LATE
0513 4507 JMS I Z ASR3 /SHOULD WE REPORT CYCLE ERROR?
0514 5322 JMP .+6 /NO

/REPORT LSR CYCLING LATE
0515 4515 JMS I Z ACYCL
0516 1121 TAD Z CHKCYC
0517 4516 JMS I Z AFORM /TYPE CORRECT LINE NUMBER
0520 1063 TAD Z LUT
0521 4516 JMS I Z AFORM /TYPE ACTUAL LINE NUMBER

0522 4504 JMS I Z ASR0 /HALT ON ERROR?
0523 5203 JMP PHASE1 /NO, REPEAT PHASE1 TEST
0524 7001 IAC /YES, HALT WITH AC = 1
0525 5275 JMP HLT PH1+2

/DATA LINE IS AT A SPACE, PHASE 1
0526 7301 SPCPH1, CLA CLL IAC
0527 3112 DCA Z ERRNUM /ERROR TYPE 1
0530 4507 JMS I Z ASR3 /REPORT ERROR?
0531 5335 JMP .+4 /NO
0532 4513 JMS I Z ATSTER /YES - TYPE ERROR
0533 1063 TAD Z LUT
0534 4516 JMS I Z AFORM /TYPE LINE NUMBER

0535 4504 JMS I Z ASR0 /HALT ON ERROR?
0536 5341 JMP SCOPE1 /NO
0537 1063 TAD Z LUT /YES
0540 7402 M0P1E1, HLT /HALT WITH LINE NUMBER IN AC

/CONTINUE PHASE 1 TEST OR PHASE 2 TEST
0541 7301 SCOPE1, CLA CLL IAC /AC = 1
0542 6404 TTO /TRY TO SET DATA LINE TO A MARK
0543 1247 TAD PR4003
0544 3214 DCA TII1+1
0545 3215 DCA TII1+2 /PRESET LSW AND CAW
0546 5213 JMP TII1 /RETEST SAME DATE LINE

```

PAUSE

/680 DCS DATA AND CONTROL TESTS - TAPE 2

\*600

/ENTER PHASE 2 TEST, (ALL DATA LINES AT MARK)

/(OP MODE 0)

0600	7301	PHASE2,	CLA CLL IAC	
0601	7001	IAC	/AC = 2	
0602	3065	DCA Z PHASE		
0603	1053	TAD Z BGL	/PRESET ACTIVE LINE DESIGNATOR	
0604	3064	DCA Z ACLUT		
0605	1054	TAD Z NAL	/PRESET ACTIVE LINE COUNTER	
0606	7041	CIA		
0607	3120	DCA Z MINAL		
0610	6001	CYCPH2,	ION	
0611	1064	TAD Z ACLUT	/GET NUMBER OF LINE TO BE TESTED	
0612	6413	6413	/CLEAR AND LOAD LINE SEL. REG.	
0613	1230	TAD K7776		
0614	6404	TTO	/SET DATA LINE TO A SPACE	
0615	4505	JMS I Z ASR1	/SCOPE LOOP?	
0616	5631	JMP I APHS12	/NO, GO TEST ALL LINES	
0617	1232	TAD PS4003		
0620	3223	DCA STTI+1		
0621	3224	DCA STTI+2		
0622	6402	STTI,	TTI	/SAMPLE DATA LINE
0623	4003	4003		
0624	0000	0		
0625	7201	CLA IAC	/YES, AC = 1	
0626	6404	TTO	/SET DATA LINE TO MARK	
0627	5210	JMP CYCPH2	/AC SHOULD CONTAIN 0	
0630	7776	K7776,	7776	
0631	0405	APHS12,	PHAS12	
0632	4003	PS4003,	4003	

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/ DATA LINE IS AT MARK, PHASE 2
0633 2121 MRKPH2,      ISZ Z CHKCYC      /+1 TO LSR CYCLE COUNTER
0634 7000      NOP
0635 1063      TAD Z LUT
0636 7041      CIA
0637 1064      TAD Z ACLUT      /SHOULD THIS LINE BE AT A SPACE?
0640 7640      SZA CLA          /SKIP IF LUT = ACLUT
0641 5243      JMP .+2
0642 5264      JMP ERR21          /ERROR, DATA LINE SHOULD BE AT SPACE
0643 1121      TAD Z CHKCYC      /SHOULD LSR HAVE CYCLED?
0644 7640      SZA CLA
0645 5663      JMP I ASCAN      /NO, SAMPLE NEXT DATA LINE

/LSR CYCLING LATE - PHASE 2
0646 4507      JMS I Z ASR3      /REPORT CYCLE ERROR?
0647 5255      JMP HLTP2B      /NO
0650 4515      JMS I Z ACYCL      /YES
0651 1064      TAD Z ACLUT
0652 4516      JMS I Z AFORM      /TYPE CORRECT LINE #
0653 1063      TAD Z LUT
0654 4516      JMS I Z AFORM      /TYPE ACTUAL LINE #

0655 4504      HLTP2B,      JMS I Z ASR0      /HALT ON ERROR?
0656 5210      JMP CYCPH2      /NO, RETEST SAME LINE
0657 7301      CLA CLL IAC      /YES
0660 7402      CYER2L,      HLT          /AC = 1 - LSR CYCLING LATE
0661 7300      CLA CLL
0662 5210      JMP CYCPH2
0663 0407      ASCAN,      SCAN

```



/DATA LINE WASN'T AT A SPACE - PHASE 2 ERROR 1

```

0664 7001 ERR21,      IAC
0665 3112      DCA Z ERRNUM      /ERRNUM = 1
0666 4507      JMS I Z ASR3      /REPORT ERROR?
0667 5273      JMP .+4          /NO
0670 4513      JMS I Z ATSTER   /TYPE ERROR REPORT
0671 1064      TAD Z ACLUT
0672 4516      JMS I Z AFORM    /TYPE LINE NUMBER FAILING TEST
    
```

/CHECK FOR POSSIBLE LSR CYCLE ERROR

```

0673 1121      TAD Z CHKCYC
0674 7640      SZA CLA          /SKIP IF LSR CYCLED CORRECTLY
0675 5303      JMP .+6          /LSR CYCLED EARLY
0676 4504      JMS I Z ASR0     /HALT ON ERROR?
0677 5210      JMP CYCPH2     /RETEST SAME LINE
0700 7402      M0P2E1,      HLT          /HALT - AC = 0 - ERROR 1
0701 7300      CLA CLL          /AC = 1 - ERROR 1 AND EARLY CYCLE ERROR
0702 5210      JMP CYCPH2
0703 4507      JMS I Z ASR3     /REPORT CYCLE ERROR?
0704 5314      JMP HLTP2A     /NO
0705 4514      JMS I Z ACYCE    /REPORT EARLY LSR CYCLE
0706 1064      TAD Z ACLUT
0707 1121      TAD Z CHKCYC
0710 0320      AND K177          /AC = CORRECT LINE #
0711 4516      JMS I Z AFORM    /TYPE CORRECT LINE #
0712 1063      TAD Z LUT        /LUT = ACLUT
0713 4516      JMS I Z AFORM    /TYPE ACTUAL LINE #
    
```

```

0714 4504      HLTP2A,      JMS I Z ASR0   /HALT ON ERROR?
0715 5210      JMP CYCPH2     /NO
0716 7101      IAC CLL        /+1 TO AC
0717 5300      JMP M0P2E1
    
```

```

0720 0177      K177,      0177
    
```

/DATA LINE IS AT SPACE, PHASE 2

```

0721 2121      SPCPH2,      ISZ Z CHKCYC   /+1 TO LSR CYCLE COUNTER
0722 7000      NOP
0723 1063      TAD Z LUT
0724 7041      CIA
0725 1064      TAD Z ACLUT     /IS THIS THE CORRECT LINE?
0726 7640      SZA CLA
0727 5757      JMP I AERR2     /ERROR, LINE SHOULD BE MARK
    
```

/CORRECT DATA LINE AT SPACE

```

0730 1121      TAD Z CHKCYC   /CHECK LSR CYCLE COUNTER FOR ZERO
0731 7640      SZA CLA
0732 5342      JMP CYER22          /LSR CYCLE EARLY
0733 7001      IAC
0734 6404      TTO          /SET DATA LINE TO MARK
0735 2120      ISZ Z MINAL     /HAVE ALL ACTIVE LINES BEEN TESTED?
0736 5340      JMP .+2          /NO
0737 5360      JMP EXPH2          /YES, EXIT FROM PHASE 2
    
```

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```

/TEST NEXT ACTIVE LINE
0740 2064      ISZ Z ACLUT
0741 5210      JMP CYCPH2

0742 4507  CYER22,      JMS I Z ASR3      /REPORT CYCLE ERROR?
0743 5353      JMP HLTP2C      /NO
0744 4514      JMS I Z ACYCE      /REPORT EARLY CYCLE ERROR
0745 1064      TAD Z ACLUT
0746 1121      TAD Z CHKCYC
0747 0320      AND K177
0750 4516      JMS I Z AFORM      /TYPE CORRECT LINE #
0751 1063      TAD Z LUT
0752 4516      JMS I Z AFORM      /TYPE ACTUAL LINE # (ACLUT)

0753 4504  HLTP2C,      JMS I Z ASR0      /HALT ON ERROR?
0754 5210      JMP CYCPH2      /RETEST SAME LINE
0755 7402  CYER2E,      HLT
0756 5210      JMP CYCPH2      /PHASE 2, EARLY CYCLE ERROR

0757 1445  AERR22,      ERR22

/EXIT FROM PHASE 2
0760 4507  EXPH2,      JMS I Z ASR3      /REPORT PHASE 2 COMPLETE?
0761 5363      JMP EXPH2A      /NO

/REPORT PHASE 2 COMPLETE
0762 4517      JMS I Z AFINIS

0763 4506  EXPH2A,      JMS I Z ASR2      /SHALL WE REPEAT PHASE 2?
0764 5366      JMP .+2      /NO
0765 5203      JMP PHASE2+3      /YES
0766 5767      JMP I APHSE3      /ENTER PHASE 2 TEST

0767 1000  APHSE3,      PHASE3

```

\*1000

/ENTER PHASE 3 TEST, (OP MODE 0)

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1000 7301 PHASE3,      CLA CLL IAC
1001 7001      IAC
1002 7001      IAC          /AC = 3
1003 3065      DCA Z PHASE

      /SET ALL ACTIVE DATA LINES TO A SPACE
1004 1054 VERPT,      TAD Z NAL          /NUMBER OF LINES TO BE TESTED
1005 7041      CIA
1006 3120      DCA Z MINAL
1007 1053      TAD Z BGL          /FIRST LINE TO BE TESTED
1010 6413      6413          /CLEAR AND LOAD LSR FROM AC

1011 6404      TTO          /SET DATA LINE TO SPACE
1012 6401      TTINCR       /+1 TO LSR
1013 2120      ISZ MINAL     /HAVE ALL ACTIVE LINES BEEN SET TO SPACE?
1014 5211      JMP .-3       /NO

      /NOW VERIFY THAT EACH DATA LINE CAN BE SET TO MARK
1015 1054      TAD Z NAL
1016 7041      CIA
1017 3120      DCA Z MINAL     /PRESET LINE UNDER TEST COUNTER
1020 1053      TAD Z BGL
1021 3064      DCA Z ACLUT     /STORE FIRST LINE NUMBER
1022 1054      NXTLIN,      TAD Z NAL
1023 7041      CIA
1024 3277      DCA CNTAL       /PRESET ACTIVE LINE COUNTER
1025 3300      DCA DONE3       /CLEAR DONE FLAG
1026 1064      TAD Z ACLUT     /LINE # TO AC
1027 6413      CLRLOD,      6413     /CLEAR AND LOAD LSR FROM AC, THEN 0 TO AC

1030 7001      IAC          /AC = 1
1031 6404      TTO          /SET LINE TO MARK

1032 4505      JMS I Z ASR1     /SCOPE MODE LOOP?
1033 5236      JMP .+3         /NO
1034 6404      TTO          /YES, ALTERNATELY SET LINE TO SPACE & MARK
1035 5230      JMP CLRLOD+1     /LOOP
1036 1053      TAD Z BGL       /GET BASE LINE #
1037 6413      6413          /CLEAR AND LOAD LSR, THEN 0 TO AC
1040 5242      JMP .+2         /DON'T INCREMENT LSR
1041 6401      INCLSR,      TTINCR     /+1 TO LSR
1042 1301      TAD PRLSW2
1043 3246      DCA LSW2       /PRESET LSW TO 4003
1044 3247      DCA CAW2       /CLEAR CAW

1045 6402      TTI          /SAMPLE DATA LINE
1046 4003      LSW2,      4003
1047 0000      CAW2,      0

1050 6414      TTRL
1051 3063      DCA Z LJT       /STORE NUMBER OF LINE SAMPLED
1052 2277      ISZ CNTAL     /IS THIS THE LAST ACTIVE LINE?
1053 5255      JMP .+2         /NO
1054 2300      ISZ DONE3     /YES, SET DONE3 = TO 1

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/WAS DATA LINE A MARK OR SPACE?
1055 1247      TAD CAW2
1056 7700      SMA CLA           /SKIP IF DATA LINE WAS MARK
1057 5271      JMP DATSPC          /NO, DATA LINE WAS SPACE

/DAIA LINE WAS MARK
1060 1063      TAD Z LUT
1061 7041      CIA
1062 1064      TAD Z ACLUT          /IS THIS THE LINE THAT WAS SET TO MARK?
1063 7640      SZA CLA           /SKIP IF YES
1064 5337      JMP ERR31              /ERROR HAS OCCURRED

/CHECK DONE3 FLAG
1065 1300      ARWEDN,      TAD DONE3
1066 7640      SZA CLA           /ARE WE FINISHED WITH ONE SCAN?
1067 5302      JMP SCNDON          /YES
1070 5241      JMP INCLSR          /NO, SCAN NEXT LINE

/DAIA LINE WAS SPACE
1071 1063      DATSPC,      TAD Z LUT
1072 7041      CIA
1073 1064      TAD Z ACLUT          /SHOULD THIS LINE BE A SPACE?
1074 7650      SNA CLA           /SKIP IF YES
1075 5361      JMP ERR32              /ERROR HAS OCCURRED
1076 5265      JMP ARWEDN          /CHECK DONE3 FLAG

1077 0000      CNTAL,      0
1100 0000      DONE3,      0
1101 4003      PRLSW2,     4003

/ONE SCAN OF ACTIVE LINES IS COMPLETE
1102 1064      SCNDON,      TAD Z ACLUT
1103 6413      6413          /CLEAR AND LOAD LSR, 0 TO AC

1104 6404      TTD          /RESET DATA LINE TO SPACE

1105 2120      ISZ Z MINAL          /HAVE ALL LINES BEEN TESTED?
1106 5310      JMP .+2            /NO
1107 5312      JMP EXPH3              /YES, EXIT FROM PHASE 3
1110 2064      ISZ Z ACLUT
1111 5222      JMP NXTLIN          /TEST NEXT LINE

/ALL SPECIFIED LINES HAVE BEEN TESTED
1112 1054      EXPH3,      TAD Z NAL
1113 7041      CIA
1114 3120      DCA Z MINAL
1115 1053      TAD Z BGL
1116 6413      6413          /CLEAR AND LOAD LSR, 0 TO AC

1117 7001      IAC          /AC = 1
1120 6404      TTD          /SET ALL ACTIVE DATA LINES TO MARK

1121 6401      TTINCR          /+1 TO LSR
1122 2120      ISZ Z MINAL          /ARE ALL LINES AT MARK?
1123 5317      JMP .-4            /NO

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```

/EXIT FROM PHASE 3
1124 4507      JMS I Z ASR3      /REPORT PHASE 3 COMPLETE?
1125 5327      JMP .+2          /NO

1126 4517      JMS I Z AFINIS   /YES

1127 4506      JMS I Z ASR2      /SHALL WE REPEAT PHASE 3?
1130 5332      JMP .+2          /NO
1131 5204      JMP VERPT          /YES
1132 4510      JMS I Z ASR5      /HALT AT COMPLETION OF PHASE 3?
1133 5736      JMP I APHSE1     /NO, ENTER PHASE 1 TEST
1134 7402      ENDMD0,      HLT          /MODE 0 TESTS COMPLETE
1135 5736      JMP I APHSE1

1136 0400      APHSE1,      MODE0

/INCORRECT DATA LINE AT MARK
1137 7001      ERR31,      IAC
1140 3112      DCA Z ERRNUM     /ERROR 1
1141 4507      JMS I Z ASR3     /REPORT ERROR?
1142 5350      JMP .+6          /NO
1143 4513      JMS I Z ATSTER   /TYPE ERROR REPORT
1144 1064      TAD Z ACLUT
1145 4516      JMS I Z AFORM     /TYPE CORRECT LINE #
1146 1063      TAD Z LUT
1147 4516      JMS I Z AFORM     /TYPE INCORRECT LINE #

1150 4504      JMS I Z ASR0     /HALT ON ERROR?
1151 5353      JMP .+2          /NO
1152 7402      M0P3E1,      HLT          /WRONG DATA LINE AT MARK
1153 6404      TTO              /SET DATA LINE TO SPACE
1154 1277      TAD CNTAL
1155 1375      TAD MINONE       /-1 FROM CNTAL
1156 3277      DCA CNTAL
1157 3300      DCA DONE3        /CLEAR DONE FLAG
1160 5242      JMP INCLSR+1     /VERIFY THAT DATA LINE IS SPACE

/LINE UNDER TEST WASN'T SET TO MARK
1161 7001      ERR32,      IAC
1162 7001      IAC
1163 3112      DCA Z ERRNUM     /ERROR 2

1164 4507      JMS I Z ASR3     /REPORT ERROR?
1165 5371      JMP .+4          /NO
1166 4513      JMS I Z ATSTER   /TYPE ERROR REPORT
1167 1064      TAD Z ACLUT
1170 4516      JMS I Z AFORM     /TYPE # OF LINE FAILING TEST

1171 4504      JMS I Z ASR0     /HALT ON ERROR?
1172 5222      JMP NXTLIN       /NO, REPEAT TEST WITH SAME LINE
1173 7402      M0P3E2,      HLT          /CAN'T SET DATA LINE FROM SPACE TO MARK
1174 5222      JMP NXTLIN       /REPEAT TEST WITH SAME LINE

1175 7777      MINONE,      -0001
    
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\*1200

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/SUBROUTINE TO TYPE STATUS REPORTS
1200 0000 TEXT, 0
1201 6002 IOF
1202 7300 CLA CLL
1203 1410 TAD I Z AUTO /GET CHARACTER TO TYPE
1204 6046 TLS
1205 6041 TSF /WAIT FOR FLAG
1206 5205 JMP .-1
1207 2111 ISZ Z TYPCNT /ARE ALL CHARACTERS TYPED?
1210 5202 JMP TEXT+2 /NO
1211 7300 CLA CLL /YES, RETURN TO PROGRAM
1212 6001 ION
1213 5600 JMP I TEXT

/SUBROUTINE TO FORMAT OCTAL LINE NUMBER
1214 0000 FORMAT, 0
1215 3302 DCA WORK /STORE BINARY LINE NUMBER
1216 1302 TAD WORK
1217 0303 AND OCTMSK
1220 1276 TAD C260 /CONVERT TO ASCII CODE
1221 3350 DCA LINHI+2 /STORE LOW ORDER
1222 1302 TAD WORK
1223 7012 RTR
1224 7010 RAR
1225 3302 DCA WORK
1226 1302 TAD WORK
1227 0303 AND OCTMSK
1230 1276 TAD C260
1231 3347 DCA LINHI+1 /STORE MID ORDER
1232 1302 TAD WORK
1233 7012 RTR
1234 7010 RAR
1235 0303 AND OCTMSK
1236 1276 TAD C260
1237 3346 DCA LINHI /STORE HIGH ORDER

/TYPE RESULTING LINE #
1240 1351 TAD ALINE
1241 3010 DCA Z AUTO /PRESET TYPE ADDRESS
1242 1352 TAD MLINE
1243 3111 DCA Z TYPCNT /PRESET NUMBER OF CHARACTERS
1244 4200 JMS TEXT
1245 5614 JMP I FORMAT

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1246 0000 /SUBROUTINE TO FORMAT CYCLE ERROR REPORT
      CYCE, 0 /EARLY CYCLE ERROR
1247 7300 CLA CLL
1250 1055 TAD Z OPMODE /SPECIFY MODE
1251 1276 TAD C260 /CONVERT OPMODE TO ASCII
1252 3327 DCA CYCERR+2 /SPECIFY MODE
1253 1065 TAD Z PHASE
1254 1276 TAD C260
1255 3330 DCA CYCERR+3 /SPECIFY PHASE
1256 1336 MODCYC, TAD CYCERR+11 /GET E OR L
1257 3341 DCA CYCERR+14 /SPECIFY EARLY CYCLE
1260 1342 TAD ACYCER
1261 3010 DCA Z AUTO /PRESET TYPE ADDRESS
1262 1343 TAD MNCYCER
1263 3111 DCA Z TYPCNT /PRESET NUMBER OF CHARACTERS
1264 4200 JMS TEXT
1265 5646 JMP I CYCE

```

```

1266 0000 CYCL, 0 /LATE CYCLE ERROR
1267 7300 CLA CLL
1270 1277 TAD MODL
1271 3256 DCA MODCYC
1272 4246 JMS CYCE
1273 1300 TAD MODE
1274 3256 DCA MODCYC
1275 5666 JMP I CYCL

```

```

1276 0260 C260, 0260
1277 1301 MODL, TAD LETRL
1300 1336 MODE, TAD CYCERR+11
1301 0314 LETRL, 0314 /L
1302 0000 WORK, 0
1303 0007 OCTMSK, 0007

```

```

1304 0000 /SUBROUTINE TO FORMAT TEST FAILURE REPORT
      TSTER, 0
1305 7300 CLA CLL
1306 1055 TAD Z OPMODE /SPECIFY MODE
1307 1276 TAD C260
1310 3355 DCA FAIL+2
1311 1065 TAD Z PHASE /SPECIFY PHASE
1312 1276 TAD C260
1313 3356 DCA FAIL+3
1314 1112 TAD Z ERRNUM /SPECIFY ERROR TYPE
1315 1276 TAD C260
1316 3367 DCA FAIL+14
1317 1370 TAD AFAIL
1320 3010 DCA Z AUTO /PRESET TYPE ADDRESS
1321 1371 TAD MFAIL
1322 3111 DCA Z TYPCNT /PRESET NUMBER OF CHARACTERS
1323 4200 JMS TEXT
1324 5704 JMP I TSTER

```

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```
/CYCLE ERROR REPORT
1325 0215 CYCERR, 0215 /CR
1326 0212 0212 /LF
1327 0000 0 /MODE
1330 0000 0 /PHASE
1331 0240 0240 /SPACE
1332 0240 0240 /SPACE
1333 0303 0303 /C
1334 0331 0331 /Y
1335 0303 0303 /C
1336 0305 0305 /E
1337 0322 0322 /R
1340 0240 0240 /SPACE
1341 0000 0 /E OR L

1342 1324 ACYCER, CYCERR-1
1343 7763 MCYCER, -0015
```

/CORRECT LINE # AND ACTUAL LINE #

```
1344 0240 LINE, 0240 /SPACE
1345 0240 0240 /SPACE
1346 0000 LINHI, 0 /HIGH ORDER LINE #
1347 0000 0 /MID ORDER LINE #
1350 0000 0 /LOW ORDER LINE #

1351 1343 ALINE, LINE-1
1352 7773 MLINE, -0005
```

/TEST FAILURE REPORT

```
1353 0215 FAIL, 0215 /CR
1354 0212 0212 /LF
1355 0000 0 /MODE
1356 0000 0 /PHASE
1357 0240 0240 /SPACE
1360 0240 0240 /SPACE
1361 0305 0305 /E
1362 0322 0322 /R
1363 0322 0322 /R
1364 0317 0317 /D
1365 0322 0322 /R
1366 0240 0240 /SPACE
1367 0000 0 /ERROR NUMBER

1370 1352 AFAIL, FAIL-1
1371 7763 MFAIL, -0015
```



\*1400

```

/TEST COMPLETE REPORT
1400 0215 DONE,      0215      /CR
1401 0212      0212      /LF
1402 0000      0      /MODE
1403 0000      0      /PHASE
1404 0240      0240      /SPACE
1405 0240      0240      /SPACE
1406 0324      0324      /T
1407 0305      0305      /E
1410 0323      0323      /S
1411 0324      0324      /T
1412 0240      0240      /SPACE
1413 0303      0303      /C
1414 0317      0317      /0
1415 0315      0315      /M
1416 0320      0320      /P
1417 0314      0314      /L
1420 0305      0305      /E
1421 0324      0324      /T
1422 0305      0305      /E

```

```

1423 1377 ADONE,      DONE-1
1424 7755 MDONE,      -0023

```

```

/SUBROUTINE TO FORMAT TEST COMPLETE REPORT
1425 0000 FINIS,      0
1426 7300      CLA CLL
1427 1055      TAD Z OPMODE
1430 1244      TAD K260      /SPECIFY MODE
1431 3202      DCA DONE+2
1432 1065      TAD Z PHASE
1433 1244      TAD K260      /SPECIFY PHASE
1434 3203      DCA DONE+3
1435 1223      TAD ADONE      /PRESET TYPE ADDRESS
1436 3010      DCA Z AUTO
1437 1224      TAD MDONE      /PRESET NUMBER OF CHARACTERS
1440 3111      DCA Z TYP CNT
1441 4643      JMS I ATEXT
1442 5625      JMP I FINIS

1443 1200 ATEXT,      TEXT
1444 0260 K260,      0260

```

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```

/PHASE 2 TEST - DATA LINE INCORRECTLY AT SPACE
1445 7301 ERR22,      CLA CLL IAC
1446 7001      IAC          /AC = 2
1447 3112      DCA Z ERRNUM /ERROR TYPE 2
1450 4507      JMS I Z ASR3  /REPORT ERROR?
1451 5257      JMP HP2ER2    /NO
1452 4513      JMS I Z ATSTER /YES
1453 1064      TAD Z ACLUT
1454 4516      JMS I Z AFORM  /TYPE CORRECT LINE #
1455 1063      TAD Z LUT
1456 4516      JMS I Z AFORM  /TYPE ACTUAL LINE #

1457 4504 HP2ER2,      JMS I Z ASR0  /HALT ON ERROR?
1460 5262      JMP .+2      /NO
1461 7402 M0P2E2,      HLT          /ERROR 2, PHASE 2
1462 1267      TAD KMIN1
1463 1121      TAD Z CHKCYC  /RETEST SAME LINE
1464 3121      DCA Z CHKCYC
1465 5666      JMP I ASCPE1

1466 0541 ASCPE1,      SCOPE1
1467 7777 KMIN1,      -0001
```

PAUSE

/680 DCS DATA AND CONTROL TESTS - TAPE 3  
 /MODES 1 & 2 - PAGE 0 CONSTANTS

		*11		
0011	0000	AUTO2,	0	/TRANSMIT ADDRESS POINTER
		*125		
0125	0000	CLKCNT,	0	
0126	0000	STRIBT,	0	
0127	0000	ROTBUF,	0	
0130	0000	DATOUT,	0	
0131	0000	CASMBL,	0	
0132	0000	OUTBUF,	0	
0133	0000	ERFLG1,	0	
0134	0000	ERFLG2,	0	
0135	0000	ERFLG3,	0	
0136	0000	PH1LUT,	0	
0137	0000	BITCNT,	0	
0140	0000	DONFLG,	0	
0141	0000	CLRPGE,	0	

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\*2000

```

/OPERATIONAL MODES 1 & 2 - TRANSMIT DATA
2000 7301  MODE1,      CLA CLL IAC
2001 3065      DCA Z PHASE      /PRESET PHASE COUNT TO ONE
2002 1054      TAD Z NAL
2003 7041      CIA
2004 3120      DCA Z MINAL      /STORE NUMBER OF ACTIVE LINES
2005 1053      TAD Z BGL
2006 3064      DCA Z ACLUT      /STORE BASE LINE #
2007 7001  RETRNS,      IAC
2010 3126      DCA Z STRTBT     /PRESET START BIT INDICATOR
2011 3125      DCA Z CLKCNF     /RESET CLOCK INTERRUPT COUNTER

2012 1055      TAD Z OPMODE
2013 1271      TAD MONE
2014 7640      SZA CLA          /SKIP IF OPMODE 1 SELECTED
2015 5227      JMP PRDATA      /OPMODE 2 WAS SELECTED
2016 1062      TAD Z CODE       /CHECK FOR CODE LEVEL
2017 7640      SZA CLA          /SKIP IF 8 LEVEL CODE SELECTED
2020 5224      JMP PRLVL5
2021 1272      TAD ADAT8
2022 3011      DCA Z AUT02      /TRANSMIT 8 LEVEL CODE TEXT
2023 5233      JMP ALLDAT

2024 1273  PRLVL5,      TAD ADAT5
2025 3011      DCA Z AUT02      /TRANSMIT 5 LEVEL CODE. TEXT
2026 5233      JMP ALLDAT

2027 1274  PRDATA,      TAD ADATA
2030 3011      DCA Z AUT02      /TRANSMIT ECHO DATA
2031 1240      TAD KTWO
2032 3065      DCA Z PHASE
2033 1275  ALLDAT,      TAD INTAD1
2034 3061      DCA Z INTSTA     /PRESET INTERRUPT ROUTINE ADDRESS POINTER
2035 4045      JMS Z CLKON      /ENABLE SELECTED CLOCK
2036 6001      ION
2037 5237      JMP .

2040 0002  KTWO,        0002

/TRANSMIT - START BIT ON DATA LINE
2041 7300  FSTPAS,      CLA CLL
2042 1270      TAD MIN177      /LSR CONTAINS ACTIVE LINE #
2043 3277      DCA DUNCNT
2044 1276      TAD LSWPR
2045 3251      DCA TRLSW      /PRESET TEST TTI LINE STATUS WORD
2046 3252      DCA TRLSW+1     /CLEAR TEST TTI CHAR. ASSEMBLY WORD

2047 6401      TTINCR          /+1 TO LSR

2050 6402      TTI              /SAMPLE STATE OF DATA LINE
2051 4003  TRLSW,        4003      /LINE STATUS WORD
2052 0000      0              /CHARACTER ASSEMBLY WORD

2053 6414      TTRL
2054 3063      DCA Z LUT          /STORE LINE # BEING SAMPLED

```

```

/ALL DATA LINES EXCEPT ACTIVE LINE SHOULD BE MARK
2055 1252 TAD TRLSW+1
2056 7700 SMA CLA /SKIP IF DATA LINE WAS MARK
2057 5263 JMP SPCERR /RECORD ERROR

2060 2277 ISZ DONCNT /SKIP IF ALL LINES TESTED
2061 5244 JMP FSTPAS+3 /NO, TEST NEXT LINE

2062 5262 WAIT1, JMP . /TEST COMPLETE, WAIT FOR NEXT CLOCK INTERRUPT

2063 7001 SPCERR, IAC
2064 3133 DCA Z ERFLG1 /SET ERROR FLAG 1
2065 1063 TAD Z LUT
2066 3136 DCA Z PH1LUT /STORE LINE # OF DETECTED AT SPACE
2067 5262 JMP WAIT1

2070 7601 MIN177, -0177
2071 7777 MONE, -0001
2072 2377 ADAT0, DAT0-1
2073 2577 ADAT5, DAT5-1
2074 3177 ADATA, DATA-1
2075 4000 INTAD1, OUTPUT
2076 4003 LSWPR, 4003
2077 0000 DONCNT, 0
    
```

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/TRANSMIT - DATA BIT ON LINE

2100	7100	DATPAS,	CLL	
2101	7604	CLA	OSR	/EXAMINE S.R.6
2102	0375	AND	MSKSR6	
2103	7640	SZA	CLA	
2104	5326	JMP	FLG20N	/LINE FULL DUPLEX, BYPASS ECHO CHECK
2105	1276	TAD	LSWPR	
2106	3311	DCA	TRLSW2	/PRESET LINE STATUS WORD
2107	3312	DCA	TRLSW2+1	/PRESET CHARACTER ASSEMBLY WORD
2110	6402	TTI		/SAMPLE STATE OF DATA LINE
2111	4003	TRLSW2,	4003	/LSW
2112	0000	0		/CAW
2113	1312	TAD	TRLSW2+1	
2114	1131	TAD	Z CASMBL	/STORE SAMPLED DATA BIT
2115	7010	RAR		
2116	3131	DCA	Z CASMBL	
2117	1134	TAD	Z ERFLG2	/GET DATA ERROR FLAG
2120	7640	SZA	CLA	
2121	5326	JMP	FLG20N	/PREVIOUS DATA ERROR DETECTED
		/TEST FOR CORRECT DATA BIT		
2122	1130	TAD	Z DATOUT	/GET CORRECT DATA BIT
2123	1312	TAD	TRLSW2+1	/GET ACTUAL DATA BIT
2124	7640	SZA	CLA	/SKIP IF DATA BIT CORRECT
2125	2134	ISZ	Z ERFLG2	/SET DATA ERROR FLAG
2126	1135	FLG20N,	TAD Z ERFLG3	/GET ROTATE ERROR FLAG
2127	7640	SZA	CLA	
2130	5336	JMP	NOWORK	/PREVIOUS ROTATE ERROR DETECTED

```

/TEST FOR TIO ROTATE ERROR
2131 1127 TAD Z ROTBUF /GET CORRECT ROTATE RESULTS
2132 7041 CIA
2133 1132 TAD Z OUTBUF /GET ACTUAL ROTATE RESULTS
2134 7640 SZA CLA /SKIP IF ROTATE RESULT CORRECT
2135 2135 ISZ Z ERFLG3 /SET ROTATE ERROR FLAG

2136 5336 NOWORK, JMP . /WAIT FOR NEXT CLOCK INTERRUPT
/COMPLETE MESSAGE HAS BEEN TRANSMITTED

2137 7300 MESDON, CLA CLL

2140 4506 JMS I Z ASR2 /RETRANSMIT ON SAME LINE # ?
2141 5343 JMP .+2 /NO, TRANSMIT ON NEXT LINE
2142 5207 JMP RETRNS /YES
2143 1055 TAD Z OPMODE
2144 1271 TAD MONE
2145 7640 SZA CLA /SKIP IF MODE 1 SPECIFIED
2146 5774 JMP I ARCVE /GO RECEIVE NEXT MESSAGE
2147 2120 ISZ Z MINAL /SKIP IF ALL LINES HAVE TRANSMITTED
2150 5352 JMP .+2 /NO
2151 5355 JMP .+4 /YES, EXIT FROM MODE 1

2152 2064 ISZ Z ACLUT /+1 TO ACTIVE LINE COUNTER
2153 7000 NOP
2154 5207 JMP RETRNS

/MODE 1 EXIT
2155 4050 JMS Z CLKOFF /DISABLE CLOCK FLAG
2156 7300 CLA CLL
2157 3061 DCA Z INTSTA /CLEAR INTERRUPT STATUS WORD
2160 4507 JMS I Z ASR3 /REPORT MODE 1 COMPLETE?
2161 5367 JMP .+6 /NO

2162 4517 JMS I Z AFINIS /YES
2163 1053 TAD Z BGL
2164 4516 JMS I Z AFORM /TYPE BASE LINE #
2165 1064 TAD Z ACLUT
2166 4516 JMS I Z AFORM /TYPE LAST LINE TESTED

2167 4510 JMS I Z ASR5 /HALT?
2170 5200 JMP MODE1 /NO, REPEAT MODE 1
2171 1064 TAD Z ACLUT
2172 7402 ENDMD1, HLT /HALT AND DISPLAY LAST LINE TESTED
2173 5200 JMP MODE1

2174 3000 ARCVE, MODE2
2175 0040 MSKSR6, 0040

```

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\*2200

/TRANSMIT - LAST STOP BIT ON DATA LINE

```
2200 7300 LSTPAS,      CLA CLL
2201 1133      TAD Z ERFLG1  /GET ERROR FLAG 1
2202 7640      SZA CLA      /SKIP IF FLAG = 0
2203 5225      JMP SPACER   /REPORT ERROR

2204 1134 CHFL23,      TAD Z ERFLG2  /GET ERROR FLAG 2
2205 7640      SZA CLA      /SKIP IF FLAG = 0
2206 5262      JMP DATER    /REPORT DATA ERROR

2207 1135      TAD Z ERFLG3  /GET ERROR FLAG 3
2210 7640      SZA CLA      /SKIP IF FLAG = 0
2211 5332      JMP ROTER    /REPORT TTD ROTATE ERROR

      /NO TRANSMIT ERRORS DETECTED
2212 4505 PASOUT,      JMS I Z ASR1  /RETRANSMIT THIS CHARACTER?
2213 5217      JMP .+4      /NO
2214 1011      TAD Z AUTO2   /YES
2215 1223      TAD CHAMN1
2216 3011      DCA Z AUTO2
2217 1224      TAD INAD1A    /PRESET INTERRUPT ADDRESS POINTER
2220 3061      DCA INTSTA
2221 4045      JMS Z CLKON   /ENABLE CLOCK
2222 5222      JMP .        /WAIT FOR NEXT CLOCK INTERRUPT

2223 7777 CHAMN1,      -0001
2224 4000 INAD1A,      OUTPUT

      /DATA LINE INCORRECTLY AT SPACE, (ERROR 1)
2225 7001 SPACER,      IAC
2226 3112      DCA Z ERRNUM
2227 4507      JMS I Z ASR3   /TYPE ERROR REPORT?
2230 5325      JMP HLTERR    /NO
2231 4050      JMS Z CLKOFF   /DISABLE 680 CLOCK
2232 3061      DCA Z INTSTA   /CLEAR INTERRUPT STATUS WORD
2233 1064      TAD Z ACLUT
2234 7041      CIA
2235 1136      TAD Z PH1LUT   /DID THE LSR CYCLE EARLY
2236 7640      SZA CLA      /SKIP IF CYCLE ERROR OCCURRED
2237 5250      JMP .+11
```



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/REPORT EARLY CYCLE ERROR
2240 4514 JMS I Z ACYCE
2241 1673 TAD I ADNCNT
2242 1272 TAD P200
2243 1064 TAD Z ACLUT
2244 4516 JMS I Z AFORM /TYPE CORRECT LSR LINE NUMBER
2245 1064 TAD Z ACLUT
2246 4516 JMS I Z AFORM /TYPE ACTUAL LSR LINE NUMBER
2247 5255 JMP .+6

/TYPE ERROR REPORT
2250 4513 JMS I Z ATSTER
2251 1064 TAD Z ACLUT
2252 4516 JMS I Z AFORM /TYPE TRANSMIT LINE #
2253 1136 TAD Z PH1LUT
2254 4516 JMS I Z AFORM /TYPE LINE # AT SPACE
2255 1134 TAD Z ERFLG2 /TEST FOR DATA OR ROTATE ERROR
2256 1135 TAD Z ERFLG3
2257 7640 SZA CLA /SKIP IF NO OTHER ERRORS
2260 5204 JMP CHFL23
2261 5325 JMP HLTERR

/DATE ERROR FLAG = 1
2262 1135 DATER, TAD Z ERFLG3 /IS ROTATE ERROR FLAG ALSO = 1
2263 7650 SNA CLA /SKIP IF FLAG3 = 1
2264 5270 JMP .+4

2265 1337 TAD KFOUR
2266 3112 DCA Z ERRNUM /ERROR TYPE 4 INDICATES DATA
2267 5272 JMP .+3 /ERROR AND ROTATE ERROR

2270 1336 TAD CTWO
2271 3112 DCA Z ERRNUM /ERROR TYPE 2 = DATA ERROR
2272 0200 P200, 0200
2273 2077 ADNCNT, DONCNT

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```

2274 4507 ROTERA,      JMS I Z ASR3      /TYPE ERROR REPORT?
2275 5325      JMP HLTERR      /NO
2276 4050      JMS Z CLKOFF      /YES, DISABLE CLOCK
2277 3061      DCA Z INTSTA      /CLEAR INTERRUPT STATUS WORD
2300 4513      JMS I Z ATSTER      /TYPE ERROR REPORT
2301 1064      TAD Z ACLUT
2302 4516      JMS I Z AFORM      /TYPE TRANSMIT LINE NUMBER
2303 1011      TAD Z AUTO2
2304 1223      TAD CHAMN1
2305 3011      DCA Z AUTO2
2306 1411      TAD I Z AUTO2      /GET CORRECT CHARACTER
2307 4516      JMS I Z AFORM      /TYPE CORRECT CHARACTER
2310 1131      TAD Z CASMBL      /GET CHARACTER ASSEMBLED
2311 7112      CLL RTR          /DURING TRANSMISSION
2312 3131      DCA Z CASMBL
2313 1062      TAD Z CODE
2314 7640      SZA CLA          /SKIP IF 8 LEVEL CODE SPECIFIED
2315 5321      JMP .+4
2316 1131      TAD Z CASMBL
2317 7010      RAR          /8 LEVEL CODE CHARACTER IN AC
2320 5324      JMP .+4

2321 1131      TAD Z CASMBL
2322 7012      RTR
2323 7012      RTR          /5 LEVEL CODE CHARACTER IN AC

2324 4516      JMS I Z AFORM      /TYPE ASSEMBLED CHARACTER

2325 4504 HLTERR,      JMS I Z ASR0      /HALT ON ERROR?
2326 5212      JMP PASOUT      /NO
2327 1112      TAD Z ERRNUM
2330 7402 M12ERR,      HLT          /HALT AND DISPLAY ERROR TYPE (1,2,3 OR 4)
2331 5212      JMP PASOUT      /DEPRESS CONTINUE TO RESUME TEST

      /TTO ROTATE ERROR
2332 7001 ROTER,      IAC
2333 1336      TAD CTWO
2334 3112      DCA Z ERRNUM      /ERROR TYPE 3 - TTO ROTATE ERROR
2335 5274      JMP ROTERA      /REPORT ROTATE ERROR

2336 0002 CTWO,      0002
2337 0004 KFOUR,    0004

```

\*2400  
/ASCII 8 LEVEL CODE TEST MESSAGE

2400 0215 DAT8, 0215 /CR  
2401 0212 0212 /LF

2402 0324 0324 /T  
2403 0310 0310 /H  
2404 0305 0305 /E  
2405 0240 0240  
2406 0321 0321 /Q  
2407 0325 0325 /U  
2410 0311 0311 /I  
2411 0303 0303 /C  
2412 0313 0313 /K  
2413 0240 0240  
2414 0302 0302 /B  
2415 0322 0322 /R  
2416 0317 0317 /O  
2417 0327 0327 /W  
2420 0316 0316 /N  
2421 0240 0240  
2422 0306 0306 /F  
2423 0317 0317 /O  
2424 0330 0330 /X  
2425 0240 0240  
2426 0312 0312 /J  
2427 0325 0325 /U  
2430 0315 0315 /M  
2431 0320 0320 /P  
2432 0305 0305 /E  
2433 0304 0304 /D  
2434 0240 0240  
2435 0317 0317 /O  
2436 0326 0326 /V  
2437 0305 0305 /E  
2440 0322 0322 /R

2441 0215 0215 /CR  
2442 0212 0212 /LF  
2443 0324 0324 /T  
2444 0310 0310 /H  
2445 0305 0305 /E  
2446 0240 0240  
2447 0314 0314 /L  
2450 0301 0301 /A  
2451 0332 0332 /Z  
2452 0331 0331 /Y  
2453 0240 0240

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2454	0304	0304	/D
2455	0317	0317	/O
2456	0307	0307	/G
2457	0247	0247	/.
2460	0323	0323	/S
2461	0240	0240	
2462	0302	0302	/B
2463	0301	0301	/A
2464	0303	0303	/C
2465	0313	0313	/K
2466	0241	0241	/!
2467	0240	0240	
2470	0240	0240	
2471	0261	0261	/1
2472	0262	0262	/2
2473	0263	0263	/3
2474	0264	0264	/4
2475	0265	0265	/5
2476	0266	0266	/6
2477	0267	0267	/7
2500	0270	0270	/8
2501	0271	0271	/9
2502	0260	0260	/0
2503	0207	0207	/BELL
2504	0215	0215	/CR
2505	0212	0212	/LF
2506	0000	0000	/TERMINATE MESSAGE

\*2600  
 /BAUDOT 5 LEVEL TELETYPE CODE TEST MESSAGE

2600	0010	DAT5,	0010	/CR
2601	0002	0002		/LF
2602	0037	0037		/LETTERS
2603	0020	0020		/I
2604	0024	0024		/H
2605	0001	0001		/E
2606	0004	0004		
2607	0027	0027		/Q
2610	0007	0007		/U
2611	0006	0006		/I
2612	0016	0016		/C
2613	0017	0017		/K
2614	0004	0004		
2615	0031	0031		/B
2616	0012	0012		/R
2617	0030	0030		/O
2620	0023	0023		/W
2621	0014	0014		/N
2622	0004	0004		
2623	0015	0015		/F
2624	0030	0030		/O
2625	0035	0035		/X
2626	0004	0004		
2627	0013	0013		/J
2630	0007	0007		/U
2631	0034	0034		/M
2632	0026	0026		/P
2633	0001	0001		/E
2634	0011	0011		/D
2635	0004	0004		
2636	0030	0030		/O
2637	0036	0036		/V
2640	0001	0001		/E
2641	0012	0012		/R
2642	0010	0010		/CR
2643	0002	0002		/LF
2644	0020	0020		/T
2645	0024	0024		/H
2646	0001	0001		/E
2647	0004	0004		
2650	0022	0022		/L
2651	0003	0003		/A
2652	0021	0021		/Z
2653	0025	0025		/Y
2654	0004	0004		

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2655	0011	0011	/D
2656	0030	0030	/O
2657	0032	0032	/G
2660	0033	0033	/FIGURES
2661	0013	0013	/'
2662	0037	0037	/LETTERS
2663	0005	0005	/S
2664	0004	0004	
2665	0031	0031	/B
2666	0003	0003	/A
2667	0016	0016	/C
2670	0017	0017	/K
2671	0033	0033	/FIGURES
2672	0015	0015	/!
2673	0004	0004	
2674	0004	0004	
2675	0027	0027	/1
2676	0023	0023	/2
2677	0001	0001	/3
2700	0012	0012	/4
2701	0020	0020	/5
2702	0025	0025	/6
2703	0007	0007	/7
2704	0006	0006	/8
2705	0030	0030	/9
2706	0026	0026	/0
2707	0005	0005	/BELL
2710	0010	0010	/CR
2711	0002	0002	/LF
2712	0000	0000	/TERMINATE MESSAGE

\*3000

```

/OPERATIONAL MODE 2 - RECEIVE DATA FROM TELETYPE
3000 7300 MODE2,      CLA CLL
3001 4050      JMZ CLKOFF      /DISABLE CLOCK
3002 3061      DCA Z INTSTA    /CLEAR INTERRUPT STATUS WORD
3003 7001      IAC
3004 3065      DCA Z PHASE     /PRESET PHASE COUNT TO 1
3005 7130      CLL CML RAR     /SEI AC = 4000
3006 3064      DCA Z ACLUT
3007 1234      TAD ADATA2
3010 3011      DCA Z AUTO2     /PRESET RCVE STARTING ADDRESS
3011 1235      TAD NEG200
3012 3141      DCA Z CLRPGC
3013 3411      DCA I Z AUTO2   /CLEAR RCVE BUFFER TO ZERO
3014 2141      ISZ Z CLRPGC    /SKIP IF FULL PAGE IS CLEAR
3015 5213      JMP .-2

3016 1236      TAD CLR177      /-0177
3017 3141      DCA Z CLRPGC    /PRESET RCVE COUNTER
3020 7001      IAC
3021 7001      IAC
3022 3126      DCA Z STRTBT    /PRESET STRTBT
3023 3140      DCA Z DONFLG    /RESET DONFLG
3024 1234      TAD ADATA2
3025 3011      DCA Z AUTO2
3026 1233      TAD AINPUT
3027 3061      DCA Z INTSTA    /PRESET INTERRUPT STATUS WORD
3030 4045      JMS Z CLKON     /ENABLE CLOCK
3031 6001      ION
3032 5232      WAIT2,      JMP .      /WAIT FOR INTERRUPT

3033 4200      AINPUT,      INPUT
3034 3177      ADATA2,     DATA-1
3035 7600      NEG200,     -0200
3036 7601      CLR177,     -0177
3037 0000      LINCNT,     0
    
```

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```

/VERIFY MARK ON INACTIVE DATA LINES
3040 1133 STR1ST, TAD Z ERFLG1
3041 7640 SZA CLA
3042 5264 JMP STR1EX /ERROR PREVIOUSLY DETECTED

/SAMPLE ALL INACTIVE DATA LINES
3043 1236 TAD CLR177
3044 3237 DCA LINCNT /PRESET TO -177
3045 1064 TAD Z ACLUT
3046 6413 6413 /LOAD LSR WITH ACTIVE LINE #
3047 1273 TAD S4003
3050 3253 DCA STRTTI+1 /PRESET LINE STATUS WORD
3051 3254 DCA STRTTI+2 /RESET CAW

3052 6403 STRTTI, 6403 /+1 TO LSR AND TTI
3053 4003 4003
3054 0000 0

3055 6414 TTRL /READ LSR INTO AC
3056 3063 DCA Z LUT /STORE LINE #
3057 1254 TAD STRTTI+2 /GET CAW
3060 7700 SMA CLA /SKIP IF DATA LINE AT MARK
3061 5266 JMP SETER1
3062 2237 ISZ LINCNT /SKIP IF ALL INACTIVE LINES ARE TESTED
3063 5247 JMP STRTTI-3

3064 3126 STR1EX, DCA Z STRTBT /0 TO STRTBT
3065 5265 JMP . /WAIT FOR CLOCK INTERRUPT

3066 7001 SETER1, IAC
3067 3133 DCA Z ERFLG1 /STORE ERROR # 1
3070 1063 TAD Z LUT
3071 3136 DCA Z PH1LUT /STORE LINE #
3072 5264 JMP STR1EX

3073 4003 S4003, 4003

/COMPLETE DATA CHARACTER RECEIVED
3074 4050 CHADON, JMS Z CLKOFF /DISABLE CLOCK
3075 3061 DCA Z INTSTA /CLEAR INTERRUPT STATUS WORD
3076 4507 JMS I Z ASR3 /SHOULD ERRORS BE REPORTED?
3077 5311 JMP CHKDON /NO, DON'T CHECK ERROR FLAGS

/TEST ERROR FLAGS AND REPORT ANY ERRORS
3100 1133 TAD Z ERFLG1
3101 7640 SZA CLA /SKIP IF ERFLG1 = 0
3102 5321 JMP REPER1 /REPORT ERROR # 1

3103 1134 CHFLG2, TAD Z ERFLG2
3104 7640 SZA CLA /SKIP IF ERFLG2 = 0
3105 5331 JMP REPER2 /REPORT ERROR # 2

3106 1135 TAD Z ERFLG3
3107 7640 SZA CLA /SKIP IF ERFLG3= 0
3110 5341 JMP REPER3 /REPORT ERROR # 3

```



```

/ERROR CHECK COMPLETE
3111 1140  CHKDON,      TAD Z CONFLG
3112 7640      SZA CLA
3113 5720      JMP I ARETRN      /GO TRANSMIT RECEIVED DATA

3114 1233      TAD AINPUT
3115 3061      DCA Z INTSTA      /PRESET INTERRUPT STATUS WORD
3116 4045      JMS Z CLKON      /ENABLE CLOCK
3117 5317      JMP .          /WAIT FOR NEXT CHARACTER

3120 2007  ARETRN,      RETRNS

/SPACE DETECTED ON INACTIVE DATA LINE
3121 7001  REPER1,      IAC
3122 3112      DCA Z ERRNUM      /=1
3123 4513      JMS I Z ATSTER
3124 1064      TAD Z ACLUT
3125 4516      JMS I Z AFORM      /TYPE ACTIVE LINE #
3126 1136      TAD Z PH1LUT
3127 4516      JMS I Z AFORM      /TYPE INACTIVE LINE #
3130 5303      JMP CHFLG2      /CHECK REMAINING ERROR FLAGS

/CAW WAS MODIFIED AT WRONG CLOCK COUNT
3131 1351  REPER2,      TAD ERTWO
3132 3112      DCA Z ERRNUM      /= 2
3133 1135      TAD Z ERFLG3      /IS ERFLG3 ALSO SET, (NO STOP BIT) ?
3134 7650      SNA CLA
3135 40        JMP .+3
3136 2112      ISZ Z ERRNUM
3137 2112      ISZ Z ERRNUM      /ERRNUM = 4 IF FLAGS 2 & 3 ARE SET
3140 5343      JMP .+3

/STOP BIT NOT PRESENT ON DATA LINE
3141 1352  REPER3,      TAD ERTHRE
3142 3112      DCA Z ERRNUM      /= 3

3143 4513      JMS I Z ATSTER      /TYPE ERROR REPORT
3144 1064      TAD Z ACLUT
3145 4516      JMS I Z AFORM      /TYPE ACTIVE LINE #
3146 1127      TAD Z ROTBUF
3147 4516      JMS I Z AFORM      /TYPE RECEIVED CHARACTER
3150 5311      JMP CHKDON

3151 0002  ERTWO,      0002
3152 0003  ERTHRE,     0003

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PAUSE

/680 DCS DATA AND CONTROL TESTS - TAPE 4  
/RECEIVE BUFFER STORAGE

```

*3200
3200 0000 DATA,      0

*4000
/TRANSMIT ROUTINE FOR MODES 1 & 2
4000 7300 OUTPUT,    CLA CLL
4001 1125 TAD Z CLKCNT
4002 7640 SZA CLA      /OUTPUT WHEN CLKCNT = 0
4003 5237 JMP INCLOK
4004 1315 TAD PRCLOK
4005 3125 DCA Z CLKCNT  /PRESET CLKCNT TO -8
4006 1064 TAD Z ACLUT
4007 6413 6413        /LOAD LSR WITH SPECIFIED LINE #
4010 1126 TAD Z STRTBT  /HAS START BIT BEEN SENT?
4011 7640 SZA CLA      /SKIP IF START BIT SENT
4012 5244 JMP STRT

4013 1137 TAD Z BITCNT  /COMPLETE CHARACTER HAS BEEN
4014 7640 SZA CLA      /SENT WHEN BITCNT = 0
4015 5271 JMP SNDBIT    /GO SEND DATA BIT

/SEND STOP BITS
4016 1320 TAD STOP
4017 7650 SNA CLA      /SKIP IF FIRST STOP BIT HAS BEEN SENT
4020 5306 JMP STOP1

/SEND 2ND STOP BIT
4021 1321 TAD ALSTPS
4022 3236 DCA RPADR      /PRESET EXIT ADDRESS
4023 1062 TAD Z CODE
4024 7650 SNA CLA      /SKIP IF 5 LEVEL CODE SPECIFIED
4025 5230 JMP .+3

/SPECIFY A ONE HALF BIT STOP TIME
4026 1316 TAD HALFBT
4027 3125 DCA Z CLKCNT

4030 2126 ISZ Z STRTBT  /PRESET START BIT INDOCATOR
4031 7001 IAC
4032 6404 TTO          /OUTPUT TO SPECIFIED LINE
4033 4045 CMNEX,      JMS CLKON      /RESET AND ENABLE CLOCK FLAG
4034 6001 ION
4035 5636 JMP I RPADR    /RETURN TO DESIGNATED ROUTINE

4036 0000 RPADR,      0

/DO NOT OUTPUT ON THIS CLOCK INTERRUPT
4037 2125 INCLOK,    ISZ Z CLKCNT  /+1 TO INTERRUPT COUNTER
4040 7000 NOP
4041 1322 TAD ARNFS      /PRESET EXIT ADDRESS
4042 3236 DCA RPADR
4043 5233 JMP CMNEX
    
```

```

/OUTPUT START BIT
4044 1062 STR1,      TAD Z CODE
4045 7640   SZA CLA      /SKIP IF 8 LEVEL CODE SPECIFIED
4046 5252   JMP .+4
4047 1327   TAD LEVEL8
4050 3137   DCA Z BITCNT  /PRESET BIT COUNT FOR 8 LEVEL CODE
4051 5254   JMP .+3
4052 1317   TAD LEVEL5
4053 3137   DCA Z BITCNT  /PRESET BIT COUNT FOR 5 LEVEL CODE
4054 3320   DCA STOP      /CLEAR STOP BIT INDICATOR
4055 3131   DCA Z CASMBL  /CLEAR CHARACTER ASSEMBLY WORD
4056 3133   DCA Z ERFLG1
4057 3134   DCA Z ERFLG2
4060 3135   DCA Z ERFLG3
4061 1411   TAD I Z AUTO2  /GET NEXT DATA CHARACTER
4062 7450   SNA          /MESSAGE COMPLETE IF AC = 0
4063 5312   JMP NOCHAR  /MESSAGE COMPLETE

4064 3132   DCA Z OUTBUF  /STORE CHARACTER
4065 1323   TAD AFSPAS
4066 3236   DCA RPADR      /PRESET EXIT ADDRESS
4067 3126   DCA Z STRTBT  /RESET START BIT INDICATOR
4070 5232   JMP CMNEX-1  /OUTPUT START BIT

/OUTPUT DATA BIT
4071 1132   SNDBIT,     TAD Z OUTBUF  /GET DATA CHARACTER
4072 7110   CLL RAR      /LINC CONTAINS BIT TO BE TRANSMITTED
4073 3127   DCA Z ROTBUF  /STORE CORRECT ROTATE RESULTS
4074 7010   RAR
4075 3130   DCA Z DATOUT  /STORE DATA BIT FOR COMPARISON

4076 2137   ISZ Z BITCNT  /INCREMENT BIT COUNTER
4077 7000   NOP
4100 1324   TAD ADATPS
4101 3236   DCA RPADR      /PRESET EXIT ADDRESS

4102 1132   TAD Z OUTBUF
4103 6404   TIO          /OUTPUT DATA BIT
4104 3132   DCA Z OUTBUF  /UPDATE OUTBUF
4105 5233   JMP CMNEX

/SEND 1ST STOP BIT
4106 2320   STOP1,     ISZ STOP      /STOP NOW EQUALS 1
4107 1325   TAD ANOWRK
4110 3236   DCA RPADR      /PRESET EXIT ADDRESS
4111 5231   JMP CMNEX-2  /OUTPUT STOP BIT

/NO CHARACTER FOR TRANSMISSION
4112 1326   NOCHAR,    TAD AMSDON
4113 3236   DCA RPADR      /PRESET EXIT ADDRESS
4114 5233   JMP CMNEX

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4115	7771	PRCLOK,	-0007
4116	7775	HALFBT,	-0003
4117	7773	LEVEL5,	-0005
4120	0000	STOP,	0
4121	2200	ALSTPS,	LSTPAS
4122	0023	ARNPS,	RNPS
4123	2041	AFSPAS,	FSTPAS
4124	2100	ADATPS,	DATPAS
4125	2136	ANOWRK,	NOWORK
4126	2137	AMSDON,	MESDON
4127	7770	LEVEL8,	-0010

\*4200

/RECEIVE DATA - 8 LEVEL ASCII OR 5 LEVEL BAUDOT CODE

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4200 7300 INPUT,      CLA CLL
4201 1126      TAD Z STRTBT
4202 7440      SZA
4203 5205      JMP .+2
4204 5733      JMP I ARCDAT      /START BIT HAS BEEN RECEIVED

4205 1332      TAD NEGONE
4206 7640      SZA CLA      /SKIP IF STRTBT EQUALS 1
4207 5217      JMP RCV1ST      /STRTBT EQUALS 2

4210 2125      ISZ Z CLKCNT      /ADD 1 TO INTERRUPT COUNTER
4211 5213      JMP .+2
4212 7402      HLT      /PROGRAM DEBUG HALT
4213 1331      TAD ARNPS2
4214 3320      DCA RPADR2
4215 2721      ISZ I RCVLSW      /UPDATE RECEIVE TTI LSW
4216 5257      JMP RCMNEX

      /STRTBT=2 - WAITING FOR START BIT
4217 1062      RCV1ST,      TAD Z CODE
4220 7640      SZA CLA      /SKIP IF 8 LEVEL CODE SELECTED
4221 5225      JMP .+4      /5 LEVEL CODE WAS SELECTED
4222 1327      TAD RCVLV8
4223 3137      DCA Z BITCNT      /PRESET BITCNT FOR 8 LEVEL CODE
      /AND START BIT
4224 5227      JMP .+3

4225 1330      TAD RCVLV5
4226 3137      DCA Z BITCNT      /PRESET BITCNT FOR 5 LEVEL CODE AND
      /START BIT
4227 3242      DCA FSTTI+1      /CLEAR LINE STATUS WORD
4230 3133      DCA Z ERFLG1
4231 3134      DCA Z ERFLG2
4232 3135      DCA Z ERFLG3      /RESET ERROR FLAGS
4233 3127      DCA Z ROTBUF
4234 1054      TAD Z NAL
4235 7041      CIA
4236 3120      DCA Z MINAL      /STORE TWO'S COMPLEMENT OF #
      /OF ACTIVE LINES
4237 1053      TAD Z BGL
4240 6413      6413      /CLEAR AND LOAD LSR WITH BASE LINE #

4241 6402      FSTTI,      TTI
4242 0000      0      /LINE STATUS WORD
4243 0000      0      /CAW

4244 1242      TAD FSTTI+1      /GET LINE STATUS WORD
4245 7700      SMA CLA      /SKIP IF START BIT PRESENT
4246 5250      JMP .+2
4247 5262      JMP LINACT

4250 2120      ISZ Z MINAL      /SKIP IF ALL ACTIVE LINES HAVE BEEN
4251 5253      JMP .+2      / SCANNED
4252 5255      JMP NOSTRT      /NO START BIT PRESENT

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4253 6401      TTINCR          /+1 TO LNE SELECTION REGISTER
4254 5241      JMP FSTTI          /SAMPLE NEXT DATA LINE
4255 1323      NOSIRT,      TAD AWAIT2
4256 3320      DCA RPADR2    /PRESET EXIT ADDRESS
4257 4045      RCMNEX,      JMS Z CLKON  /RESET & ENABLE CLOCK
4260 6001      ION
4261 5720      JMP I RPADR2    /EXIT FROM RECEIVE INTERRUPT ROUTINE

/START BIT PRESENT ON DATA LINE
4262 6414      LINACT,      TTRL
4263 3063      DCA Z LUT          /STORE LINE #
4264 1064      TAD Z ACLUT
4265 7510      SPA          /SKIP IF ACTIVE LINE IS ALREADY DEFINED
4266 5314      JMP NOTDEF

4267 7041      CIA
4270 1063      TAD Z LUT          /IS START BIT PRESENT ON CORRECT LINE?
4271 7640      SZA CLA          /SKIP IF CORRECT LINE
4272 5305      JMP BADLIN

4273 1326      CMNEXA,      TAD PRLSWR
4274 3721      DCA I RCVLSW    /PRESET LSW
4275 3722      DCA I RCVCAW    /RESET CAW
4276 7001      IAC
4277 3126      DCA Z STRTBT    /1 TO STRTBT
4300 1325      TAD MINUS4
4301 3125      DCA Z CLKCNT    /-4 TO CLKCNT
4302 1324      TAD AST1ST
4303 3320      DCA RPADR2    /PRESET EXIT ADDRESS
4304 5257      JMP RCMNEX

/START BIT PRESENT ON INCORRECT LINE
4305 1133      BADLIN,      TAD Z ERFLG1
4306 7640      SZA CLA          /SKIP IF 1ST ERROR
4307 5253      JMP NOSTRT-2    /ERROR PREVIOUSLY DETECTED
4310 2133      ISZ Z ERFLG1
4311 1063      TAD Z LUT
4312 3136      DCA Z PH1LUT    /SAVE ERROR LINE # FOR REPORTING
4313 5253      JMP NOSTRT-2    /CONTINUE SCANNING ACTIVE LINES

/FIRST START BIT OF NEW MESSAGE - DEFINE ACTIVE LINE
4314 7300      NOTDEF,      CLA CLL
4315 1063      TAD Z LUT
4316 3064      DCA Z ACLUT    /ACTIVE LINE # NOW DEFINED
4317 5273      JMP CMNEXA
4320 0000      RPADR2,      0
4321 4403      RCVLSW,      RCVITI+1
4322 4404      RCVCAW,      RCVTTI+2
4323 3032      AWAIT2,      WAIT2
4324 3040      AST1ST,      STR1ST
4325 7774      MINUS4,      -0004
4326 4000      PRLSWR,      4000
4327 7767      RCVLV8,      -0011
4330 7772      RCVLV5,      -0006
4331 0023      ARNPS2,      RNPS
4332 7777      NEGONE,      -0001
4333 4400      ARCDAT,      RCVDAT

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\*4400

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/RECEIVE AND ASSEMBLE DATA CHARACTER
4400 1064 RCVDAT, TAD Z ACLUT
4401 6413 6413 /LOAD LSR WITH ACTIVE LINE #

4402 6402 RCVTTI, TTI
4403 4000 4000 /LINE STATUS WORD
4404 0000 0 /CHARACTER ASSEMBLY WORD

4405 2125 ISZ Z CLKCNT /DATA LINE SHOULD BE SAMPLED
/WHEN CLKCNT = 0
4406 5210 JMP .+2
4407 5222 JMP STRLIN /CAW SHOULD HAVE BEEN UPDATED

/VERIFY THAT CAW WAS NOT MODIFIED ON THIS PASS
4410 1127 TAD Z ROTBUF
4411 7041 CIA
4412 1204 TAD RCVTTI+2 /CAW SHOULD EQUAL ROTBUF
4413 7650 SNA CLA /SKIP IF NOT EQUAL
4414 5217 JMP .+3

/STORE ERROR # 2 - CAW INCORRECTLY UPDATED
4415 7001 IAC
4416 3134 DCA Z ERFLG2

4417 1310 CMNEXB, TAD WAIT2A
4420 3711 DCA I RPADRA /PRESET EXIT ADDRESS
4421 5712 JMP I ACMNEX

/DATA LINE SHOULD BE SAMPLED ON THIS PASS
4422 1137 STRLIN, TAD Z BITCNT
4423 7640 SZA CLA /SKIP IF ALL DATA BITS RECEIVED
4424 5226 JMP .+2
4425 5235 JMP STRSTP
4426 2137 ISZ Z BITCNT
4427 7000 NOP
4430 1204 TAD RCVTTI+2 /GET UPDATED CAW
4431 3127 DCA Z ROTBUF
4432 1313 TAD CLOKPR
4433 3125 DCA Z CLKCNT /PRESET CLKCNT TO -8
4434 5217 JMP CMNEXB

/STOP BIT SHOULD BE PRESENT ON DATA LINE
4435 1204 STRSTP, TAD RCVTTI+2 /GET CAW
4436 7710 SPA CLA /SKIP IF STOP BIT NOT PRESENT
4437 5242 JMP .+3

/STORE ERROR # 3 - STOP BIT NO PRESENT
4440 7001 IAC
4441 3135 DCA Z ERFLG3

4442 1062 TAD Z CODE
4443 7640 SZA CLA /SKIP IF 8 LEVEL CODE SELECTED
4444 5261 JMP ASEMB5

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/ASSEMBLE AND STORE 8 LEVEL ASCII CHARACTER
4445 1204 TAD RCVTTI+2
4446 7012 RTR
4447 7010 RAR
4450 0314 AND MSKASI /CHARACTER CORRECTLY ASSEMBLED IN AC
4451 3127 DCA Z ROTBUF
4452 1127 TAD Z ROTBUF
4453 3411 DCA I Z AUTO2 /STORE CHARACTER IN DATA FIELD
4454 1127 TAD Z ROTBUF
4455 1316 TAD MPRIOD
4456 7640 SZA CLA /SKIP IF CHAR IS A PERIOD
4457 5276 JMP CHKBUF
4460 5300 JMP ENDRCV /SET DONE FLAG

/ASSEMBLE AND STORE 5 LEVEL BAUDOT CHARACTER
4461 1204 ASEMB5, TAD RCVTTI+2
4462 7012 RTR
4463 7012 RTR
4464 7012 RTR
4465 0315 AND MSKBDT /CHARACTER ASSEMBLED IN AC
4466 3127 DCA Z ROTBUF
4467 1127 TAD Z ROTBUF
4470 3411 DCA I Z AUTO2 /STORE CHARACTER IN DATA FIELD
4471 1127 TAD Z ROTBUF
4472 1317 TAD MPEROD
4473 7640 SZA CLA /SKIP IF CHAR IS M OR PERIOD
4474 5276 JMP CHKBUF
4475 5300 JMP ENDRCV /SET DONE FLAG

4476 2141 CHKBUF, ISZ Z CLRPGE /SKIP IF RECEIVE BUFFER IS FULL
4477 5302 JMP .+3

4500 7001 ENDRCV, IAC
4501 3140 DCA Z DONFLG /1 TO DONFLG

4502 7001 IAC
4503 7001 IAC /AC = 2
4504 3126 DCA Z STRTBT /PRESET STRTBT TO 2
4505 1320 TAD ACHADN
4506 3711 DCA I RPADRA /PRESET EXIT ADDRESS
4507 5712 JMP I ACMNEX

4510 3032 WAIT2A, WAIT2
4511 4320 RPAURA, RPADR2
4512 4257 ACMNEX, RCMNEX
4513 7770 CLOKPR, -0010
4514 0377 MSKASI, 0377
4515 0037 MSKBDT, 0037
4516 7522 MPRIOD, -0256
4517 7744 MPEROD, -0034
4520 3074 ACHADN, CHADON

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ACLUT 0064
ACMNEX 4512
ACYCE 0114
ACYCER 1342
ACYCL 0115

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SPACER	2225
SPCERR	2063
SPCPH1	0526
SPCPH2	0721
SR0	0301
SR1	0326
SR2	0335
SR3	0344
SR5	0353
STAT0	0035
STOP	4120
STOP1	4106
STORAC	0057
STORL	0060
STRLIN	4422
STRSTP	4435
STRT	4044
STRTBT	0126
STRTTI	3052
STR1EX	3064
STR1ST	3040
STTI	0622
S4003	3073
TEXT	1200
TRLSW	2051
TRLSW2	2111
TSTER	1304
TTCL	6411
TII	6402
TTINCR	6401
TTI1	0413
TIO	6404
TTRL	6414
TTSL	6412
TT1OFF	6422
TT1ON	6424
TT2OFF	6432
TT3OFF	6442
TT4OFF	6452
TYPCN1	0111
VERPT	1004
WAIT1	2062
WAIT2	3032
WAIT2A	4510
WORK	1302

