DATA SET 401A

TRANSMITTER

TEST PROCEDURES

1. GENERAL

1.01 This section describes test procedures for Data Set 401A. These tests are to be made at time of installation and as a means of clearing routine trouble.

1.02 This section is reissued to provide improved end-to-data test center (DTC) interface tests. Since this reissue constitutes a general revision, arrows ordinarily used to denote changes have been omitted.

1.03 Before proceeding with any tests of the data set, verify the following:

(a) Data loop has been tested and meets requirements as specified in the section entitled Data Systems—DATA-PHONE® Service, Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501).

(b) The telephone portion of the installation meets standard dc talk, signaling, and supervision requirements.

Take necessary steps to ensure customer is not billed for test calls. Refer to the section entitled Crediting Charges on Test Calls (010-250-001).

1.04 Tests contained in this section are divided into two parts. Part 2 contains tests to be performed at the time of installation and Part 3 contains tests to be performed during maintenance visits.

2. INSTALLATION TEST PROCEDURE

2.01 Data Set 401A does not have integrated test circuits which provide remote test capability with the serving DTC. Therefore, a 901A or B or a 914B Data Test Set (DTS) should be used at time installation to perform a local or end-to-DTC interface test as shown in Part 3 of this section. In addition, the installer should whenever possible observe to assure that data can be transmitted and/or received using the business machines and data sets at both the near- and far-end data terminals.

3. MAINTENANCE TEST PROCEDURES

3.01 The tests contained in this part are intended to be used as a troubleshooting aid during maintenance vists. Use of the end-to-DTC interface test should enable the tester to isolate the trouble to either the business machine or data set and will normally provide the degree of confidence needed. 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.

Local Test (901-type Data Test Set)

3.02 The following procedure permits audible monitoring of the data set transmitter output at the data set under test. The test should therefore be used only as an indication of the functionality of the data set and should not be used to replace the end-to-DTC interface test.

STEP	PROCEDURE
1	When using 901A DTS, rotate SELECTOR switch to 401A, C, E position. When using 901B DTS, rotate SELECTOR switch to 6. On either data test set, set A TEST and B TEST switches to OFF. Set the UNATT-ATT switch to ATT.
2	Connect the cord of the 901A or 901B DTS to the interface connector of the data set.
3	Establish connection to a quiet line. If no quiet line is available, dial any single digit to remove dial tone. It may be necessary to repeat this if the interval for the following test exceeds the time-out period.
4	Connect a 1011-type handset to tip and ring of the telephone line. Set the TALK-MON switch to MON.
5	Pull up the data key.
6	Rotate the A TEST switch of the data test set to position 1. A 600-Hz tone should be heard in the 1011-type handset receiver.
7	Move the 1011-type handset to terminals C and D of the data test set. Operate the TALK-MON switch to TALK. The same tone should be heard at a higher level. ***Caution: The 1011-type handset must not be held close to the ear because of the high level of oscillator tone.***
8	Rotate the A TEST switch from position 2 through 10. Table A shows the frequency that should be heard at each position of the A TEST switch.
9	Disconnect test equipment.

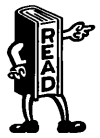
TABLE A

TEST FREQUENCIES

A TEST POSITION	NOMINAL FREQUENCY (Hz)	REQUIRED VALUES (Hz)
1	600	598-612
2	697	690-704
3	770	763-777
4	852	845-859
5	941	934-948
6	1098	1100-1114
7	1209	1202-1216
8	1336	1329-1343
9	1477	1470-1484
10	1633	1626-1640

Local Test (914B Data Test Set)

3.03 The following procedure permits audible monitoring of the data set transmitter at the data set under test. The test should therefore be used only as an indication of the functionality of the data set and should not be used to replace the end-to-DTC interface test.



Test set switches not shown on the test connection diagram (Fig. 1) or not mentioned in text are not required for the test. Before making any test connections, ensure that all programming pins are removed from the 914B matrix. Insert only those pins shown in the test connection diagram (Fig. 1).

STEP	PROCEDURE
1	Establish test connections and switch settings as shown in Fig. 1.
2	Program the 914B matrix by inserting red programming pins as shown in Fig. 1.
3	Operate (depress) all A interface selector switches on the 914B. ***Note:*** Data Set 401A is powered from the telephone line. No commercial 60-Hz 120-volt power is required for the 914B for this test.
4	Establish connection to a quiet line. If no quiet line is available, dial any single digit to remove dial tone. It may be necessary to repeat this if the interval for the following test exceeds the time-out period. ***Caution: The 1011-type handset must not be held close to the ear because of the high level of oscillator tone.***
5	Pull up the data key. A 600-Hz tone should be heard in the 1011-type handset receiver.
6	Set toggle switches as shown in Table B. The corresponding frequencies should be heard in the handset receiver.
7	Remove all test connections and restore equipment to normal operating conditions.

TABLE B

TEST FREQUENCIES

STEP	914B TOGGLE SWITCHES		NOMINAL FREQUENCY (Hz)	REQUIRED VALUES (Hz)
	ON	OFF		
1	S1		697	690-704
2	S2		770	763-777
3	S3		852	845-859
4	S4	S1	941	943-948
5	S1	S5 S8	1098	1100-1114
6	S5		1209	1202-1216
7	S6		1336	1329-1343
8	S7		1477	1470-1484
9	S8	S5	1633	1626-1640

End-to-Data Test Center Interface Test (901B Data Test Set)

3.04 This test permits the DTC to measure the frequency of each data channel transmitted in response to a contact closure applied to the data set interface. Answer-back tone is also checked.

3.05 Detailed test instructions are provided for the telco employer in the left column. A summary of associated actions performed at the DTC is shown in the right column to provide coordination and minimize testing time.

3.06 The following test equipment is required.

901-type DTS

1011-type handset or equipment

3.07 ***Test Procedure:***

STEP	DATA STATION	DATA TEST CENTER
Data Channels Tests		
1	On DTS— Set A TEST switch to OFF. Set B TEST switch to OFF. Set toggle switch to ATT. If DTS is 901A— Set SELECTOR switch to 401A, C, E. If DTS is 901B— Set SELECTOR switch to 6.	
2	Connect the DTS interface cord to the data set interface connector.	
3	Connect the 1011-type handset across terminals C and D of the DTS.	
4	Using the data set telephone, call the serving DTC and request DTC to test the data set, using procedures described in Section 668-104-500.	
5	Hang up.	DTC operator conditions test equipment to perform test.
6	When station bell rings, lift handset. ***Requirement:*** Ringing tripped, voice communication satisfactory.	DTC calls station under test.
7	Determine from DTC the time required to measure each data frequency transmitted in Steps 8 and 9.	
8	Pull up data set data key. ***Caution: The 1011-type handset must not be held close to the ear because of the high level of oscillator tone.***	DTC goes to test mode.

STEP	DATA STATION	DATA TEST CENTER
9	In cooperation with DTC, rotate the A TEST switch through positions 1 through 10. ***Requirement:*** A different data tone heard in 1011-type handset for each switch position.	DTC measures each frequency as sent from the data station.
10	Depress data key and discuss test results with DTC.	DTC goes to talk mode.
Answer-Back Test		
11	Pull up data key.	DTC goes to test mode.
12	Answer-back tone heard in 1011-type handset receiver.	DTC sends 1017 Hz for 5 seconds.
13	Depress data key and discuss test results with DTC.	DTC goes to talk mode.
14	Remove all test connections and restore equipment to normal operating conditions.	

End-to-Data Test Center Interface Test (914B Data Test Set)

3.08 This test permits the DTC to measure the frequency of each data channel transmitted in response to contact closures applied at the data set interface. Answer-back tone is also checked.

3.09 Detailed test instructions are provided for the telco employee in the left column. A summary of associated actions perfomed at the DTC is shown in the right column to provide coordination and minimize testing time.

Test set switches not shown on the test connection diagram (Fig. 1) or not mentioned in text are not required for the test. Before making any test connections, ensure that all programing pins are removed from the 914B matrix. Insert only those pins shown in the test connection diagram (Fig. 1).

3.10 The following test equipment is required:

914B DTS

1011-type handset or equivalent

3.11 ***Test Procedure:***

STEP	DATA STATION	DATA TEST CENTER
Data Channels Test		
1	Establish test connections as shown in Fig. 1.	
2	Program the 914B matrix by inserting red programming pins as shown in Fig. 1.	
3	Operate (depress) all A interface selector switches on the 914B. ***Note:*** Data Set 401A is powered from the telephone line. No commercial 60-Hz 120-volt power is required for the 914B for this test.	

STEP	DATA STATION	DATA TEST CENTER
4	Using the data set telephone, call the serving DTC and request DTC to test the data set using the procedures described in Section 668-104-500.	
5	Hang up.	DTC operator conditions test equipment to perform test.
6	When station bell rings, lift handset. ***Requirement:*** Ringing tripped, voice communication satisfactory.	DTC calls data station under test.
7	Determine from DTC the time required to measure each data frequency transmitted in Steps 8 through 10. ***Caution: The 1011-type handset must not be held close to the ear because of the high level of oscillator tone.***	
8	Pull up data key. ***Requirement:*** Data signal (600 Hz) heard in 1011-type handset. ***Note:*** Toggle switches S1 through S8 ***must*** be set as shown in Fig. 1.	DTC goes to test mode and measures rest tone.
9	Momentarily remove and replace programming pin in matrix, column 25 row TP3. ***Requirement:*** Data tone silenced when pin is removed, restored when pin is replaced.	
10	In cooperation with DTC, operate switches as shown in Table B, Steps 1 through 9, ***in sequence.*** ***Requirement:*** Data signals heard in handset receiver as shown in Table B.	DTC measures each frequency as sent from data station.
11	Depress data key and discuss test results with DTC.	DTC goes to talk mode.
Answer-Back Test		
12	Pull up data key.	DTC goes to test mode.
13	Answer-back tone heard in 1011-type handset receiver.	DTC sends 1017 Hz for 5 seconds.

STEP	DATA STATION	DATA TEST CENTER
14	Depress data key and discuss results with DTC.	DTC goes to talk mode.
15	Remove all test connections and restore equipment to normal operating conditions.	

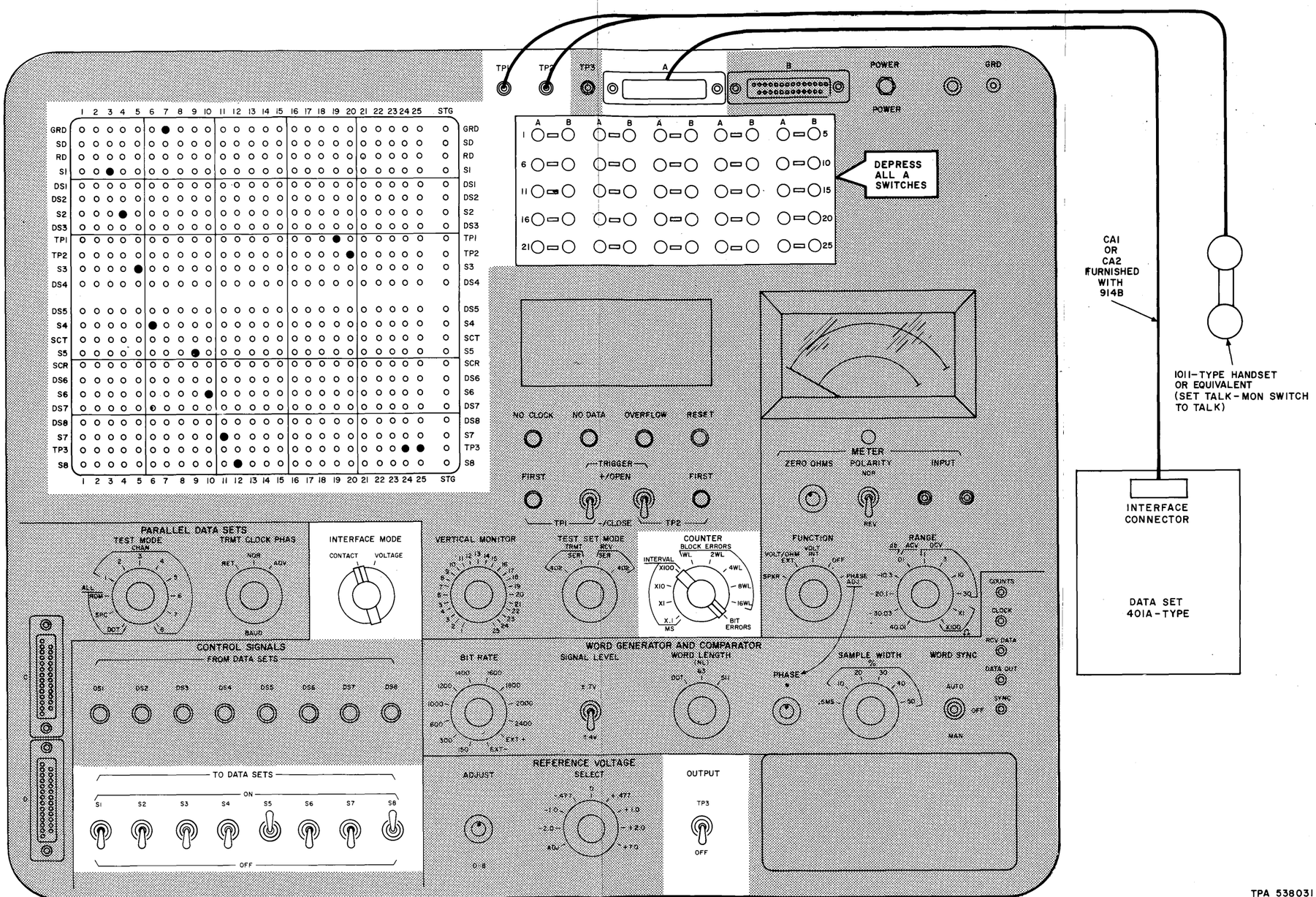


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Fig. 1—Test Connection Diagram