DATA SET 401L-TYPE

TEST PROCEDURES

1. GENERAL

1.01 This section describes test procedures for Data Set 401L-type which are to be used at the time of installation or as a means of clearing routine trouble conditions.

1.02 This section is reissued for the following reasons:

(a) To add a test procedure using the 914B Data Test Set (DTS)

(b) To delete reference to the KS-14510 volt-ohm-milliammeter.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Data Sets 401L1 and 401L2 are equipped with remote test features which allow the data sets to be tested without a telephone company employee at the station. The tests outlined in this section should be used at the time of installation or when remote tests indicate trouble at the station.

1.04 Before proceeding with the tests provided within this section, the data loop should be tested and should meet the requirements specified in the section entitled Data Systems—DATA-PHONE® Service On Direct Distance Dialing Network—Test Requirements For Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501). A check with the local test center will verify whether the loop has been tested and whether or not it meets requirements.

1.05 When test or demonstration calls are made, refer to the section entitled Crediting Charges On Test Calls (010-250-001) for the proper procedure for crediting charges.

1.06 The telephone line should be verified as a ground start line. It should be verified that the proper line coupler options (A, B, C, D, E, F, G, H) are installed to compensate for the length of the local loop. Refer to the section entitled Data Set 401L-Type Installation and Connections (594-027-200) for this procedure.

Certain tests in this section require options that may not be specified on the service order. After the completion of testing, ensure that only the customer-required options are installed.

1.07 Figure 1 illustrates a typical test arrangement.

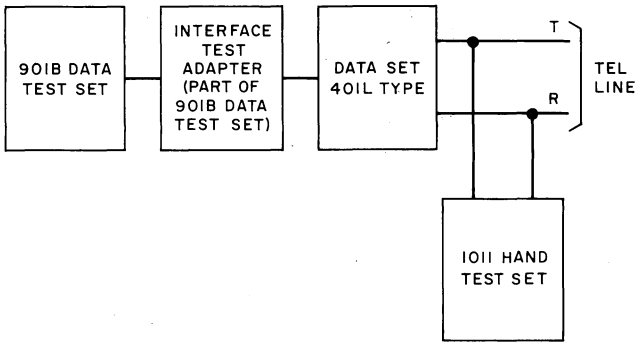

Fig. 1—Typical Test Arrangement

2. INSTALLATION TEST PROCEDURES

2.01 Installation tests should be performed immediately after the data set has been installed to ensure that the equipment is ready to be placed in service. Tests performed using the 901B DTS and the 914B DTS are similar in nature. The test to be performed will be determined by the type of test equipment available.

2.02 The test procedure in 2.04 verifies the following:

(a) That the data set will answer an incoming call and respond properly

(b) That the DTC is able to test the data set transmitter for proper rest and data frequencies

(c) That the data set will outpulse a previously encoded telephone number and establish a connection to a remote station.

2.03 The test equipment required for this test is as follows:

(a) 901B DTS

(b) Interface test adapter (901B DTS cover)

(c) 1011-type handset

(d) Data test center (DTC).

2.04 ***Test Procedure (401L1 or 401L2 Using 901B DTS):***

STEP	PROCEDURE
1	Set switches on 901B DTS to the following positions: SELECTOR switch to position 6 A TEST switch to OFF B TEST switch to position 1 UNATT-ATT switch to ATT.
2	Connect the cord of 901B DTS to the interface connector through the cover of the interface adapter. Connect terminal EQ25 to terminal EQ1 on the interface adapter.
3	If not in place, install for this test the option which allows call termination at any time with a TCL closure (at DS1 circuit pack, loosen option screws B, C and tighten option screw A), and the 1-second EON option for No. 1 and No. 5 crossbar exchanges (at DS1 circuit pack, tighten option screw 12).
4	Set option screws as follows: for Data Set 401L1 or 401L2, at DS1 circuit pack, tighten option screw E and loosen option screw D.
5	Connect the 1011-type handset between the data set tip and ring, and operate the TALK MON switch to MON. ***Note:*** This switch should remain in the MON position during the entire test.
6	Using the associated telephone set, call the DTC. Inform the DTC of the type of data set to be tested and the telephone number of the station. Determine the estimated time required by the DTC to make the necessary measurements. Place the telephone handset on-hook.

STEP	PROCEDURE
7	The DTC will call, and ringing will persist for at least 30 seconds. DO NOT ANSWER. After ringing ceases, the data set outpulses a number which may be monitored by the 1011-type handset.
8	When the pulsing ceases, the DTC will transmit a 2025-Hz answer tone. The data set detects this frequency and prepares to transmit the rest tones (three simultaneous tones).
9	Perform the operation outlined in Table A by placing the A switch of 901B DTS to the indicated positions and by holding each position for at least 20 seconds. ***Note:*** The above time interval may be varied upon agreement with the DTC.

TABLE A

TRANSMITTING FREQUENCIES

A TEST SWITCH ON 901B DATA TEST SET TO POSITION	LISTEN FOR FREQUENCY	CHECK FREQUENCY AT DTC
OFF	REST	*
1	A0	600 ±10 Hz
2	A1	697 ±10 Hz
3	A2	770 ±10 Hz
4	A3	852 ±10 Hz
5	A4	941 ±10 Hz
6	B0	1098 ±10 Hz
7	B1	1209 ±10 Hz
8	B2	1336 ±10 Hz
9	B3	1477 ±10 Hz
10	B4	1633 ±10 Hz
11	C0	1950 ±10 Hz
12	C1	2050 ±10 Hz
13	C2	2150 ±10 Hz
14	C3	2250 ±10 Hz
15	C4	2350 ±10 Hz

*600, 1098, and 1950 Hz in a composite signal

STEP	PROCEDURE
10	Connect terminals EQ19 and EQ20 of the 901B DTS cover to terminate the call.
11	Use the associated telephone set to contact the DTC for results of the test.
12	Verify that the proper number has been encoded for the remote customer, then connect terminal EQ13 to EQ20 of the 901B DTS cover. The data set will attempt to call the remote station. Monitor the call attempt, using the 1011-type handset.
13	Using the associated telephone set, verify with the remote station that the proper number has been reached.
14	Disconnect all test equipment, remove any options required for this test, and restore equipment to normal operating conditions. ***Note:*** For a remote test of the 402L2 using only the DTC, refer to the test described in 2.09.

2.05 The test procedure in 2.07 verifies the following:

(a) That the data set will answer an incoming call and respond properly

(b) That the DTC is able to test the data set transmitter for proper rest and data frequencies

(c) That the data set will outpulse a previously encoded telephone number and establish a connection to a remote station.

2.06 The test equipment required for this test is as follows:

(a) 914B DTS

(b) 1011-type handset

(c) Data test center (DTC).

Test set switches not shown on the test connection diagram (Fig. 2) or not mentioned in text are not required for the test. Lamp indications not called for in the test are not pertinent and may be disregarded. 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. 2).

2.07 ***Test Procedure (401L1 or 401L2 Using 914B DTS):***

STEP	PROCEDURE
1	Establish test connections as shown in Fig. 2.
2	Program the 914B matrix by inserting shorting pins as shown in Fig. 2.
3	If not in place, install for this test the option which allows call termination at any time with a TCL closure (at DS1 circuit pack, loosen option screws B, C, and tighten option screw A), and the 1-second EON option for No. 1 and No. 5 crossbar offices (at DS1 circuit pack, tighten option screw 12).

STEP	PROCEDURE
4	Set option screws as follows: for Data Set 401L1 or 401L2, at DS1 circuit pack, tighten option screw E and loosen option screw D.
5	Connect the 1011-type handset between the data set tip and ring, and operate the TALK MON switch to MON. ***Note:*** This switch should remain in the MON position during the entire test.
6	Using the associated telephone set, call the DTC. Inform the DTC of the type of data set to be tested and the telephone number of the station. Determine the estimated time required by the DTC to make the necessary measurements. Place the telephone handset on-hook.
7	The DTC will call, and ringing will persist for at least 30 seconds. DO NOT ANSWER. After ringing ceases, lamp DS1 on the 914B should momentarily light. The data set then outpulses a number which may be monitored by the 1011-type handset.
8	When the pulsing ceases, the DTC will transmit a 2025-Hz answer tone. Lamp DS2 on the 914B should light, indicating that the data set has detected this tone. The data set should transmit the rest tones (three simultaneous tones).
9	Perform the operation outlined in Table B. Hold each frequency for at least 20 seconds. The DTC should receive and check the frequencies as shown in the table. ***Remove the shorting pins shown in Table B before operating toggle switches on the 914B.*** ***Note:*** The above time interval may be varied upon agreement with the DTC.
10	Using a clip lead, short the interface selector switch 19A to switch 20A.
11	Use the associated telephone set to contact the DTC for results of the test.
12	Verify that the proper number has been encoded for the remote customer. Set S1 toggle switch to ON. The data set will attempt to call the remote station. Monitor the call attempt, using the 1011-type handset.
13	Using the associated telephone set, verify with the remote station that the proper number has been reached.
14	Disconnect all test equipment, remove any options required for this test, and restore equipment to normal operating conditions.

TABLE B
TRANSMITTING FREQUENCIES

SET 914B TOGGLE SWITCHES	INSERT PIN IN MATRIX		FREQUENCY GROUP HEARD	CHECK FREQUENCY AT DTC
	ROW	COLUMN		
All OFF			Rest Tones	*
S1,2,3,8, — OFF S4,5,6,7 — ON			A0	600 ±10 Hz
	GRD	3	A1	697 ±10 Hz
	GRD	4	A2	770 ±10 Hz
	GRD	5	A3	852 ±10 Hz
	GRD	6	A4	941 ±10 Hz
S1,4,5,6,8 — OFF S2,3,6,7 — ON			B0	1098 ±10 Hz
	GRD	9	B1	1209 ±10 Hz
	GRD	10	B2	1336 ±10 Hz
	GRD	11	B3	1477 ±10 Hz
	GRD	12	B4	1633 ±10 Hz
S1,6,7,8 — OFF S2,3,4,5 — ON			C0	1950 ±10 Hz
	GRD	14	C1	2050 ±10 Hz
	GRD	15	C2	2150 ±10 Hz
	GRD	16	C3	2250 ±10 Hz
	GRD	17	C4	2350 ±10 Hz

* 600, 1098, and 1950 Hz in a composite signal.

2.08 The test procedure in 2.09 permits Data Set 401L2 to be remotely tested from the DTC. The data set should meet requirements specified in the section entitled Data Test Center—904A- and 904C-Type—Test Procedures—Data Set 401L-Type (668-104-507).

2.09 ***Test Procedure (401L2 Using DTC):***

STEP	PROCEDURE
1	Call the DTC and arrange to have the data set tested.
2	If not in place, install for this test the remote test option (at DS1 cirdcuit pack, tighten option screw D and loosen option screw E).
3	Replace the handset of the associated telephone set on-hook. The DTC will call back, and ringing will persist for at least 30 seconds. DO NOT ANSWER.
4	There will be a time duration of approximately 5 minutes while the DTC performs the tests. At the conclusion of the tests, the DTC will call to give the results of the tests.
5	If installed for this test, loosen option screw D and restore the data set to normal operating conditions according to the service order.

2.10 The test procedure in 2.11 should be performed as a final test to ensure that the data set will answer a polling call and dial the encoded number.

2.11 ***Test Procedure (401L1 or 401L2):***

STEP	PROCEDURE
1	Encode the telephone number of the remote customer, request a call to the data line and allow three ringing intervals before hanging up. ***Note:*** A number other than that of the remote customer (such as the DTC) can be used if required.
2	Request the remote customer to verify that a call from the data set was received.
3	Restore the data set to normal operating conditions according to the service order.

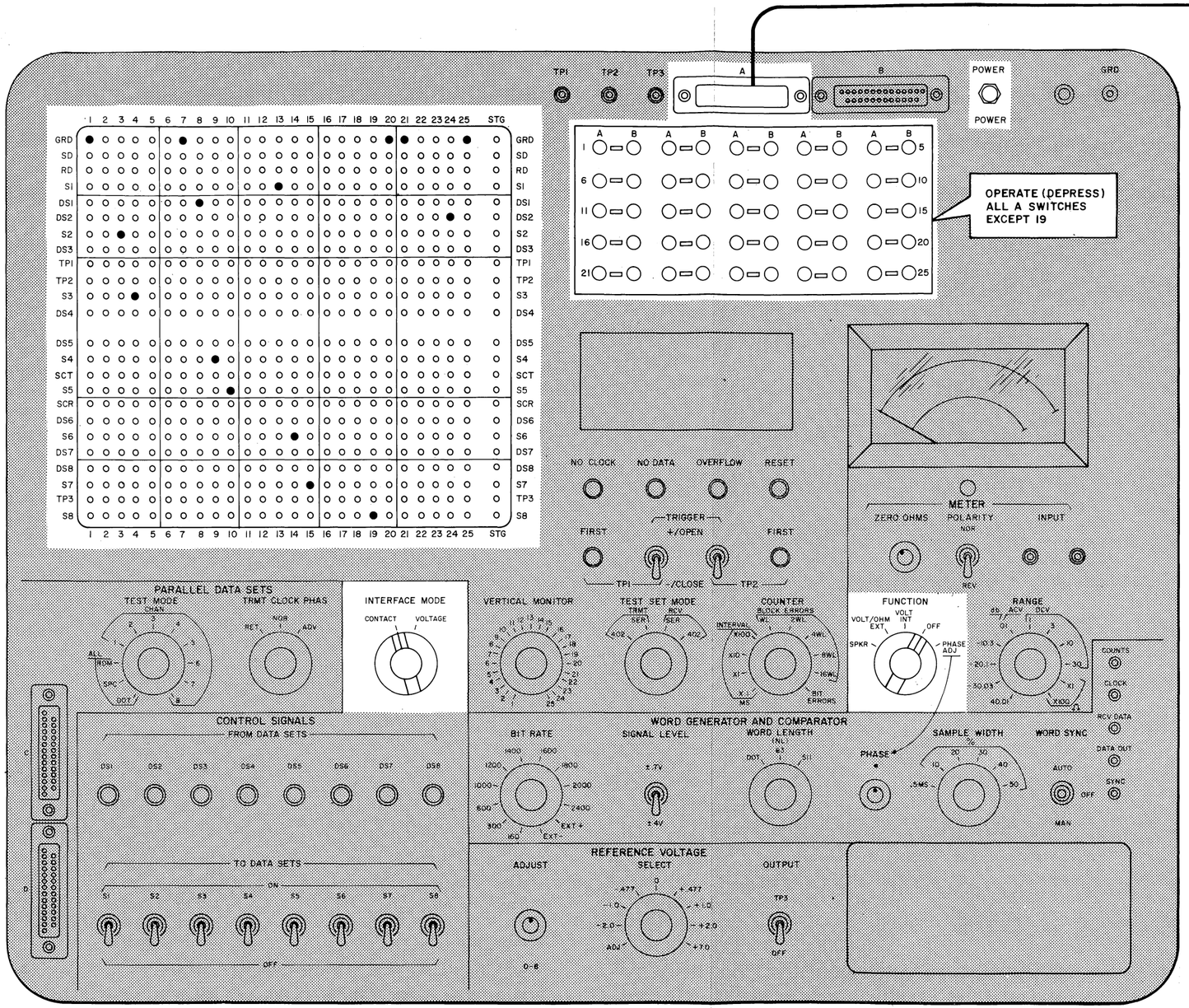

Fig. 2—Test Connection Diagram