

## DATA SET 602B-TYPE TEST PROCEDURES

### 1. GENERAL

**1.01** This section describes test procedures for Data Set 602B-type. The tests are to be made at the time of installation or when investigating trouble reports.

**1.02** This section is reissued to add new test procedures using the 901B and 914B Data Test Sets. Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes have been omitted. The rating of the section has been changed to AT&TCo Standard.

**1.03** The following tests are included in this section.

Loop-Back Test

End-To-Data Test Center (DTC) Test

End-To-End Test

**1.04** When more than one method of performing a test procedure is given, the method selected should depend upon the type of test equipment available.

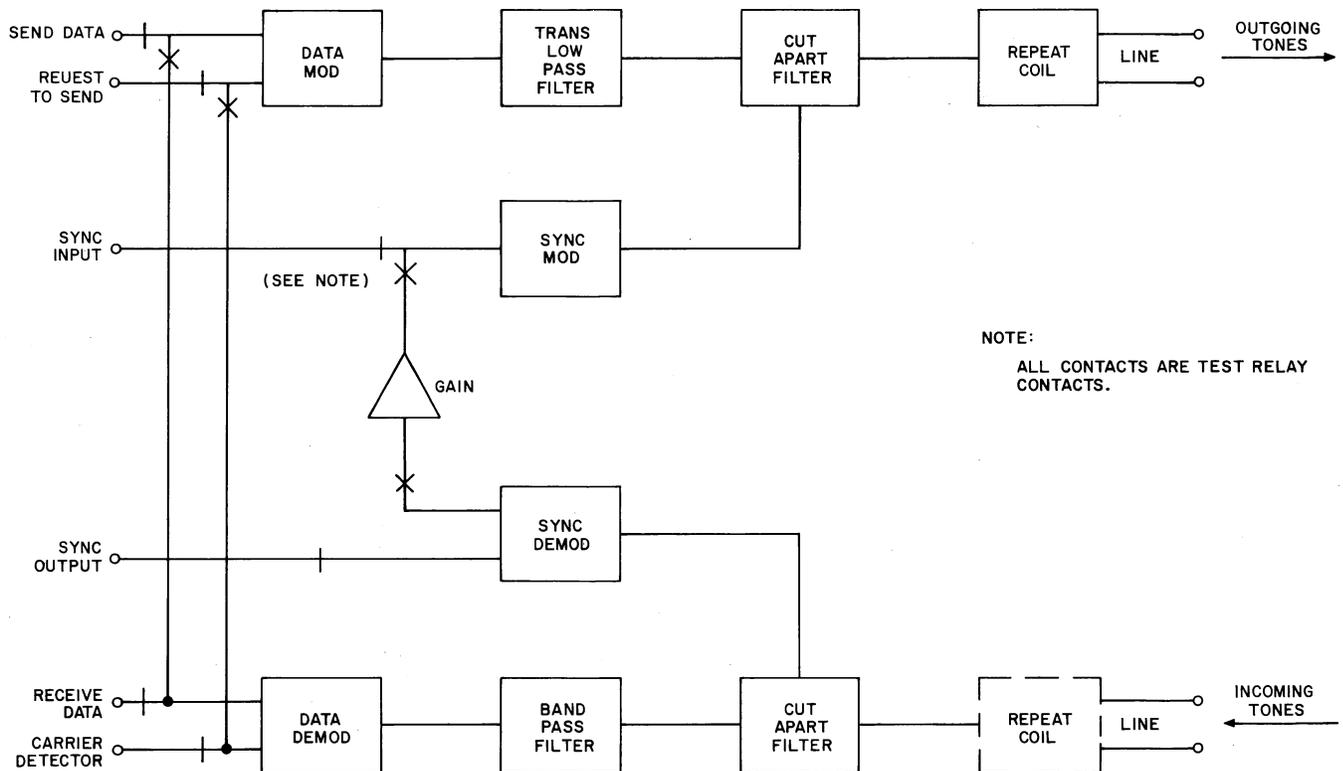
### 2. INSTALLATION TEST PROCEDURES

**2.01** The following test to ensure proper operation of Data Set 602B-type should be made immediately after installation or when investigating trouble reports.

#### A. Loop-Back Test

**2.02** The data test center (DTC) will perform the loop-back test in conjunction with the customer and direct activities of the telephone company employees in making supplemental or verification tests.

**2.03** Refer to Fig. 1 for a block diagram of Data Set 602B-type in a loop-back test mode configuration.



**Fig. 1—Data Set 602B-Type—Test Mode—Block Diagram**

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**2.04** The only relay used in the Data Set 602B-type is the test (TE) relay. The test condition is initiated by the customer, who by appropriate switching causes a standard Electronics Industries Association (EIA) positive voltage to be applied to pin 25 of the interface plug. This positive voltage operates the TE relay, which disconnects all interface leads except the test leads from the business machine interface, and connects the receiver outputs to the corresponding transmitter inputs.

**2.05** When the data set is in the loop-back test mode configuration, it is possible for the DTC to send frequencies within the data band and receive the same frequency, within the tolerance limits, back from Data Set 602B-type. Return frequency deviations greater than the tolerance limits will indicate trouble in Data Set 602B-type.

**2.06** The DTC informs the customer by another line when tests have been completed. The customer, through appropriate switching, applies a negative voltage to the test pin at the interface. The negative voltage releases the test relay, thereby restoring Data Set 602B-type to normal operation.

**3. MAINTENANCE TEST PROCEDURES**

**3.01** Tests contained in this part are intended to be used as troubleshooting aids during maintenance visits. Use of the End-To-DTC Test in this part in conjunction with Loop-Back Test contained in Part 2 should enable the tester to isolate the trouble to either the business machine or data set. Dynamic tests permit end-to-end testing of a data system, allowing evaluation of the data set performance when using the normal

transmission facility. However, this test is so time consuming it should only be done as a last resort. Instead, a dynamic test to the nearest serving DTC will normally provide the degree of confidence needed. The tests to be performed will be determined by the trouble encountered and the test equipment available. Data sets found to be defective should be tagged to indicate the nature of the trouble and returned to the Western Electric Company distributing houses for repair.

**A. End-To-DTC Test**

**3.02** The purpose of this test is to check the linearity of the data system by transmitting to and receiving test voltages from the DTC over the line facilities.

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**3.03** The following test equipment is required for this test:

901B Data Test Set (DTS) (Interface Test Adapter)

Hewlett-Packard Model 412A DC Vacuum Tube Voltmeter (VTVM), or equivalent

Hewlett-Packard Model 400H AC VTVM, or equivalent

KS-6573 Battery (22-1/2 volts), or equivalent

Potentiometer, 5,000 ohms

Shorting Strap

**3.04** Perform the following procedure:

STEP	PROCEDURE
1	<b>Transmitter Output Frequency</b> Gain access to Data Set 602B-type.
2	Verify that the customer business machine is turned off.
3	Place a call to the 904E DTC and request an end-to-DTC test of Data Set 602B-type. Make arrangements with the DTC to allow enough time for frequency measurements required in Steps 6, 7, and 8.
4	Place Data Set 602B-type in the data mode.

STEP	PROCEDURE
5	Arrange the test equipment as shown in Fig. 2.
6	Adjust potentiometer for a reading of 0.0 volts dc on the VTVM. DTC should receive $1500 \pm 50$ Hz.
7	After prearranged time interval, adjust potentiometer for a reading of +3.5 volts dc on the VTVM. DTC should receive $1975 \pm 50$ Hz.
8	After prearranged time interval, adjust potentiometer to +7.0 volts dc. DTC should receive $2450 \pm 50$ Hz.
9	Go to the voice mode and discuss results of the test with the DTC. If requirements are not met, replace circuit pack (CP) AS6 (AS83), and repeat Steps 6 through 9. If requirements are still not met, replace the data set.
10	If the receiver portion of Data Set 602B-type is to be tested, proceed to Step 11. If the receiver portion is not to be tested, restore all equipment to normal operating condition.
<p><b>Receiver Output Voltage</b></p>	
11	Request an end-to-DTC test of the receiver portion of Data Set 602B-type. Make arrangements with the DTC to allow enough time for voltage measurements required in Steps 16, 19, 20, and 21.
12	Place Data Set 602B-type in the data mode.
<p style="text-align: center;"><b>Fig. 2—End-to-Data Center Test Using 901B Data Test Set</b></p>	

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STEP	PROCEDURE
13	Remove strap between terminals 4 and 9 of the interface test adapter.
14	Disconnect 412A VTVM, battery, and potentiometer from terminals 2 and 7 of the interface test adapter.
15	Condition the 400H VTVM to measure 1 volt ac.
16	Connect the 400H VTVM between terminals 3 and 7 of the interface test adapter. Meter should read approximately 250 millivolts noise.
17	Disconnect the 400H VTVM.
18	Connect the 412A VTVM between terminals 3 and 7 of the interface test adapter (positive to 3, negative to 7).
19	When the DTC transmits 1500 Hz, meter should indicate $0.0 \pm 0.2$ volts dc.
20	When the DTC transmits 1975 Hz, meter should indicate $3.5 \pm 0.4$ volts dc.
21	When the DTC transmits 2450 Hz, meter should indicate $7.0 \pm 0.5$ volts dc.
22	Go to the voice mode and discuss results of the test with the DTC. If requirements are not met, replace CP AS4 (AS82), and repeat Steps 19 through 22. If requirements are still not met, replace data set.
23	End of test; restore all equipment to normal operating condition.

**914B Data Test Set Method**

914B DTS matrix.

**3.05** The only test equipment required for this test is a 914B DTS.

**3.07** For further information on the 914B DTS, refer to the section entitled 914B Data Test Set—Description and Operation (107-101-100).

**3.06** Before making test connections, ensure that all programming pins are removed from the

**3.08** Perform the following procedure.

STEP	PROCEDURE
<b>Transmitter Output Frequency</b>	
1	Gain access to Data Set 602B-type.
2	Verify that the customer business machine is turned off.
3	Place a call to the 904E DTC and request an end-to-DTC test of Data Set 602B-type. Make arrangements with the DTC to allow enough time for the frequency measurements required in Steps 7, 12 and 16.

STEP	PROCEDURE
4	Place Data Set 602B-type in the data mode.
5	Arrange the test equipment as shown in Fig. 3. Plug 914B DTS into a source of 117-volt 60-Hz power, and depress POWER switch.
6	Set OUTPUT switch on the 914B DTS to TP3.
7	Place S1 ON. DS1 should light and DTC should receive $1500 \pm 50$ Hz.
8	After the prearranged time interval, place S1 OFF. DS1 should extinguish.
9	Rotate SELECT switch to ADJ position.
10	Place METER FUNCTION switch to VOLT INT.
11	Rotate ADJUST control until meter indicates 3.5 volts.
12	Place S1 ON. DS1 should light and DTC should receive $1975 \pm 50$ Hz.
13	After the prearranged time interval, place S1 OFF. DS1 should extinguish.
14	Place METER FUNCTION switch to OFF.
15	Rotate SELECT switch to +7.0 position.
16	Place S1 ON. DS1 should light and DTC should receive $2450 \pm 50$ Hz.
17	Go to the voice mode and discuss results of the test with the DTC. If the requirements are not met, replace circuit pack (CP) AS6 (AS83) and repeat Steps 5 through 17. If the requirements are still not met, replace the data set.
18	If the receiver portion of Data Set 602B-type is to be tested, proceed to Step 19. If the receiver portion is not to be tested, restore all equipment to normal operating condition.
	<b>Receiver Output Voltage</b>
19	Request an end-to-DTC test of the receiver portion of Data Set 602B-type. Make arrangements with the DTC to allow enough time for voltage measurements required in Steps 24, 25, and 26.
20	Place Data Set 602B-type into the data mode.
21	Remove programming pins from the following crosspoints on the 914B DTS matrix.
	S1 and 4
	TP3 and 2
	DS1 and 8

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STEP	PROCEDURE
22	Rotate VERTICAL MONITOR switch to position 3.
23	Place the METER FUNCTION switch to VOLT INT.
24	When the DTC transmits 1500 Hz, meter should indicate $0.0 \pm 0.2$ volts.
25	When the DTC transmits 1975 Hz, meter should indicate $3.5 \pm 0.4$ volts.
26	When the DTC transmits 2450 Hz, meter should indicate $7.0 \pm 0.5$ volts.
27	Go to the voice mode and discuss results of the test with the DTC. If requirements are not met, replace CP AS4 (AS82) and repeat Steps 22 through 27. If requirements are still not met, replace the data set.
28	End of test; restore all equipment to normal operating condition.

**B. End-To-End Test**

**3.09** The End-To-End-Test should be made after the loop-back test and end-to-DTC test, but only when it is necessary to identify facility troubles which the data set has been occasionally experiencing over a period of time.

**901B Data Test Set Method**

**3.10** The following test equipment is required for this test:

- (2) 901B DTS (Interface Test Adapter)
- (2) Hewlett-Packard Model 412A DC VTVM, or equivalent
- KS-6573 Battery (22-1/2 volts), or equivalent
- Potentiometer, 5000 ohms
- Shorting Strap

**3.11 Transmitting End Preparation:**

- (1) Gain access to Data Set 602B-type.
- (2) Verify that the customer business machine is turned off.
- (3) Connect the equipment as shown in Fig. 2.

**3.12 Receiving End Preparation:**

- (1) Gain access to Data Set 602B-type.
- (2) Verify that the customer business machine is turned off.
- (3) Disconnect customer business machine cord from interface connector of Data Set 602B-type.
- (4) Connect interface test adapter to interface connector of Data Set 602B-type.
- (5) Connect the 412A VTVM between terminals 3 (positive) and 7 (negative) of the interface test adapter.

**3.13 Test Procedure:**

<b>TRANSMIT</b>	<b>RECEIVE</b>
(1) Establish a call to the receiving station and request an end-to-end test be conducted.	(1) Not applicable.
(2) Place Data Set 602B-type in the data mode.	(2) Place Data Set 602B-type in the data mode.
(3) Adjust potentiometer for a reading of 0.0 volt dc on the meter.	(3) Meter should indicate $0.0 \pm 0.2$ volt.
(4) Adjust potentiometer for a reading of 3.5 volts dc on the meter.	(4) Meter should indicate $3.5 \pm 0.4$ volts.
(5) Adjust potentiometer for a reading of 7.0 volts dc on the meter.	(5) Meter should indicate $7.0 \pm 0.5$ volts.
(6) Go to the voice mode and discuss results of test with telephone company employee at the receiver location.	(6) Go to the voice mode.

**914B Data Test Set Method**

**3.14** The only test equipment required for this test is two 914B DTSSs.

**3.15 Test Procedure:**

<b>TRANSMIT</b>	<b>RECEIVE</b>
(1) Connect equipment as shown in Fig. 4.	(1) Connect equipment as shown in Fig. 4.
(2) Plug 914B DTS into a source of 117-volt 60-Hz power, and depress POWER switch.	(2) Plug 914B DTS into a source of 117-volt 60-Hz power, and depress POWER switch.
(3) Call receiving station and request an end-to-end test be conducted.	(3) Not applicable.
(4) Place Data Set 602B-type in the data mode.	(4) Place Data Set 602B-type in the data mode.
(5) Place S1 ON. DS1 lights.	(5) Meter should indicate $0.0 \pm 0.2$ volt.
(6) Place S1 OFF. DS1 extinguishes.	(6) Not applicable.
(7) Place SELECT switch in ADJ position.	(7) Not applicable.
(8) Place METER FUNCTION switch to VOLT INT.	(8) Not applicable.
(9) Rotate ADJUST control until meter indicates 3.5 volts.	(9) Not applicable.

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**TRANSMIT**

- (10) Place S1 ON. DS1 lights.
- (11) Place S1 OFF. DS1 extinguishes.
- (12) Place METER FUNCTION switch to OFF.
- (13) Rotate SELECT switch to 7.0.
- (14) Place S1 ON. DS1 lights.
- (15) Place S1 OFF. DS1 extinguishes.
- (16) Go to the voice mode and discuss results of test with the telephone employee at the receiver location.

**RECEIVE**

- (10) Meter reads  $3.5 \pm 0.4$  volts.
- (11) Meter indicates 0 volts.
- (12) Not applicable.
- (13) Not applicable.
- (14) Meter indicates  $7.0 \pm 0.5$  volts.
- (15) Meter indicates 0 volts.
- (16) Go to the voice mode.

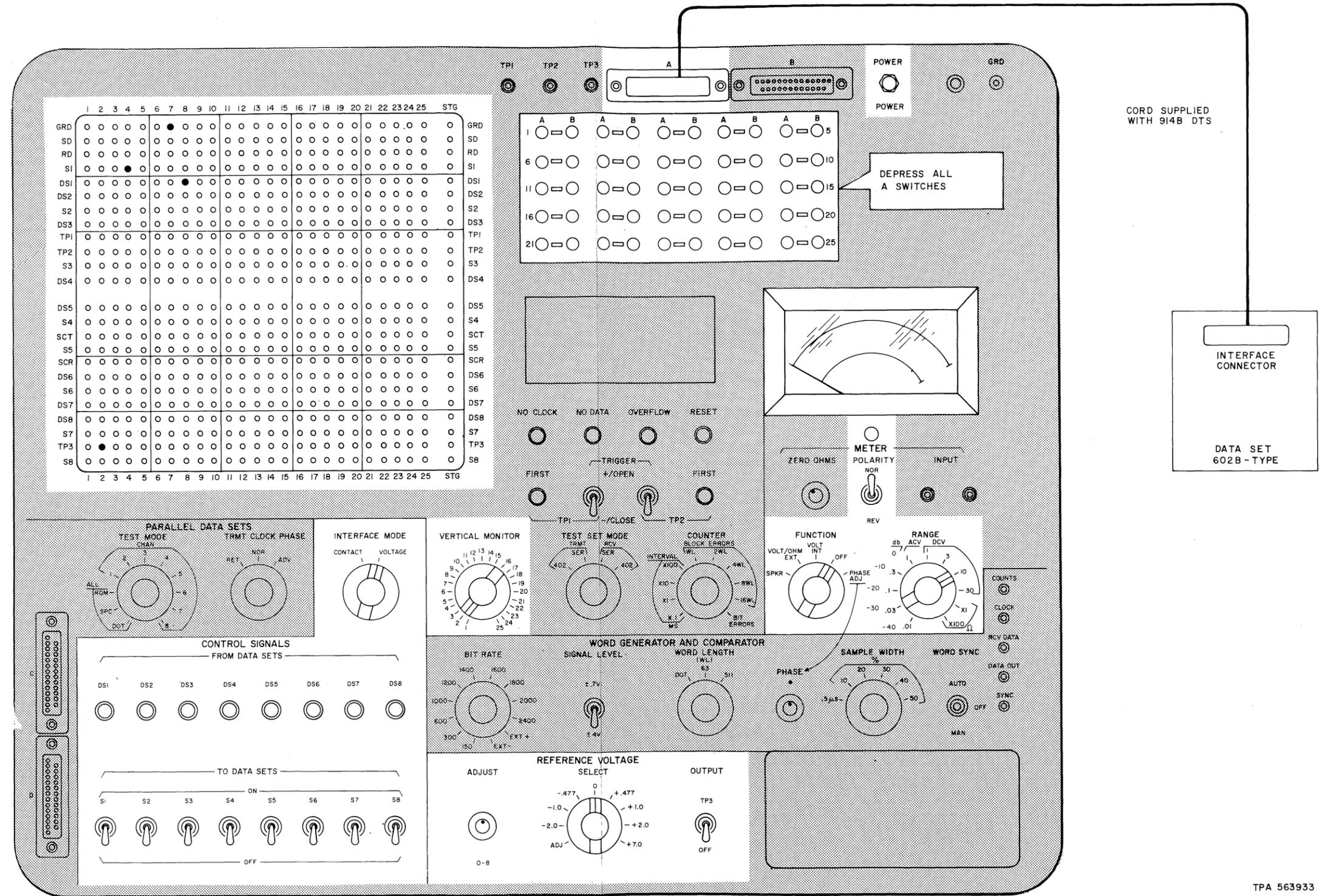


Fig. 3—End-to-Data Test Center Test Using 914B Data Test Set

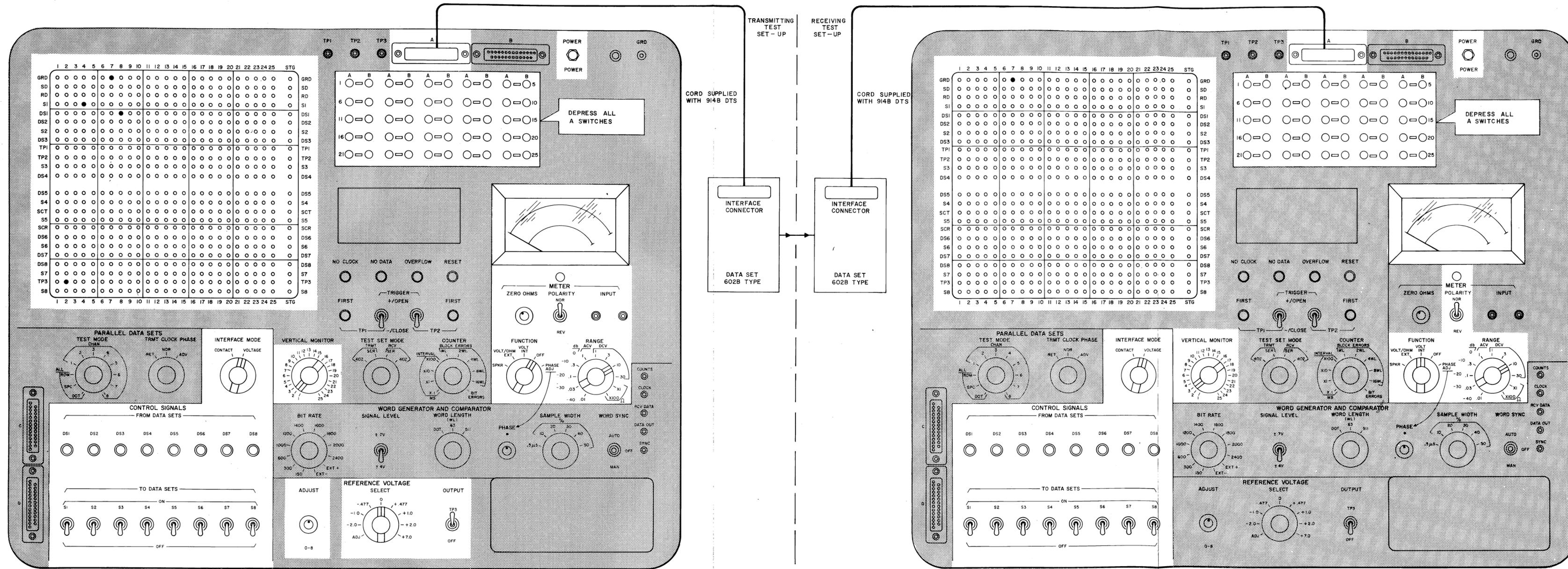


Fig. 4—End-to-End Test—914B Data Test Set Method

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