PARITY FAILURE DETECTOR (SA110)

CHECKOUT AND TROUBLESHOOTING

CONTENTS PAGE

1. GENERAL

1.01 This section provides the checkout and troubleshooting procedures for the SA110 parity failure detector and the bypass and indicator assemblies available for use with it.

1.02 The checkout procedure is divided into two parts: Checkout for parity failure detectors mounted on standard speed equipment (33 and 35 type sets) and checkout for those mounted on high speed equipment (DATASPEED Type 2 Receivers). Since the SA110 is a receive-only device (except for optional break generation), access to a sending station – either remote or local – is necessary for troubleshooting.

1.03 Because of the complexity of the parity detector circuits, troubleshooting is confined to repairing wired connections and replacing faulty circuit cards. It is not considered practical to repair cards in the field. Damaged cards should either be sent to a shop equipped to test and replace integrated circuit packages or discarded.

2. CHECKOUT PROCEDURE

2.01 The following operational tests should be made, when required, after installation is complete. They should also be performed after correction of any parity detector trouble.

2.02 Refer to Part 3 for analysis of any trouble which appears during checkout.

STANDARD SPEED EQUIPMENT (33 and 35 Type Sets)

A. Reception of Normal Copy

2.03 This test requires transmitting a test message from an external sender to the terminal having the SA110, either locally (over a signal line) or remotely (over transmission lines). If a remote sender is used, transmission errors may occur which are not detectable by the SA110, or which have only the parity bit changed and so are detected by the SA110 as errors but appear correctly in the printed copy. The presence of an error in the copy which was not detected by the SA110 or the appearance of an error indication not accompanied by an error in the copy, then, does not necessarily mean that a malfunction occurred. Should this happen, testing must be extended to determine whether other errors will be detected or other false indications occur. If a local sender is used, no transmission errors can occur though noise pulses from a 33 type distributor may cause error indications at an SA110 strapped for the significant distortion check.

2.04 When a remote sender is used for either a 33 or 35 type set, the data connection to the terminal should be established in the usual manner as though the SA110 were not there. If there is more than one remote sender to choose from, pick the sender most likely to have the lowest overall error rate. This will probably be a new sender, or one recently readjusted, located in the same city as the SA110 receiver or otherwise physically as close to it as

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possible. If records have been kept of the error rates from various senders, select the best one regardless of its age or location. If the error indication is a line break (SA110 AB, SA110 BA, and SA110 CA), a telephone connection must be established to the sender for the operator there to report on the indications received.

2.05 When a local sender is used for either a 33 or 35 type set, the data connection to the terminal should be established in the usual manner as though the SA110 were not there. If there is more than one local sender to choose from, pick the one most likely to have the lowest overall error rate. This will probably be a new sender, or one recently readjusted, unless error rate records have been kept and show otherwise.

2.06 Transmit correct-parity copy to the SA110 for 15 minutes. If the copy is printed correctly and no line breaks are generated or errors counted, or if an occasional line break is generated or error counted and a corresponding error is observed in the copy (remote sender only), the SA110 can be assumed to operate properly with error-free copy. If the copy is garbled, refer to Part 3. If the copy is printed correctly, but errors are indicated continuously from a remote sender or if any errors are indicated from a local sender (except a 33 sender when the SA110 is strapped for the significant distortion check), refer to Part 3. If the copy from a remote sender is printed correctly but an occasional line break is generated or error counted, or if an occasional error appears in the copy which is not indicated, extend the test for several more minutes. This will determine whether normal false indications (caused by the parity bit only being in error) or nondetectable errors occurred or whether the SA110 is defective. If further failures occur regularly, refer to Part 3.

Note: The direct output of a 33 type sender, depending on its age and condition, may contain noise spikes which can trigger the significant distortion check circuit in the SA110. A very high percentage of errors may be indicated under these conditions. To check for SA110 operation under normal service conditions when only a 33 type sender is available, cut strap C on card MC402 in the SA110 chassis to remove the significant distortion check. Be sure to solder strap C closed at the conclusion of checkout if the significant distortion check will be used in service.

B. Parity Error Detection

2.07 A tape containing parity errors can be prepared using either a nonparity or a parity keyboard. If an ASR set with a nonparity keyboard is available it would be easier to use it. (To determine if the keyboard on an ASR set is nonparity, turn on the set and depress the A key several times. If three holes are punched in the tape, the keyboard is nonparity.) Make a test tape using the format of Figure 1. If an ASR set with a nonparity keyboard is not available, use any ASR set and make a test tape as shown in Figure 2.

(RETURN) CEFIJLOQRTWX AEXERTBEXERT ATWXBTWXDTWX QUESTMOPRAID ABDGHKMNPSUV

Note: Space once between each group of 12 letters. First group has no parity errors, second group has two (A and B) with five good characters following, third group has three (A, B, and D) with three good characters following, fourth has alternate correct and incorrect parity (six errors – U, S, M, P, A, and D), and last group has 12 consecutive errors.

Figure 1 - Low Speed Parity Error Test Tape Using Nonparity Keyboard (8th Bit Marking)

(RETURN) A?U*A?U*A?U* A?U*A?U*A?U* A?U*A?U*A?U* A?U*A?U*A?U* A?U*A?U*A?U*

Make Incorrect Parity Characters as Explained Below

Note: Space once between each group of 12 letters. Keyboard the characters with incorrect parity as follows:

A – Keyboard A then depress LOC B SP once and keyboard @

U – Keyboard U then depress LOC B SP once and keyboard @

? – Keyboard ? then depress LOC B SP once and depress space bar

* – Keyboard " then depress LOC B SP once and keyboard LINE FEED

Figure 2 - Low Speed Parity Error Test Tape Using Parity Keyboard

2.08 Send the parity error tape to the SA110 receiver from a local sender, if possible. The response depends on the SA110 version being checked, as follows:

(a) The response of an SA110 AB, SA110 BA, or SA110 CA for either tape should be as follows for each group of 12 letters: Group 1 – no response; group 2 – two line breaks; group 3 – two line breaks; group 4 – two or three line breaks; and group 5 – three line breaks. All characters should be printed correctly by the printer (including incorrect parity *, if present in tape).

(b) The response of an SA110 BB or SA110 CB for either tape should be as follows for each group of 12 letters: Group 1 – no indication; group 2 – counter registers 2; group 3 – counter registers 3 more (total is 5); group 4 – counter registers 6 more (total is 11); and group 5 – counter registers 12 more (total is 23). All characters should be printed correctly by the printer (including incorrect parity *, if present in tape). Lamp flashes for each error or lights on first error and blinks off and on for all following errors until reset by depressing lamp housing, depending on strapping.

2.09 If any deviation from the correct response occurs for a local sender, refer to Part 3. If a deviation occurs for a remote sender, repeat the test one or two times to see if it was caused by line noise. If the same deviation is repeated, refer to Part 3.

C. Significant Distortion Detection

2.10 Operation of the significant distortion check, if used, may be checked with a DXD800 signal distortion test set or equivalent, either remotely or locally. If a DXD800 is used, set the test knob to R, turn the INCREASE DISTORTION knob so that about 40 to 45 percent bias distortion, either marking or spacing, is introduced, and check operation of the set. Continuous Rs should be copied by the printer. Increase the distortion further and repeat. At some point between 45 and 51 percent distortion, the printer should stop printing (and spacing) and the SA110 should indicate continuous errors.

Note: The distortion percentages in 2.10 apply to local testing only. If testing is done remotely, the distortion introduced by the transmission lines must be taken into account.

2.11 If the SA110 garbles characters with less than 45 percent distortion or indicates errors for such characters, or if it fails to garble characters distorted more than 51 percent or indicate errors for them, refer to Part 3.

HIGH SPEED EQUIPMENT (DATASPEED Type 2 Sets)

A. Reception of Normal Data

2.12 This test requires transmitting a test message to the terminal having the SA110, either locally (at a send-receive station in the TEST position or over a telephone extension) or remotely (over transmission lines). If a remote sender is used, transmission errors may occur which are not detectable by the SA110, or which have only the parity bit changed and so are detected by the SA110 as errors but appear correctly in the punched tape. The presence of an error in the tape which was not detected by the SA110 or the appearance of an error indication not accompanied by an error in the tape, then, does not necessarily mean that a malfunction occurred. Should this happen, testing must be extended to determine whether other errors will be detected or other false indications occur. If a local sender is used, no transmission errors can occur.

2.13 When a remote sender is used, the data connection to the terminal should be established in the usual manner as though the SA110 were not there. If there is more than one remote sender to choose from, pick the sender most likely to have the lowest overall error rate. This will probably be a new sender, or one recently readjusted, located in the same city as the SA110 receiver or otherwise physically as close to it as possible. If records have been kept of the error rates from various senders, select the best one regardless of its age or location.

2.14 When a send-receive station is available, place the sender mode switch in the TEST position. When a send-receive station is not available, the data connection to the terminal should be established in the usual manner as though the SA110 were not there. If there is more than one local sender to choose from, pick the one most likely to have the lowest overall error rate. This will probably be a new sender, or one recently readjusted, unless error rate records have been kept and show otherwise.

2.15 Transmit a correct-parity tape to the SA110 for 15 minutes. If the tape is punched correctly and no breaks on reverse channel are generated or errors counted, or if an occasional break is generated or error counted and a corresponding error is observed in the tape (remote sender only), the SA110 can be assumed to operate properly with error-free tapes. If the tape is garbled, refer to Part 3. If the tape is punched correctly, but errors are indicated continuously, refer to Part 3. If the tape from a remote sender is punched correctly but an occasional break is generated or error counted or if an occasional error appears in the tape which is not indicated, extend the test for several more minutes to determine whether normal false indications or nondetectable errors occurred or whether the SA110 is defective. If further failures occur regularly, refer to Part 3.

B. Parity Error Detection

2.16 A tape containing parity errors can be prepared using either a nonparity or a parity keyboard. If an ASR set with a nonparity keyboard is available, it would be easier to use it. (To determine if the keyboard on an ASR set is nonparity, turn on the set and depress the A key several times. If three holes are punched in the tape, the keyboard is nonparity.) To check even parity, make a test tape using the format of Figure 3. If an ASR set with a nonparity keyboard is not available, use any ASR set and make a test tape as shown in Figure 4. To check odd parity, make a test tape using an odd parity keyboard and backspace and overstrike to obtain incorrect (even) parity characters (similar to the procedure of Figure 4).

```
CCCCCCCCCC**********@@@@@@@@@@10 DELETESCCCCCCCCCC**********@@@@@@@@@@
ACCCCCCCCC**********@@@@@@@@@@10 DELETESCCCCCCCCCC**********@@@@@@@@@@
ACCCCCCCCC**********@@@@@@@@@@10 DELETESCCCCCCCCCC*A*********@@@@@@@@@@
 D D D D D D D D D
AEAEAEAEAEAEAEAEAEV@V@V@V@V@V@V@V@U*U*U*U*U*U*U*U*U*DCDCDCDCDCDCDCDC
 L L L L L L L L L
AAAAAAAAAAVVVVVVVVVVUUUUUUUUUUDDDDDDDDDDAAAAAAAAAAVVVVVVVVVVDDDDDDDDDD
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Note: "10 DELETES" and "DEL" refer to nonprinting DELETE (RUB OUT) character, which should be punched where indicated. Separate each line with 50 DELETES so that it can be clearly recognized in the output tape. First line has no parity errors, second line has one (A), third line has two (A, A), fourth line has 35 (every other character – all A, V, U, and D characters), and fifth line has 70 (all errors).

Figure 3 - High Speed Even Parity Error Test Tape Using Nonparity Keyboard (8th Bit Marking)

UUUUUUUUUU**********AAAAAAAAAA10 DELETESUUUUUUUUUU**********AAAAAAAAAA

UUUUUUUUUU**********AAAAAAAAAA10 DELETESUUUUUUUUUU**********AAAAAAAAAA

Make Incorrect Parity Character as Explained Below

UUUUUUUUUU**********AAAAAAAAAA10 DELETESUUUUUUUUUU**********AAAAAAAAAA

Make Incorrect Parity Characters as Explained Below

UUUUUUUUUU**********AAAAAAAAAA10 DELETESUUUUUUUUUU**********AAAAAAAAAA

Make Incorrect Parity Characters as Explained Below

UUUUUUUUUU**********AAAAAAAAAA10 DELETESUUUUUUUUUU**********AAAAAAAAAA

Make Entire Line Above Incorrect Parity Characters as Explained Below

Note: "10 DELETES" refers to nonprinting DELETE (RUB OUT) character, which should be punched where indicated. Separate each line with 50 DELETES so that it can be clearly recognized in the output tape. Keyboard the characters with incorrect parity as follows:

U – Keyboard U then depress LOC B SP once and keyboard @

* – Keyboard " then depress LOC B SP once and keyboard LINE FEED

A – Keyboard A then depress LOC B SP once and keyboard @

DELETE – Keyboard A then depress LOC B SP once and keyboard ?

Figure 4 - High Speed Even Parity Error Test Tape Using Parity Keyboard

2.17 Send the parity error tape to the SA110 receiver from a local sender, if possible. The response depends on the SA110 version being checked, as follows:

(a) The response of an SA110 AD or SA110 EA for either tape should be as follows for each line (group of 70 characters): Line 1 – no response; line 2 – one break on reverse channel; line 3 – two breaks on reverse channel (one break acceptable but indicates that SA110 inhibit is longer than 500 milliseconds); line 4 – two breaks on reverse channel; line 5 – two breaks on reverse channel. All characters should be punched exactly as sent, including all incorrect parity characters.

Note: More or less breaks will appear if the lines are not separated by about 50 DELETE characters.

(b) The response of an SA110 EB for either tape should be as follows for each line (group of 70 characters): Line 1 – no response; line 2 – counter registers 1; line 3 – counter registers 2 more (total is 3); line 4 – counter registers 11 to 17 more (total is 14 to 20); line 5 – counter registers about 11 to 17 more (total is about 25 to 37). The SA110 is considered acceptable if at least 23 errors are counted during this test. All characters should be punched exactly as sent, including all incorrect parity characters. Lamp flashes for each error or lights on first error and blinks off and on for all following errors until reset by depressing lamp housing, depending on strapping.

(c) The response of an SA110 EC for either tape should be as follows for each line (group of 70 characters): Line 1 – no response; line 2 – lamp lights and remains on; lines 3 through 5 – no change. Lamp remains on after test is complete until lamp housing is depressed. All characters should be punched exactly as sent, including all incorrect parity characters.

(d) The response of an SA110 ED for either tape should be as follows for each line (group of 70 characters): Line 1 – no response; line 2 – counter registers 1; line 3 – counter registers 2 more (total is 3); line 4 – counter registers 35 more (total is 38); line 5 – counter registers 70 more (total is 108). A few counts may be dropped in the last line; the SA110 is considered acceptable if the final count is at least 101. All characters should be punched exactly as sent, including all incorrect parity characters. Lamp lights on first error

and remains on after test is complete until lamp housing is depressed (blinks may be seen while the counter is counting).

C. Significant Distortion Detection

2.18 Operation of the significant distortion check, if used, may be checked with a TSG800 test set or high speed 911 test set, if one is available. Introduce a correct-parity signal containing about 40 to 45 percent bias distortion, either marking or spacing, and check operation of the receiver. The test signal should be punched correctly by the receiver. Increase the distortion further and repeat. At some point between 45 and 51 percent distortion, the receiver should begin to punch incorrect characters and the SA110 should indicate continuous errors.

Note: The distortion percentages given above apply to local testing only. If testing is done remotely, the distortion introduced by the transmission lines must be taken into account.

2.19 If the SA110 garbles characters with less than 45 percent distortion or indicates errors for such characters, or if it fails to garble characters distorted more than 51 percent or indicate errors for them, refer to Part 3.

3. TROUBLESHOOTING PROCEDURE

GENERAL

3.01 Tools required for troubleshooting are listed in Section 570-005-800. A volt-ohm-milliammeter is also required.

3.02 Special terms used in troubleshooting are defined as follows:

(a) Open circuit – no current flowing

(b) Closed circuit – current able to flow

(c) Running open – open circuit condition at printer or punch; shafts turn continuously and mechanisms operate, but clutches do not latch, or punch punches continuous NULL characters

(d) Running closed – closed circuit condition at printer or punch; clutches latched and shafts do not turn

(e) Garble – incorrect characters printed or punched

3.03 Receiving troubles at the set can be caused by malfunction of one or more of several elements. The sender might garble or distort its signal; its data set might do likewise; the transmission line might open or become noisy; the terminal data set might open or garble signals; the SA110 might fail in a number of ways; or the terminal itself might malfunction. The first step in troubleshooting is to isolate the trouble to one or more of these sources.

3.04 To determine if the source of trouble is in the terminal or ahead of it (SA110 parity failure detector, data set, etc), place the terminal in the local mode, if possible, and check its operation. Abnormal operation indicates that the trouble is in the terminal.

3.05 Troubles isolated to the terminal are not covered in this section.

3.06 If terminal operation is normal in the local mode, turn the PARITY CHECK switch on the bypass switch or indicator assembly (if present) to OFF. (If the SA110 has no bypass switch or indicator assembly, disconnect it from line and place a wire strap between the data input and the data output. Be sure to remove the strap before reconnecting the SA110 to the line when this check is completed.) Request a message transmission from a terminal whose transmission the receiver could not copy correctly. Abnormal operation indicates that the trouble is in the sender or its data set, the transmission line, or the receiver data set, provided that the SA110 was installed correctly. Verify all SA110 connections if in doubt.

3.07 Troubles isolated to sending terminals, data sets, or the transmission line are not covered in this section.

3.08 If terminal operation is normal in the local mode and in the line mode with the SA110 PARITY CHECK switch OFF (or equivalent), but is abnormal with the PARITY CHECK switch ON, the trouble is in the SA110.

3.09 Troubles isolated to the SA110 parity failure detector are corrected by replacement of a fuse or card. Do not remove or insert cards with the power on. Unplug the SA110 first.

CAUTION: THE INTEGRATED CIRCUITS USED ON THE SA110 CIRCUIT CARDS ARE FRAGILE. DO NOT DROP OR JAR ANY CARD OR ALLOW ONE TO COME IN CONTACT WITH SOLDER OR LOOSE METAL PARTICLES.

3.10 Because of the complexity of the SA110 circuits, it is not practical to make some repairs to cards at the terminal location. Damaged cards which cannot be repaired quickly should be returned to a central facility for repair.

TROUBLESHOOTING CHART

3.11 Troubles are listed on the troubleshooting chart in the order they would be detected when the SA110 is checked. Reference is made to the following schematic and actual wiring diagrams:

NUMBER	TYPE	CONTENTS
8538WD	S	SA110 Parity Failure Detector
8539WD	A	SA110 Parity Failure Detector
322402-04	C	TP322402-04 Regenerators and Parity Detect Logic Card
322405	C	TP322405 Interface Amplifiers and Break Generator Circuitry Card
8716WD	S	TP327631-34 Bypass Switch and Indicator Assemblies
8566WD	A	TP327631-34 Bypass Switch and Indicator Assemblies
8717WD	S	TP327637-40 Bypass Switch and Indicator Assemblies
8567WD	A	TP327637-40 Bypass Switch and Indicator Assemblies
322423	C	TP322423 Counter Driver Card

S = Schematic, A = Actual, C = Card Drawing

A detailed circuit description is contained in 8538WD.

3.12 Refer to Section 578-200-200 for information on installation of the SA110 and the optional bypass switch and indicator assemblies coded as part of it, and Section 578-200-800 for parts. Refer to sections and wiring diagrams furnished with the terminal for information on the terminal.

SA110 PARITY FAILURE DETECTOR TROUBLESHOOTING CHART

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
1.	Nothing is received by terminal from SA110 (terminal runs closed).	a. Check SA110 data input and output terminals for loose connections or connections made to wrong terminals (8716WD or 8717WD). Correct any faults found. b. If data connections are good, turn PARITY CHECK switch to ON and request a long message transmission from another station. Measure the voltage between slip connector terminals 2 and 3 (EIA input) or 2 and 1 (all other inputs) on card MC405 while the message is being received. If the voltage between terminals 2 and 3 or 2 and 1 is a steady 0 volt, check the contacts and wiring on the PARITY CHECK switch (8566WD or 8567WD). Repair any faults found. c. If the voltage measured in step b fluctuates near 0 volt (positive or negative, but not a steady -3 to -25 volts), measure the voltage between slip connector terminal 2 and post 18 on card MC405 while a message is being received. If this voltage is a steady +6 volts, the input amplifier (8538WD) is defective. Repair it or replace card MC405 (TP322405). d. If the voltage measured in step c fluctuates near +3 volts (from 0 to +6 volts), measure the voltage between slip connector terminal 2 and post 16 on card MC405 while a message is being received. If this voltage is a steady 0 volt, card MC402-04 is defective. Repair or replace card MC402-04 (TP322402-04). e. If the voltage measured in step d fluctuates near +3 volts (from 0 to +6 volts), measure the voltage between slip connector terminals 2 and 10 (EIA output) or 2 and 12 (all other outputs) on card MC405 while a message is being received. If this voltage is a steady -8 (±2) volts (EIA), +8 (±2) volts (signal line), or 0 volt (101C or 105A data set), the output amplifier (8538WD) is defective. Repair it or replace card MC405 (TP322405). f. If the voltage measured in step e fluctuates near 0 volt (EIA) or +4 volts (all other outputs), check the contacts and wiring on the PARITY CHECK switch (8566WD or 8567WD) and connections to the terminal. Repair any faults found.
2.	Terminal runs open when SA110 PARITY CHECK switch is ON.	a. Check connections between terminal and SA110 to be certain that all wires were installed at the correct locations (8716WD or 8717WD) and that no connections are loose. Correct any faults found. b. Check fuses F1 and F2 between cards in SA110. Replace any bad fuse. Make certain SA110 is securely plugged in.

SA110 PARITY FAILURE DETECTOR TROUBLESHOOTING CHART (continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
2. (cont)		c. If fuses are good, measure the voltage between posts 13 and 14 on card MC405. If this voltage is less than +5.0 volts, measure the voltage between posts 13 and 25 on card MC405. If this voltage is less than +10 volts, remove fuse F2 and measure it again. If it rises to about +14 volts, the +6 or +14 volt supply voltage is being loaded by card MC402-04 or card MC405. Repair involves unsoldering leads and components to locate the overload, so the entire SA110 must be replaced. d. If the voltage between posts 13 and 14 is less than +5.0 volts and the voltage between posts 13 and 25 is less than +10 volts but does not rise with fuse F2 removed, the transformer, diode block, or electrolytic capacitor portion of the power supply is defective (or line voltage is too low). Repair the power supply or replace the entire SA110. e. If the voltage between posts 13 and 14 is less than +5.0 volts but the voltage between posts 13 and 25 is +10 volts or more (about +14 volts), resistor R41 or zener diode ZD1 (both on card MC405) or power transistor Q14 (on heat sink) is defective. Repair the power supply or replace card MC405 (TP322405) or Q14. f. If the voltage between posts 13 and 14 is +5.0 volts or more, turn PARITY CHECK switch to ON and request a long message transmission from another station. Measure the voltage between slip connector terminals 2 and 3 (EIA input) or 2 and 1 (all other inputs) on card MC405 while the message is being received. If the voltage between terminals 2 and 3 or 2 and 1 is a steady positive voltage (about +6 volts), check the contacts and wiring on the PARITY CHECK switch (8566WD or 8567WD). Repair any faults found. g. If the voltage measured in step f fluctuates near 0 volt (positive or negative), measure the voltage between slip connector terminal 2 and post 18 on card MC405 while a message is being received. If this voltage is a steady 0 volt (approximately), the input amplifier (8538WD) is defective. Repair it or replace card MC405 (TP322405). h. If the voltage measured in step g fluctuates near +3 volts (from 0 to +6 volts), measure the voltage between slip connector terminal 2 and post 16 on card MC405 while a message is being received. If this voltage is a steady positive voltage (about +6 volts), card MC402-04 is defective. Repair or replace card MC402-04 (TP322402-04).

SA110 PARITY FAILURE DETECTOR TROUBLESHOOTING CHART (continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
2. (cont)		i. If the voltage measured in step h fluctuates near +3 volts (from 0 to +6 volts), measure the voltage between slip connector terminals 2 and 10 (EIA output) or 2 and 12 (all other outputs) on card MC405 while a message is being received. If this voltage is a steady +6 (±1) volts (EIA), 0 volt (signal line), or +8 (±2) volts (101C or 105A data set), the output amplifier (8538WD) is defective. Repair it or replace card MC405 (TP322405). j. If the voltage measured in step i fluctuates near 0 volt (EIA) or +4 volts (all other outputs), check the contacts and wiring on the PARITY CHECK switch (8566WD or 8567WD) and connections to the terminal. Repair any faults found.
3.	Terminal receives garbled copy when SA110 PARITY CHECK switch is ON.	a. Check SA110 data input and output terminals for loose connections or connections made to wrong terminals (8716WD or 8717WD). Correct any faults found. b. If data connections are good, check straps A and B and terminals 10, 11, and 12 on card MC402-04 to determine if they are strapped for the unit code being received (Section 578-200-200 and 8538WD). Change strapping if incorrect. c. If straps A and B and terminals 10, 11, and 12 are strapped correctly, either card MC402-04 (TP322402-04) or MC405 (TP322405) is defective. Replace either card first to isolate trouble or replace entire SA110.
4.	Parity errors are not detected (some or all).	a. If no parity errors are detected, check strapping of terminals 7, 8, and 9 (8538WD). Carefully resolder correct strap if both are open (do not keep soldering iron on strap any longer than necessary to obtain a good joint, or the heat may loosen the ends of the strap). b. If strapping of terminals 7, 8, and 9 is good, or if some parity errors are detected, either card MC402-04 (TP322402-04) or MC405 (TP322405) is defective. Replace either card first to isolate trouble or replace entire SA110.
5.	Significant distortion errors are not detected (parity error detection normal).	a. Check strap C on card MC402-04 to be sure it is properly closed (zero resistance). Carefully resolder it if necessary (do not keep soldering iron on strap any longer than necessary to obtain a good joint, or the heat may loosen the ends of the strap). b. If strap C is properly closed, MSFF, SMFF, and DDFF circuit on card MC402-04 (8538WD) is defective. Repair it or replace card MC402-04 (TP322402-04).

SA110 PARITY FAILURE DETECTOR TROUBLESHOOTING CHART (continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
6.	Errors indicated continuously (output copy good).	a. If SA110 input is from a 33 type set, cut strap C on card MC402-04. b. If strap C is open, or if SA110 input is not from a 33 type set, check terminals 7, 8, and 9 on card MC402-04 to determine if they are strapped for the type of parity being received (8 and 9 strapped for even parity check – alarm on odd parity, 8 and 7 strapped for odd parity check – alarm on even parity). Change strapping if incorrect. c. If strapping of terminals 7, 8, and 9 is correct, card MC402-04 is defective. Repair or replace card MC402-04 (TP322402-04).
7.	Errors indicated continuously (output copy garbled).	a. Check straps A and B and terminals 10, 11, and 12 on card MC402-04 to determine if they are strapped for the unit code being received (Section 578-200-200 and 8538WD). Change strapping if incorrect. b. If straps A and B and terminals 10, 11, and 12 are strapped correctly, either card MC402-04 (TP322402-04) or MC405 (TP322405) is defective. Replace card MC402-04 first to isolate trouble or replace entire SA110.
8.	False parity or significant distortion error indications (not continuous, output copy good).	Card MC402-04 is defective. Repair or replace card MC402-04 (TP322402-04).
9.	Indicator lamp does not light, but counter advances for each error.	a. Check lamp bulb. Replace bulb if burned out. b. If bulb is good, check SA110 connections for lamp and counter (8716WD or 8717WD). Look for loose connections or connections made to wrong terminals. Correct any faults found. c. If lamp and counter connections are good, check wiring of bypass switch and indicator assembly for lamp and counter (8566WD or 8567WD). Correct any faults found. d. For the SA110 ED only, check to be sure that strap C on card MC405 is open and strap D is closed (except 2400 baud operation). Change strapping if incorrect. e. If straps C and D are correct, relay K1 on card MC405 is defective. Replace it or replace card MC405 (TP322405).
10.	Indicator lamp lights, but counter does not advance (SA110 BB, SA110 CB, or SA110 EB only).	a. Check terminals 31, 32, and 33 on card MC405 to determine if they are strapped for -14 volts as required (Section 578-200-200). If connections are reversed, strap as required. Also replace diode CR1 (8716WD, 8566WD, 8717WD, 8567WD) on the counter, which was destroyed by the improper voltage.

SA110 PARITY FAILURE DETECTOR TROUBLESHOOTING CHART (continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
10. (cont)		b. If strapping of terminals 31, 32, and 33 is correct, check SA110 connections for lamp and counter (8716WD or 8717WD). Look for loose connections or connections made to wrong terminals. Correct any faults found. c. If lamp and counter connections are good, check wiring of bypass switch and indicator assembly for lamp and counter (8566WD or 8567WD). Correct any faults found. d. If wiring is good, replace TP327641 counter.
11.	Indicator lamp lights, but counter does not advance (SA110 ED only).	a. Check terminals 31, 32, and 33 on card MC405 to determine if they are strapped for +14 volts as required (Section 578-200-200). If connections are wrong, strap as required. b. If strapping of terminals 31, 32, and 33 is correct, check SA110 connections for counter (8717WD). Look for loose connections or connections made to wrong terminals. Also check the single white-black wire from position C7 of plug P902 to the bypass switch and indicator assembly for loose connections (8717WD). Correct any faults found. c. If counter connections are good, check wiring of bypass switch and indicator assembly for counter (8567WD). Correct any faults found. d. If wiring is good, either TP322423 counter driver card or TP327642 counter is defective. Replace counter driver card first to isolate trouble or replace entire TP327637 bypass switch and indicator assembly.
12.	PARITY CHECK switch inoperative.	Repair or replace TP327621 PARITY CHECK switch.