DIGITAL TRANSMISSION SYSTEMS
T1 DIGITAL LINE
FAULT-LOCATING PROCEDURES

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1. GENERAL

1.01 This section contains information for locating faults on the repeatered lines in the T1 Carrier System. Fault locating should be performed after tests in Section 365-225-500 indicate that the repeatered line does not operate properly.

1.02 This section is reissued to add information about 208 and 209 repeaters and about the error-detecting procedure at manholes and to expand the power loop test. The power loop test now appears before the fault-locating test, and the margin test has been renamed the obscure trouble test. Since this issue is a general revision, arrows usually used to denote changes have been omitted. This reissue does not affect Equipment Test Lists.

1.03 The 201-type and 208D office repeaters require span and bank terminating assemblies for patching and termination. The 215A adapter allows the use of the 208D repeater in the 201-type repeater bay. The 206-type office repeater is a plug-in unit which provides a complete span terminating circuit except for power resistors which are mounted externally. The 206A, B, E, F, H, J, L, and M repeater units contain a current regulator, transformers for simplex powering, a regenerator for the incoming signal, access jacks, fuses, and option screws for setting up appropriate powering combinations for the line and the local regenerator. The 206D, G, K, and N repeater units are like the other 206 repeaters except that they do not have the current regulator.

1.04 Trouble conditions can be classified into two fundamental groups: total signal failure and marginal operation. The transmission test described in this section is a continuity test used to isolate excessive loss or an open causing a transmission failure on a span line. The obscure trouble test in this section reveals locations where obscure faults are causing marginal operation. Both these tests constitute the fault-locating test which is used to examine a span line whenever marginal operation exists.

1.05 The fault-locating test may include one or more spans using up to 12 repeaters per fault-locating line, depending upon the system layout. The fault-locating line is usually connected through unattended offices where short span lines are involved. In such cases, the fault-locating test may be conducted from attended offices. The spans are powered individually and each span may have two power loops, one from each end. The office records show the division of spans into power loops.

1.06 Fault-locating filters may not be provided in attended offices. In such cases, all other likely sources of trouble should be eliminated before the office repeater is replaced. Caution should be observed in replacing office repeaters since an additional working system may be affected.

1.07 Tests in Parts 3, 4, 5, and 7 must be performed in sequence to isolate the trouble. Part 8 is performed when a repeater is suspected, because all the other possibilities were eliminated by the previously required tests.

2. APPARATUS

2.01 The following listed test apparatus or equivalent is required for performing the tests in this section:

1—KS-14510 Volt-Ohm-Milliammeter (VOM)

1—J98710F Fault Locating Set, calibrated according to Section 103-491-100

1—J98710R Quasi-Random Signal Source (Section 103-493-104)

1—J94003A (Section 103-611-100) or J94003C (Section 103-611-101) Noise Measuring Set (NMS)

3—3P7C Cords

1—3P17B Cord for 3A NMS

1—3P13A Cord for 3A NMS

386B Terminating Plugs

349A Shorting Plugs

3. PREPARATION

3.01 When a line of 201- or 205-type repeaters is not supplied with a bipolar pulse stream, the repeaters may oscillate. This oscillation will not occur when 206H, J, K, L, M, or N office repeaters are used with only 208 or 209 line repeaters. Fault-locating an oscillating line may reveal an inoperative repeater which is causing the 201- or 205-type repeaters beyond it to oscillate. The checks in the following procedure assure that the span lines sharing a fault-locating pair are properly terminated and supplied with a signal to stabilize the lines. The noise on the fault-locating pair is also measured in the following procedure because high noise will affect the fault-locating test.

STEP	PROCEDURE
1	Check that the bay has been acceptance tested per Section 365-224-500.
2	Check that all lines sharing a fault-locating pair are supplied with a bipolar signal from a terminal, quasi-random signal source, an extra fault locating set, or an operating system through a bridging repeater. ***Note:*** Pulse signals must be supplied to both ends of lines equipped with bidirectional repeaters.
3	**Check that all lines including the failed line sharing a fault-locating pair have a proper termination at both ends for bidirectional operation and at the far end for unidirectional operation. Assure proper terminations by providing a repeatered line, a D-type bank, or a 386B plug in the OUT jack of the 201-type and 208D office repeater or the R OUT jack of the 206-type office repeater.**
4	Check that all unassigned office regenerators sharing a fault-locating pair have a 349A shorting plug in the OUT jack of the 201-type office repeater or R OUT jack of the 206-type office repeater. ***Caution: These checks should also be done for spare lines or lines which are patched off.***
5	Connect the NMS to the FL jack for the line to be tested with a 3P17B cord or a 3P7C cord (3C NMS).

STEP	PROCEDURE
6	Measure the noise with C-MESSAGE weighting. ***Requirement:*** Less than 20 dBrnc. ***Note:*** Good results can be obtained with about 14 dBrnc of noise on the fault-locate pair, but noise in excess of 20 dBrnc makes testing difficult and should be reported to supervision. A widely varying reading indicates an oscillating line.

4. POWER LOOP TEST

4.01 Since a span line powering malfunction affects the fault-locating test, the power loop test verifies that the powering is satisfactory. This test is conducted from both ends of the span except on spans where one office is a looping point. For the office that employs 201-type and 208D office repeaters, this test checks that the line current is fully under the control of the control unit. For offices employing 206-type office repeaters, this test ensures that the line current is fully under the control of the repeater line current regulators.

STEP	PROCEDURE
	201-Type and 208D Office Repeaters
1	Inspect the fuses in the control unit in the span terminating assembly and replace burned out fuses with new 70R fuses. ***Note:*** A burned out fuse indicates excessive line current or a faulty fuse.
2	Connect the VOM to the pin jacks associated with the circuit to be tested. The negative terminal of the VOM connects to the white jack and the positive terminal to the red jack. Read and record the meter indication. ***Requirement 1:*** For 201 or 205 line repeaters: +1.3 to +2.0 volts (in hot weather: +1.3 to 1.5 volts). This reading does not include the office repeater if powered locally.) ***Requirement 2:*** For 208 or 209 line repeaters: +1.3 to +1.6 volts. ***Note:*** Too high or too low voltage indicates a change in resistance or a short or an open in the span.
3	Turn the ADJ control counterclockwise and read the meter indication. ***Requirement:*** The voltage indication should decrease.

STEP	PROCEDURE
4	Reset the ADJ control to obtain the meter indication recorded in Step 2. ***Note:*** Failure to obtain the recorded indication means no control and indicates a possible short on the line.
5	Remove the upper fuse in the circuit to be tested and read the meter indication. ***Requirement:*** Voltage reading should be zero.
6	Reinsert the fuse. ***Note:*** Failure to meet the requirement of Step 5 indicates a possible leakage of current or a short to ground in the span.
7	If the office repeater is powered locally, the power may be checked by connecting the positive lead of the VOM to pin 5 and the negative lead to pin 7 on the back of the office repeater connector. ***Requirement:*** 9.5 to 12.5 volts. **206-Type Office Repeaters**
8	Inspect the fuses located in the front panel fuse receptacles on the 206-type office repeater and replace burned out fuses with new 70K fuses. ***Note:*** A burned out fuse indicates excessive line current or a faulty fuse.
9	Set the VOM to the 3-volt dc scale.
10	Connect the VOM (−) to the (−I) test point on the repeater unit to be checked. Connect the VOM (+) to the (+) test point on the repeater. ***Requirement:*** The meter should indicate between 1.33 and 1.47 volts. (This reading corresponds to 133 and 147 mA of line current.)
11	Set the VOM to the 150-VOLT-DC scale.
12	Connect the VOM − terminal to the repeater + test point. Connect the VOM + terminal to the repeater REG test point (see Fig. 1). ***Requirement:*** The VOM should indicate between 2 and 120 volts for the 130-volt regulator (206B, F, J, or M repeater). For the 48-volt regulator (206A, E, H, or L repeater), the VOM should indicate between 1 and 40 volts. ***Note 1:*** Repeaters of the same kind and in the same span should measure within 8 percent of each other. Any wide variation in readings should be investigated (see Table A). ***Note 2:*** The reading approaches the lower limit during hot weather and approaches the upper limit during cold weather.

STEP	PROCEDURE

13 Connect the VOM + terminal to the repeater + test point and connect the VOM − terminal to the repeater −V test point.

Requirement: All repeaters on the same shelf must measure within 8 percent of each other.

TABLE A

POWERING TROUBLE INDICATIONS AT 206 REGULATOR

INDICATION	PROBABLE CAUSES
206 Regulator Voltage High	Cable tip or ring leakage path to ground: 206A, E, H, or L repeater Cable tip or ring open High resistance connection
206 Regulator Voltage Low	Cable tip or ring leakage path to ground: 206B, F, J, or M repeater Shorted component in line repeater regulator

5. FAULT-LOCATING TEST

5.01 The fault-locating test includes two tests, the transmission test and the obscure trouble test. Both tests use the same testing arrangement. The transmission test is used to locate the cause of a transmission failure, and the obscure trouble test is an extension of the same process which is used to locate the cause of a marginal line. If the trouble detected by the test in Section 365-225-500 is definitely a total signal failure, the obscure trouble test may be omitted. However, if marginal operation exists, perform the complete fault-locating test.

5.02 The fault-locating test can only be conducted in the direction of transmission. If a fault-locating test covers more than 12 repeaters, two fault-locating lines are used, both of which are terminated on the same jack mounting strips at each end. The fault-locating test is normally begun with the section closest to the central office from which tests are being conducted. The sequence of the 598- or 1068-type fault-locating filters assigned to each section and the assignment to the fault-locating lines must be obtained from the office records. The 1068-type filters are used in 475-type apparatus cases which contain 208- and 209-type repeaters.

STEP	PROCEDURE

1 Perform Part 3 before attempting fault location.

Note: The central office should always maintain order-wire contact with outside plant personnel at the repeater location, and the line should be monitored while fault-locating tests are being performed.

2 Plug the −48V cord of the J98710F fault locating set into the −48V TEST jack of the jack mounting.

Note: The set is immediately powered. There is no switch to turn power on and no pilot light. No warmup period is necessary.

3a If the repeater in the office is a 201-type or 208D in a 201 bay, patch the GEN OUT jack of the fault locating set to the SPAN IN jack of the proper line on the bank terminating assembly with a 3P7C cord. At some intermediate offices the line appears in the IN jack on the span terminating assembly.

Note: The connections of Steps 3a and 3b supply a signal to the line in one direction of transmission. At intermediate offices where a 201 or 208 office repeater is cross-connected to a 206 repeater, the test signal can be sent in the other direction by patching the GEN OUT jack of the fault locating set to the X IN jack of the 206-type repeater. (See Fig. 2.)

3b If the repeater in the office is a 206-type, patch the GEN OUT jack of the fault locating set to the L IN jack on the 206-type repeater terminating the line (see note of Step 3a).

4 With a 3P7C cord patch the FAULT LOC LINE jack of the fault locating set to the FL jack for the fault location line assigned to the first section and filter.

5 Connect the DET jack of the fault locating set to the IN jack of the NMS with a 3P13A cord or a 3P7C cord (3C NMS).

6 Set the controls of the fault locating set as follows:

CONTROL	POSITION
FUNCTION switch	MEAS 1
REF ADJ control	Fully clockwise
MEAS ADJ control	Fully clockwise
PULSE PERIOD switch	REF
598 FILTER switch	Same as the code letter of the filter in the first section
PATTERN dial	Same as the 598-type filter

Note: The 1068A through M filters correspond to 598A through M filters.

STEP	PROCEDURE

7 Set the controls on the NMS as follows:

CONTROL	POSITION
FUNCTION switch	BRDG
WTG unit	3KC FLAT
DBRN switch	For on-scale reading

Note: A widely varying reading indicates an oscillating line.

Transmission Test

Note: Complete the Fault Locating Record (Fig. 3) during this test.

8 Tune the PATTERN dial on the fault locating set for peak response on the NMS. Use the monitoring headphone to listen for fault-locating tones.

Note: To assure that the set is tuned for peak response, tune the PATTERN dial for a peak indication of the NMS while the FUNCTION switch is set to REF and the 598 FILTER is set to agree with the code of the filter to be fault located. Repeaking the fault locating set may be necessary when reading the actual repeater location.

9 Set the FUNCTION switch on the fault locating set to MEAS 2 and read the meter indication.

Requirement: The meter indication should drop 4 to 8 dB.

Note: A drop of less than 4 dB indicates that the line may be oscillating or that the fault-locating pair is noisy.

10 Set the FUNCTION switch to MEAS 3 and read the meter indication.

Requirement: The indication should not change more than 1 dB from the previous indication in Step 9.

11 Set the FUNCTION switch to BIPOLAR SIGNAL and read the meter indication.

Requirement: The signal level should drop at least 10 dB from the previous indication.

Note 1: A source of confusion is that even when the filter under test does not pass the interrogation frequency because of a fault at that point, preceding filters allow a portion of this interrogation frequency to return. When one of the preceding repeaters has an adjacent interrogation frequency, the returned signal may only be 10 to 15 dB below normal. The PATTERN dial must be carefully tuned.

Note 2: If the requirement is not met, the repeater under test should be suspected only if the noise level on the fault-locate line is in accordance with Part 3, Step 6.

STEP	PROCEDURE

12 Repeat Steps 8 through 11 with the 598 FILTER switch and the PATTERN dial set to agree with the code of the filter in the second section, then the third, etc. For long span lines where more than one fault-locating line is involved, patch the FAULT LOC LINE jack on the J98710F set to the other line at the appropriate point in the test.

Note: If the requirements of Steps 8 through 11 are not met for all sections tested, note the position of the 598 FILTER switch when requirements are not met. This position indicates the section causing the transmission failure.

Obscure Trouble Test

Note: The obscure trouble test is required if the repeatered line operates with an excessive error rate. This test should follow the transmission test. Generally, if the trouble can not be located by the transmission test, the repeater is probably not at fault. Very few repeaters go into a marginal state, but instead fail completely and can be located by the transmission test. The obscure trouble test should reveal the location of the trouble. The trouble will usually be on the cable in the form of a bridge tap, split pair, build-out capacitor, paraffin splice, etc.

13 Set the FUNCTION switch to MEAS 1.

14 Set the 598 FILTER switch and PATTERN dial to agree with the filter code in the first section and carefully tune the PATTERN dial for peak response on the NMS as in Step 8.

15 Adjust the MEAS ADJ control on the J98710F until the NMS indicates 9 on the scale with the DBRN switch in the highest possible position.

16 Set the FUNCTION switch to REF.

17 Adjust the REF ADJ control until the NMS again indicates a scale reading of 9.

18 Switch back and forth between the MEAS 1 and REF positions on the FUNCTION switch, noting that the meter indication is the same in both positions. Use the REF ADJ control to correct for any difference.

19 Set the PULSE PERIOD switch to the next position (from REF to 10 or from 10 to 9, etc).

20 With the FUNCTION switch in the REF position return the meter indication to 9 on the scale with the MEAS ADJ control. Do not touch the REF ADJ control. Always use the highest possible MEAS ADJ and DBRN switch positions for this adjustment.

21 Set the FUNCTION switch to MEAS 1. Observe the meter reading deviation from the reference of 9 on the NMS. Designate the deviation as follows:

(a) 0 if the deviation is not more than ± 0.5 dB

(b) The reading preceded by a minus sign if the deviation is more than 0.5 dB below reference

STEP	PROCEDURE

(c) The reading preceded by a plus sign if the deviation is more than 0.5 dB above reference.

22 Record the results on the chart shown in Fig. 3 in the following manner:

(a) Under FILTER CODE list the code letter of each 598- or 1068-type filter in the sequence it is installed in the line under test. This information appears in the office records.

(b) Mark the appropriate designation in the place determined by the filter code and the setting of the PULSE PERIOD switch.

23 Repeat Steps 20 through 22 until readings are obtained for pulse periods 10 through 4; then repeat the obscure trouble test with the 598 FILTER switch and the PATTERN dial set to agree with the code of the filter in the second section, then the third, etc. For long span lines where more than one fault-locating line is involved, patch the FAULT LOC LINE jack on the J98710F set to the other line at the appropriate point in the test.

Caution: At the completion of these tests, return the PULSE PERIOD switch to the REF position. Some digital terminals can erroneously lock into frame with the signal produced by the fault-locating set when left in PULSE PERIOD-4 position.

6. EVALUATION OF OBSCURE TROUBLE TEST

6.01 The recorded deviations in columns 10 through 4 of Fig. 3 indicate the performance of a repeater section while the test signal from the fault locating set is made increasingly difficult to regenerate.

6.02 No general rule exists for locating marginal sections, but the following considerations are used to evaluate a line containing only 201- or 205-type repeaters used with older 206 repeaters. Pronounced troubles are revealed by deviations in excess of +0.5 dB from the reference of 9 on the NMS occurring when the PULSE PERIOD switch on the fault locating set is positioned on 10, 9, or 8. A section of line is considered to be in better condition if the deviation first becomes greater than ±0.5 dB when the PULSE PERIOD switch is set to the lower numbers. Any good line, however, usually shows negative deviations greater than −0.5 dB at the lower PULSE PERIOD switch positions for sections further away. The trend of a good line is generally to have no deviations greater than ±0.5 dB until reaching PULSE PERIOD position 5 or 4 where negative deviations normally occur (see Fig. 4). Therefore, the results of the tests must be evaluated on the basis of distance and comparison to the preceding sections. Figures 5 and 6 are typical examples.

6.03 A line consisting solely of 208 or 209 repeaters responds slightly differently than described above. The trend of a good line of 208 or 209 repeaters used with 206 repeaters having automatic line build out is to have the deviations start going above +0.5 dB at pulse period 8 or 7 and steadily increase to approximately +1.0 to +3.0 dB at pulse period 4 (see Fig. 7). A section with a 208 or 209 repeater which has some problem will have less of an upward trend. If the section has a pronounced problem, the deviation may begin to increase at pulse period 8 or 7 as expected but then flatten out or even begin to decrease as shown in Fig. 8.

6.04 Lines containing a mixture of 201 (or 205) and 208 (or 209) repeaters will not produce the consistent trend of test results that are exhibited by lines containing only 201 (or 205) or 208 (or 209) repeaters. When the different vintage repeaters are mixed in a good line, the deviations measured

for each repeater will be characteristic of the repeater type. Hence a 201 repeater preceded by a mixture of 201 and 208 repeaters shows the trend described in paragraph 6.02. Similarly, a 208 repeater preceded by a mixture of 201 and 208 repeaters shows the trend described in paragraph 6.03. The T Carrier Span Line Record (Form E-4941) has the repeater types and locations which are needed to evaluate lines with this mixture.

7. OBSCURE DIGITAL LINE TROUBLES

7.01 In some instances where trouble recurs, more effort is needed on the part of the central office and the outside plant personnel to locate the actual source of the trouble, whether it be a faulty repeater, wiring in the case, loose LBO, etc.

7.02 Something other than the repeater may cause the interruption of service. In this case the other components of the line section (cable section, fault-locating filter, previous repeater output, apparatus case wiring, etc) must be checked. Judgment must be exercised before replacing repeaters only suspected of being faulty.

7.03 The outside plant personnel must always make order-wire contact with the central office before removing the apparatus case cover, and the line should be monitored continually while the outside plant personnel are at the repeater location. By maintaining order-wire contact and observing the trouble indication, the central office can immediately advise the construction personnel when the trouble is cleared. This method provides a more specific means to assist in identifying the source of trouble.

7.04 The checks outlined in this part may be employed as an aid in locating intermittent troubles or faulty installations.

STEP	PROCEDURE
1	For 201-type and 208D office repeaters check for the omission of the strap on TSA block (see SD-97080-01). For 206-type office repeaters check for the omission of strap W which is part of jack J1 (see SD-97080-02, Issue 4A or later). *Note:* The 208D repeater is the only 208-type repeater that can be used as an office repeater. A 215A adapter is required to mount it in a 201-type bay.
2	Check for the wrong selection of equalizer or pad (see SD-97060-01 or SD-97083-01) used to adjust the loss between a digital terminal and a repeater bay.
3	Check for fault-locating filters wired backwards.
4	Check for omission of frame ground connection to G1 (see SD-97080-01).
5	Check for incomplete line preparation (removal of bridge taps, build-out capacitors, crossed pairs, etc).
6	Check for 77A1 dummy heat coil which is too short to fit in a 300-type protector frame.
7	Check for noisy carbons in office or in protected apparatus cases on the pairs associated with the system in trouble (475B cases are equipped with gas tubes).
8	Check for omitted or incorrect termination at the receiving end (see Part 3).
9	For 201-type and 208D office repeaters check for loose fuses in the control unit. For 206-type office repeaters check for loose fuses in the fuse receptacles located on the front panel of the repeater.

STEP	PROCEDURE
10	Check that the proper 2560AL transformers are installed in the control unit (old repeater bay) for 201B and 208D repeaters.
11	Check for a malfunctioning fault locating set.
12	For 201-type office repeaters ensure that the repeater is always in the L power option (looped). For 206-type office repeaters check the power option as required by the office records. Ensure that all required option screws are firmly turned down and making good contact with the option straps. Determine that all unused option screws do not make contact with the option straps. The 208D office repeater is hard-wired in the looped power condition.
13	Tap apparatus case; then remove apparatus case cover.
14	Check that the repeaters are held securely in the slots by the retaining bar (channel or latch assembly).
15	Swing repeater retainer back and forth, while checking the received signal with an error detector in the next office.
16	Check that proper 836 LBO networks are employed in side 1 and side 2 (refer to span line record cards). ***Note 1:*** 208- and 209-type repeaters do not have the 836 LBO networks. ***Note 2:*** Only one 836 LBO network is employed in 206A, B, D, E, F, and G repeaters. No 836 LBO networks are needed in 206H, J, K, L, M, or N repeaters.
17	Jiggle and tap 836 LBO networks.
18	Remove retaining bar (channel or latch assembly) and jiggle the repeater without removing the repeater.
19	For 201-type and 208D office repeaters remove power from the repeatered line and then repower by removing and replacing the proper fuse in the control unit. For 206-type office repeater remove power from the line and then repower by removing and then replacing fuses in the fuse receptacles located on the front panel of the repeater.
20	If trouble persists, remove power again; remove and reinsert original repeater; then repower the line.
21	If trouble persists, remove power again and replace the repeater with a new unit; then repower the line.

8. REPEATER TESTING

8.01 When a line repeater is suspected of being the cause of marginal operation or a transmission failure, it must be tested with the J98710P error detector set according to Section 640-525-225. The repeater under test is removed and the battery-powered J98710P error detector, which has a cavity to directly mount a 201- or 205-type repeater, is placed in the apparatus case. A 215A adapter is required to mount a 208-type repeater in the cavity on the error detector, and a 216A adapter is required to mount a 209-type repeater in the cavity. The 215A and 216A adapters are electrically identical and may be interchanged if necessary. In addition, the 217A adapter is required to mount the error detector in the 475-type apparatus case.

8.02 When troubleshooting a line, many repeaters are unnecessarily replaced because they are suspected of being defective. Therefore repeaters returned to the CO from outside plant should be tested before they are shipped to WE distributing house repair center. If a suspected repeater meets the requirements of Section 365-221-500, it should not be returned for repair but should be placed in stock for future use. Before replacing a repeater, the dc power on the line must be removed at the office which powers that section. After the replacement, the power is restored and the line is retested.

8.03 The following procedures taken from Section 640-525-225 are provided to coordinate the activities at the central office and the manhole. Order-wire contact should be maintained for cooperation between personnel at these locations. Test A should be used for a repeater suspected of causing an unsuccessful transmission test, and Test B should be used if a repeater is suspected of causing marginal operation.

STEP	PROCEDURE
	Test A
1	Direct the tester at the manhole to the slot in the apparatus case associated with the faulty line and identify the side of the repeater in trouble. Ensure that service is patched off at the office.
	Caution: Before removing a repeater or patching to a repeater associated with DIC/TSPS, notify the TSPS personnel.
2	Before the line repeater is disturbed, verify that the receiving office is still receiving errors with the J98710F fault locating set arranged to supply a BIPOLAR SIGNAL at the sending office. The quasi-random signal source (QRSS) may be used to reveal problems that the fault locating set does not.
3	If the tester at the manhole reads no errors on the T1 line error detector (J98710P), turn the function switch on the fault locating set to MEAS 3. If the repeater is operating properly, this setting should cause an error indication, and the next location should be tested.
4	If the tester at the manhole reads errors while the fault locating set is set for BIPOLAR SIGNAL or the QRSS is connected, the employee must test the repeater again with the error detector arranged to provide a 100-ohm termination.
5	If errors are not indicated when the error detector is set to provide a 100-ohm termination, check the cable records and record cards for build-out capacitors, stubs, bad splices, incorrect LBO networks (for 201 and 205 repeaters).

STEP	PROCEDURE
6	If errors are indicated when the error detector is set to provide a 100-ohm termination, the repeater under test is malfunctioning or the trouble is in a previous repeater of cable section. A new repeater should be substituted for the one under test to eliminate one possibility; but if trouble persists, replace the original repeater.
	Test B
1	Direct the tester at the manhole to the slot in the apparatus case associated with the faulty line and identify the side of the repeater in trouble. Ensure that service is patched off at the office.
	Caution: Before removing a repeater or patching to a repeater associated with D1C/TSPS, notify the TSPS personnel.
2	Before a line repeater is disturbed, verify that the receiving office is still receiving errors with the signal supplied from a quasi-random signal source or a working terminal through a bridging repeater.
3	If the tester at the manhole reads no errors, there is no trouble this far on the line.
4	If the tester at the manhole reads errors, the employee should test the repeater again with the error detector arranged to provide a 100-ohm termination.
5	If errors are not indicated when the error detector is set to provide a 100-ohm termination, check the cable records and record cards for build-out capacitors, stubs, bad splices, incorrect LBO networks (for 201 and 205 repeaters).
6	If errors are indicated when the error detector is set to provide a 100-ohm termination, the repeater under test is malfunctioning or the trouble is in a previous repeater or cable section. A new repeater should be substituted for the one under test to eliminate one possibility. If trouble persists, replace the original repeater.