

**DATA SET 208BR-L1C  
TRANSMITTER-RECEIVER**

**TEST PROCEDURES USING 921A DATA TEST SET**

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3. MAINTENANCE TESTS . . . . .	3	1.01 This section contains test procedures using the 921A data test set (DTS) and the self-test capabilities of data set (DS) 208BR-L1C. Test procedures using the 914-type DTS and the self-test capabilities of DS 208BR-L1C are contained in Section 592-038-500. These procedures are to be used when testing DS 208BR-L1C on an initial installation or during a maintenance visit.	
4. TEST PROCEDURES . . . . .	6	1.02 When this section is reissued, the reason for reissue will be contained in this paragraph.	
A. Analog Loopback Self Test . . . . .	6	A. Test Capabilities	
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C. End-to-End Start-Up Self Test . . . . .	6	1.04 The 921A DTS (Fig. 1) is a portable, general purpose data test set that provides the serial testing capabilities of the 914C DTS and is compatible with the 914C for the testing of serial data sets. The 921A DTS also provides additional testing capabilities that are described in Section 107-402-100. Input to the 921A DTS is made through a 20-button keyboard. A 32-character display provides operator prompting and test results.	
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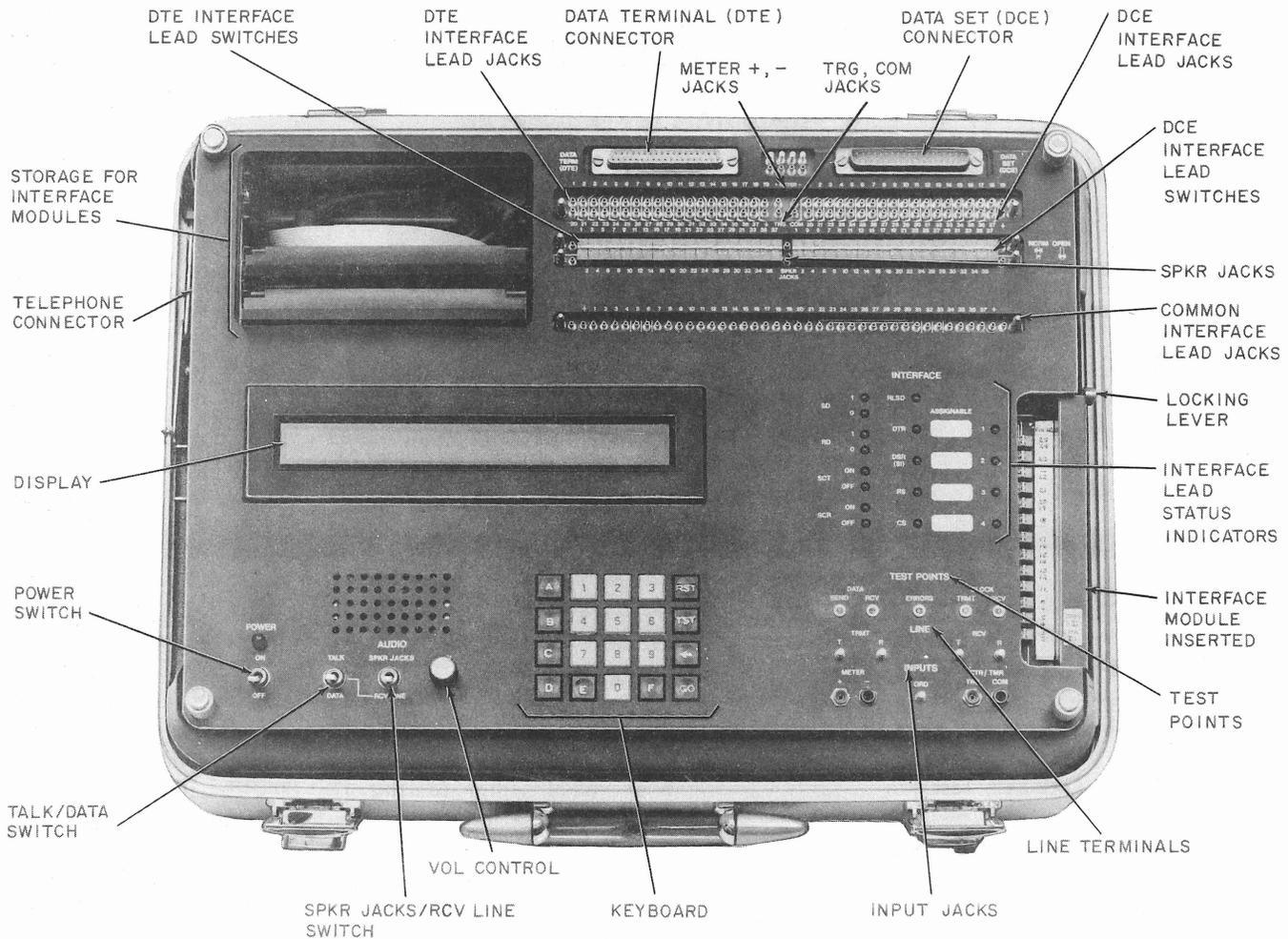


Fig. 1—921A Data Test Set—Front Panel

**B. Self Tests**

**Lamp Test**

**1.05** The lamp test (LP) nonlocking switch, when depressed, lights the TR, MR, RS, CS, CO, and ER lamps to verify proper operation of these lamps. The LP switch can be depressed at any time, as it does not affect normal data set operation. When the ST switch is depressed, the LP switch circuit is reconfigured to introduce errors (spaces) for test purposes.

**Analog Loopback Self Test**

**1.06** This test is initiated by depressing the analog loopback (AL) and self-test (ST) locking switches. Depressing the AL switch connects

the data set transmitter to the data set receiver through an internal pad. Depressing the ST switch turns *on* the internal request-to-send (CA) lead, transmits a steady mark on the internal send-data (BA) lead, and conditions the ER lamp to indicate received errors. Depressing the LP switch causes steady spaces to be sent.

**End-to-End Self Test**

**1.07** This test is initiated, after a call connection has been established, by depressing the ST locking switch at the transmitting end and the ST and RO (receive only) locking switches at the receiving end and then transferring to the data mode. This conditions the transmitting end to transmit steady marks. The ER lamp at the receiving end indicates any errors made in

transmission. The direction of transmission can be reversed by releasing the RO switch at the receiving end (which now becomes the transmitting end) and depressing the RO switch at the transmitting end (which now becomes the receiving end). Depressing the LP switch causes steady spaces to be sent.

**2. INSTALLATION TESTS**

**2.01** This part provides the sequence in which tests are to be performed following installation of the data set. This test sequence (Fig. 2) provides a method of verifying that the installation is satisfactory. Before proceeding with the tests, verify that the local loop meets the requirements specified in Section 314-205-501.

**3. MAINTENANCE TESTS**

**3.01** This part provides the sequence in which tests are to be performed when clearing a trouble report and during a maintenance visit to the data station.

**3.02** When a trouble report is received, a test center is responsible for isolating the trouble to the data station or the transmission facility. The procedure for doing this is shown in Fig. 3.

**3.03** If the trouble seems to be in the data station equipment, a telephone company (telco)

employee must be dispatched to conduct more extensive tests at the data station. The following equipment should be taken on a trouble visit:

- 921A DTS
- D-180881 Maintenance Kit

**3.04** The maintenance kit consists of replacement circuit packs for DS 208BR-L1C.

**3.05** The sequence in which tests are to be performed by the telco employee at the data station is shown in Fig. 4. If the trouble is isolated to the data set, the repair test procedures in paragraphs 4.29 and 4.30 are to be performed to isolate the trouble to a circuit pack in the data set.

**3.06** If a circuit pack is replaced, tag the defective circuit pack with a description of the trouble and carefully pack the circuit pack in the shipping carton supplied with the maintenance kit. Mark the carton with the data set code, circuit pack code, and date of manufacture. For example:

Data set 208BR-L1C

HG27B II 78

Send the properly packed and marked carton to the telco supplies operation group and notify that

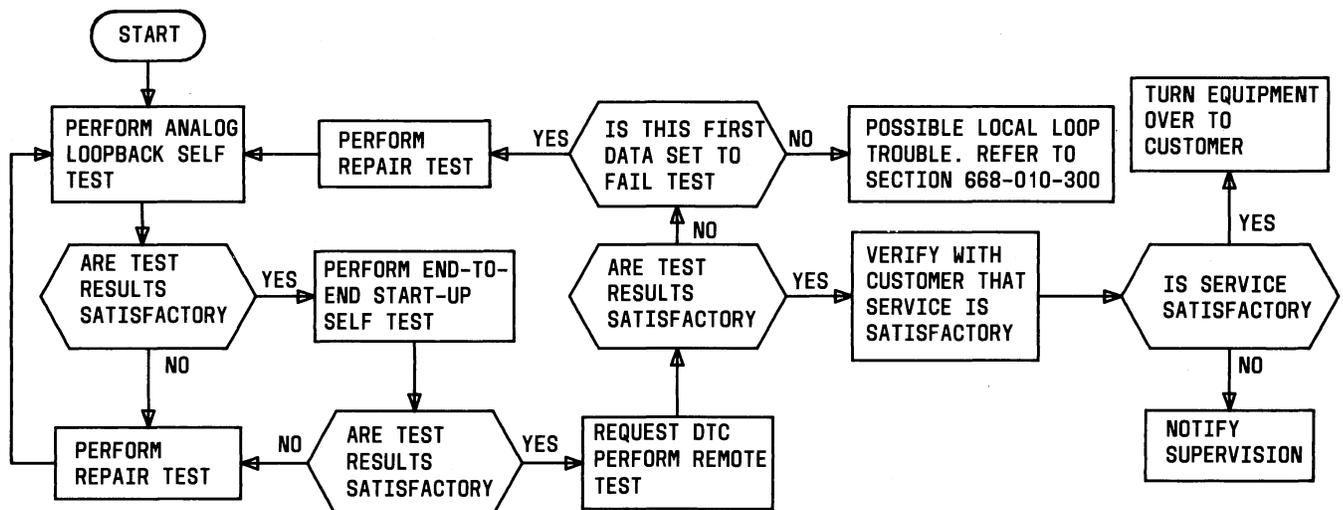


Fig. 2—Installation Test Sequence

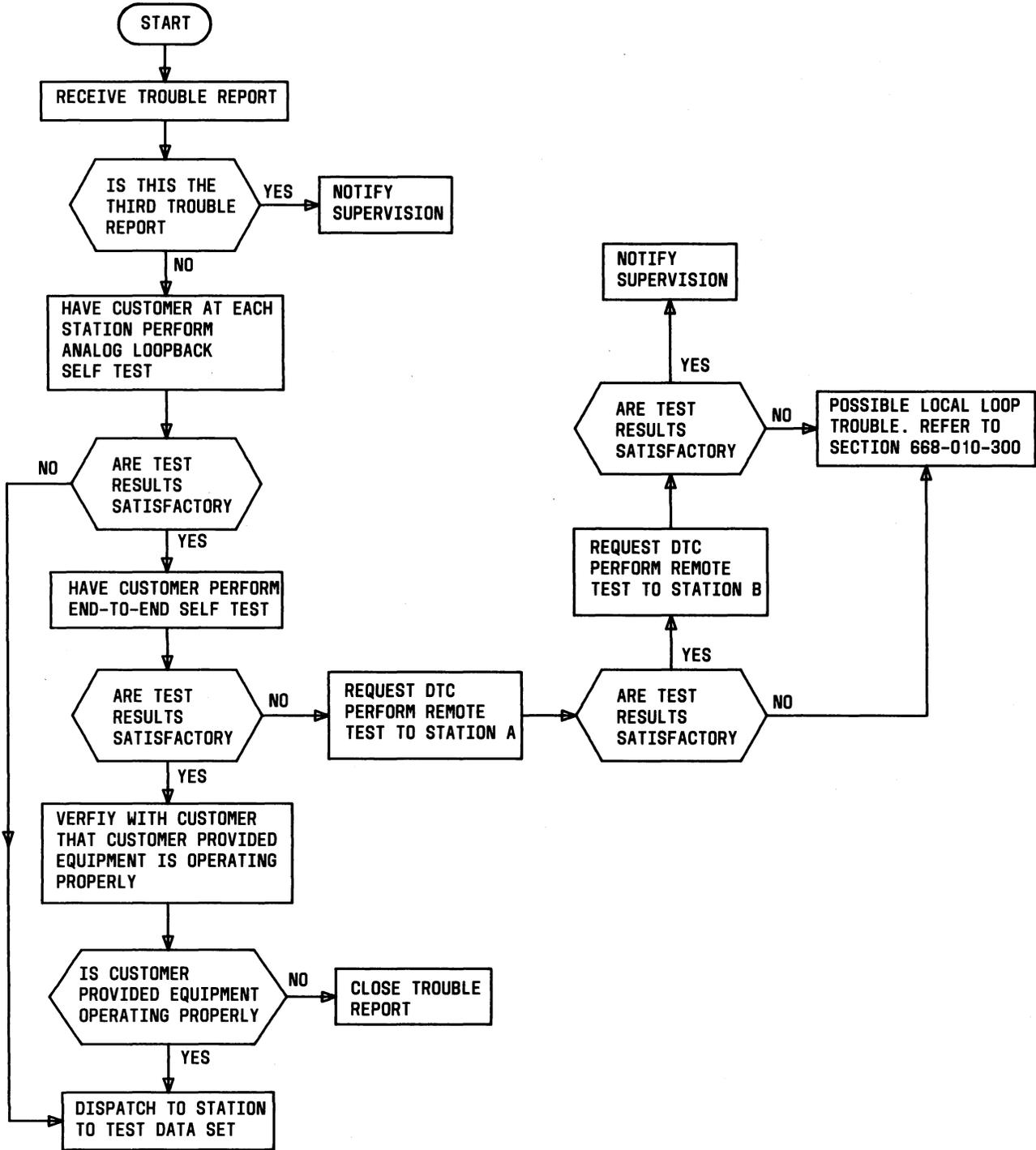


Fig. 3—Clearing Trouble Report

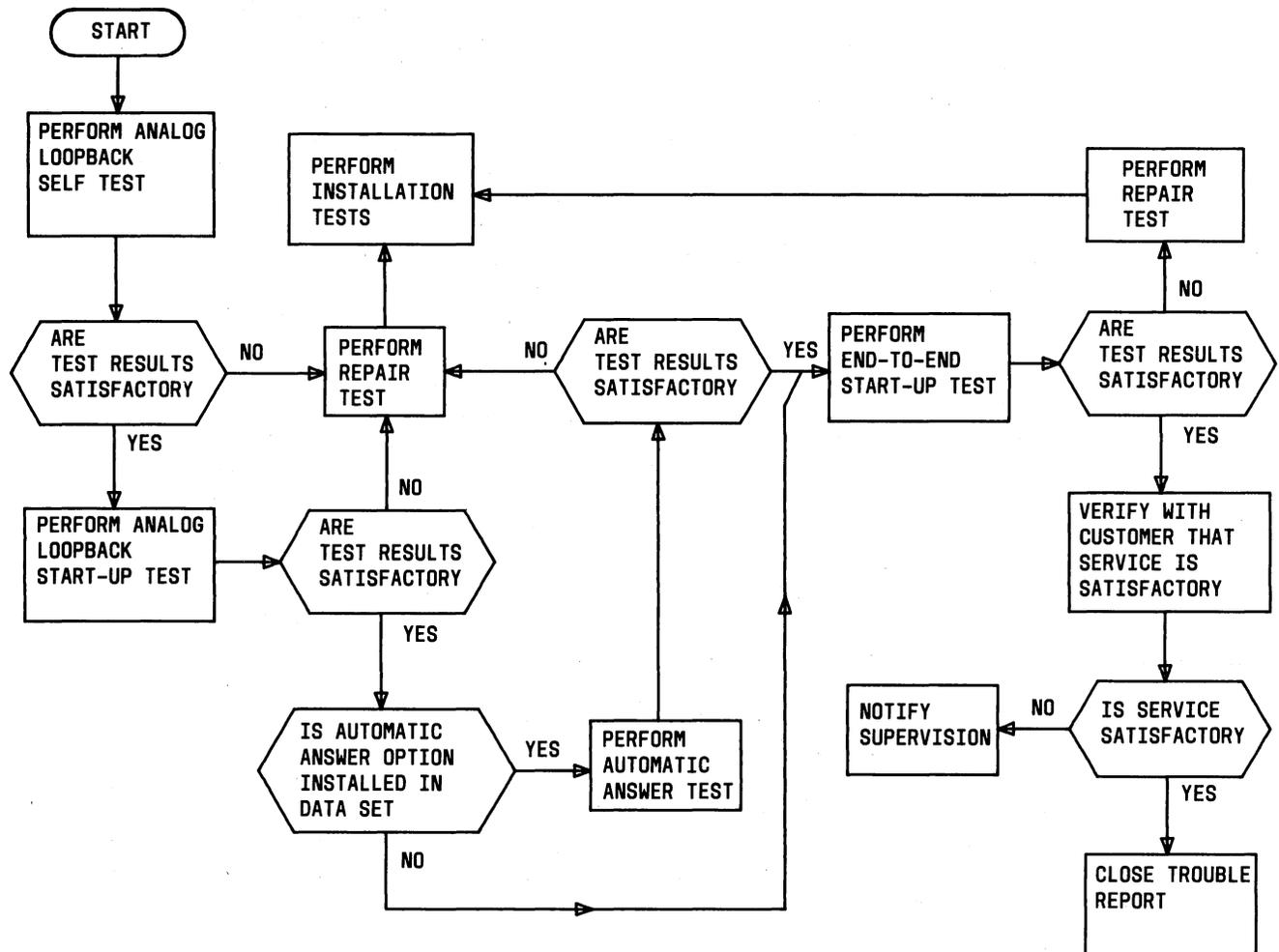


Fig. 4—Maintenance Test Sequence

group in the normal manner that a replacement circuit pack is needed. The telco supplies operation group will place a requisition for a replacement circuit pack with the local Western Electric service center which will expedite the requisition to the Montgomery (ILL) merchandise organization to ensure its receipt within 24 hours. The Montgomery merchandise organization will ship the circuit pack (via fastest method) directly to the designated telco location within 24 hours after receiving the requisition.

**3.07** If the trouble persists after the tests have been completed, proceed as follows:

(a) Check that options installed in data set agree with those specified on service order.

(b) Verify that customer-provided equipment (CPE) has been tested and is operating properly.

(c) Check for physical damage to data station equipment.

(d) Verify that all cords and connectors are properly connected.

(e) Check for intermittent trouble in station wiring.

(f) Verify that data set and CPE are connected to a common ground.

(g) If trouble persists, request help from immediate supervisor.

**4. TEST PROCEDURES**

**4.01** This part provides the procedures for the installation and maintenance tests.

**A. Analog Loopback Self Test**

**4.02** This test checks the data set transmitter and receiver. The customer interface is not checked.

**4.03** Perform the test as follows:

- (1) Ensure that data set is not transmitting or receiving data.
- (2) Depress LP switch on data set.

**Requirement:** All lamps are lighted.

- (3) Depress AL and ST switches on data set.

**Requirements:** ON, RS, CS, and CO lamps are lighted. ER, MR, and TR lamps are off.

**Note:** ER lamp must go off immediately after CO lamp lights. If there is a delay or if ER lamp is lighted or blinks, data set has failed analog loopback self test.

- (4) Depress LP switch on data set.

**Requirement:** ER lamp lights.

- (5) Release ST and AL switches on data set.

**B. End-to-End Self Test**

**4.04** This test checks the transmitter and receiver of both data sets and the facilities connecting the data sets. The customer interfaces are not checked.

**4.05** Perform the test as follows:

- (1) Call far-end data set and arrange to conduct an end-to-end self test.
- (2) Request ST switch on far-end data set be depressed, and far-end data set be transferred to data mode by depressing DATA button on associated telephone set.

**Requirements:** ON, RS, CS, ER, MR, and TR lamps on far-end data set are lighted.

- (3) Depress ST and RO switches on near-end data set, and then transfer to data mode by depressing DATA button on associated telephone set.

**Requirements:** ON, CO, MR, and TR lamps on near-end data set are lighted. RS, CS, and ER lamps are off.

- (4) Observe ER lamp on near-end data set for ten 1-minute periods.

**Requirement:** ER lamp does not blink more than an average of three blinks per 1-minute period.

- (5) At a prearranged time, have LP switch on far-end data set depressed.

**Requirement:** ER lamp lights on near-end data set.

- (6) After a prearranged time, return to talk mode to discuss results of test. If test failed, terminate call, place a second call to involve a different connecting path, and repeat test.

- (7) Request ST switch on far-end data set be released.

- (8) Release RO and ST switches on near-end data set.

**C. End-to-End Start-Up Self Test**

**4.06** This test checks start-up performance with the 4-dB and 8-dB slope compromise equalizers.

**4.07** Perform the test as follows:

- (1) Call far-end data set and arrange to conduct an end-to-end start-up self test. (Far-end data set should be one customer will normally call or receive calls from.)
- (2) Request ST switch on far-end data set be depressed, and far-end data set be transferred to data mode by depressing DATA button on associated telephone set.

**Requirements:** ON, RS, CS, ER, MR, and TR lamps on far-end data set are lighted.

- (3) Depress ST and RO switches on near-end data set, and then transfer to data mode by depressing DATA button on associated telephone set.

**Requirements:** ON, CO, MR, and TR lamps on near-end data set are lighted.

- (4) Install 4-dB slope compromise equalizer option (S2B up; S2C up) in near-end data set.
- (5) Request RO switch on far-end data set be depressed and released at 5-second intervals for 1 minute.

**Requirements:** On near-end data set, CO lamp lights and ER lamp goes off at same time. ER lamp does not flicker.

- (6) If ER lamp flickers more than twice during 1-minute period, install 8-dB slope compromise equalizer option (S2B down; S2C up) in near-end data set and repeat Step (5).
- (7) Install 4-dB slope compromise equalizer option (S2B up; S2C up) in near-end data set, unless 8-dB slope compromise equalizer option produced at least three fewer flickers of ER lamp.

- (8) Request ST switch on far-end data set be released.

- (9) Release RO and ST switches on near-end data set.

**D. Remote Test**

**4.08** This test allows a test center to check the data set transmitter and receiver and the facilities connecting the data set and the test center. The customer interface is not checked.

**4.09** Perform the test as follows:

- (1) Contact test center and request a remote test.
- (2) When directed by test center, depress RT switch and then depress "50" switch (if not already depressed).
- (3) Test center performs remote test.
- (4) When directed by test center, release RT switch and then release "50" switch if it was depressed in Step (2).

**E. Initial Test Setup for 921A DTS**

**4.10** Perform the initial test setup for the 921A DTS when used to test DS 208BR-L1C as follows:

STEP	ACTION	VERIFICATION
1	Connect data set to DTS using interface cable and Electronic Industries Association (EIA) adapter cord provided with DTS.  <b>Note:</b> The interface cable is equipped with two 37-pin connectors. The 6-inch adapter cord is equipped with a 37-pin female connector and a 25-pin male connector. Connect interface cable from DATA SET (DCE) connector on DTS to 37-pin connector on adapter cord. Insert 25-pin connector on adapter cord into customer interface connector on data set.	
2	Connect DTS to a 105- to 129-Vac 60-Hz power source.	
3	Apply power to data set.	Data set ON lamp lights.
4	On front of DTS, set POWER switch to ON.	POWER lamp lights.

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
5	<p>Press RST on keyboard.</p> <p><b>Note:</b> If RST is pressed during a test, the test is ended and the DTS recycles to this step.</p>	<p>Display reads (briefly) version number of DTS.</p> <p>DTS then performs self tests.</p> <p>If DTS is defective, display reads—<b>TEST FAILED</b></p> <p>If DTS is satisfactory, display reads—<b>DATA SET:</b></p>
6	Remove EIA RS-232-C interface module from storage and ensure that all 25 interface module switches are in TERM position.	
7	On right side of DTS, ensure that locking lever is in OPEN position.	
8	Insert interface module into slot.	
9	Move locking lever to CLOSE position.	
10	On front of DTS, ensure that all 37 DCE interface lead switches are in NORM position.	
11	<p>Enter 71.</p> <p><b>Note:</b> To delete a wrong entry on keyboard during any test, press back arrow (←).</p>	<p>Display reads—<b>DATA SET: 71</b></p>
12	Press GO.	Display reads— <b>BIT RATE:</b>
13	Enter 48.	Display reads— <b>BIT RATE: 48</b>
14	<p>Press GO.</p> <p><b>Note:</b> If GO or TST is pressed at an unauthorized point in a test, the test is ended and the DTS recycles to this step.</p>	Display reads— <b>TEST SEQ:</b>

**F. Power Supply Test**

**4.12** Perform the test as follows:

**4.11** This test measures the +12, +5, and -12 volt supply voltages at the customer interface.

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— <b>TEST SEQ:</b>

STEP	ACTION	VERIFICATION
2	Enter 12.	Display reads— TEST SEQ: 12
3	Connect jumper wire from DCE interface lead jack 7 to - METER jack.	
4	Connect jumper wire from DCE interface lead jack 9 to + METER jack.	
5	Press GO.	Display reads voltage present on jack 9.  <b>Requirement:</b> +11.0 to +13.0 volts.
6	Move jumper wire from jack 9 to jack 10.	Display reads voltage present on jack 10.  <b>Requirement:</b> -11.0 to -13.0 volts.
7	Move jumper wire from jack 10 to jack 25.	Display reads voltage present on jack 25.  <b>Requirement:</b> +4.5 to +5.5 volts.
8	Remove jumper wires from DCE interface lead and METER jacks.	

**G. Automatic Answer Test**

4.14 Perform the test as follows:

4.13 This test verifies that the data set will automatically answer a call, go to the data mode, and end the call.

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.  <b>Note:</b> Ensure that automatic answer option (S3B down) is installed in data set.	Display reads— TEST SEQ:
2	On DTS, enter 40.	Display reads— TEST SEQ: 40
3	Press GO.	Display reads— WAITING FOR RI
4	Place a call to data set from any convenient telephone set.	Display reads— RINGING (during ringing period—ring indicator lead <b>on</b> ). ASSIGNABLE 1 indicator follows ring indicator lead. After 3 complete ringing cycles, DTR indicator lights (data terminal ready lead <b>on</b> ).

STEP	ACTION	VERIFICATION
		After several seconds, DSR indicator lights (data set ready lead <b>on</b> ). Display then reads— ANSWERED After several more seconds, DTR indicator goes off (data terminal ready lead <b>off</b> ). Then DSR indicator immediately goes off (data set ready lead <b>off</b> ).  <b>Requirement:</b> Display reads (briefly)— TEST PASSED

**H. CA-CB (RS-CS) Interval Test**

4.15 This test measures the interval between the time the request-to-send (CA) lead is

turned **on** and the clear-to-send (CB) lead turns **on**.

4.16 Perform the test as follows:

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
2	Ensure that "50" switch on data set is depressed (50 ms CA-CB interval) and that transmitter internally timed option (S3C down) is installed.	
3	Depress AL switch on data set.	
4	On DTS, enter 30.	Display reads— TEST SEQ: 30
5	Press GO.  <b>Note:</b> To repeat test, press A.	Display reads RS-CS (CA-CB) interval in milliseconds.  <b>Requirement:</b> 48 to 56 ms.
6	Release "50" switch on data set (150 ms CA-CB interval).	
7	Press A.  <b>Note:</b> To repeat test, press A.	Display reads RS-CS (CA-CB) interval in milliseconds.  <b>Requirement:</b> 140 to 180 ms.
8	Depress "50" switch on data set (50 ms CA-CB interval).	
9	Release AL switch on data set.	

**I. Transmitter Output Test**

Relative levels of data and 600-Hz tone are also measured.

**4.17** This test measures the frequency of the 2021-Hz answer tone and 600-Hz idle tone.

**4.18** Perform the test as follows:

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
2	Ensure that following options are installed in data set.  Compromise equalizer in—4-dB slope (S2B up; S2C up) or 8-dB slope (S2B down; S2C up)  CC (DSR) <i>off</i> in analog loop mode (S3A down)  Automatic answer (S3B down)  Transmitter internally timed (S3C down)  -4 dBm transmit level (S1A down; S1B up; S1C down; S2A up).	
3	Ensure that all switches on data set except "50" switch are in released (out) position. "50" switch may be depressed (in) or released (out).	
4	Connect data set to DTS using telephone interface cable and adapter cord provided with DTS.  <b>Note:</b> The telephone interface cable is equipped with two 9-pin connectors. The 6-inch adapter cord is equipped with a 9-pin connector and a double-faced, 25-pin connector. Connect interface cable from 9-pin telephone connector on left side of DTS to 9-pin connector on adapter cord. Insert double-faced, 25-pin connector on adapter cord between telephone line connector on data set and telephone line cord.	
5	On front of DTS:  (a) Connect meter leads from LINE—TRMT terminals T and R to INPUTS—METER jacks + and -.  (b) Connect jumper wires from SPKR JACKS to METER jacks + and - located above SPKR	

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STEP	ACTION	VERIFICATION
	<p>JACKS. Also connect jumper wires from TRG and COM jacks to METER jacks + and -.</p>	
	(c) Set TALK/DATA switch to DATA.	
	(d) Set SPKR JACKS/RCV LINE switch to SPKR JACKS.	
6	Enter 36.	Display reads— TEST SEQ: 36 RS=? (0 OR 1)
7	Enter 0.	Display reads— TEST SEQ: 36 RS=0 (0 OR 1)
8	Enter 37.	Display reads— :37 DTR=? (0 OR 1)
9	Enter 1.	Display reads— :37 DTR=1 (0 OR 1)
10	Enter 11.	Display reads— :11 R=? 1=135 6=600 9=900 0=N
11	Enter 6.	Display reads (briefly)— :11 R=6 1=135 6=600 9=900 0=N Display then reads— :
12	Enter 18.	Display reads— :18
13	Press GO.	Display reads (briefly)— TEST COMPLETE
14	Place a call to data set from any convenient telephone set.	Ringing is heard on DTS speaker followed by answer tone sequence (1 second of silence, 2 seconds of 2021-Hz answer tone, and then continuous 600-Hz tone).
	<p><b>Note 1:</b> VOL control adjusts speaker volume.</p>	
	<p><b>Note 2:</b> The 921A DTS will not measure the answer tone level accurately because of the short duration of the tone and therefore audible verification of the presence of this tone must suffice. Data and 600-Hz levels are also difficult to measure accurately because of the variable impedance of a telephone line connected to the data set. The difference between the data level and the 600-Hz level should be in the order of 7 to 9 dB as shown in Table A. The levels of Table A are</p>	Display reads 600-Hz 1 level in dBm.
		<p><b>Requirement:</b> dBm value displayed must be within limits specified for 600 Hz 1 level in Table A.</p>

STEP	ACTION	VERIFICATION
	calculated levels established in a laboratory under ideal conditions of line termination.	
15	Depress ST switch on data set.	Display reads data 1 level in dBm.  <b>Requirement:</b> dBm value displayed must be within limits specified for data 1 level in Table A.
16	On data set, install -11 dBm transmit level option (S1A down; S1B down; S1C up; S2A down).	Display reads data 2 level in dBm.  <b>Requirement:</b> DBM value displayed must be within limits specified for data 2 level in Table A.
17	Release ST switch on data set.	Display reads 600-Hz 2 level in dBm.  <b>Requirement:</b> dBm value displayed must be within limits specified for 600-Hz 2 level in Table A.
18	Press GO.	Display reads (briefly)— TEST INTERRUPTED Typical display then reads— FREQ=0600 HZ
19	At telephone set associated with data set, remove handset from cradle and depress TALK button (if not already depressed). Then depress DATA button. Replace handset on cradle.	Display reads 2 or 3 frequencies for a short period among which is answer tone frequency. Typical display reads (briefly)— FREQ=2021 HZ

TABLE A

## TRANSMIT LEVELS (ALL READINGS IN dBm WITH RESPECT TO 600Ω)

COMPROMISE EQUALIZER OPTION	NOTE 1			NOTE 2		
	ANSWER TONE 1	DATA 1	600 Hz 1	ANSWER TONE 2	DATA 2	600 Hz 2
8-dB SLOPE (S2B-DOWN; S2C-UP)	-4 (+1, -2)	-4 (+1, -2)	-13 (±2)	-11 (±2)	-11 (±2)	-20 (±2)
4-dB SLOPE (S2B-UP; S2C-UP)	-4 (+1, -2)	-4 (+1, -2)	-11 (±2)	-11 (±2)	-11 (±2)	-18 (±2)

**Note 1:** -4 dBm Transmit Level (S1A-DOWN; S1B-UP; S1C-DOWN; S2A-UP)

**Note 2:** -11 dBm Transmit Level (S1A-DOWN; S1B-DOWN; S1C-UP; S2A-DOWN)

STEP	ACTION	VERIFICATION
		<b>Requirement:</b> 2020 to 2022 Hz.
		Display then reads idle tone frequency. Typical display reads— FREQ=0600 HZ
		<b>Requirement:</b> 599 to 601 Hz.
20	Disconnect meter leads, jumper wires, telephone interface cable, and adapter cord.	
21	Restore data set to pretest condition.	

**J. Transmitter Clock Test**

**4.20** Perform the test as follows:

**4.19** This test measures the frequency of the transmitter clock signal, DB (SCT), on the transmitter signal element timing lead.

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
2	Ensure that following options are installed in data set:  Compromise equalizer in—4-dB slope (S2B up; S2C up) or 8-dB slope (S2B down; S2C up)  CC (DSR) <i>off</i> in analog loop mode (S3A down)  Manual answer (S3B up)  Transmitter internally timed (S3C down)  -4 dBm transmit level (S1A down; S1B up; S1C down; S2A up).	
3	Ensure that all switches on data set except "50" switch are in released (out) position. "50" switch may be depressed (in) or released (out).	
4	On DTS, enter 47 48 17 47.	Display reads— TEST SEQ: 47 48 17 47
5	Press GO.	Display reads (briefly)— TEST COMPLETE

STEP	ACTION	VERIFICATION
		Display then reads— SW CONN: X=?? Y=??
6	Enter 04 03.	Display reads (briefly)— SW CONN: X=04 Y=03 Display then reads— SW CONN: X=?? Y=??
7	Press GO.	Display reads (briefly)— TEST INTERRUPTED  For Version 2 and higher DTS: Display then reads (briefly)— CROSS CONNECTIONS MANUALLY SET  Display then reads transmitter clock frequency in hertz.  <b>Requirement:</b> 4799 to 4801 Hz.
8	Press GO.	Display reads (briefly)— TEST INTERRUPTED  For Version 2 and higher DTS: Display then reads (briefly)— CROSS CONNECTIONS MANUALLY SET  Display then reads (briefly)— TEST COMPLETE Display then reads— TEST SEQ:
9	Restore data set to pretest condition.	

**K. CA-CF (RS-COD) Interval Test**

**4.22** Perform the test as follows:

**4.21** This test measures the interval between CA (request-to-send) and CF (carrier on).

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
2	Depress AL switch on data set.	
3	On DTS, enter 31.	Display reads— TEST SEQ: 31
4	Press GO.	Display reads RS-RLSD (CA-CF) interval in milliseconds.

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STEP	ACTION	VERIFICATION
	<i>Note:</i> To repeat test, press A.	<i>Requirement:</i> 46.0 to 56.0 ms.
5	Release AL switch on data set.	

**L. Analog Loopback Start-Up Test** **4.24** Perform the test as follows:

**4.23** This test checks the ability of the data set to begin error-free transmission.

STEP	ACTION	VERIFICATION
1	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
2	Depress AL switch on data set.	
3	On DTS, enter 67.	Display reads— TEST SEQ: 67
4	Press GO.	Display reads— 1=ONE WAY 2=IR SW 3=IR CONT
5	Enter 2.	Display reads— TRMT: 1=MAN 2=TIMED 3=SW CARR
6	Enter 2.	Display reads— PRESS A TO START
7	Press A.	

*Note 1:* When A is pressed, a count may appear on BLK RCVD, ERR, and \* display. If this occurs, press C to clear displays.

*Note 2:* To perform functions listed below, press associated key.

KEY	FUNCTION	
A	Restart test.	Display reads— BLK RCVD=0000 ERR=0000 *=0000 From this point, BLK RCVD display counts number of blocks received, ERR display counts number of received blocks in error, and * display counts number of times DTS transmitted a block but did not receive a block.
C	Clear display.	
D	Stop test.	

8	At end of about 1 minute, press D.	<i>Requirement:</i> Zero count on ERR and * displays.
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STEP	ACTION	VERIFICATION
9	Release AL switch on data set.	

**M. End-to-End Start-Up Test**

**4.25** This test checks the ability of both data sets to begin error-free transmission. In this test, one end is arbitrarily selected as the

controlling station. This station has operating control of the test.

**4.26** Perform the test as follows:

STEP	ACTION	VERIFICATION
1	Establish voice communication between the data stations and arrange to conduct an end-to-end start-up test.	

**Note:** Procedure at controlled station must be performed first.

**At controlled station, perform Steps 2 through 7.**

2	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
3	Enter 68.	Display reads— TEST SEQ: 68
4	Press GO.	Display reads— 1=ONE WAY 2=IR SW 3=IR CONT
5	Enter 2.	Display reads— PRESS A TO START
6	Place data set in data mode.	On DTS, DSR indicator lights (data set ready lead <b>on</b> ) Display continues to read— PRESS A TO START
7	Press A.	Display reads— BLK RCVD=0000 ERR=0000 *=0000

**Note:** When A is pressed in Step 14, a count may appear on BLK RCVD, ERR, and/or \* display. If this occurs, press C to clear displays.

After A is pressed at controlling station, BLK RCVD display counts number of blocks received, ERR display counts number of received blocks in error, and \* display counts number of times DTS transmitted a block but did not receive a block. All displays stop counting when D is pressed at controlling station.

**Requirements:** Count of less than 2 on ERR display and zero count on \* display.

STEP	ACTION	VERIFICATION
<b>At controlling station, perform Steps 8 through 15.</b>		
8	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
9	Enter 67.	Display reads— TEST SEQ: 67
10	Press GO.	Display reads— 1=ONE WAY 2=IR SW 3=IR CONT
11	Enter 2.	Display reads— TRMT: 1=MAN 2=TIMED 3=SW CARR
12	Enter 2.	Display reads— PRESS A TO START
13	Place data set in data mode.	On DTS, DSR indicator lights (data set ready lead <b>on</b> ) Display continues to read— PRESS A TO START
14	Press A.	
	<b>Note 1:</b> When A is pressed, a count may appear on BLK RCVD, ERR, and/or * display. If this occurs, press C to clear displays.	
	<b>Note 2:</b> To perform functions listed below, press associated key.	
	<b>KEY    FUNCTION</b>	
	A    Restart test. C    Clear display. D    Stop test.	Display reads— BLK RCVD=0000 ERR=0000 *=0000
		<b>Note:</b> From this point, BLK RCVD display counts number of blocks received, ERR display counts number of received blocks in error, and * display counts number of times DTS transmitted a block but did not receive a block.
15	At end of about 1 minute, press D.	<b>Requirements:</b> Count of less than 2 on ERR display and zero count on * display.

**N. End-to-End Block Error Test**

**4.27** This test checks the transmitter and receiver of both data sets and the facilities connecting the data sets. The customer interfaces are also checked. This test is also used to select the best slope compromise equalizer option. Identical test

data is generated by 921A DTSs at both data sets. This data is transmitted by one of the data sets and compared to the data generated by the DTS at the receiving data set. Data errors are indicated by the DTS display.

**4.28** Perform the test as follows:

STEP	ACTION	VERIFICATION
1	Establish voice communication between the data stations and arrange to conduct an end-to-end block error test.  <i>Note 1:</i> If distant station is not equipped with a 921A DTS, use a test set that provides at least one of the test patterns provided by the 921A DTS and use the same word length at both stations.  <i>Note 2:</i> Procedure at transmitting station must be performed first.	
<b><i>At transmitting station, perform Steps 2 through 6.</i></b>		
2	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:
3	Enter 53.	Display reads— TEST SEQ: 53
4	Press GO.	Display reads (briefly)— SELECT ERROR TEST Display then reads— D=DT 0=SP 1=MK 2=2047 5=511 6=63
5	Enter 5.	Display reads— 511 BIT ERROR TEST
6	Place data set in data mode.	On DTS, DSR indicator lights (data set ready lead <i>on</i> ) Display continues to read— 511 BIT ERROR TEST
<b><i>At receiving station, perform Steps 7 through 19.</i></b>		
7	Ensure that 4-dB slope compromise equalizer option (S2B up; S2C up) is installed in data set.	
8	Ensure that initial test setup described in paragraph 4.10 has been performed.	Display reads— TEST SEQ:

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
9	Enter 54.	Display reads— TEST SEQ: 54
10	Press GO.	Display reads (briefly)— SELECT ERROR TEST Display then reads— D=DT 0=SP 1=MK 2=2047 5=511 6=63
11	Enter 5.	Display reads (briefly)— 511 BIT ERROR TEST Display then reads— 1=BIT ERRORS 2=BLOCK ERRORS
12	Enter 2.	Display reads— ????? BITS IN A BLOCK
13	Enter 01024.	Display reads (briefly)— 01024 BITS IN A BLOCK Display then reads— ???? SECONDS
14	Place data set in data mode.	On DTS, DSR indicator lights (data set ready lead <i>on</i> ) Display continues to read— ???? SECONDS
15	Enter 0600.	

**Note:** To perform functions listed below, press associated key. Keys A through D function at receiving station only. Keys E and F function at transmitting station only.

**KEY                      FUNCTION**

- A    Repeat test.
- B    Display time remaining in test.
- C    Clear display.
- D    End test.
- E    Inject 8 errors into data stream.
- F    Force out-of-sync condition.

Display reads (briefly)—  
0600 SECONDS  
Display then reads—  
BLK RCVD=0000 ERR=0000

**Note:** From this point, display counts number of blocks received and number of blocks in error. If sync is lost during test, display flashes OSYN. If this occurs, test must be repeated by pressing A.  
At end of test, display reads TEST COMPLETE, total sync losses, total blocks received, and total blocks in error.

**Requirement:** Total blocks in error are less than 30. Record block errors.

STEP	ACTION	VERIFICATION
16	Install 8-dB slope compromise equalizer option (S2B down; S2C up) in data set.	
17	On DTS, press TST and repeat Steps 9 through 15.	
18	If 8-dB slope compromise equalizer option produced fewer block errors than 4-dB slope compromise equalizer option, leave 8-dB option installed in data set.	
19	If 4-dB slope compromise equalizer option produced the same or fewer block errors than 8-dB slope compromise equalizer option, install 4-dB option (S2B up; S2C up) in data set.	
20	Perform the end-to-end block error test in the opposite direction. The receiving station now becomes the transmitting station.	

#### O. Repair Test

**Note:** If CP HG27B is replaced, install correct options before proceeding.

**4.29** This test provides a method for isolating a data set trouble to a single circuit pack (CP). Table B lists the individual tests in the sequence in which they are to be performed, and also lists the associated CPs that might be defective if the test fails.

(2) Replace first CP in list and repeat test.

**4.30** If the data set fails a test listed in Table B, proceed as follows:

(3) If data set still fails test, restore original CP in data set.

(1) Refer to list of CPs associated with test that failed.

(4) Continue replacing, testing, and restoring CPs in sequence in which they are listed until data set passes test. The last CP replaced is cause of trouble.

(5) If all CPs have been replaced and cause of trouble has not been found, notify supervision.

TABLE B

REPAIR PROCEDURES

TEST	CP REPLACEMENT SEQUENCE	TEST	CP REPLACEMENT SEQUENCE
Automatic Answer	HG27B HG22B HG16C HG26B HG21B	CA-CF (RS-COD) Interval	HG20B HG4B HG22B HG14C HG27B HG16C HG2B
CA-CB (RS-CS) Interval	HG26B HG20B HG27B HG21B HG22B	Analog Loopback Start-Up	HG27B HG4B HG20B HG3B HG26B HG21B HG2B HG14C HG22B HG15C HG12B (No. 1) HG12B (No. 2) HG13B HG11B HG16C
Transmitter Output	HG27B HG16C HG22B HG26B		
Transmitter Clock	HG21B HG26B		

5. REFERENCES

5.01 Additional information concerning the testing of DS 208BR-L1C is contained in the following publications:

SECTION	TITLE
107-402-100	921A Data Test Set—Description and Operation
314-205-501	Data Systems—DATAPHONE® Service and Data Access Arrangements on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines

SECTION

TITLE

592-038-100	Data Set 208BR-L1C—Transmitter-Receiver—Description and Operation
592-038-200	Data Set 208BR-L1C—Transmitter-Receiver—Installation and Connections
592-038-500	Data Set 208BR-L1C—Transmitter-Receiver—Test Procedures Using 914-Type Data Test Set
5.02	Detailed information concerning DS 208BR-L1C is contained in CD- and SD-1D242-02.