

DATA SET 103B
TRANSMITTER-RECEIVER
TEST PROCEDURES

CONTENTS	PAGE
1. GENERAL	1
2. APPARATUS	2
3. TEST PROCEDURES	2
A. Power Outlet Ground Test Using 901B DTS	2
B. Loop-Back Test From Data Test Center	3
C. Interface Tests Using 901B DTS	3
D. End-to-End Test Using 901B DTS	21
E. Power Outlet Ground Test Using 914B DTS	27
F. Interface Tests Using 914B DTS	27
G. End-to-End Test Using 914B DTS	38

1. GENERAL

1.01 This section describes test procedures for Data Set 103B. These tests are to be made at the time of installation and also when clearing routine trouble conditions.

1.02 This section is reissued to include power outlet ground, interface, and end-to-end tests using the 914B Data Test Set (DTS). Since this reissue is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

- A. Power Outlet Ground Test Using 901B DTS**
- B. Loop-Back Test From Data Test Center (DTC)**

- C. Interface Tests Using 901B DTS**
- D. End-to-End Test Using 901B DTS**
- E. Power Outlet Ground Test Using 914B DTS**
- F. Interface Tests Using 914B DTS**
- G. End-to-End Test Using 914B DTS**

1.04 Prior to performing tests, verify the following:

(a) That the overall transmission facilities meet requirements specified in the section entitled Private Line Data Circuits—Voice Bandwidth Circuits for Miscellaneous Data—Overall Test and Requirements (314-410-500).

(b) That the test equipment is in good operating condition. Refer to the appropriate sections covering operational and calibration tests of test equipment, as follows:

- (1) J94006A (6A) Impulse Counter—Description, Operation, and Maintenance (103-620-100)
- (2) 901A and 901B Data Test Sets—Identification and Operation (and adapter) (107-100-100)
- (3) 902-Type Data Test Sets—Identification and Operation (107-300-100)
- (4) 903-Type Data Test Sets—Description and Operation (107-200-100)
- (5) 914B Data Test Set—Description and Operation (107-101-100).

1.05 A letter a, b, c, etc, added to a step number in Part 3 of this section indicates an action which may or may not be required, depending on local conditions. The condition under which a lettered step should be made is given in the PROCEDURE column, and all steps governed by

SECTION 591-015-500

the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 The apparatus required for each test is shown in Table A.

3. TEST PROCEDURES

A. Power Outlet Ground Test Using 901B DTS

3.01 Test A should be performed when required. See section entitled Data Set 103B—Transmitter-Receiver—Installation and Connection (591-015-200).

**TABLE A
TEST APPARATUS**

APPARATUS	TESTS								
	A	B	C	D		E	F	G	
				RCV TERM.	TRMT TERM.			RCV TERM.	TRMT TERM.
6A Impulse Counter	1					1			
901B Data Test Set (J79901B)			1	1	1				
Interface Test Adapter (J79901B-L3-Cover of J79901B)	1								
* 902-type Data Test Set (J79902)				1*					
* 903-type Data Test Set (J79903)				1*	1*				
914B Data Test Set						1	1	1	1
KS-14510-L1 Volt-Ohm-Milliammeter or equivalent			1						
Serving Test Center		1	1				1		
1011-type Handset			1						

* If 902B and 903B Data Test Sets are used at the receive terminal, 903B Data Test Set must be used at the transmit terminal. If 902C and 903C Data Test Sets are used at the receive terminal, 903C must be used at the transmit terminal. The 902B and 903B Data Test Sets are not compatible with the 903C Data Test Set and vice versa.

STEP	PROCEDURE
1	Connect 6A impulse counter and interface test adapter as shown in Fig. 1.
2	Unbridge terminals 1 and 7 of interface test adapter.
3	Set 6A WTG switch to VOICE BAND.
4	Set 6A REF LEV DBRN toggle switch to ADD 30.
5	Set 6A REF LEV DBRN rotary switch to 60.
6	Set 6A MINUTES switch to 15.
7	Operate 6A RESET lever to reset counter to 0000.
	<p>Requirement: Counter remains at 0000 for 15 minutes.</p> <p>Note: If any counts are noted in a 15-minute period, grounding arrangements must be improved.</p>

B. Loop-Back Test From Data Test Center

3.02 This test requires the assistance of the nearest serving test center (STC).

3.03 Using a customer-provided telephone, call the STC and request a test of Data Set 103B. The STC will make arrangements with the DTC to perform the test.

3.04 The STC should be given a telephone number near the data set being tested. The STC will give this number to the DTC. The DTC will call and provide the test instructions.

3.05 At end of test, DTC will restore the data set to normal by removing carrier frequency from the line.

C. Interface Tests Using 901B DTS

3.06 The following equipment is required for Test C:

- 901B DTS (J79901B)

- KS-14510-L1 or KS-16979-L1 volt-ohm-milliammeter, or equivalent.

3.07 The interface tests using the 901B DTS have been divided into two main categories (interface tests from the STC and interface tests between two data sets). When performing the test with the STC, use either Test 1A (EIA option), Test 1B (unipolar option), or Test 1C (current option). When it is inconvenient to test with the STC, one of the similar tests (2A—EIA option, 2B—unipolar option, or 2C—current option) between two data sets must be used. The two data sets may be separated by the telephone line facility.

3.08 *Interface Tests From STC*

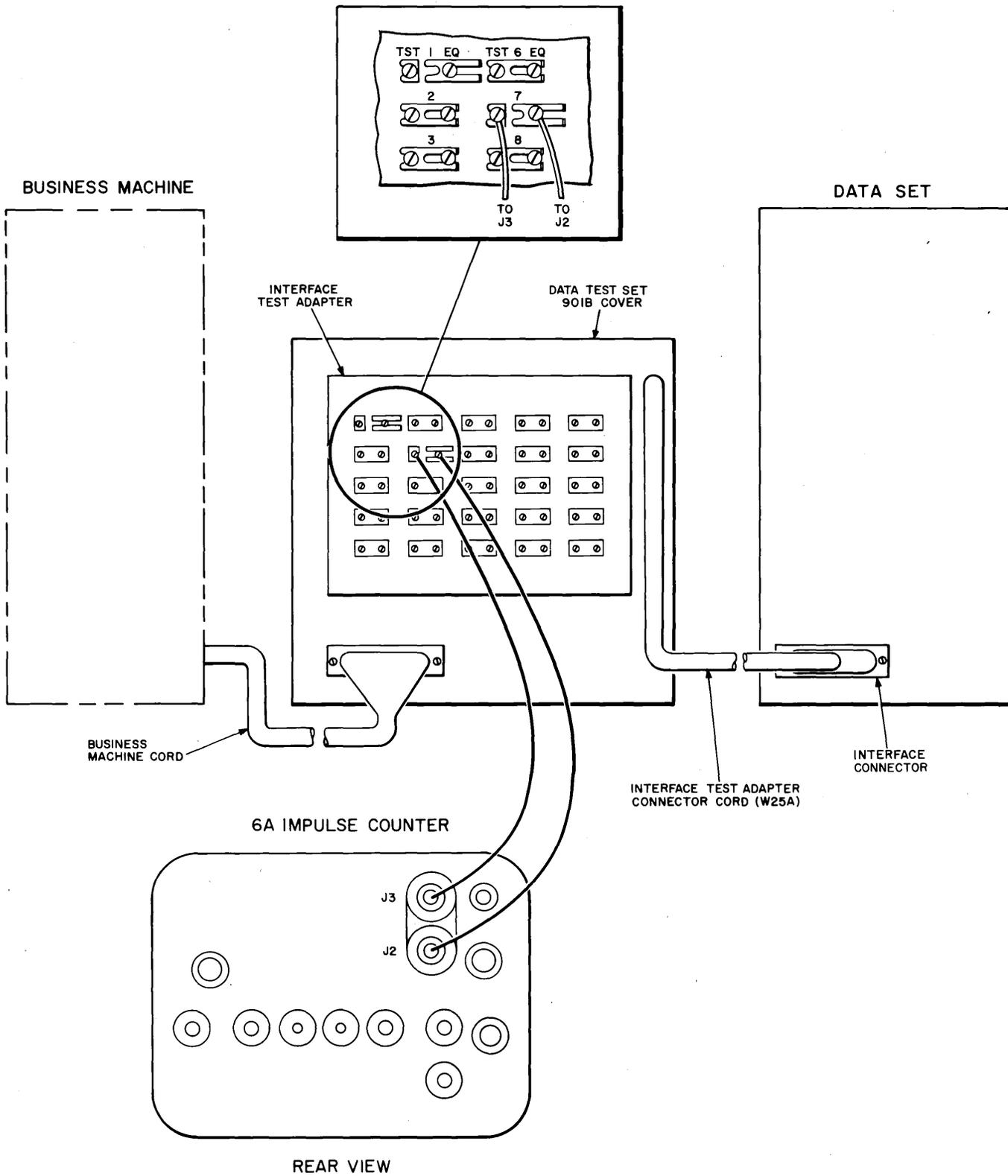


Fig. 1—Ground Noise Test Using 6A Impulse Counter

STEP	PROCEDURE
	<i>Test 1A—EIA Option</i>
1	Arrange Data Set 103B for originating option by strapping MD to OR on TB1.
2	Connect 901B DTS to interface connector of data set.
3	At 901B DTS, set switches as follows: <ul style="list-style-type: none"> (a) A TEST switch to position 3 (b) B TEST switch to position 5 (c) ATT/UNATT toggle switch to ATT (d) SELECTOR switch to 1.
4	Set volt-ohm-milliammeter (VOM) scale switch to 12 VDC and connect – lead to C and + lead to B. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead IT is in the on condition.
5	Disconnect VOM.
6	At the 901B DTS, set A TEST to position 4.
7a	If the data set uses space-hold option, connect VOM – lead to C and + lead to B. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the space-hold condition.
8b	If the data set uses mark-hold option, connect VOM – lead to B and + lead to C. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the mark-hold condition.
9	Set VOM scale switch to 60 VDC and disconnect leads.
10	At the 901B DTS, set A TEST to position 5.
11	Connect VOM – lead to B and + lead to C. <i>Requirement:</i> VOM indicates between 19.0 and 26.0V dc. <i>Note:</i> Interface lead CN is in the off condition.
12	Disconnect VOM.

SECTION 591-015-500

STEP	PROCEDURE
13	Using a customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communication.
14	Set VOM scale switch to 12 VDC.
15	<p>When informed by STC via the customer-provided telephone that they have sent tone, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
16	Disconnect VOM.
17	<p>At the 901B DTS, strap terminal C to terminal D.</p> <p>Note: Data set in answering mode (AN relay operated).</p>
18	<p>Set VOM scale switch to 60 VDC and connect – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead CN is in the off condition.</p>
19	Disconnect VOM.
20	Set VOM scale switch to 12 VDC.
21	Using customer-provided telephone, request STC to send a tone of 1070 Hz to data set under test.
22	<p>When informed by STC via the customer-provided telephone that they have sent tone, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
23	Disconnect VOM.
24	At the 901B DTS, set A TEST switch to position 4.
25	<p>Connect VOM – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the mark condition.</p>
26	Disconnect VOM.

STEP	PROCEDURE
27	Connect a 1011-type handset to tip and ring of line.
	<i>Note:</i> The 1070-Hz tone from the STC should be audible.
28	Set 901B DTS B TEST switch to 3 and listen for 2025-Hz tone transmitted by the data set.
29	Request STC to send 1270 Hz to the data set.
30	Connect VOM – lead to C and + lead to B.
	<i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc.
	<i>Note:</i> Interface lead TO is in the space condition.
31	Disconnect VOM.
32	Still listening to handset receiver, remove strap from terminals C and D of the 901B DTS.
	<i>Requirement:</i> Tone transmitted by data set should change from 2025 Hz to 1070 Hz.
33	Request STC to send 2225-Hz tone to data set.
34	When tone is heard in handset receiver, connect VOM – lead to C and + lead to B.
	<i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc.
	<i>Note:</i> Interface lead TO is in the space condition.
35	Disconnect VOM.
36	Set VOM scale switch to 60 VDC.
37	Set 901B DTS A TEST switch to 5.
38	Using customer-provided telephone, request DTC to turn off carrier.
39	Connect VOM – lead to B and + lead to C.
	<i>Requirement:</i> VOM indicates between 19.0 and 26.0V dc.
	<i>Note:</i> Interface lead CN is in the off condition.
40	Disconnect VOM.
41	Set 901B DTS B TEST switch to 5.
	<i>Requirement:</i> Data set carrier turns off (no tone heard in 1011-type handset receiver).

STEP	PROCEDURE
	<i>Test 1B—Unipolar Option</i>
1	Arrange Data Set 103B for originating option by strapping MD to OR on TB1.
2	Connect 901B DTS to interface connector of data set.
3	At 901B DTS, set switches as follows: (a) A TEST switch to position 3 (b) B TEST switch to position 4 (c) ATT/UNATT toggle switch to ATT (d) SELECTOR switch to 1.
4	Set volt-ohm-milliammeter (VOM) scale switch to 12 VDC and connect — lead to B and + lead to C. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead IT is in the on condition.
5	Disconnect VOM.
6	Set 901B DTS A TEST switch to 4.
7a	If the data set uses space-hold option, connect VOM — lead to C and + lead to B. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the space-hold condition.
8b	If the data set uses mark-hold option, connect VOM — lead to B and + lead to C. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the mark-hold condition.
9	Disconnect VOM.
10	Set 901B DTS A TEST switch to 5.
11	Connect VOM — lead to B and + lead to C. <i>Requirement:</i> VOM indicates 0V dc. <i>Note:</i> Interface lead CN is in the off condition.
12	Using customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communication.

STEP	PROCEDURE
	<p>Requirement: When data set receives tone, VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
13	<p>Strap terminal C to terminal D on the 901B DTS.</p>
	<p>Requirement: VOM indicates 0V dc.</p> <p>Note 1: Interface lead CN is in the off condition.</p> <p>Note 2: Data set in answering mode (AN relay operated).</p>
14	<p>Using customer-provided telephone, request STC to send a tone of 1070 Hz to data set under test.</p>
	<p>Requirement: When data set receives tone, VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
15	<p>Set 901B DTS A TEST switch to 4.</p>
	<p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the mark condition.</p>
16	<p>Disconnect VOM.</p>
17	<p>Connect a 1011-type handset to tip and ring of telephone line.</p>
	<p>Requirement: The 1070-Hz tone from the STC should be audible.</p>
18	<p>While listening to receiver of 1011-type handset, set 901B DTS B TEST switch to 5.</p>
	<p>Requirement: 2025-Hz tone from data set heard in handset receiver.</p>
19	<p>Request STC to send 1270-Hz tone to the data set.</p>
20	<p>Connect VOM – lead to C and + lead to B.</p>
	<p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the space condition.</p>
21	<p>While listening to 1011-type handset receiver, remove strap from 901B DTS terminals C and D.</p>
	<p>Requirement: Tone heard in handset receiver should change from 2025 Hz to 1070 Hz.</p>
22	<p>Request STC to send 2225-Hz tone to the data set.</p>

STEP	PROCEDURE
	<p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the space condition.</p>
23	Using customer-provided telephone, request STC to remove carrier.
24	<p>When informed by STC via customer-provided telephone that carrier has been removed, set 901B DTS A TEST switch to 5.</p> <p>Requirement: VOM indicates 0V dc.</p> <p>Note: Interface lead CN is in the off condition.</p>
25	Disconnect VOM.
26	Set 901B DTS B TEST switch to 4.
	<p>Requirement: Data set carrier turns off (no tone heard in handset receiver).</p> <p>Test 1C—Current Option</p>
1	Arrange Data Set 103B for originating option by strapping MD to OR on TB1.
2	Connect 901B DTS to interface connector of data set.
3	At 901B DTS, set switches as follows:
	(a) A TEST switch to position 2
	(b) B TEST switch to OFF
	(c) ATT/UNATT toggle switch to ATT
	(d) SELECTOR switch to 1.
4	Set volt-ohm-milliammeter (VOM) scale switch to 60 VDC.
5	Connect VOM leads to RECEIVE DATA terminals as follows:
	(a) Space-hold option: — to black, + to red
	(b) Mark-hold option: — to red, + to black.
	<p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the hold condition.</p>
6	Disconnect VOM and set VOM scale switch to X10,000.

STEP	PROCEDURE
7	At 901B DTS, set A TEST switch to 3.
8	<p>Connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 0 and 1 ohm.</p> <p>Note: Interface lead IT is in the on condition.</p>
9	<p>At 901B DTS, set A TEST switch to 5.</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note: Interface lead CN is in the off condition.</p>
10	<p>Using a customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communication.</p> <p>Requirement: When data set receives tone, VOM indicates between 0 and 1 ohm.</p> <p>Note: Interface lead CN is in the on condition.</p>
11	<p>At 901B DTS, strap terminals C and D.</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note 1: Interface lead CN is in the off condition.</p> <p>Note 2: Data set is now in answering mode (AN relay operated).</p>
12	<p>Using customer-provided telephone set, request STC to send a tone of 1070 Hz to data set under test.</p> <p>Requirement: When data set receives tone, VOM indicates between 0 and 1 ohm.</p> <p>Note: Interface lead CN is in the on condition.</p>
13	Disconnect VOM and set scale switch to 60 VDC.
14	At 901B DTS, set A TEST switch to 2.
15	<p>Connect VOM – lead to RECEIVE DATA red terminal and VOM + lead to RECEIVE DATA black terminal.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the mark condition.</p> <p>Disconnect VOM.</p> <p>Connect a 1011-type handset to tip and ring of telephone line.</p>

STEP	PROCEDURE
18	<p>Requirement: The 1070-Hz tone should be audible in 1011-type handset receiver.</p> <p>While listening to receiver of 1011-type handset, set 901B DTS B TEST switch to 2.</p>
	<p>Requirement: 2025-Hz tone from data set heard in handset receiver.</p>
19	Request STC to send 1270-Hz tone to the data set.
20	Connect VOM – lead to RECEIVE DATA black terminal and VOM + lead to RECEIVE DATA red terminal.
	<p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p>
	<p>Note: Interface lead RD1 is in the space condition.</p>
21	While listening to 1011-type handset receiver, remove strap between 901B DTS terminals C and D.
	<p>Requirement: The 2025-Hz tone heard in handset receiver should change to 1070 Hz.</p>
22	Request STC to send 2225-Hz tone to data set.
	<p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p>
	<p>Note: Interface lead RD1 is in the space condition.</p>
23	Disconnect VOM and set scale switch to X10,000.
24	Using customer-provided telephone, request STC to remove carrier.
25	When informed by STC via customer-provided telephone that carrier has been removed, set 901B DTS A TEST switch to 5.
26	Connect VOM – lead to C and + lead to B.
	<p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p>
	<p>Note: Interface lead CN is in the off condition.</p>
27	Disconnect VOM.
28	Set 901B DTS B TEST switch to OFF.
	<p>Requirement: Data set carrier turns off (no tone heard in handset receiver).</p>
	<p>Interface Tests Between Two Data Sets Test 2A—EIA Option</p>
1	At both data sets, strap MD to OR on TB1.

STEP	PROCEDURE
2	Connect 901B DTS to the interface connector of each data set.
3	<p>At both 901B DTSs, set switches as follows:</p> <ul style="list-style-type: none"> (a) A TEST switch to 3 (b) B TEST switch to 5 (c) ATT/UNATT switch to ATT (d) SELECTOR switch to 1.
4	<p>Set volt-ohm-milliammeter (VOM) scale switch to 12 VDC and connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead IT is in the on condition.</p>
5	At both stations, disconnect VOM.
6	At both stations, set 901B DTS A TEST switch to 4.
7a	<p>If the data set uses space-hold option, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the space-hold condition.</p>
8b	<p>If the data set uses mark-hold option, connect VOM – lead to B and + lead to C.</p> <p>Requirement: Same as 7a.</p> <p>Note: Interface lead TO is in the mark-hold condition.</p>
9	At both stations, disconnect VOM and set scale switch to 60 VDC.
10	At both stations, set 901B DTS A TEST switch to 5.
11	<p>At both stations, connect VOM – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note 1: Interface lead CN is in the off condition.</p> <p>Note 2: For the remainder of test, designate one station A and the other station B.</p>
12	At both stations, disconnect VOM.
13	At station B, set 901B DTS B TEST switch to 3.

SECTION 591-015-500

STEP	PROCEDURE
14	<p>At station B, strap terminal C to terminal D on 901B DTS (AN relay operated).</p> <p>Note: A tone of 2025 Hz is transmitted to station A.</p>
15	<p>At station A, set VOM scale switch to 12 VDC and connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
16	<p>Disconnect VOM.</p>
17	<p>At station A, strap terminal C to terminal D on 901B DTS (AN relay operated).</p>
18	<p>At station A, set VOM scale switch to 60 VDC and connect – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead CN is in the off condition.</p>
19	<p>Disconnect VOM.</p>
20	<p>At station B, remove strap from terminal C to terminal D.</p> <p>Note: A tone of 1070 Hz is transmitted to station A.</p>
21	<p>At station A, set VOM scale switch to 12 VDC and connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
22	<p>Disconnect VOM.</p>
23	<p>At station A, set 901B DTS A TEST switch to 4.</p>
24	<p>At station A, connect VOM – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the mark condition.</p>
25	<p>Disconnect VOM.</p>
26	<p>At station A, set 901B DTS A TEST switch to 5 and B TEST switch to 3.</p> <p>Note: A tone of 2025 Hz (f_{2m}) is transmitted to station B.</p>

STEP	PROCEDURE
27	At station B, set 901B DTS B TEST switch to 5.
28	<p>At station B, set VOM scale switch to 12 VDC and connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
29	Disconnect VOM.
30	At station B, strap terminal C to terminal D on 901B DTS (AN relay operated).
31	<p>At station B, set VOM scale switch to 60 VDC and connect – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead CN is in the off condition.</p>
32	Disconnect VOM.
33	<p>At station A, remove strap from terminal C to terminal D (AN relay released).</p> <p>Note: A tone of 1070 Hz is transmitted to station B.</p>
34	<p>At station B, set VOM scale switch to 12 VDC and connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
35	Disconnect VOM.
36	At station B, set 901B DTS A TEST switch to 4.
37	<p>At station B, connect VOM – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the mark condition.</p>
38	At stations A and B, set VOM scale switch to 60 VDC.
39	<p>At station A, set 901B DTS B TEST switch to 5 and connect VOM – lead to B and + lead to C.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p>

SECTION 591-015-500

STEP	PROCEDURE
40	<p><i>Note:</i> Interface lead CN is in the off condition.</p> <p>At station B, set 901B DTS A TEST switch to 5.</p> <p><i>Requirement:</i> VOM indicates between 19.0 and 26.0V dc.</p>
41	<p><i>Note:</i> Interface lead CN is in the off condition.</p> <p>End of test. Disconnect all test equipment and restore normal operating conditions.</p>
	<p><i>Test 2B—Unipolar Option</i></p>
1	<p>At both data sets, strap MD to OR on TB1.</p>
2	<p>Connect 901B DTS to the interface connector of each data set.</p>
3	<p>At both 901B DTSs, set switches as follows:</p> <ul style="list-style-type: none"> (a) A TEST switch to 3 (b) B TEST switch to 4 (c) ATT/UNATT switch to ATT (d) SELECTOR to 1.
4	<p>Set volt-ohm-milliammeter (VOM) scale switch to 12 VDC and connect – lead to B and + lead to C.</p> <p><i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc.</p> <p><i>Note:</i> Interface lead IT is in the on condition.</p>
5	<p>At both stations, disconnect VOM.</p>
6	<p>At both stations, set 901B DTS A TEST switch to 4.</p>
7a	<p>If the data set uses space-hold option, connect VOM – lead to C and + lead to B.</p> <p><i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc.</p> <p><i>Note:</i> Interface lead TO is in the space-hold condition.</p>
8b	<p>If the data set uses mark-hold option, connect VOM – lead to B and + lead to C.</p> <p><i>Requirement:</i> Same as 7a.</p> <p><i>Note:</i> Interface lead TO is in the mark-hold condition.</p>

STEP	PROCEDURE
9	At both stations, disconnect VOM.
10	At both stations, set 901B DTS A TEST switch to 5.
11	At both stations, connect VOM – lead to B and + lead to C.
	Requirement: VOM indicates 0V dc.
	Note 1: Interface lead CN is in the off condition.
	Note 2: For the remainder of test, designate one station A and the other station B.
12	At station B, disconnect VOM.
13	At station B, set 901B DTS B TEST switch to 5.
14	At station B, strap terminal C to terminal D on 901B DTS (AN relay operated).
	Note: A tone of 2025 Hz is transmitted to station A.
	Requirement: VOM at station A indicates between 7.3 and 9.7V dc.
	Note: At station A interface lead CN is in the on condition.
15	At station A, strap terminal C to terminal D on 901B DTS (AN relay operated).
	Requirement: VOM indicates 0V dc.
	Note: Interface lead CN is in the off condition.
16	At station B, remove strap from terminal C to terminal D (AN relay released).
	Note: A tone of 1070 Hz is transmitted to station A.
	Requirement: VOM at station A indicates between 7.3 and 9.7V dc.
	Note: At station A, interface lead CN is in the on condition.
17	At station A, set A TEST switch to 4.
	Requirement: VOM at station A indicates between 7.3 and 9.7V dc.
	Note: At station A, interface lead TO is in the mark condition.
18	At station A, disconnect VOM.
19	At station A, set 901B DTS A TEST switch to 5 and B TEST switch to 5.
	Note: A tone of 2025 Hz is transmitted to station B.

SECTION 591-015-500

STEP	PROCEDURE
20	At station B, set 901B DTS B TEST switch to 4.
21	At station B, connect VOM – lead to B and + lead to C. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead CN is in the on condition.
22	At station B, strap terminal C to terminal D on 901B DTS (AN relay operated). <i>Requirement:</i> VOM indicates 0V dc. <i>Note:</i> Interface lead CN is in the off condition.
23	At station A, remove strap from terminal C to terminal D on 901B DTS (AN relay released). <i>Note:</i> A tone of 1070 Hz is transmitted to station B. <i>Requirement:</i> At station B, VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> At station B, interface lead CN is in the on condition.
24	At station B, set 901B DTS A TEST switch to 4. <i>Requirement:</i> VOM indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the mark condition.
25	At station A, set 901B DTS B TEST switch to 4.
26	At station A, connect VOM – lead to B and + lead to C. <i>Requirement:</i> VOM indicates 0V dc. <i>Note:</i> Interface lead CN is in the off condition.
27	At station B, set 901B DTS A TEST switch to 5. <i>Requirement:</i> VOM indicates 0V dc. <i>Note:</i> Interface lead CN is in the off condition.
28	End of test. Disconnect all test equipment and restore normal operating conditions. <i>Test 2C—Current Option</i>
1	At both data sets, strap MD to OR on TB1.
2	Connect 901B DTS to the interface connector of each data set.

STEP	PROCEDURE
3	<p>At both 901B DTSSs, set switches as follows.</p> <ul style="list-style-type: none"> (a) A TEST switch to 2 (b) B TEST switch to OFF (c) ATT/UNATT switch to ATT (d) SELECTOR switch to 1.
4	<p>At both stations, set volt-ohm-milliammeter (VOM) scale switch to 60 VDC.</p>
5a	<p>If the data set uses space-hold option, connect VOM – lead to RECEIVE DATA black terminal and + lead to RECEIVE DATA red terminal.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the hold condition.</p>
6b	<p>If the data set uses mark-hold option, connect VOM – lead to RECEIVE DATA red terminal and + lead to RECEIVE DATA black terminal.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the hold condition.</p>
7	<p>At both stations, disconnect VOM and set scale switch to X10,000.</p>
8	<p>At both stations, set 901B DTS A TEST switch to 3.</p>
9	<p>At both stations, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 0 and 1 ohm.</p> <p>Note: Interface lead IT is in the on condition.</p>
10	<p>At both stations, set 901B DTS A TEST switch to 5.</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note 1: Interface lead CN is in the off condition.</p> <p>Note 2: For the remainder of test, designate one station A and the other station B.</p>
11	<p>At station B, strap terminal C to terminal D on 901B DTS (AN relay operated).</p>
12	<p>At station B, disconnect VOM and set 901B DTS B TEST switch to 2.</p> <p>Note: A tone of 2025 Hz is transmitted to station A.</p> <p>Requirement: At station A, VOM indicates between 0 and 1 ohm.</p> <p>Note: At station A, interface lead CN is in the on condition.</p>

SECTION 591-015-500

STEP	PROCEDURE
13	<p>At station A, strap terminal C to terminal D on 901B DTS (AN relay operated).</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note: Interface lead CN is in the off condition.</p>
14	<p>At station B, remove strap from terminal C to terminal D on 901B DTS (AN relay released).</p> <p>Note: A tone of 1070 Hz is transmitted to station A.</p> <p>Requirement: At station A, VOM indicates between 0 and 1 ohm.</p> <p>Note: At station A, interface lead CN is in the on condition.</p>
15	<p>At station A, disconnect VOM and set scale switch to 60 VDC.</p>
16	<p>At station A, set 901B DTS A TEST switch to 2.</p>
17	<p>At station A, connect VOM – lead to RECEIVE DATA red terminal and + lead to RECEIVE DATA black terminal.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the mark condition.</p>
18	<p>At station A, disconnect VOM and set scale switch to X10,000.</p>
19	<p>At station A, set 901B DTS A TEST switch to 5 and B TEST switch to 2.</p> <p>Note: A tone of 2025 Hz is transmitted to station B.</p>
20	<p>At station B, set 901B DTS B TEST switch to OFF.</p>
21	<p>At station B, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 0 and 1 ohm.</p> <p>Note: Interface lead CN is in the on condition.</p>
22	<p>At station B, strap terminal C to terminal D on 901B DTS (AN relay operated).</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note: Interface lead CN is in the off condition.</p>
23	<p>At station A, remove strap from terminal C to terminal D on 901B DTS (AN relay released).</p> <p>Note: A tone of 1070 Hz is transmitted to station B.</p>

STEP	PROCEDURE
	<p>Requirement: At station B, VOM indicates between 0 and 1 ohm.</p> <p>Note: At station B, interface lead CN is in the on condition.</p>
24	At station B, disconnect VOM and set scale switch to 60 VDC.
25	At station B, set 901B DTS A TEST switch to 2.
26	<p>At station B, connect VOM – lead to RECEIVE DATA red terminal and + lead to RECEIVE DATA black terminal.</p> <p>Requirement: VOM indicates between 19.0 and 26.0V dc.</p> <p>Note: Interface lead RD1 is in the mark condition.</p>
27	At station B, disconnect VOM and set scale switch to X10,000.
28	At station A, set 901B DTS B TEST switch to OFF.
29	<p>At station A, connect VOM – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note: Interface lead CN is in the off condition.</p>
30	At station B, set 901B DTS A TEST switch to 5.
31	<p>At station B, connect – lead to C and + lead to B.</p> <p>Requirement: VOM indicates between 250,000 and 350,000 ohms.</p> <p>Note: Interface lead CN is in the off condition.</p>
32	End of test. Disconnect all test equipment and restore normal operating conditions.

D. End-to-End Test Using 901B DTS

3.09 This test measures the distortion and error rate of the data system. In this test, the originating data set is driven by a 903-type DTS (63-bit word generator). At the distant end, the received data is fed to a 902-type DTS. Also at the answering station, another 903-type DTS delivers an identical signal to the 902-type DTS. The 902-type DTS compares the two signals, measures peak distortion, and counts any errors in the received data. The answering station should be

prepared to record errors and peak distortion on a minute-by-minute basis. Figure 2 shows a block diagram of the test setup.

Caution: Do not connect the 903-type DTS until all other equipment is connected and all equipment switches have been placed to proper settings. Do not change switch settings of the test equipment to any settings other than those specified for the specific data set being tested.

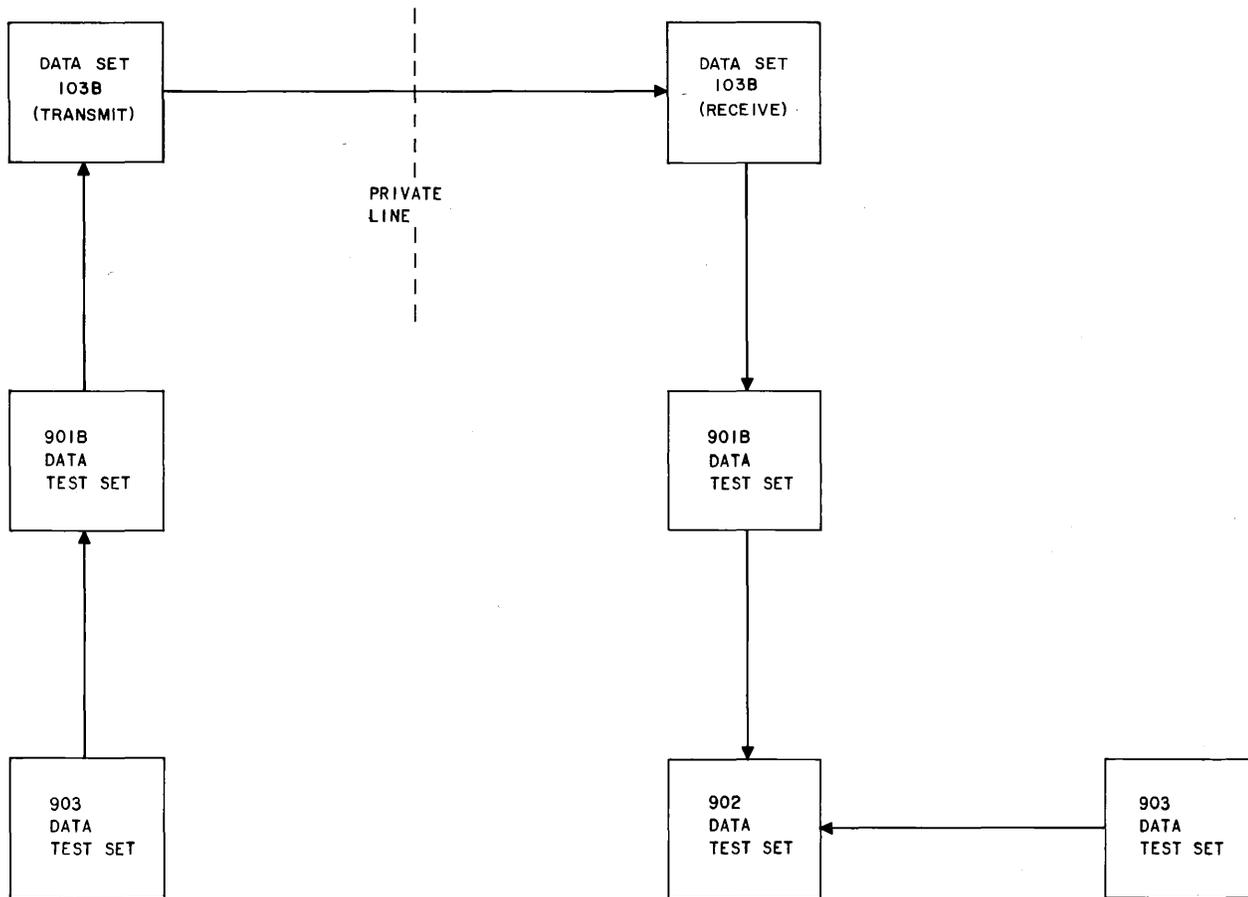


Fig. 2—Block Diagram, End-to-End Test for 901B DTS

3.10 Test Procedure:

STEP	PROCEDURE
1	Using a customer-provided telephone, establish voice communication between stations.
2	Connect the test equipment as shown in Fig. 2.
3	At transmit terminal, set switches on the 901B DTS according to the particular option in Table B.

STEP	PROCEDURE																							
<p>TABLE B</p> <p>SWITCH SETTINGS FOR 901B DTS</p> <table border="1" data-bbox="581 441 1214 730"> <thead> <tr> <th data-bbox="587 449 834 533" rowspan="2">SWITCH</th> <th colspan="3" data-bbox="834 449 1208 483">INPUT-OUTPUT OPTION</th> </tr> <tr> <th data-bbox="834 483 964 533">EIA</th> <th data-bbox="964 483 1094 533">UNI</th> <th data-bbox="1094 483 1208 533">CUR</th> </tr> </thead> <tbody> <tr> <td data-bbox="587 533 834 588">SELECTOR</td> <td data-bbox="834 533 964 588">1</td> <td data-bbox="964 533 1094 588">1</td> <td data-bbox="1094 533 1208 588">1</td> </tr> <tr> <td data-bbox="587 588 834 642">A TEST</td> <td data-bbox="834 588 964 642">OFF</td> <td data-bbox="964 588 1094 642">OFF</td> <td data-bbox="1094 588 1208 642">OFF</td> </tr> <tr> <td data-bbox="587 642 834 697">B TEST</td> <td data-bbox="834 642 964 697">3</td> <td data-bbox="964 642 1094 697">5</td> <td data-bbox="1094 642 1208 697">2</td> </tr> <tr> <td data-bbox="587 697 834 730">ATT-UNATT</td> <td data-bbox="834 697 964 730">UNATT</td> <td data-bbox="964 697 1094 730">UNATT</td> <td data-bbox="1094 697 1208 730">UNATT</td> </tr> </tbody> </table>		SWITCH	INPUT-OUTPUT OPTION			EIA	UNI	CUR	SELECTOR	1	1	1	A TEST	OFF	OFF	OFF	B TEST	3	5	2	ATT-UNATT	UNATT	UNATT	UNATT
SWITCH	INPUT-OUTPUT OPTION																							
	EIA	UNI	CUR																					
SELECTOR	1	1	1																					
A TEST	OFF	OFF	OFF																					
B TEST	3	5	2																					
ATT-UNATT	UNATT	UNATT	UNATT																					
4	At transmit terminal, set switches of the 903-type DTS as follows:																							
	(a) BIT RATE to 180 (903B) or 150 (903C)																							
	(b) RANDOM-DOT to RANDOM																							
	(c) TRIGGER to +.																							
5	Run two leads from SIGNAL OUT terminals of 903-type DTS to TRANSMIT DATA terminals of the 901B DTS.																							
	Note: Connect red-to-red and black-to-black.																							
6	Connect 901B DTS to interface connector of Data Set 103B (in place of business machine cord).																							
7	Connect power cord of 903-type DTS to 117-volt ac outlet. Operate power switch to ON.																							
8	Arrange data set for originating mode (strap MD to OR on TB1).																							
9	At receive terminal, set switches on 901B DTS according to the particular option in Table B.																							
10	At receive terminal, set switches of 902-type DTS as follows.																							
	(a) BIT RATE to 180 (902B) or 150 (902C)																							
	(b) Meter selection switch to DIST ADJ																							
	(c) TRIGGER—not required.																							

SECTION 591-015-500

STEP	PROCEDURE
11	<p>At receive terminal, set switches of the 903-type DTS as follows:</p> <ul style="list-style-type: none"> (a) BIT RATE to EXT CLOCK (b) RANDOM-DOT to RANDOM (c) TRIGGER to +.
12	<p>Run two leads from RECEIVE CLOCK terminals of 901B DTS to DATA IN terminals of 902-type DTS.</p> <p>Note: Connect red-to-red and black-to-black.</p>
13	<p>Run one lead from red TRANSMIT DATA terminal of 901B DTS to red SIGNAL OUT terminal of 903-type DTS.</p>
14	<p>Connect 903-type DTS to 902-type DTS with cord provided.</p>
15	<p>Connect 901B DTS to interface connector of the data set (in place of business machine cord).</p>
16	<p>Connect power cord of the 903-type DTS to 117-volt ac outlet. Turn power switch on.</p>
17	<p>Arrange the data set for answering mode (strap MD to AN on TB1).</p>
18	<p>At transmit terminal of 903-type DTS, momentarily operate START key.</p>
19	<p>At receiving station, attendant should monitor line to verify that data signal is being received.</p>
20	<p>Allow the meter selection switch of 902-type DTS to remain in DIST ADJ position for several seconds before making distortion adjustments. Zero meter by means of DISTORTION adjustment control.</p>
21	<p>Set meter selection switch to VOLT ADJ.</p>
22	<p>Adjust VOLT control for a zero meter reading.</p>
23	<p>Set meter selection switch to PHASE ADJ.</p>
24	<p>Adjust PHASE control for a zero meter reading.</p>
25	<p>Set meter selection switch to DIST MEAS.</p>
26	<p>Momentarily operate WORD SYNC & RESET switch and record the time.</p>
27	<p>At the end of one minute, record number of errors shown on the TOTAL ERRORS lamps and the average peak distortion as shown on the 902-type DTS microammeter. Repeat Step 26.</p>

STEP	PROCEDURE
	<p>Note 1: One microamp is equal to one percent distortion.</p> <p>Note 2: To determine total number of errors, add the numbers panel-stamped next to the TOTAL ERRORS lamps. For example, lighted 8, 4, and 1 lamps equal 13 total errors.</p>
28	<p>Repeat Step 27 until 10 total error recordings and 10 average peak distortion measurements have been made.</p>
	<p>Requirement: Disregard the 1-minute test period with most errors. The remaining nine 1-minute test periods should be error free.</p>
	<p>Requirement 2: An average peak distortion of 20 percent must not be exceeded in the 10-minute test period.</p>
	<p>Note: An occasional peak over 20 percent is permissible as long as the 20 percent average is not exceeded.</p>
29	<p>At transmit terminal, move strap from OR to AN on TB1.</p>
30	<p>At receive terminal, move strap from AN to OR on TB1.</p>
31	<p>Repeat Steps 18 through 28.</p>
32	<p>Reverse equipment setup (original transmit terminal is now receive terminal and original receive terminal is now transmit terminal).</p>
33	<p>Repeat Steps 18 through 28.</p>
34	<p>At transmit terminal, move strap from OR to AN on TB1.</p>
35	<p>At receive terminal, move strap from AN to OR on TB1.</p>
36	<p>Repeat Steps 18 through 28.</p>
37	<p>End of test. Disconnect all test equipment and restore to normal operating conditions.</p>

SECTION 591-015-500

E. Power Outlet Ground Test Using 914B DTS

3.11 Test E should be performed when required. See section entitled Data Set 103B Transmitter-Receiver—Installation and Connection (591-015-200).

STEP	PROCEDURE
1	Remove all programming pins from the 914B DTS matrix.
2	Operate (depress) all interface selector switches except 1A, 1B and 7A, 7B.
3	Connect equipment as shown in Fig. 3. <i>Note:</i> Do not ground 6A impulse counter.
4	Set WTG switch to VOICE BAND.
5	Set REF LEV DBRN toggle switch to ADD 30.
6	Set REF LEV DBRN rotary switch to 60.
7	Set MINUTES switch to 15.
8	Reset counter to 0000 by use of the RESET lever. <i>Requirement:</i> Counter remains at 0000 for 15 minutes. <i>Note:</i> If any counts are noted in a 15-minute period, grounding arrangements must be improved.

F. Interface Tests Using 914B DTS

3.12 The interface tests using the 914B DTS requires the assistance of the STC.

3.13 The interface tests using the 914B DTS have been included as three separate tests. When performing the test, use either test 1, test 2, or test 3, depending on the input-output option.

3.14 The interface test checks data set in both originating and answering mode. Therefore,

if the data set is strapped for answering mode only, temporarily strap for originating mode.

Caution: To avoid damaging the 914B DTS meter movement, set the FUNCTION switch to the OFF position and the RANGE switch to the DCV/30 position until a meter indication is required. After obtaining proper meter indication, always return the FUNCTION switch to the OFF position and the RANGE switch to the DCV/30 position.

3.15 *Test Procedure:*

STEP	PROCEDURE
1	<p>Interface Test From Serving Test Center (STC) (914B DTS) Test 1—EIA Option Arrange data set for space-hold (strap HD to SH on TB1).</p>
2	Program matrix and set switches as shown in Fig. 4.
3	Connect the 914B DTS to the data set as shown in Fig. 4.
4	Operate POWER key of the 914B DTS.
	<p>Requirement: METER indicates between 7.3 and 9.7V dc. DS2, DS3, and DS6 lamps lighted.</p>
	<p>Note: Interface lead RD1 is in the space-hold condition.</p>
5	Operate 914B DTS POWER switch to OFF and unplug ac power to Data Set 103B.
6	Arrange data set for mark-hold (move strap from SH to MH on TB1).
7	Set METER POLARITY switch to REV.
8	Operate 914B DTS POWER switch to ON and plug in ac power to Data Set 103B.
	<p>Requirement: DS3 lamp lighted. Meter indicates between 7.3 and 9.7V dc.</p>
	<p>Note: Interface lead RD1 is in the mark-hold condition.</p>
9	Set VERTICAL MONITOR to 6 and METER POLARITY to NOR.
	<p>Requirement: METER indicates between 7.3 and 9.7V dc. DS3 lamp lighted.</p>
	<p>Note: Interface lead IT is in the on condition.</p>
10	Set VERTICAL MONITOR switch to 9.
	<p>Requirement: METER indicates between 19.0 and 23.0V dc.</p>
11	Set VERTICAL MONITOR to 10 and METER POLARITY to REV.
	<p>Requirement: METER indicates between 19.0 and 23.0V dc.</p>
12	Set VERTICAL MONITOR switch to 15.
	<p>Requirement: METER indicates between 10.5 and 14.5V dc.</p>
	<p>Note: Interface lead CN is in the off condition.</p>

STEP	PROCEDURE
13	<p>Set VERTICAL MONITOR switch to 16.</p> <p>Requirement: METER indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the mark-hold condition.</p>
14	<p>Set FUNCTION switch to SPKR.</p>
15	<p>Set RANGE switch to ACV.</p>
16	<p>Set S4 toggle switch to ON.</p> <p>Requirement: DS3 and DS4 lamps lighted. Transmitter on.</p> <p>Note: Data set transmits f_{1m}. Interface lead RS is in the on condition.</p>
17	<p>Set S1 toggle switch to ON.</p> <p>Requirement: DS1, DS3, and DS4 lamps lighted.</p> <p>Note: Data set transmits f_{1s}. Interface lead SD is in the space condition.</p>
18	<p>Set S4 toggle switch to OFF.</p> <p>Requirement: DS4 lamp extinguished. Transmitter squelched.</p> <p>Note: Interface lead RS is in the off condition.</p>
19	<p>Insert red shorting pin in the 914B DTS matrix at GND/11.</p> <p>Note: AN relay operated.</p>
20	<p>Set S4 toggle switch to ON.</p> <p>Requirement: DS1, DS3, and DS4 lamps lighted. Transmitter on.</p> <p>Note: Data set sends f_{2s}. Interface lead AN is in the on condition.</p>
21	<p>Insert red shorting pin in the 914B DTS matrix at GND/8.</p> <p>Requirement: DS1, DS2, and DS4 lamps lighted. DS3 lamp extinguished. Transmitter squelched.</p> <p>Note: LO relay operated.</p>
22	<p>Set RANGE switch to DCV/30.</p>
23	<p>Set FUNCTION switch to OFF.</p>

STEP	PROCEDURE
24	Set VERTICAL MONITOR switch to 3.
25	Set METER POLARITY toggle switch to NOR. Requirement: METER indicates between 3.5 and 5.0V dc. Note: Interface lead RD1 connected to SD.
26	Set VERTICAL MONITOR switch to 6 and METER POLARITY toggle switch to REV. Requirement: METER indicates between 8.0 and 11.0V dc. Note: Interface lead IT is in the off condition.
27	Remove pins inserted in Step 19 and 21. Requirement: DS1, DS3, and DS4 lamps lighted. DS2 lamp extinguished. Transmitter on. Note: AN relay released. LO relay released.
28	Set S1 and S4 toggle switches to OFF. Requirement: DS1 and DS4 lamps extinguished. Transmitter squelched.
29	Set VERTICAL MONITOR switch to 15.
30	Set METER POLARITY switch to NOR.
31	Using customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communication.
32	When informed by STC via customer-provided telephone that tone has been sent, set FUNCTION switch to VOLT INT. Requirement: METER indicates between 7.3 and 9.7V dc. DS3 and DS5 lamps lighted. Note: Interface lead CN is in the on condition.
33	Set VERTICAL MONITOR switch to 16 and METER POLARITY toggle switch to REV. Requirement: METER indicates between 7.3 and 9.7V dc. Note: Interface lead TO is in the mark condition.
34	Set VERTICAL MONITOR switch to 3. Requirement: METER indicates between 7.3 and 9.7V dc. Note: Interface lead RD1 is in the mark condition.

STEP	PROCEDURE
35	Set METER POLARITY switch to NOR.
36	Using customer-provided telephone, request STC to send a tone of 2225 Hz to data set under test.
37	<p>When informed by STC via customer-provided telephone that tone has been sent, set FUNCTION switch to VOLT INT.</p> <p>Requirement: METER indicates between 7.3 and 9.7V dc. DS2, DS3, DS5, and DS6 lamps lighted.</p> <p>Note: Interface leads RD1 and TO are in the space condition. Interface lead CN is in the on condition.</p>
38	<p>Insert red shorting pin in the 914B DTS matrix at GND/11.</p> <p>Requirement: DS2, DS5, and DS6 lamps extinguished. DS3 lamp lighted.</p> <p>Note: AN relay operated.</p>
39	<p>Using customer-provided telephone, request STC to send a tone of 1070 Hz to data set under test.</p> <p>Requirement: When data set receives tone, DS3 and DS5 lamps light.</p> <p>Note: Interface lead RD1 is in the mark condition. Interface lead CN is in the on condition. Interface lead TO is in the mark condition.</p>
40	<p>Using customer-provided telephone, request STC to send a tone of 1270 Hz to data set under test.</p> <p>Requirement: When data set receives tone, DS2, DS3, DS5, and DS6 lamps light.</p> <p>Note: Interface lead RD1 is in the space condition, interface lead CN is in the on condition, interface lead TO is in the space condition.</p>
41	<p>End of test. Inform the STC and restore normal operating conditions.</p> <p>Test 2—Unipolar Option</p>
1	Arrange data set for space-hold (strap HD to SH on TB1).
2	Program matrix and set switches as shown in Fig. 5.
3	Connect the 914B DTS to the data set as shown in Fig. 5.
4	Apply power to the 914B DTS.
	<p>Requirement: METER indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead TO is in the space-hold condition.</p>

STEP	PROCEDURE
5	Arrange data set for mark-hold (move strap from SH to MH on TB1).
6	Set METER POLARITY toggle switch to REV. <i>Requirement:</i> Meter indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the mark-hold condition.
7	Set VERTICAL MONITOR switch to 6. <i>Requirement:</i> METER indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead IT is in the on condition.
8	Set VERTICAL MONITOR switch to 9 and METER POLARITY toggle switch to NOR. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc.
9	Set VERTICAL MONITOR switch to 10 and METER POLARITY toggle switch to REV. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc.
10	Set VERTICAL MONITOR switch to 15. <i>Requirement:</i> METER indicates 0V dc. <i>Note:</i> Interface lead CN is in the off condition.
11	Insert red shorting pin in 914B DTS matrix at DS7/15. <i>Requirement:</i> DS7 lamp lighted.
12	Remove red shorting pin from 914B DTS matrix at DS7/15.
13	Set FUNCTION switch to SPKR.
14	Set RANGE switch to ACV.
15	Insert red shorting pin in 914B DTS matrix at TP1/14. <i>Note:</i> Data set transmits f _{1s} . Interface lead RS is in the on condition.
16	Insert red shorting pin in 914B DTS matrix at TP1/2. <i>Note:</i> Data set transmits f _{1m} . Interface lead SD is in the mark condition.
17	Remove red shorting pin in 914B DTS matrix at TP1/14. <i>Note:</i> Transmitter squelched. Interface lead RS is in the off condition.

STEP	PROCEDURE
18	<p>Insert red shorting pin in 914B DTS maxtrix at TP1/14 and set S8 toggle switch to ON.</p> <p>Requirement: AN relay operated. Transmitter on.</p> <p>Note: Data set sends f_{2m}. Interface lead AN is in the on condition.</p>
19	<p>Set S1 toggle switch to ON.</p> <p>Requirement: LO relay operated. Transmitter squelched.</p> <p>Note: Interface lead LO is in the on condition.</p>
20	<p>Set VERTICAL MONITOR switch to 6 and RANGE switch to DCV/30.</p>
21	<p>Set FUNCTION switch to VOLT INT.</p> <p>Requirement: METER indicates 0V dc.</p> <p>Note: Interface lead IT is in the off condition.</p>
22	<p>Insert red shorting pin in 914B DTS matrix at DS2/6.</p> <p>Requirement: DS2 lamp lighted.</p>
23	<p>Remove red shorting pin from 914B DTS matrix at DS2/6.</p>
24	<p>Set VERTICAL MONITOR switch to 3.</p> <p>Requirement: METER indicates between 19.0 and 23.0V dc.</p> <p>Note: Interface lead RD1 connected to SD.</p>
25	<p>Remove red shorting pins from 914B DTS matrix at TP1/14 and TP1/2.</p>
26	<p>Set S1 and S8 toggle switches to OFF.</p>
27	<p>Set VERTICAL MONITOR switch to 15.</p>
28	<p>Using customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communication.</p> <p>Requirement: When informed by STC via customer-provided telephone that tone has been sent, METER indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead CN is in the on condition.</p>
29	<p>Set VERTICAL MONITOR switch to 3.</p> <p>Requirement: METER indicates between 7.3 and 9.7V dc.</p> <p>Note: Interface lead RD1 is in the mark condition.</p>

STEP	PROCEDURE
30	Using customer-provided telephone, request STC to send a tone of 2225 Hz to data set under test.
31	Set METER POLARITY switch to NOR.
32	When informed by STC via customer-provided telephone that tone has been sent, set FUNCTION switch to VOLT INT. Requirement: METER indicates between 0.4 and 1.0V dc. Note: Interface lead RD1 is in the space condition.
33	Set S8 toggle switch to ON. Note: AN relay operated.
34	Set VERTICAL MONITOR switch to 16.
35	Using customer-provided telephone, request STC to send 1270 Hz to data set under test. Requirement: When informed by STC via customer-provided telephone that tone has been sent, METER indicates between 7.3 and 9.7V dc. Note: Interface lead TO is in the space condition.
36	End of test. Inform the STC and restore normal operating conditions.
	Test 3—Current Option
1	Program matrix and set switches as shown in Fig. 6.
2	Connect the 914B DTS to the data set as shown in Fig. 6.
3a	If the mark-hold option is provided in data set under test—apply POWER to the 914B DTS. Requirement: METER indicates between 19.0 and 23.0V dc. Note: Interface lead RD1 is in the mark-hold condition.
4a	Set VERTICAL MONITOR switch to 5. Requirement: Meter indicates between 1.9 and 2.5V dc less than indication for Step 3a. Note: Interface lead RD2 is in the mark-hold condition.
5b	If the space-hold option is provided in data set under test—set METER POLARITY switch to NOR and apply POWER to the 914B DTS.

STEP	PROCEDURE
6b	<p>Requirement: METER indicates between 19.0 and 23.0V dc.</p> <p>Note: Interface lead RD1 is in the space-hold condition.</p> <p>Set VERTICAL MONITOR switch to 5.</p>
7b	<p>Requirement: METER indicates between 1.9 and 2.5V dc less than indication for Step 5b.</p> <p>Note: Interface lead RD2 is in the space-hold condition.</p> <p>Strap data set for mark-hold option (strap HD to MH on TB1).</p>
8	<p>Set VERTICAL MONITOR switch to 4 and METER POLARITY toggle switch to REV.</p> <p>Requirement: METER indicates between 19.0 and 23.0V dc.</p> <p>Note: Interface lead DX is under test.</p>
9	<p>Set VERTICAL MONITOR switch to 6.</p> <p>Requirement: METER indicates 0V dc. DS1 lamp lighted.</p> <p>Note: Interface lead IT is in the on condition.</p>
10	<p>Set VERTICAL MONITOR switch to 9 and METER POLARITY toggle switch to NOR.</p> <p>Requirement: METER indicates between 19.0 and 23.0V dc.</p> <p>Note: Interface lead +20 under test.</p>
11	<p>Set VERTICAL MONITOR switch to 10 and METER POLARITY toggle switch to REV.</p> <p>Requirement: METER indicates between 19.0 and 23.0V dc.</p> <p>Note: Interface lead -20 under test.</p>
12	<p>Set VERTICAL MONITOR switch to 15 and METER POLARITY switch to NOR.</p> <p>Requirement: METER indicates between 21.0 and 25.0V dc. DS3 lamp extinguished.</p> <p>Note: Interface lead CN is in the off condition.</p>
13	<p>Set VERTICAL MONITOR switch to 16 and METER POLARITY toggle switch to REV.</p> <p>Requirement: METER indicates between 14.0 and 18.0V dc.</p> <p>Note: Interface lead TO is in the mark condition.</p>
14	<p>Set FUNCTION switch to SPKR.</p>

SECTION 591-015-500

STEP	PROCEDURE
15	Set RANGE switch to ACV.
16	Set S2 toggle switch ON. <i>Requirement:</i> Data set transmits f1s. <i>Note:</i> Interface lead RS is in the on condition.
17	Insert red shorting pin in 914B DTS matrix at TP2/2. <i>Requirement:</i> Data set transmits f1m. <i>Note:</i> Interface lead SD is in the mark condition.
18	Set S2 toggle switch to OFF. <i>Requirement:</i> Transmitter squelched. <i>Note:</i> Interface lead RS is in the off condition.
19	Set S4 toggle switch to ON. <i>Requirement:</i> ANrelay operated. <i>Note:</i> Interface lead AN is in the on condition.
20	Set S2 toggle switch to ON. <i>Requirement:</i> Data set transmits f2m.
21	Set S5 toggle switch to ON. <i>Requirement:</i> LO relay operated. Transmitter squelched. DS1 and DS3 lamps extinguished. <i>Note:</i> Interface lead LO is in the on condition. Interface leads IT and CN are in the off condition.
22	Set VERTICAL MONITOR switch to 3.
23	Set RANGE switch to DCV 30.
24	Set FUNCTION switch to VOLT INT. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc. <i>Note:</i> Interface lead RD1 is in the mark condition.
25	Set VERTICAL MONITOR switch to 5. <i>Requirement:</i> METER indicates between 1.9 and 2.5V dc less than indication for Step 24. <i>Note:</i> Interface lead RD2 is in the mark condition.

STEP	PROCEDURE
26	Remove red shorting pin from 914B DTS matrix at TP2/2.
27	Set METER POLARITY toggle switch to NOR. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc. <i>Note:</i> Interface lead RD2 is in the space condition.
28	Set S4 toggle switch to OFF. <i>Requirement:</i> AN relay released.
29	Set S5 toggle switch to OFF. <i>Requirement:</i> LO relay released. DS1 lamp lighted. <i>Note:</i> Interface lead IT is in the on condition.
30	Using customer-provided telephone, call and request STC to send a tone of 2025 Hz to data set under test. Maintain voice communications. <i>Requirement:</i> When informed by STC via customer-provided telephone that tone has been sent, DS3 lamp lighted. <i>Note:</i> Interface lead CN is in the on condition.
31	Set S4 toggle switch to ON. <i>Requirement:</i> AN relay operated. DS1 lamp lighted. DS3 lamp extinguished.
32	Set VERTICAL MONITOR switch to 16.
33	Using customer-provided telephone, request STC to send a tone of 1270 Hz to data set under test. <i>Requirement:</i> When informed by STC via customer-provided telephone that tone has been sent, METER indicates between 7.3 and 9.7V dc. <i>Note:</i> Interface lead TO is in the space condition.
34	Set VERTICAL MONITOR switch to 5. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc. <i>Note:</i> Interface lead RD2 is in the space condition.
35	Set VERTICAL MONITOR switch to 3. <i>Requirement:</i> METER indicates between 19.0 and 23.0V dc. <i>Note:</i> Interface lead RD1 is in the space condition.
36	End of test. Inform the STC and restore normal operating conditions.

G. End-to-End Test Using 914B DTS

3.16 This test measures the error rate of the data system. In this test the transmitting data set is driven by a 914B DTS. At the distant end, the received data is fed into another 914B DTS which counts the errors in the received data. The receiving station should be prepared to record errors on a minute-by-minute basis. Figure 7 shows a block diagram and the switch settings of the test setup.

3.17 This test may also be performed using a 903C DTS at the transmit terminal as a

word generator. See Fig. 2 for the test setup at the transmit terminal. At the receive terminal, set the word length of the 914B DTS to 63.



Before making any test connections, ensure that all programming pins are removed from the 914B DTS matrix. Insert only those pins shown in the test connection diagram (Fig. 7).

3.18 Establish voice communication between the two stations.

3.19 Test Procedure:

STEP	PROCEDURE
1	<p>At the transmit terminal, set 914B DTS switches and program matrix as shown in Fig. 7.</p> <p>Note: The EIA input-output option must be provided in the Data Set 103B at the transmit terminal because the 914B DTS provides only an EIA output on the SD lead.</p>
2	<p>At the receive terminal, set 914B DTS switches and program matrix as shown in Fig. 7.</p> <p>Note: Depending upon the interface option used, additional red shorting pin(s) must be inserted in the 914B DTS matrix as follows:</p> <p style="padding-left: 40px;">EIA option—TP1/14, TP1/9</p> <p style="padding-left: 40px;">unipolar option—TP1/14, TP1/10</p> <p style="padding-left: 40px;">current option—GND/14</p>
3	<p>At the transmit terminal, strap MD to OR on TB1 of the data set (originating mode).</p>
4	<p>At the receive terminal, strap MD to AN on TB1 of the data set (answering mode).</p>
5	<p>At the transmit terminal, operate the POWER key of the 914B DTS.</p>
6	<p>At the receive terminal, operate the POWER key of the 914B DTS.</p>
7	<p>At the receive terminal, adjust the PHASE control of the 914B DTS for a null meter indication, then set the FUNCTION switch to OFF.</p>
8	<p>At the receive terminal momentarily operate the WORD SYNC switch of the 914B DTS to MAN.</p>
9	<p>At the receive terminal momentarily operate the 914B DTS RESET key.</p>
10	<p>At the end of one minute, record number of errors shown on the counter display of the 914B DTS and repeat Step 9.</p>

STEP	PROCEDURE
11	Repeat Step 10 until ten total error recordings have been made. Requirement: Disregard the 1-minute test period with most errors. The remaining nine 1-minute test periods should be error free.
12	At the transmit terminal, move strap from OR to AN on TB1 of the data set.
13	At the receive terminal, move strap from AN to OR on TB1 of the data set.
14	At the receive terminal, set FUNCTION switch to PHASE ADJ and repeat Steps 7 through 11.
15	Reverse equipment setup (original transmit terminal is now receive terminal and original receive terminal is now transmit terminal).
16	At the receive terminal, set FUNCTION switch to PHASE ADJ and repeat Steps 7 through 11.
17	At the transmit terminal, move strap from OR to AN on TB1 of the data set.
18	At the receive terminal, move strap from AN to OR on TB1 of the data set.
19	At the receive terminal, set FUNCTION switch to PHASE ADJ and repeat Steps 7 through 11.
20	End of test. Disconnect all test equipment and restore to normal operating conditions.

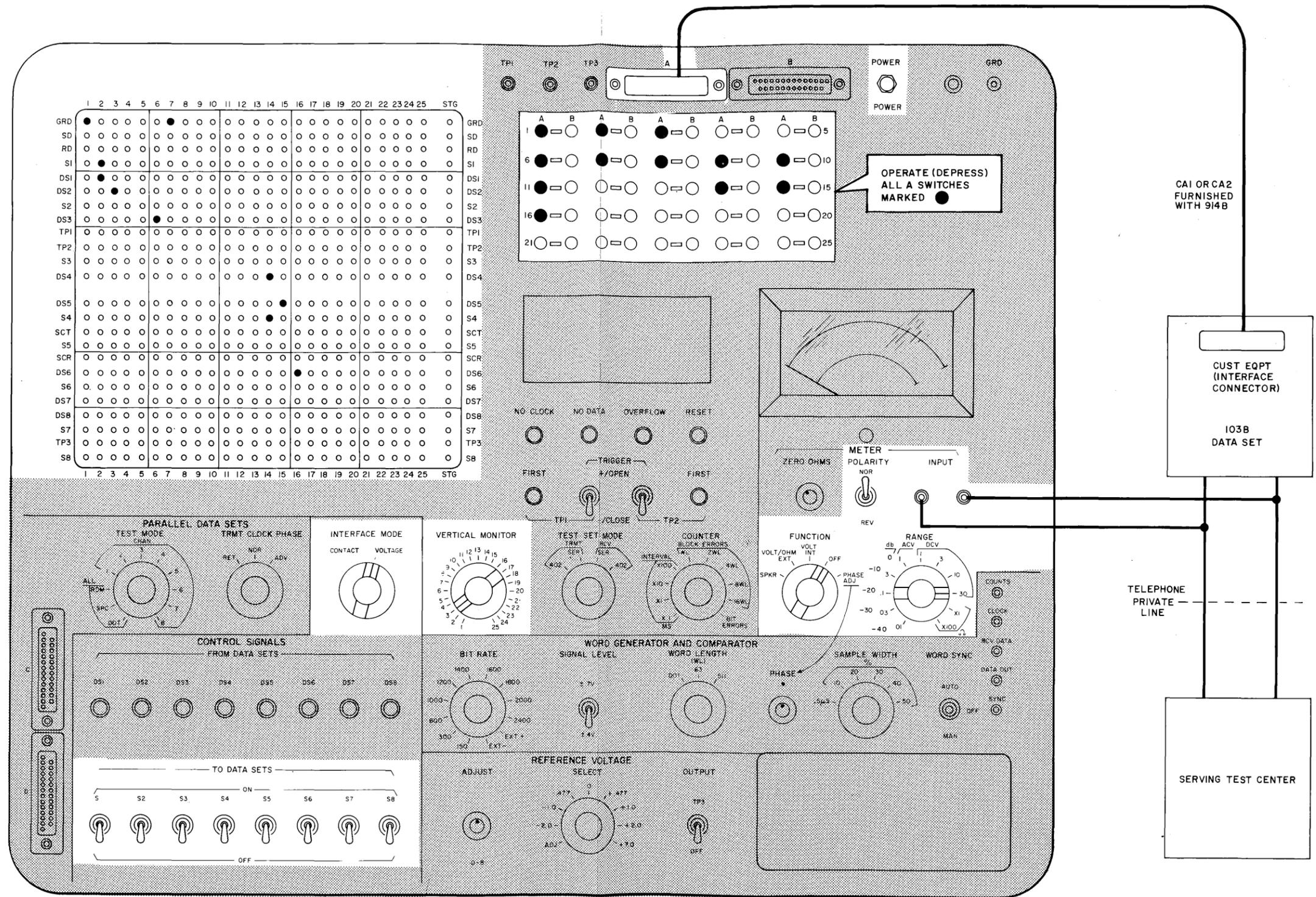


Fig. 4—Interface Test Using 914B DTS (EIA Option)

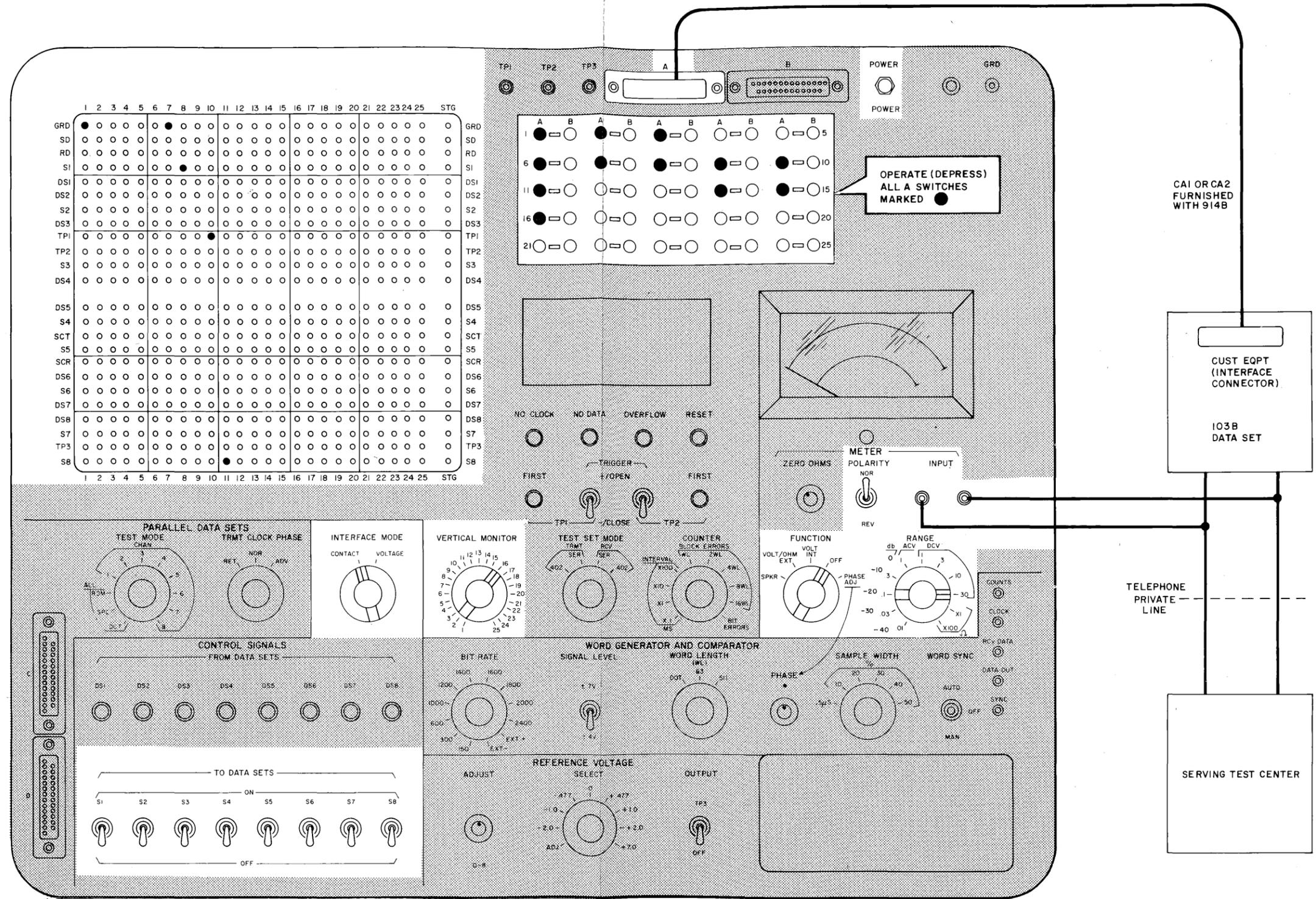


Fig. 5—Interface Test Using 914B DTS (Unipolar Option)

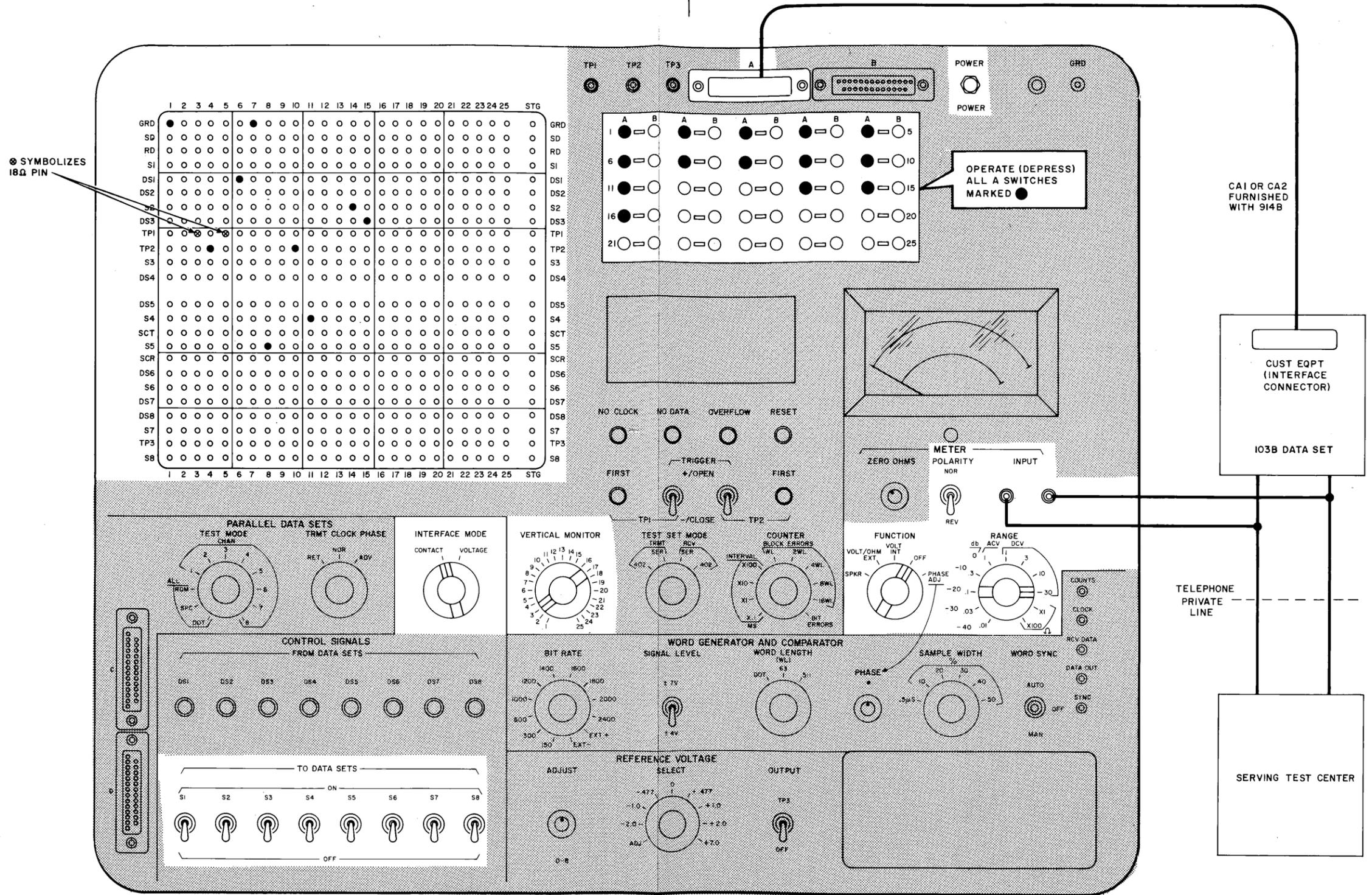


Fig. 6—Interface Test Using 914B DTS (Current Option)

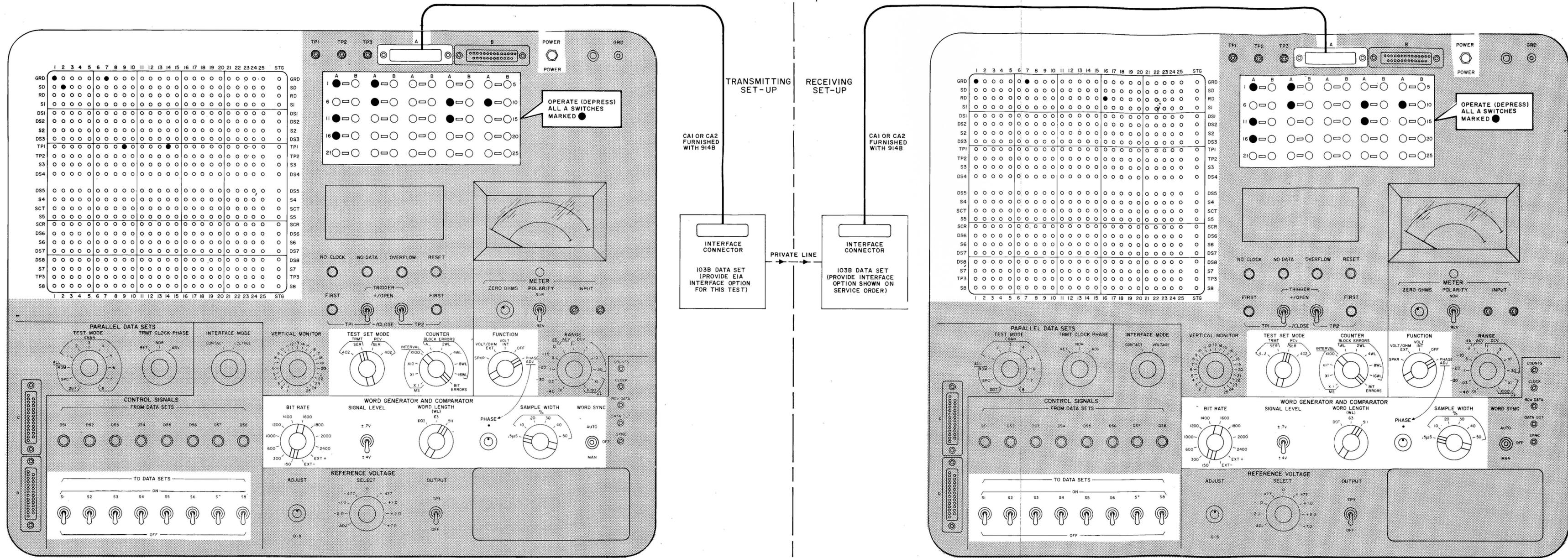


Fig. 7—End-to-End Test Using 914B DTS