2511 COMMUNICATIONS DISPLAY TERMINAL (CDT)

WITH A CDDC802 MODULE

TROUBLESHOOTING

CONTENTS PAGE

1. GENERAL

1.01 This section provides a general troubleshooting procedure for a 2511 Communications Display Terminal equipped with a CDDC802 display controller module. Issue 1 of this section was a limited printing edition and did not receive general system-wide availability nor distribution. This reissue includes the latest troubleshooting information available at the time of this printing. This is the first standard printing available for general Bell System distribution. For similar information for the Series 2510 Communications Display Terminal, refer to Section 578-100-300.

1.02 The troubleshooting procedure provided in this section is divided into four basic categories: (1) a trouble call procedure, (2) a trouble analysis procedure, (3) options, and (4) a series of troubleshooting charts recommending corrective steps for restoring operation.

1.03 The trouble analysis procedure and troubleshooting charts are written to enable isolation of troubles to major components or circuit cards. The defective assembly can then be replaced by a known good assembly.

1.04 Do not begin random probing or substitutions of circuit cards until the operating trouble is isolated to a specific area in the terminal logic circuitry and a procedure or method is realized. The systematic approach presented in this section is intended to prevent the possibility of introducing additional troubles and to restore operation in a minimum amount of time.

1.05 After isolating a trouble to a specific circuit or component in the CDT, the troubleshooting procedure will recommend a swapping or substitution method where a known good part is used to replace the suspected circuit card assembly or electronic power supply. If the operating trouble is then eliminated, the replaced part (if it is a repairable component such as a power supply or circuit card assembly) should be returned to the nearest Teletype Corporation Product Service Center with a description of the suspected defect. Nonrepairable items such as deflection yoke windings and cathode ray tubes should be disposed of following normal Telephone Company scrap or reclamation procedures. Replacement parts can be ordered from Teletype Corporation Service Parts Division.

1.06 The troubleshooting guide in this section reflects a philosophy of replacing component assemblies or circuit card assemblies by a swapping method until a trouble is eliminated, or the difficulty is found to be more complex than this method can alleviate. This philosophy permits a "nonfamiliar" Telephone Company craftsman to troubleshoot and repair the majority of CDT troubles in a relatively short amount of time. Oscilloscope or volt-ohm metering equipment is not intended to be used by the nonfamiliar craftsman. Only spare units and circuit cards are required. For this reason, oscilloscope waveform illustrations are not provided in this section.

1.07 In the event that the swapping method does not correct the CDT trouble, the nonfamiliar craftsman should refer the set for

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repair by a Telephone Company craftsman or a Teletype Corporation Product Service craftsman, specifically trained for detailed CDT trouble-shooting, using an oscilloscope for waveform analysis and metering equipment for continuity tracing.

2. TROUBLE CALL PROCEDURE

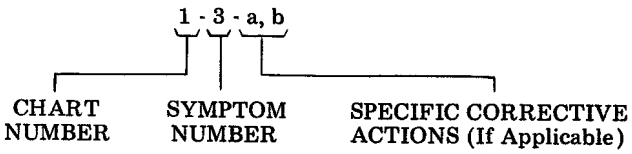
2.01 The procedure in Figure 1 illustrates the action that is normally taken when answering a trouble call.

3. TROUBLE ANALYSIS PROCEDURE

3.01 The trouble analysis procedure shown in Figure 2 should be followed when the cause of trouble in the CDT is not obvious.

3.02 The trouble analysis is broken down into eight specific areas (Figures 3 through 10). Each area has a series of steps that should be followed in order to arrive at the cause of the trouble. The area in which the trouble occurs is the only one that has to be checked.

3.03 Throughout the trouble analysis there are several references to the trouble-shooting charts in Part 5. The chart and specific symptom can be located as follows:



3.04 Follow the basic trouble analysis procedure for the 2511 CDT as shown in Figure 2.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES INSERT, REMOVE, CONNECT, OR DISCONNECT ANY ELECTRONIC COMPONENT OF THE CDT WITH THE AC POWER APPLIED.

4. OPTIONS

4.01 The procedures found in Part 2 and Part 3 are related to the basic operation of the 2511 CDT. There are, however, many options that affect the operation of the CDT in Local, Transmit, and Receive.

4.02 To troubleshoot any of the options, proceed as follows:

(a) Determine what options are being used in the CDT.

(b) Check that the particular option has been installed properly. Refer to Section 578-101-200 for all strapping information and option programming.

(c) Refer to the appropriate trouble-shooting chart in Part 5.

5. TROUBLESHOOTING CHARTS

5.01 The troubleshooting charts are divided into two areas. Those under the heading of Basic Set cover all of the troubles that affect the normal operation of any 2511 CDT. Those under Options cover all of the troubles that affect the optional operation of the CDT.

BASIC SET

Chart 1 — Power
Chart 2 — Digital Control for CRT Drive Circuits
Chart 3 — Display Errors
Chart 4 — Cursor and Cursor Movement
Chart 5 — Character Entry and Position
Chart 6 — Character and Line Delete Errors
Chart 7 — Character and Line Insert Errors
Chart 8 — Transmit Operation
Chart 9 — Receive Operation

OPTIONS

Chart 10 — Horizontal Tabulation
Chart 11 — End-of-Line Indicator
Chart 12 — Video Highlight
Chart 13 — Protected Format
Chart 14 — On-Line Edit (Receive)
Chart 15 — Transmit of Escape Sequences
Chart 16 — External Mode Control (Cluster Controller)

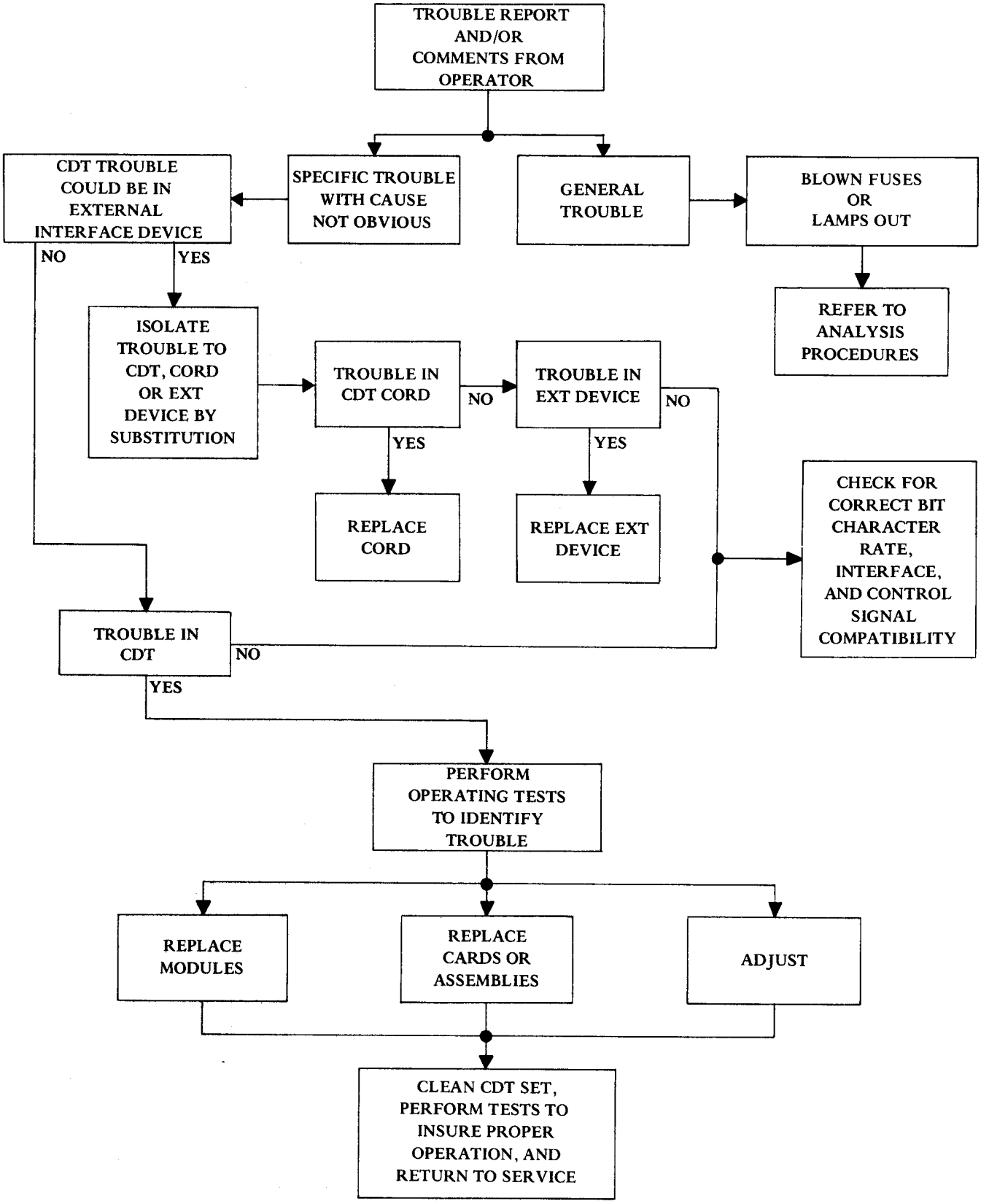


Figure 1 - Trouble Call Procedure

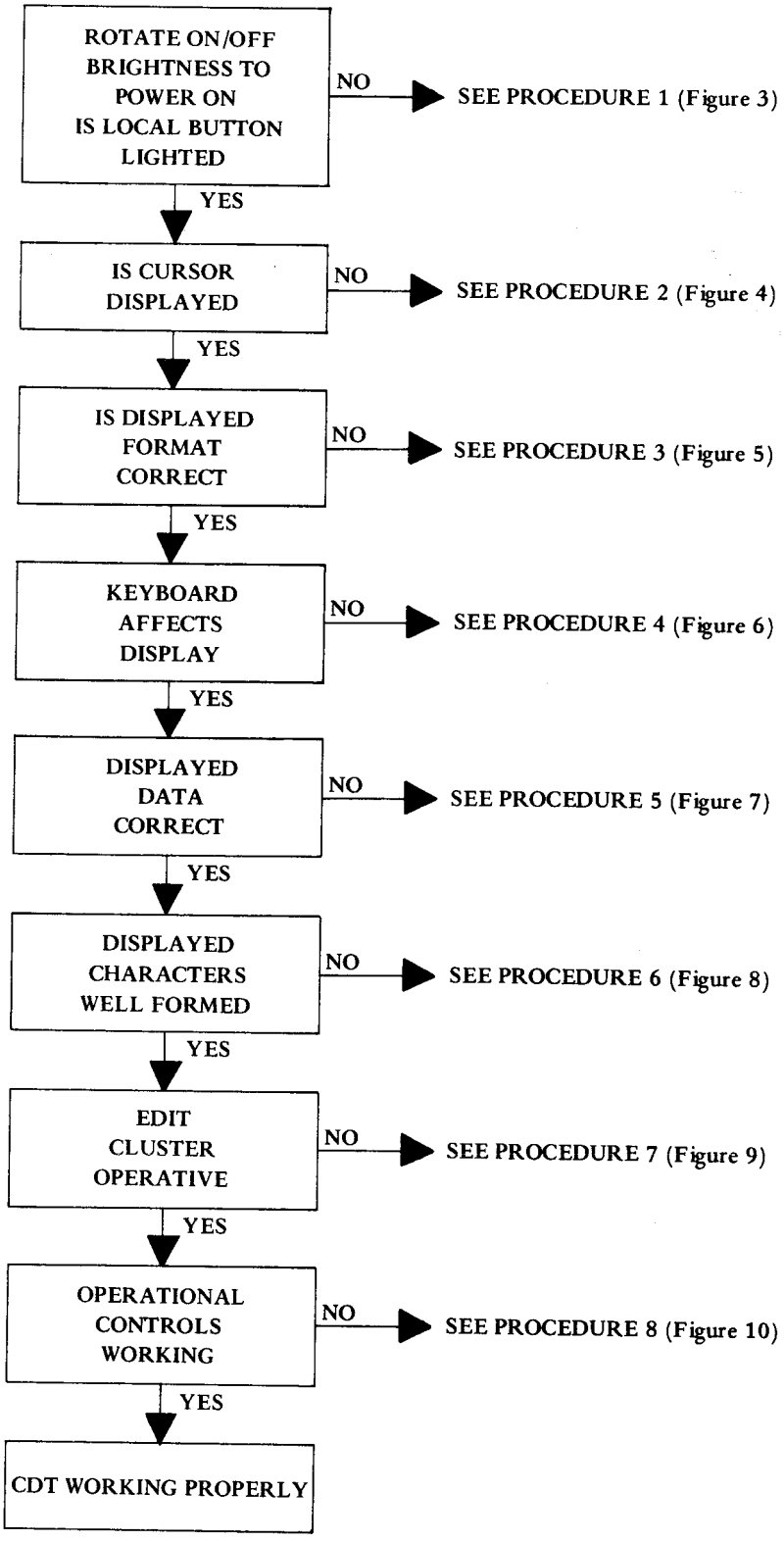


Figure 2 - Basic Trouble Analysis

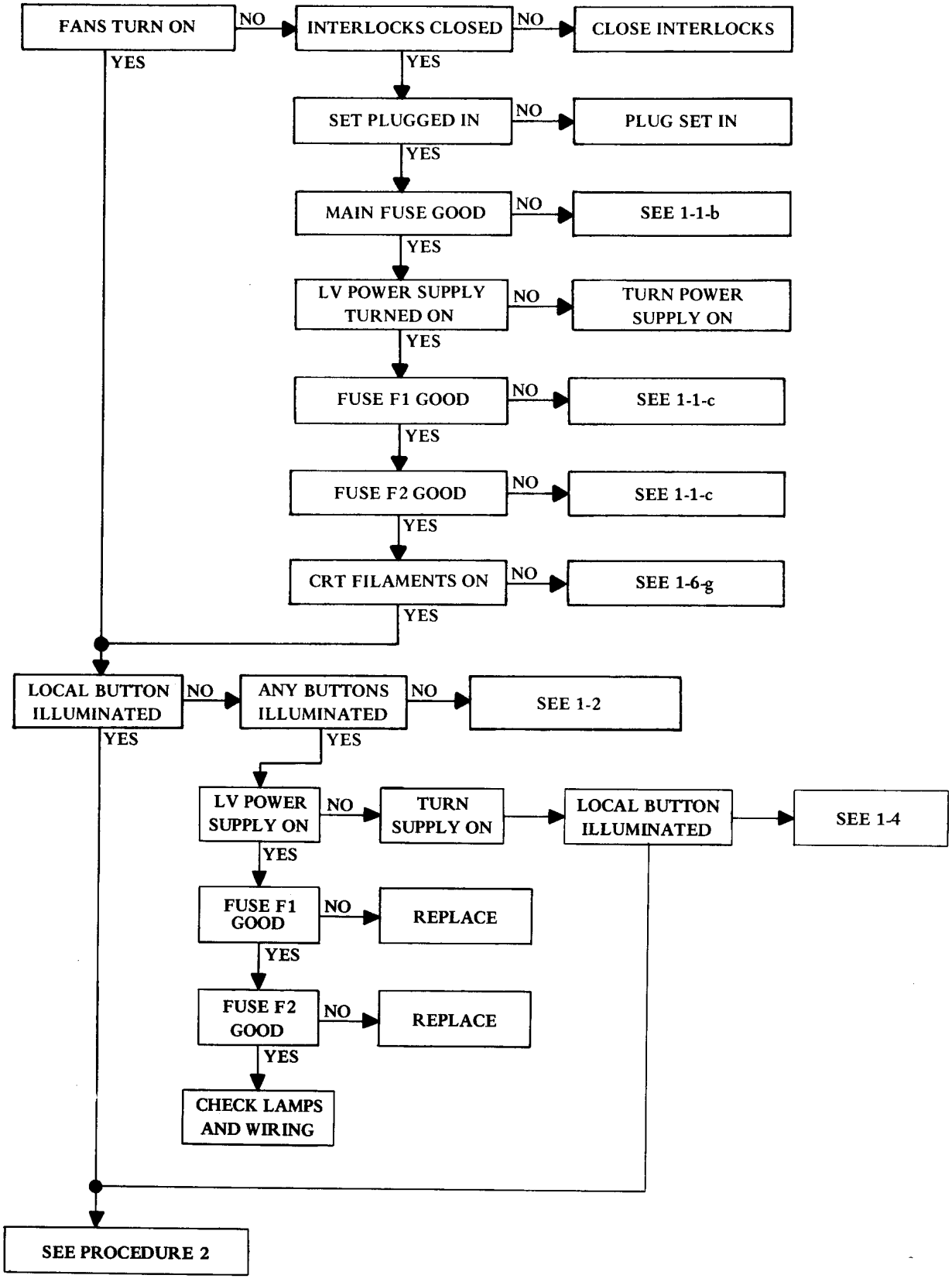


Figure 3 - Procedure 1

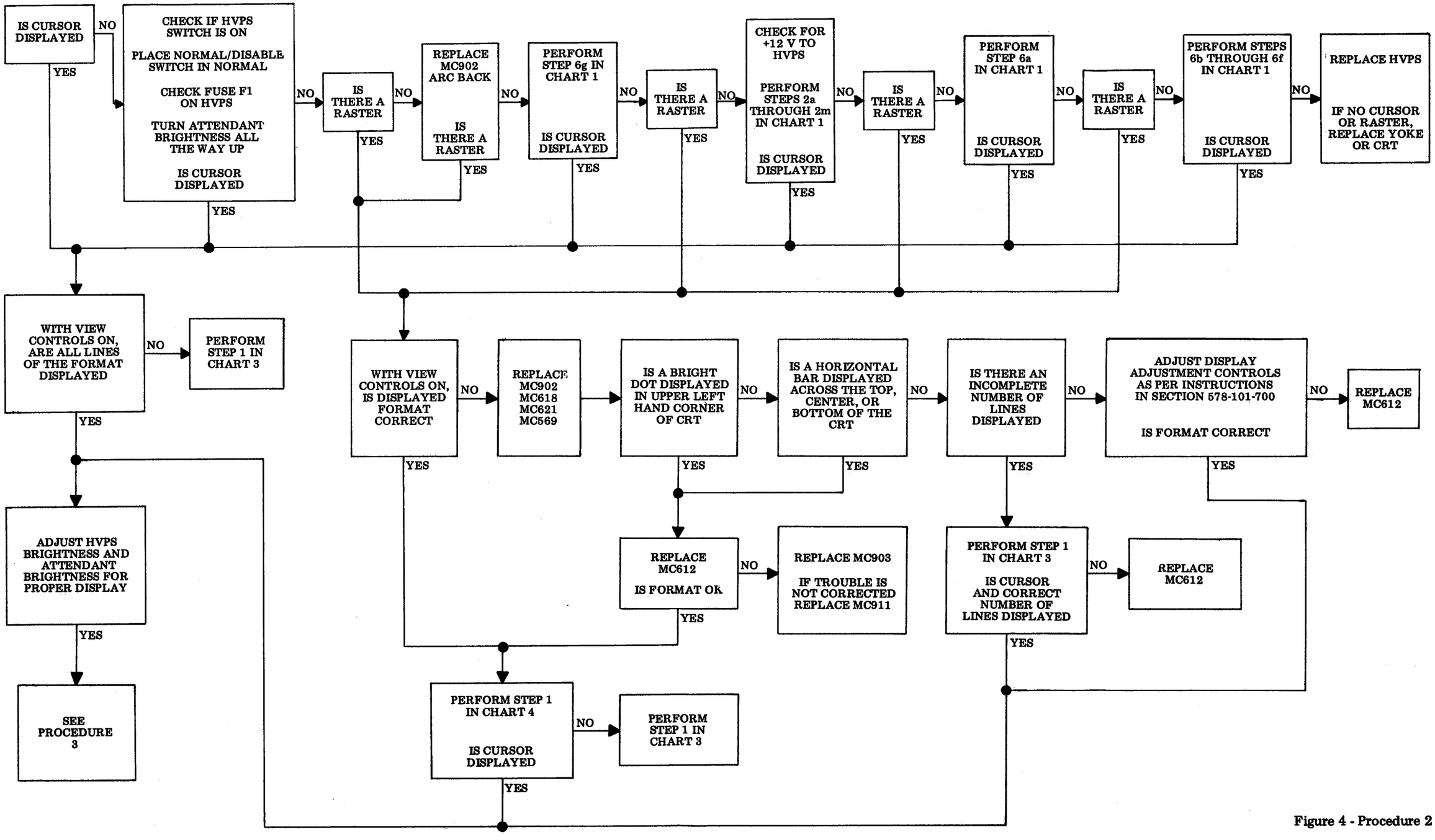


Figure 4 - Procedure 2

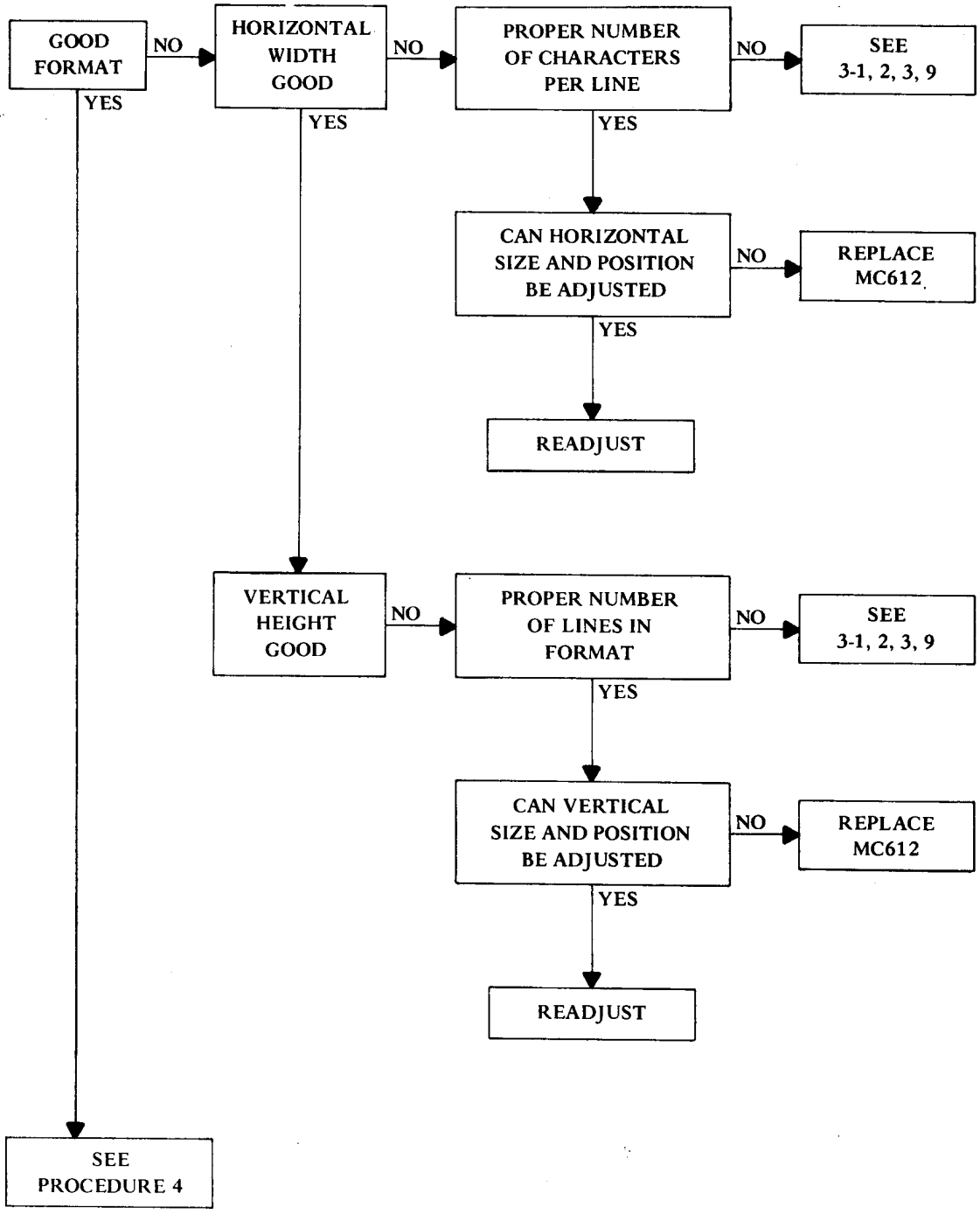


Figure 5 - Procedure 3

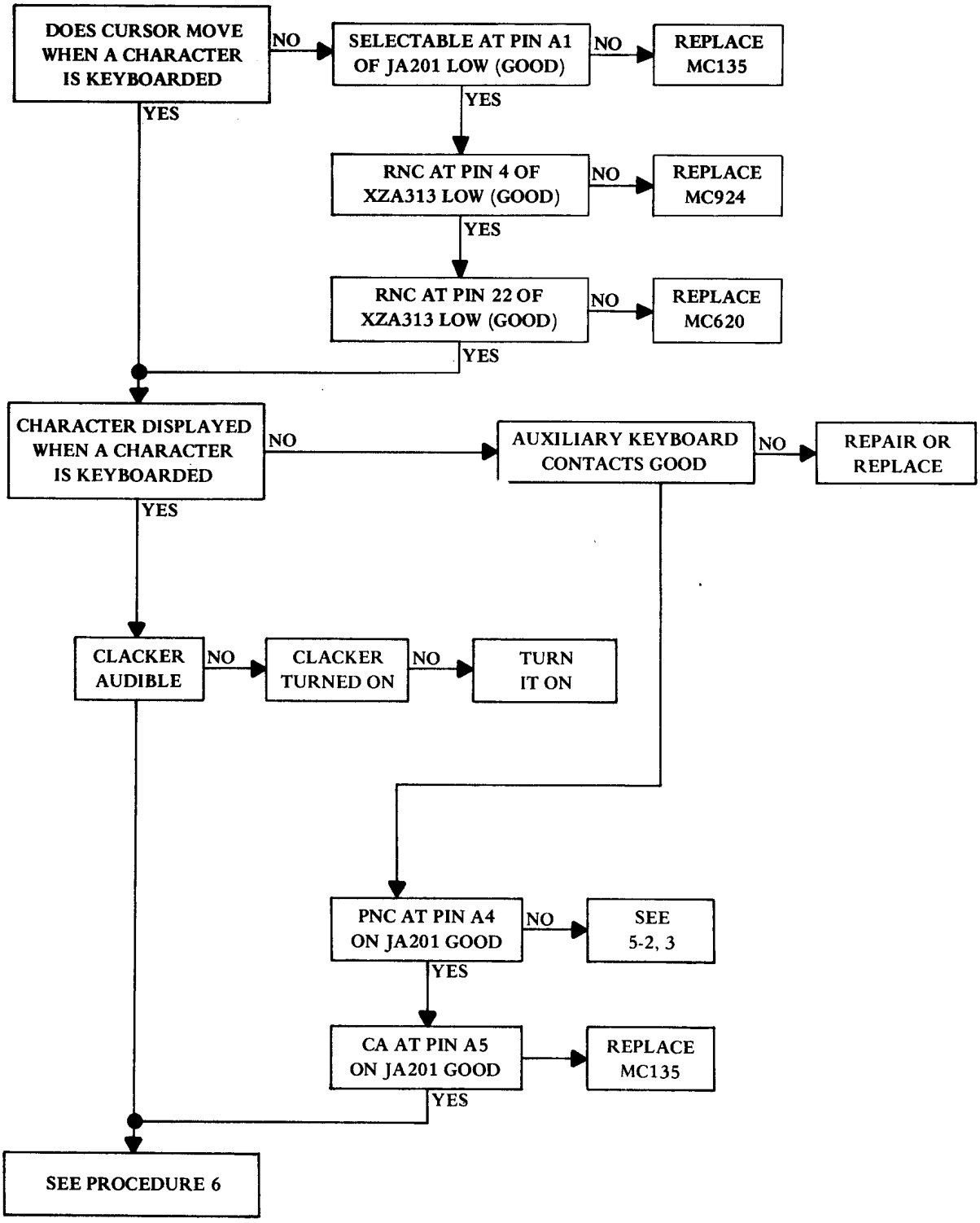


Figure 6 - Procedure 4

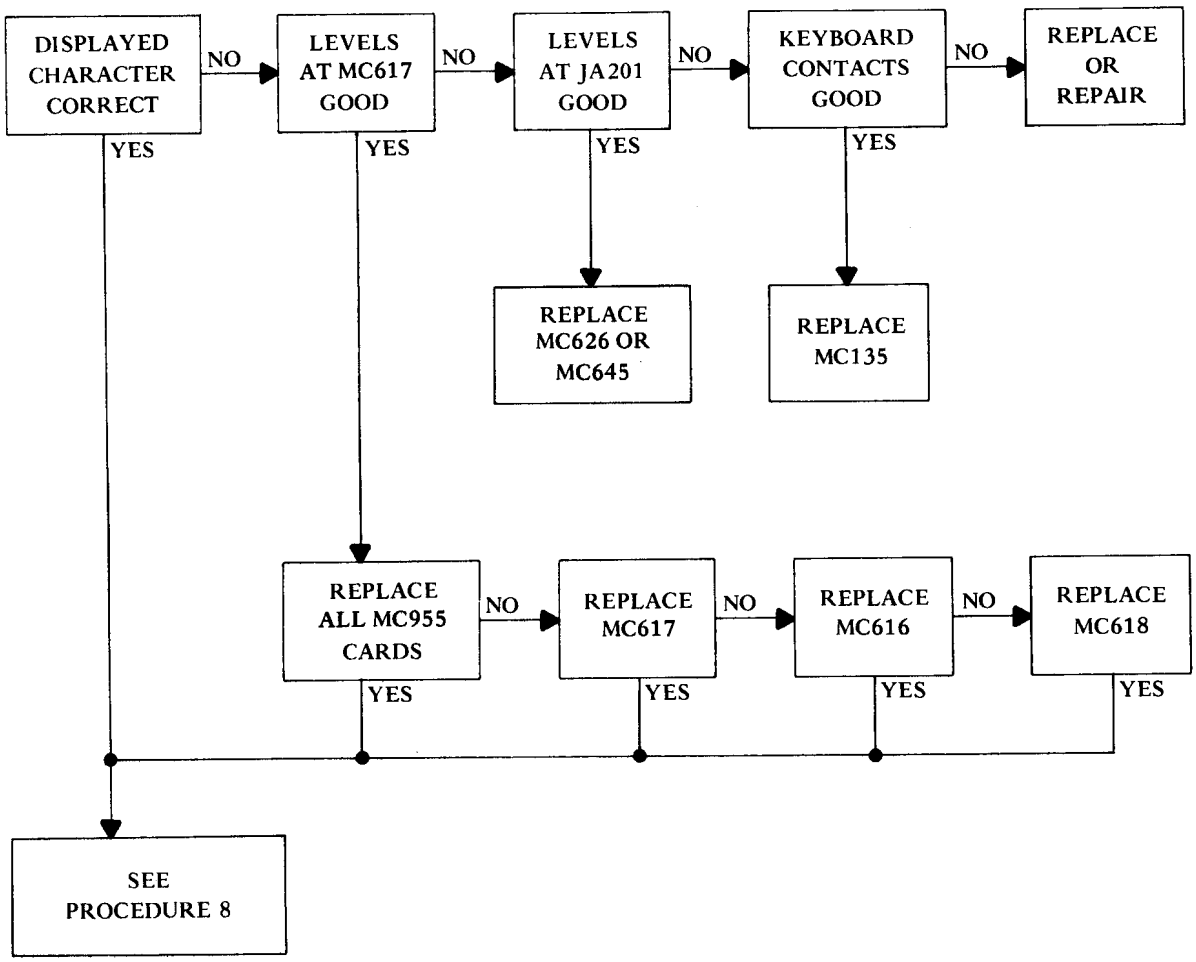


Figure 7 - Procedure 5

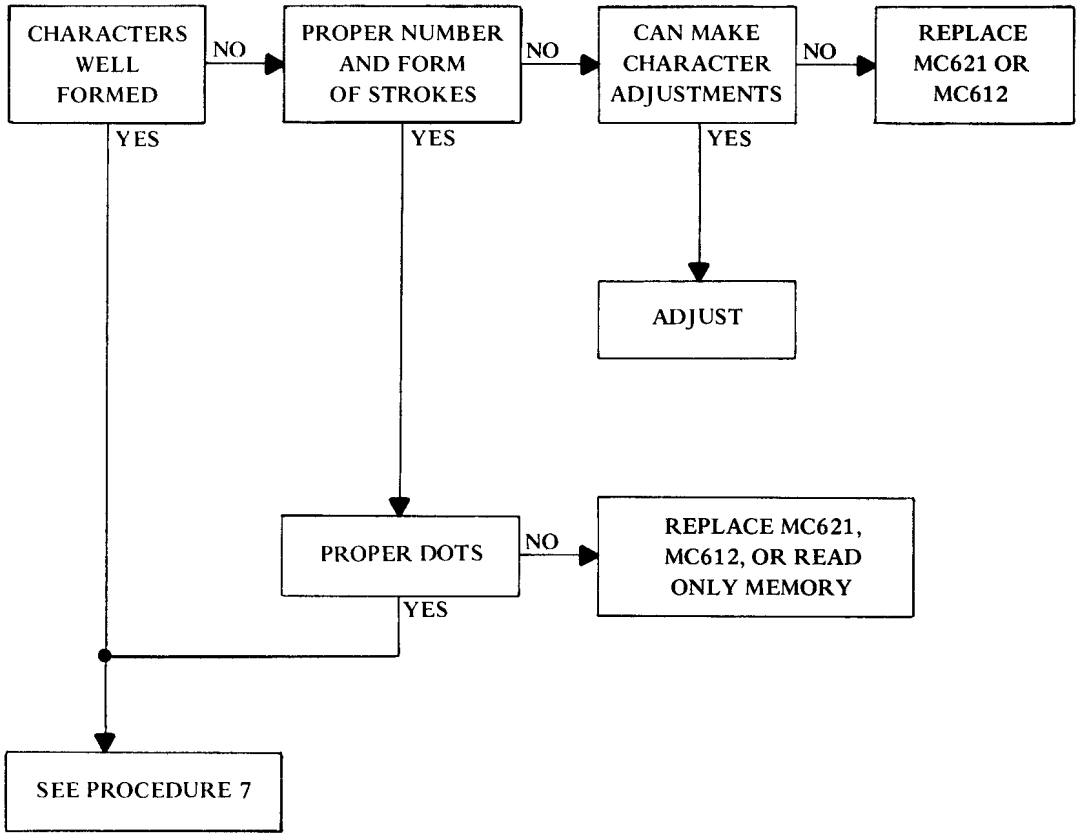


Figure 8 - Procedure 6

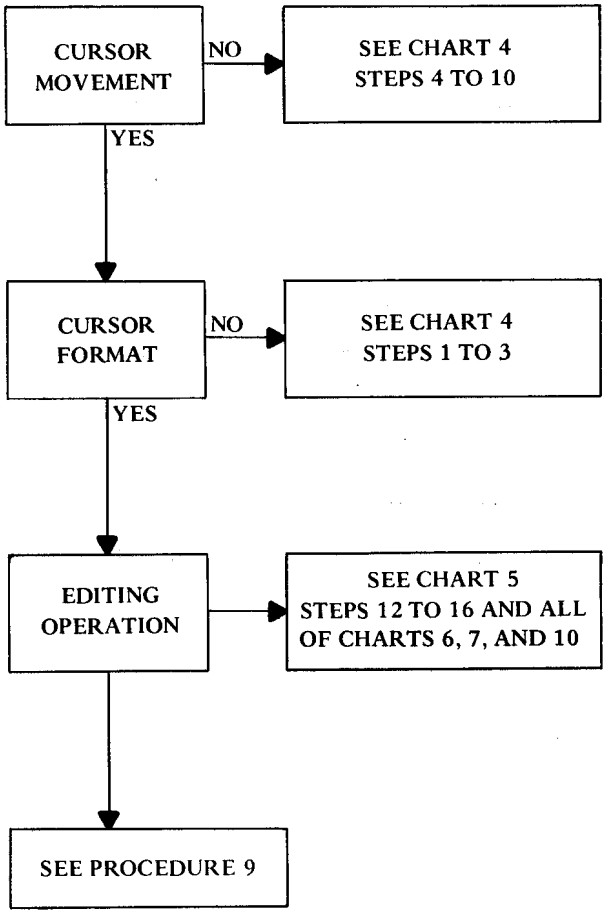


Figure 9 - Procedure 7

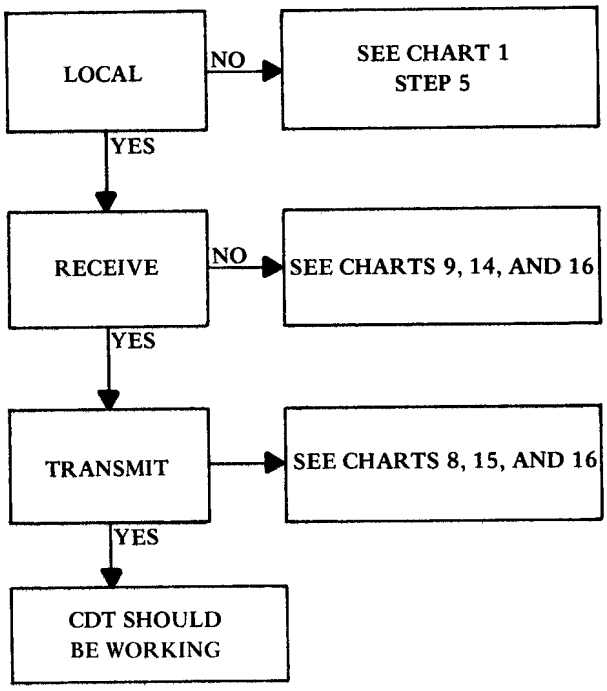


Figure 10 - Procedure 8

CHART 1

POWER

NO.	SYMPTOM	CORRECTIVE ACTION
1	When the set is turned on, nothing happens.	a. Check customer ac receptacle for power. b. Replace main fuse if indicator is illuminated. c. Replace fuses F1 and F2 on the TP335879 LV Power Supply if defective. d. If cabinet fans do not come on, check cabinet interlock switches and replace if defective. e. If fans still do not come on, check XK relay coil winding in LV Power Supply and ON/OFF switch wiring (1174SD-B-13).
2	Cabinet fans operate, but device controls fail to illuminate.	a. Check that the LV Power Supply switch is in the ON position. b. Replace fuses F1 and F2 on the LV Power Supply if defective. c. Remove LV Power Supply; raise cover screen and replace fuse F3 if defective. d. With cover screen raised, check for +12 v dc on TA-7 (TA-18 common). If not present, replace LV Power Supply (1069SD-2). e. Replace fuses F4 and F5 if defective. If fuses blow after replacement, place the NORMAL/DISABLE switch to DISABLE. Replace the fuses and replace either MC903 or MC911 Deflection Amplifier using the substitution method. f. Check for -20 v dc on TA-11 and +30 v dc on TA-12. If either voltage is not present, replace the Power Supply. g. Check for +5 v dc on TB-2 (TB-10 common). If voltage is not present, replace MC904. If fuse F3 blows repeatedly, replace the Power Supply. h. Check for -11 v dc on TB-11. Replace MC907 if voltage is not present. If -11 v dc is still not present or if fuse F4 blows, replace the Power Supply. i. Check for -16 v dc on TB-6, replace MC913 if not present.

CHART 1

POWER (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
2 (cont)		j. Check for +6 v dc on TB-5, replace MC905 if not present. k. Check Power Supply wiring (1069SD-2). l. Check for 6.3 v ac on TM-6 and TM-7 of the Power Supply. If not present, replace the Power Supply. m. Check for +5 v dc at pins 35 and 36 of the MC621 Video Generator at XZA102.
3	LOCAL button fails to illuminate when depressed, set remains in TRANSMIT.	a. Replace fuses F4 and F5 on the Low Voltage Power Supply if defective. b. Perform corrective action for steps 2 e and 2 f in Chart 1.
4	LOCAL button fails to illuminate when it is depressed.	Replace the lamp under the LOCAL button. Check other device controls in Procedure 10 of the Trouble Analysis.
5	Clacker fails to operate.	a. Check that the clacker switch on TP322135 assembly is in the ON position. b. Check that clacker armature backstop has Min 0.015 inch — Max 0.025 inch between armature and backstop with armature held against pole piece (Section 578-100-103). c. Check clacker magnet and wiring 1039SD-1.
6	Set is on, but no display (steps 1 through 5 are not faulty).	a. Check for dc voltage distribution from the Low Voltage Power Supply to the MC612 Function Generator, MC911 Deflection Amplifier, Display Controller A Module, and High Voltage Power Supply (1174SD-B14). b. Check for a variation of -150 v dc to -60 v dc at TB-2 of the MC612 Function Generator card when the operators brightness control is turned from a full counterclockwise position to a full clockwise position. c. Check for video information on TB-3 of MC612. If not present, check cards listed at end of h.

CHART 1

POWER (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3 (cont)		d. If video is present at TB-3 of MC612, check Horizontal Sweep Indicator input at TB-7 for a sawtooth waveform, and TB-10 for a vertical stairstep waveform. If waveforms are present, see steps 2 and 3 in Chart 2. e. Check that the lead of SG3, closest to hole 1 (yellow wire) on MC902 Arc Suppression card, is at ground. If not, replace MC902. f. Check for 300 v dc at TB-2 of MC902. If not present, replace MC902 or the High Voltage Power Supply. g. With power off, check for continuity between pin 1 and pin 12 of the CRT. If not present, replace the CRT. h. Replace the circuit cards in order until the display appears: MC621 Video Generator at XZA102 MC618 Stroke Counter at XZA103 MC900, MC927, MC937, or MC938 Memory Format at XZA115 MC606 Memory Address Register at XZA116 MC625 Edit No. 2 at XZA311

CHART 2

DIGITAL CONTROL FOR CRT DRIVE CIRCUITS

NO.	SYMPTOM	CORRECTIVE ACTION
1	All inputs to the MC612 Function Generator card at DC levels.	a. Replace the X-tal on the MC621 Video Generator card at XZA102. b. Replace the MC621 Video Generator card at XZA102.
2	Sync inputs to TB5 and TB6 on the MC612 Function Generator are present, all other inputs at DC levels (bright bar across top or bottom of screen).	Replace the circuit cards in order until the symptom is corrected: MC621 Video Generator at XZA102 MC618 Stroke Counter at XZA103 MC651 Miscellaneous Circuits at XZA117 MC606 Memory Address Register at XZA116

CHART 2

DIGITAL CONTROL FOR CRT DRIVE CIRCUITS (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3	Sync (TB-5) and horizontal retrace (TB-18) inputs to MC612 Function Generator present, line count inputs (TB-20 through TB-25) at DC levels.	Replace the circuit cards in order until the symptom is corrected: MC606 Memory Address Register at XZA116 MC651 Miscellaneous Circuits at XZA117 MC927 Format Memory at XZA115
4	No video input present at TB1-3 of MC612 Function Generator.	Replace the circuit cards in order until the symptom is corrected: MC621 Video Generator at XZA102 MC618 Stroke Counter at XZA103 If the condition is not corrected, check the wiring from the Read-Only Memory frame into the Display Controller module. If condition still exists, replace the Read-Only Memory.
5	No sync input (TB1-5) to MC612 Function Generator.	Replace the MC621 Video Generator card at XZA102.

CHART 3

DISPLAY ERRORS

NO.	SYMPTOM	CORRECTIVE ACTION
1	Incorrect number of character positions per line.	Replace the circuit cards in order until the symptom is corrected: MC927 Memory Format at XZA115 MC606 Memory Address Register at XZA116
2	Incorrect number of lines per display.	See corrective action for step 1.
3	Display rolling.	Replace the circuit cards in order until the condition is corrected: MC927 Memory Format at XZA115 MC621 Video Generator at XZA102
4	Partial display.	See corrective action for step 1.
5	Display overlapped.	See corrective action for step 1.

CHART 3

DISPLAY ERRORS (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
6	No ASCII (American National Standard Code for Information Interchange) characters displayed.	Replace the MC621 Video Generator at XZA102. If the condition is not corrected, replace the Read-Only Memory and check wiring from the Memory Frame to the Display Controller module.
7	One, two, or a group of characters missing.	Replace the Read-Only Memory.
8	Improper character formation (incorrect amount of dots).	Replace the MC618 Stroke Counter at XZA103. See corrective action for step 6.
9	Insufficient spacing between characters.	Replace the MC618 Stroke Counter at XZA103.
10	Random dots displayed.	See corrective action for step 6.

CHART 4

CURSOR AND CURSOR MOVEMENT

NO.	SYMPTOM	CORRECTIVE ACTION
1	No cursor.	Replace the circuit cards in order until the symptom is corrected: MC621 Video Generator at XZA102 MC922 Cursor Register at XZA112 and XZA113 MC628 Cursor Format at XZA114
2	More than one cursor per line.	Replace the circuit cards in order until the symptom is corrected: MC922 Cursor Register at XZA113 MC628 Cursor Format at XZA114
3	Cursors on more than one line.	Replace the circuit cards in order until the symptom is corrected: MC922 Cursor Register at XZA112 MC628 Cursor Format at XZA114
4	Cursor up and/or down inoperative.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC651 Miscellaneous Circuits at XZA117 MC922 Cursor Register at XZA112

CHART 4

CURSOR AND CURSOR MOVEMENT (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
5	Cursor right and/or left inoperative.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC651 Miscellaneous Circuits at XZA117 MC922 Cursor Register at XZA113
6	Cursor repeat movement inoperative.	Replace the MC623 Edit No. 1 at XZA312.
7	Erratic cursor movements.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC651 Miscellaneous Circuits at XZA117 MC922 Cursor Register at XZA112 and XZA113 MC628 Cursor Format at XZA114
8	No cursor return.	Replace the MC625 Edit No. 2 at XZA311.
9	No single step cursor movements.	Replace MC623 Edit No. 1 at XZA312.
10	No cursor home.	See corrective action for step 9.

CHART 5

CHARACTER ENTRY AND POSITION

NO.	SYMPTOM	CORRECTIVE ACTION
1	Character shifting through display.	Replace the circuit cards in order until the symptom is corrected: MC927 Memory Format at XZA115 MC616 Access Register at XZA110
2	No entry from keyboard.	Replace the circuit cards in order until the symptom is corrected: MC626 Receive/Read and Decode at XZA308 MC645 2 Character Buffer at XZA304 MC617 Refresh/Write and Decode at XZA104 MC618 Stroke Counter at XZA103 MC619 Transmit/Write and Decode at XZA301 MC135 Keyboard Interface located behind the keyboard

CHART 5

CHARACTER ENTRY AND POSITION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3	Random characters displayed when power is applied.	Replace the MC620 Terminal Interface Control at XZA313.
4	Wrong characters displayed when entering from the keyboard.	Replace the circuit cards in order until the symptom is corrected: MC626 Receive/Read and Decode at XZA308 MC645 2 Character Buffer at XZA304 MC617 Refresh/Write and Decode at XZA104 MC618 Stroke Counter at XZA103 MC955 Refresh Shift Register at XZA105, XZA107, and XZA109 MC135 Keyboard Interface located behind the keyboard Read-Only Memory If the condition is not corrected, check the wiring from the Memory Frame to the Display Controller module.
5	Multiple characters appear with a single depression of a keytop.	Replace the circuit cards in order until the symptom is corrected: MC645 2 Character Buffer at XZA304 MC619 Transmit/Write and Decode at XZA301 MC890 Keyboard Interface located behind the keyboard
6	Character changing in refresh.	Replace the circuit cards in order until the symptom is corrected: MC955 Refresh Shift Register at XZA105, XZA107, and XZA109 MC616 Access Register at XZA110
7	Cursor does not step to left when depressing the BACK SPACE key.	Replace the circuit cards in order until the symptom is corrected: MC651 Miscellaneous Circuits at XZA117 MC619 Transmit/Write and Decode at XZA301
8	Depressing the NEW LINE key does position the cursor to the first character position of the next line.	Replace the circuit cards in order until the symptom is corrected: MC628 Cursor Format at XZA114 MC617 Refresh/Write and Decode at XZA104

CHART 5

CHARACTER ENTRY AND POSITION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
9	With VIEW CONTRLS (Controls) button not illuminated, control characters are displayed.	Replace the circuit cards in order until the symptom is corrected: MC625 Edit No. 2 at XZA311 MC621 Video Generator at XZA102
10	With VIEW CONTRLS button illuminated, control characters are not displayed.	See the corrective action for step 9.
11	When CLEAR button is depressed, characters remain on display.	Replace circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC617 Refresh/Write and Decode at XZA104 MC618 Stroke Counter at XZA103 MC625 Edit No. 2 at XZA311
12	When the CLEAR button is depressed, all characters change to something other than nulls.	Replace the circuit cards in order until the symptom is corrected: MC617 Refresh/Write and Decode at XZA104 MC955 Refresh Shift Register at either XZA105, XZA107, or XZA109 depending upon the level affected
13	LINE ERASE function does not operate.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC618 Stroke Counter at XZA103 MC625 Edit No. 2 at XZA311
14	Depressing the LINE ERASE button performs a CLEAR function.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC651 Miscellaneous Circuits at XZA117
15	Underscore is not displayed when the appropriate key is depressed.	Replace the circuit cards in order until the symptom is corrected: MC617 Refresh/Write and Decode at XZA104 MC955 Refresh Shift Register at XZA109 MC651 Miscellaneous Circuits at XZA117 MC621 Video Generator at XZA102

CHART 6

CHARACTER AND LINE DELETE ERRORS

NO.	SYMPTOM	CORRECTIVE ACTION
1	Entire edit cluster is inoperative.	Replace the MC625 Edit No. 2 card at XZA311.
2	CHAR (Character) DELETE function is inoperative.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC616 Access Register at XZA110 MC618 Stroke Counter at XZA103 MC625 Edit No. 2 at XZA311
3	No single step CHAR DELETE.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC616 Access Register at XZA110
4	CHAR DELETE function will not repeat.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311
5	LINE DELETE function is inoperative.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC616 Access Register at XZA110 MC618 Stroke Counter at XZA103
6	LINE DELETE function does not reset after one line.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311
7	LINE DELETE function operates in first 6 lines of USO (Universal Service Order) format.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC628 Cursor Format at XZA114

CHART 7

CHARACTER AND LINE INSERT ERRORS

NO.	SYMPTOM	CORRECTIVE ACTION
1	CHAR (Character) INSERT function is inoperative.	Replace the circuit cards in order until the symptom is corrected: MC625 Edit No. 2 at XZA311 MC623 Edit No. 1 at XZA312 MC616 Access Register at XZA110 MC618 Stroke Counter at XZA103
2	No single step CHAR INSERT.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311
3	CHAR INSERT function will not repeat.	Replace the circuit cards in order until the symptom is corrected: MC625 Edit No. 2 at XZA311 MC623 Edit No. 1 at XZA312
4	CHAR INSERT operative, even though the last character in the line is other than a null or space.	Replace the circuit cards in order until the symptom is corrected: MC617 Refresh/Write and Decode at XZA104 MC625 Edit No. 2 at XZA311
5	LINE INSERT function is inoperative.	Replace the circuit cards in order until the symptom is corrected: MC625 Edit No. 2 at XZA311 MC616 Access Register at XZA110 MC618 Stroke Counter at XZA103
6	LINE INSERT function does not reset after one line.	Replace the MC625 Edit No. 2 card at XZA311.
7	LINE INSERT operates in the first six lines of the USO format.	Replace circuit cards in order until the symptom is corrected: MC628 Cursor Format at XZA114 MC625 Edit No. 2 at XZA311
8	LINE INSERT operative even though the last line of the display contains characters other than nulls or spaces.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311

CHART 7

CHARACTER AND LINE INSERT ERRORS (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
9	The CHAR (Character) DELETE function operates from one tab field into another.	Replace the circuit cards in order until the symptom is corrected: MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311 MC635 Horizontal Tab at XZA108
10	CHAR (Character) INSERT operates from one tab field into another.	Replace the circuit cards in order until the symptom is corrected: MC625 Edit No. 2 at XZA311 MC635 Horizontal Tab at XZA108
11	CHAR INSERT operative, even though the last character in the tab field is other than a null or space.	Replace the circuit cards in order until the symptom is corrected: MC617 Refresh/Write and Decode at XZA104 MC625 Edit No. 2 at XZA311

CHART 8

TRANSMIT OPERATION

NO.	SYMPTOM	CORRECTIVE ACTION
1	With the proper EOT (End of Transmission) character located after the cursor, the TRANS (Transmit) button does not illuminate when it is depressed.	Replace the circuit cards in order until the symptom is corrected: MC924 Mode and Sequence Control at XZA305 MC620 Terminal Interface Control at XZA313 MC621 Video Generator at XZA102
2	When the TRANS button is depressed it becomes illuminated, but when released the CDT goes into Receive or Local.	Replace the circuit cards in order until the symptom is corrected: MC620 Terminal Interface Control at XZA313 MC924 Mode and Sequence Control at XZA305
3	TRANS button is illuminated, display goes blank, but no data is transmitted.	Replace the circuit cards in order until the symptom is corrected: MC620 Terminal Interface Control at XZA313 MC924 Mode and Sequence Control at XZA305 (card list continued)

CHART 8

TRANSMIT OPERATION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3 (cont)		MC644 Automatic Line Ending Sequence at XZA307 MC645-646 Two or Six Character Buffer at XZA304 MC619 Transmit and Decode Read/Write Control at XZA301 MC976 PTI Driver at XZA315 If the symptom is still not corrected, check the receiving device connected to JA301.
4	Automatic Line Ending Sequence inoperative.	Replace the circuit cards in order until the symptom is corrected: MC924 Mode and Sequence Control at XZA305 MC644 Automatic Line Ending Sequence at XZA307 MC651 Miscellaneous Circuits at XZA117
5	Improper characters sent for Line Ending Sequence.	Replace the MC644 Automatic Line Ending Sequence card at XZA307.
6	Automatic Line Ending Sequence generated randomly.	Replace the circuit cards in order until the symptom is corrected: MC924 Mode and Sequence Control at XZA305 MC644 Automatic Line Ending Sequence at XZA307 MC651 Miscellaneous Circuits at XZA117 MC621 Video Generator at XZA102
7	Transmitted data is garbled.	Replace the circuit cards in order until the symptom is corrected: MC626 Receive Read and Decode at XZA308 MC645-646 Two or Six Character Buffer at XZA304 MC620 Terminal Interface Control at XZA313 MC644 Automatic Line Ending Sequence at XZA307 MC619 Transmit and Decode Read/Write Control at XZA301 MC976 PTI Driver at XZA315 If the symptom is still not corrected, check the receiving device connected to JA301.

CHART 8

TRANSMIT OPERATION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
8	CDT does not return to proper operation (LOCAL or RECEIVE) after transmitting the proper End of Transmission character.	Replace the circuit cards in order until the symptom is corrected: MC619 Transmit and Decode Read/Write Control at XZA301 MC620 Terminal Interface Control at XZA313 MC626 Receive Read and Decode at XZA308 MC924 Mode and Sequence Control at XZA305
9	CDT goes into LOCAL or RECEIVE after transmitting a character other than End of Transmission.	Replace the circuit cards in order until the symptom is corrected: MC619 Transmit and Decode Read/Write Control at XZA301 MC620 Terminal Interface Control at XZA313 MC626 Receive Read and Decode at XZA308 MC924 Mode and Sequence Control at XZA305
10	When returning to the LOCAL (or RECEIVE, optional) after transmitting, the displayed information is garbled.	Replace the circuit cards in order until the symptom is corrected: MC618 Stroke Counter at XZA103 MC616 Access Register at XZA110 MC955 Refresh Shift Register at either XZA105, XZA107, or XZA109 MC956 Refresh Shift Register at XZA106
11	With Home on Transmit option used, HOME is inoperative.	Replace the MC620 Terminal Interface Control card at XZA313.

CHART 9

RECEIVE OPERATION

NO.	SYMPTOM	CORRECTIVE ACTION
1	When power is applied, the CDT is not in Local.	Replace the MC620 Terminal Interface Control card at XZA313.
2	The REC (Receive) button does not illuminate when it is depressed.	See corrective action in step 1.

CHART 9

RECEIVE OPERATION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3	When the REC button is depressed it becomes illuminated, but when released the CDT goes into Local.	See corrective action in step 1.
4	REC button is illuminated, but the display does not go blank.	Replace the circuit cards in order until the symptom is corrected: MC620 Terminal Interface Control at XZA313 MC618 Stroke Counter at XZA103 MC969 PTI Terminator at XZA316 If the symptom is still not corrected, check the transmitting device connected to JA303.
5	REC button is illuminated, display goes blank, but no data is received.	Replace the circuit cards in order until the symptom is corrected: MC620 Terminal Interface Control at XZA313 MC618 Stroke Counter at XZA103 MC616 Access Register at XZA110 MC619 Transmit and Decode Read/Write Control at XZA301 MC924 Mode and Sequence Control at XZA305 MC626 Receive Read and Decode at XZA308 MC969 PTI Terminator at XZA316 MC645-646 Two or Six Character Buffer at XZA304 If the symptom is still not corrected, check the transmitting device connected to JA303.
6	Receive activated but received data garbled.	Replace the circuit cards in order until the symptom is corrected: MC626 Receive Read and Decode at XZA308 MC645-646 Two or Six Character Buffer at XZA304 MC618 Stroke Counter at XZA103 MC619 Transmit and Decode Read/Write Control at XZA301 MC616 Access Register at XZA110 MC969 PTI Terminator at XZA316 If the symptom is still not corrected, check the transmitting device connected to JA303.

CHART 9

RECEIVE OPERATION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
7	Character reject inoperative.	Replace the circuit cards in order until the symptom is corrected: MC626 Receive Read and Decode at XZA308 MC620 Terminal Interface Control at XZA313
8	CDT does not go into Local upon receiving a proper End of Transmission character.	Replace the circuit cards in order until the symptom is corrected: MC619 Transmit and Decode Read/Write Control at XZA301 MC620 Terminal Interface Control at XZA313 MC924 Mode and Sequence Control at XZA305
9	CDT goes into Local on a character other than End of Transmission.	Replace the MC619 Transmit and Decode Read/ Write Control card at XZA301.

CHART 10

HORIZONTAL TABULATION

NO.	SYMPTOM	CORRECTIVE ACTION
1	TAB is inoperative.	Replace the MC635 Horizontal Tabulation card at XZA108.
2	TAB VIEW is inoperative.	Replace circuit cards in order until symptom is corrected: MC635 Horizontal Tabulation at XZA108 MC651 Tab View at XZA117
3	TAB CLEAR is inoperative.	See corrective action for step 1.
4	Generating a TAB from the keyboard does not advance cursor to a tab mark or the end of a line.	Replace circuit cards in order until symptom is corrected: MC617 Refresh/Write and Decode at XZA104 MC635 Horizontal Tabulation at XZA108
5	Generating a TAB from the keyboard causes the cursor to advance to the end of a line and bypass a Tab Mark.	Replace the circuit cards in order until the symptom is corrected: MC635 Horizontal Tabulation at XZA108 MC922 Cursor Register at XZA113

CHART 10

HORIZONTAL TABULATION (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
6	Generating a TAB from the keyboard causes the cursor to stop at random before or after a Tab Mark.	See corrective action for step 5.
7	Generating a TAB from the keyboard and using the Write On Space option, spaces are not written to the Tab Mark.	Replace the circuit cards in order until the symptom is corrected: MC635 Horizontal Tabulation at XZA108 MC617 Refresh/Write and Decode at XZA104
8	Using the Write Space on Tab option, when a Tab is received, spaces are written into the entire memory.	See corrective action for step 7.

CHART 11

END-OF-LINE INDICATOR

NO.	SYMPTOM	CORRECTIVE ACTION
1	No audible indication at the proper character counts.	Replace the MC653 End-of-Line Indicator card at XZA111.
2	Audible indication at other than the proper character counts.	Replace the circuit cards in order until the symptom is corrected: MC653 End-of-Line Indicator at XZA111 MC922 Cursor Register at XZA113 MC628 Cursor Format at XZA114
3	Audible indication while in Receive or Transmit.	Replace the circuit cards in order until the symptom is corrected: MC653 End-of-Line Indicator at XZA111 MC620 Terminal Interface Control at XZA313

CHART 12

VIDEO HIGHLIGHT

NO.	SYMPTOM	CORRECTIVE ACTION
1	Highlight inoperative.	Replace the circuit cards in order until the symptom is corrected: MC943 Video Highlight on MC612 MC956 Refresh Shift Register at XZA106 MC616 Access Register at XZA110 MC934 Highlight and Protected Format at XZA306
2	All data highlighted.	See corrective action for step 1.
3	Random characters highlighted.	See corrective action for step 1.

CHART 13

PROTECTED FORMAT

NO.	SYMPTOM	CORRECTIVE ACTION
1	Protected format inoperative.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC956 Refresh Shift Register at XZA106 MC616 Access Register at XZA110
2	All displayed data protected.	See corrective action for step 1.
3	Protected format operates at random.	See corrective action for step 1.
4	Line insert and/or line delete operative with protected data displayed.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311 MC628 Cursor Format at XZA114
5	Character insert and/or character delete operates in a protective field.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC623 Edit No. 1 at XZA312 MC625 Edit No. 2 at XZA311

CHART 13

PROTECTED FORMAT (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
6	Cursor does not stop at the end of a protected field when the TAB key is depressed.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC635 Horizontal Tabulation at XZA108
7	When tabbing through a protected field, with the Write Space or Horizontal Tab option selected, spaces overwrite protected data.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight Protected Format at XZA306 MC956 Refresh Shift Register at XZA106
8	When tabbing through a protected field where a Line Feed character is present, the cursor does not advance to the next line.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC628 Cursor Format at XZA114
9	With the End-of-Line indicator option selected, the audible indicator does not sound when an attempt is made to overwrite in a protected field.	Replace the circuit cards in order until the symptom is corrected: MC934 Highlight and Protected Format at XZA306 MC653 End-of-Line Indicator at XZA111

CHART 14

ON-LINE EDIT (Receive)

NO.	SYMPTOM	CORRECTIVE ACTION
1	When receiving the Escape H sequence, the cursor does not return to the home position.	Replace the circuit cards in order until the symptom is corrected: MC567 On-Line Edit at XZA303 MC568 On-Line Edit at XZA302 MC924 Mode and Sequence Control at XZA305
2	When receiving the Escape J sequence, the clear from cursor function is not activated.	See corrective action for step 1.

CHART 14

ON-LINE EDIT (Receive) (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3	When receiving the Escape 1 sequence, tabs are not set.	See corrective action for step 1.
4	When receiving the Escape 2 sequence, tabs are not cleared.	See corrective action for step 1.
5	When receiving the Escape 3 sequence, highlight is not turned on.	Replace the circuit cards in order until the symptom is corrected: MC567 On-Line Edit at XZA303 MC568 On-Line Edit at XZA302 MC924 Mode and Sequence Control at XZA305 MC934 Highlight and Protected Format at XZA306
6	When receiving the Escape 4 sequence, highlight is not turned off.	See corrective action for step 5.
7	When receiving the Escape W sequence, the Protect On function is not performed.	See corrective action for step 5.
8	When receiving the Escape X sequence, the Protect Off function is not performed.	See corrective action for step 5.
9	When receiving the Escape Y sequence, the Underline On function is not performed.	See corrective action for step 5.
10	When receiving the Escape Z sequence, the Underline Off function is not performed.	See corrective action for step 5.
11	When receiving the Escape] sequence, the Protect Off and Underline On functions are not performed.	See corrective action for step 1.
12	When receiving the Escape [sequence, the Protect On and Underline Off functions are not performed.	See corrective action for step 1.
13	One or both of the Escape Sequence Characters are displayed when received instead of being rejected.	Replace the circuit cards in order until the symptom is corrected: MC567 On-Line Edit at XZA303 MC568 On-Line at XZA302 MC620 Terminal Interface Control at XZA313

CHART 14

ON-LINE EDIT (Receive) (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
14	Receive activated but data not received.	Replace the circuit cards in order until the symptom is corrected: MC567 On-Line Edit at XZA303 MC568 On-Line Edit at XZA302 MC924 Mode and Sequence Control at XZA305 MC620 Terminal Interface Control at XZA313

CHART 15

TRANSMIT OF ESCAPE SEQUENCES

NO.	SYMPTOM	CORRECTIVE ACTION
1	Any or all of the Transmit of Escape Sequences (Underline, Protect, and Highlight) inoperative.	Replace the circuit cards in order until the symptom is corrected: MC644 Automatic Line Ending Sequence at XZA307 MC654 Underline Transmit and Read Only Memory Address at XZA309 MC655 Transmit Escape Sequence Logic at XZA310 MC653 End-of-Line Indicator at XZA111 MC626 Receive Read and Decode at XZA308
2	Improper Escape Sequences transmitted.	Replace the circuit cards in order until the symptom is corrected: MC654 Underline Transmit and Read Only Memory Address at XZA309 MC655 Transmit Escape Sequence Logic at XZA310 MC653 End-of-Line Indicator at XZA111 MC956 Refresh Shift Register at XZA106
3	Automatic Line Ending Sequence inoperative when transmitting escape sequences.	Replace the circuit cards in order until the symptom is corrected: MC654 Underline Transmit and Read Only Memory Address at XZA309 MC655 Transmit Escape Sequence Logic at XZA310 (card list continued)

CHART 15

TRANSMIT OF ESCAPE SEQUENCES (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
3 (cont)		MC653 End-of-Line Indicator at XZA111 MC924 Mode and Sequence Control at XZA305 MC644 Automatic Line Ending Sequence at XZA307
4	With the FORM TRANSMIT button not illuminated, the CDT transmits both protected and unprotected data.	Replace the circuit cards in order until the symptom is corrected: MC653 End-of-Line Indicator at XZA111 MC655 Transmit Escape Sequence Logic at XZA310
5	With the FORM TRANSMIT button not illuminated, and the Space Fill option being used, spaces are not substituted for protected data.	Replace the circuit cards in order until the symptom is corrected: MC653 End-of-Line Indicator at XZA111 MC655 Transmit Escape Sequence Logic at XZA310 MC654 Underline Transmit and Read Only Memory Address at XZA309 MC644 Automatic Line Ending Sequence at XZA307 MC626 Receive Read and Decode at XZA308
6	With the FORM TRANSMIT button not illuminated, and the Send Unprotected Only option being used, both protected and unprotected data is transmitted.	Replace the circuit cards in order until the symptom is corrected: MC653 End-of-Line Indicator at XZA111 MC655 Transmit Escape Sequence Logic at XZA310 MC654 Underline Transmit and Read Only Memory Address at XZA309
7	With the FORM TRANSMIT button illuminated, the data is not transmitted.	See corrective action for step 2.

CHART 16

EXTERNAL MODE CONTROL (Cluster Controller)

In order to monitor the condition of the control leads, an oscilloscope must be utilized. Since the signals are at the same voltage levels as the PTI signals, the oscilloscope sensitivity must be reduced to detect the difference between ground and 0.7 v.

TDE (Transmit Data Error)
TA (Transmit Abort)
TDA (Transmit Data Acknowledge)

Note 1: When monitoring the signals above, the oscilloscope ground must be connected to the TDE, TA, and TDA return located at terminal 2 of the MC966 External Mode Control circuit card.

RDE (Receive Data Error)
RDA (Receive Data Acknowledge)

Note 2: When monitoring the signals above, the oscilloscope ground should be connected to the RDE and RDA return located at terminal 29 of the MC966 External Mode Control circuit card.

NO.	SYMPTOM	CORRECTIVE ACTION
1	Cursor does not return to HOME position on TDE.	Replace the MC966 External Mode Control circuit card at XZA314.
2	No error rerun or incorrect number of reruns on TDE.	See corrective action for step 1. If the symptom still exists, check the cluster or station controller.
3	TA does not HOME cursor.	See corrective action for step 1.
4	TA does not cause LOCAL button to go on and off.	Replace the circuit cards in order until the symptom is corrected: MC966 External Mode Control at XZA314 MC620 Terminal Interface Control at XZA313
5	Depressing the LOCAL button does not reset TA.	Replace the circuit cards in order until the symptom is corrected: MC620 Terminal Interface Control at XZA313 MC966 External Mode Control at XZA314
6	TDA does not place CDT into RECEIVE.	See corrective action for step 4.
7	No error rerun on RDE.	See corrective action for step 1. If the symptom still exists, check the cluster or station controller.

CHART 16

EXTERNAL MODE CONTROL (Cluster Controller) (Continued)

NO.	SYMPTOM	CORRECTIVE ACTION
8	CDT does not go into LOCAL after RDA.	See corrective action for step 4.
9	Clear from cursor after RDA inoperative.	See corrective action for step 1.
Note: Refer to Charts 8 and 9 for troubles relating to data transfer.		