407CR-TYPE MULTIPLE DATA STATION TEST PROCEDURES

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1. GENERAL

1.01 This section describes the test procedures and associated test requirements to be met at the time of installation or when investigating trouble conditions associated with the 407CR-type multiple data station. The "R" in the data set code is used to designate that the data set is registered with the FCC. Pre-registration data sets do not have "R" in the data set code.

1.02 When this section is reissued, the reason for reissue will be presented in this paragraph.

1.03 Before proceeding with any test, verify that the data loops have been tested and meet requirements specified for Type I loops described in the section entitled Data Systems—DATAPHONE® Service on Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines (314-205-501) or for basic private lines as outlined in the section entitled Voiceband Private Line Data Circuits—Tests and Requirements (314-410-500).

1.04 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.

1.05 The 407CR multiple data station contains a test unit, consisting of the 51A-type and 47A-type data units, which is provided with the 57A2 data mounting. The test unit provides both local and remote testing capabilities for all data sets (DSs) 407CR-type mounted in the cabinet. The test unit also provides a lamp test feature for all the light emitting diodes (LEDs) in the cabinet.

1.06 When a data set is placed in the remote test mode, the data set is connected to a service line and then tested by a data test center (DTC). The local test may be conducted by the customer or telephone company (telco) employee using the test unit. A typical test arrangement is shown in Fig. 1.

1.07 The test procedures given in this section are for one line and must be repeated for the second line in each data set and for any additional data sets in the data station.

1.08 A KS-20538-L1 volt-ohm-milliammeter (VOM), or equivalent, is needed to perform the power unit test. A 1013-type handset, or equivalent, is required for the installation test.

2. INSTALLATION TEST

2.01 This test is performed during installation prior to connecting the customer interface cables to the data sets mounted in the 57-type data mounting. The test verifies that the data set is functioning properly prior to connecting the customer-provided equipment (CPE) to the data set.

2.02 Perform the installation test as follows:

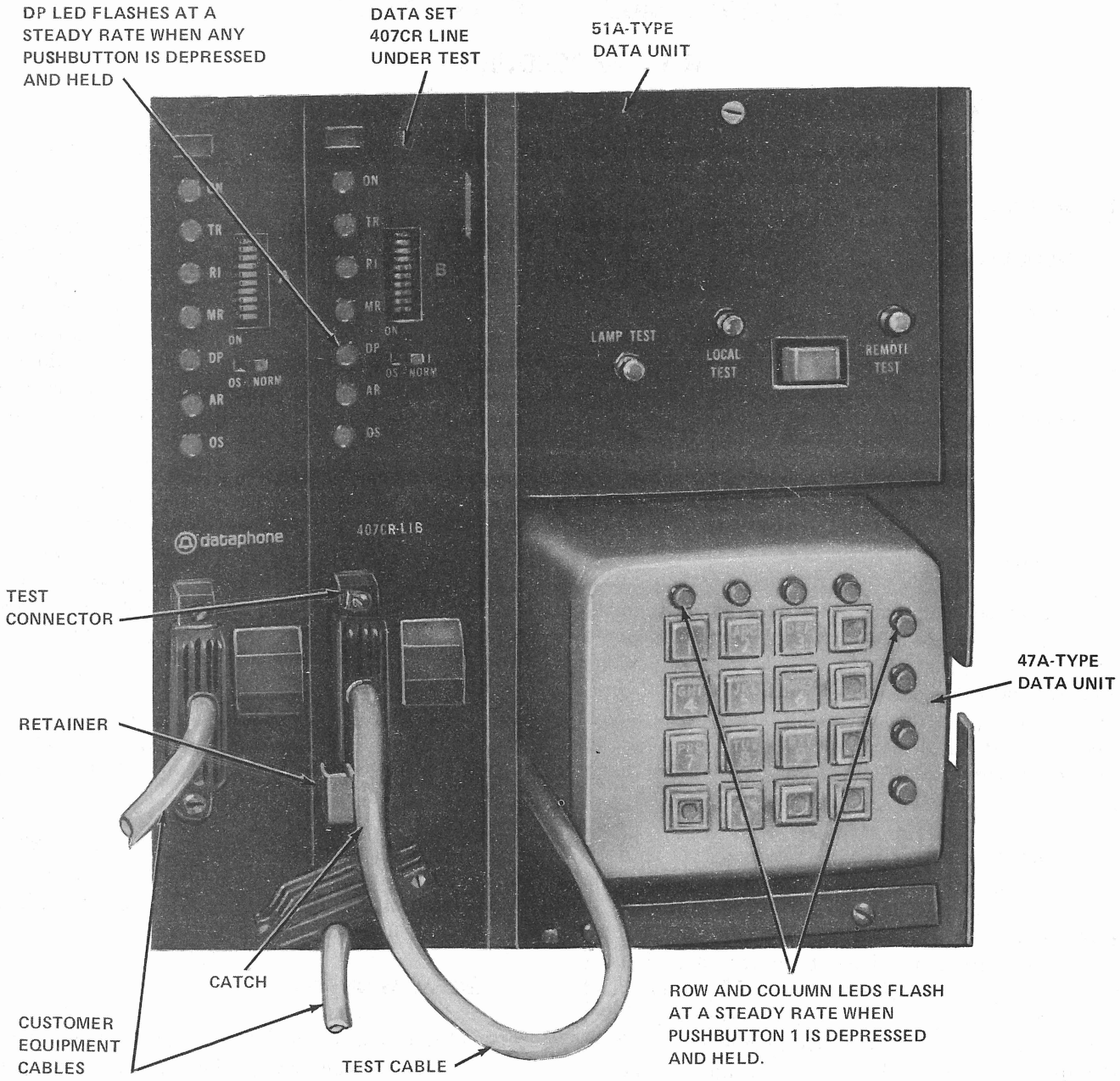

Fig. 1—Data Set 407CR-Type Test Arrangement

STEP	PROCEDURE
	Note: Install data set No. 1 and test lines A and B. Install data set No. 2 and test, etc, until the last data set has been installed and tested.
1	Operate LOCAL TEST-REMOTE TEST switch to REMOTE TEST.

STEP	PROCEDURE
2	Depress LAMP TEST switch. ***Requirement:*** All LEDs illuminate.
3	Plug the test connector into data set line A by operating the catch located on the retainer. The retainer provides a means of depressing the TEST button located on the front of the data set. ***Ensure that the retainer is fully engaged.*** ***Requirement:*** The TR and OS LEDs illuminate on the line being tested.
4	Operate LOCAL TEST-REMOTE TEST switch on test unit (51A-type data unit) to LOCAL TEST position. ***Requirement:*** The LOCAL TEST LED illuminates immediately. The MR LED illuminates after a short delay of not more than 10 seconds. During this delay, the AR and RI lamps will flash. ***Note:*** If the MR LED does not illuminate within 10 seconds, the data set is defective. Record the LED indications on the 47A-type data unit and supply this information with the data set when it is returned for repair.
5	Depress and hold pushbutton 1 on the 47A-type data unit. ***Requirement:*** Associated row and column LEDs (on the 47A-type data unit) and DP LED (on the data set line being tested) flash at a steady rate (10 pulses per second). Refer to Fig. 1 for an example of which LEDs are flashing on the 47A-type data unit when pushbutton 1 is depressed and held.
6	Repeat Step 5 for all other pushbuttons on the 47A-type data unit. If customer option switch A4 is ON (option AG), the AR LED will light or flash when a ** is received. ***Note:*** If some LEDs do not flash properly, replace the associated data set. Verify that replacement data set has proper telco and customer options installed, then repeat the test.
7	Connect a 1013-type handset across the service line tip and ring (pins 48 and 23 of J10, respectively).
8	Operate the TALK-MON switch on the handset to TALK.
9	Operate LOCAL TEST-REMOTE TEST switch to REMOTE TEST position. ***Requirement:*** The MR and LOCAL TEST LEDs are extinguished.
10	Call the ring-back number using the 1013-type handset.
11	Operate TALK-MON switch on the handset to MON.

STEP	PROCEDURE

Requirement: After ringing is tripped, monitor the following:

- REMOTE TEST LED illuminated
- 2025-Hz answer tone is heard in handset (for 1.5 seconds)
- One second of silence
- 2225-Hz tone is heard in handset (for 14 seconds)
- FSK "chirping" is heard
- MR LED illuminated
- 2025-Hz answer tone is heard in handset.

Note: Data set will automatically disconnect and extinguish REMOTE TEST LED after 15 seconds.

12 Remove test connector from data set line A by operating the catch on the retainer.

13 Plug customer interface connector into data set line A and tighten screws.

14 Repeat test as required for line B and for lines A and B of all other data sets as they are mounted in the 57-type data mounting(s).

15 Remove 1013-type handset leads from service line.

16 Perform remote test per Part 4 of this section on any one data line.

Note: This verifies the ability to perform a remote test.

17 End of installation test.

3. LOCAL TEST

3.01 This test checks the operation of a DS 407CR-type under normal input conditions via the 47A-type data unit (modified 16-button TOUCH-TONE® dial). The local test does ***not*** check the line control circuit. When a character is transmitted from the dial and received by the data set, the LEDs representing the horizontal and vertical coordinates of the character key will flash at a steady rate if the data set is functioning properly.

3.02 Perform the local test as follows:

STEP	PROCEDURE
1	Operate LOCAL TEST-REMOTE TEST switch to REMOTE TEST.
2	Depress LAMP TEST switch. ***Requirement:*** All LEDs illuminate on all data sets in the cabinet and on the 51A-type and 47A-type data units.
3	Remove customer interface cable from data set line to be tested.
4	Plug the test connector into data set line A by operating the catch located on the retainer. The retainer provides a means of depressing the TEST button located on the front of the data set. ***Ensure that retainer is fully engaged.*** ***Requirement:*** The OS and TR LEDs illuminate on the data set line being tested.
5	Operate LOCAL TEST-REMOTE TEST switch on test unit (51A-type data unit) to LOCAL TEST position. ***Requirement:*** The LOCAL TEST LED illuminates immediately. The MR LED illuminates after a short delay of not more than 10 seconds. During this delay, the AR and RI lamps will flash. ***Note:*** If the MR LED does not illuminate within 10 seconds, the data set is defective. Record the LED indications on the 47A-type data unit and supply this information with the data set when it is returned for repair.
6	Depress and hold pushbutton 1 on the 47A-type data unit. ***Requirement:*** Associated row and column LEDs (on the 47A-type data unit) and DP LED (on the data set line being tested) flash at a steady rate (10 pulses per second). Refer to Fig. 1 for an example of which LEDs are flashing on the 47A-type data unit when pushbutton 1 is depressed.
7	Repeat Step 6 for all other pushbuttons on the 47A-type data unit. If customer option switch A4 is ON (option AG), the AR LED will light or flash when a ** is received. ***Note:*** If some LEDs do not flash properly, replace the associated data set. Verify that the replacement data set has proper telco and customer options installed to correspond to the replaced data set; then perform installation test and local test.
8	Remove test connector from data set line A by operating the catch on the retainer.

STEP	PROCEDURE
9	Plug customer interface connector into data set line A and tighten screws.
10	Repeat test as required for line B, and for lines A and B for all other data sets to be tested.
11	Return station to pretest condition.

4. REMOTE TEST

4.01 This test provides a thorough check of the data set. The line control circuitry is checked along with all options and parameters such as sensitivity and bandwidth. In the remote test mode, the data set under test is connected to a service line associated with the installation and called by the DTC. Since the 407CR-type multiple data station is normally on a hunting group, the service line provides a means of accessing a particular data set.

4.02 Perform the remote test as follows:

STEP	PROCEDURE
1	Call the DTC and arrange for a remote test in accordance with DTC procedures.
2	Remove customer interface cable from line A of the data set to be tested.
3	Operate LOCAL TEST-REMOTE TEST switch on the test unit to REMOTE TEST position.
4	Plug the test connector into data set line A by operating the catch located on the retainer (placing the data set in the test mode). The retainer provides a means of depressing the TEST button located on the front of the data set. ***Ensure that retainer is fully engaged.*** ***Requirement:*** The OS and TR LEDs illuminate on data set line being tested.
5	When the DTC calls the DS 407CR-type under test, observe the following: ***Requirements:*** • RI LED flashes one or two times. • REMOTE TEST LED illuminates. • After up to 30-second delay, MR LED illuminates. During delay, RI and AR LEDs will flash briefly.
6	When the DTC transmits a valid TOUCH-TONE character, observe the following: ***Requirements:***

STEP	PROCEDURE

- The DP LED on data set line under test flashes at a steady rate (10 pulses per second).
- On the 47A-type data unit, the row and column LEDs associated with the character being transmitted by the DTC will also flash at a steady rate (10 pulses per second).
- When ** is transmitted, the AR LED may illuminate or flash.

7 When all the remote test is completed, the DTC transmits a ***hang-up*** character "a" which terminates the call. The call will also be terminated automatically if a 15-second timer times out.

Requirement: The ON, OS, and TR LEDs on data set line under test are illuminated and the REMOTE TEST LED extinguishes (on 51A-type data unit).

Note: If data set fails the above test, replace the data set. Verify that replacement data set has telco and customer options installed to correspond to the replaced data set; then perform installation test, local test, and remote test.

8 Remove test cable from data set line A by operating the catch on the retainer.

9 Plug customer interface connector into data set line A and tighten screws.

10 Repeat Steps 2 through 9, as required, for line B, and for lines A and B of all other data sets to be tested.

11 Return station to pretest condition.

5. POWER UNIT TEST

5.01 The following procedure is used to measure the voltages of the 229A power unit. Since each data set operates from a separate regulator in the power unit, one data set could be out of service due to trouble within a particular regulator. In this case, the power unit may have to be replaced. A data set may also have power unit trouble even if the ON lamp on the data set under test is illuminated. A KS-20538-L1 VOM or equivalent is required for this test.

5.02 Perform the power unit test as follows:

STEP	PROCEDURE

1 Gain access to the rear of the 57-type data mounting(s).

2 Set VOM FUNCTION switch to 30 Vdc.

3 Connect VOM leads as follows:

- Negative lead to terminal 32 of J terminal interface (J1-J8) as required for data set under test.

STEP	PROCEDURE

- Positive lead to terminal 29 of J terminal interface (J1-J8) as required for data set under test.

Requirement: VOM reads 11.4 to 12.6 volts.

4 Disconnect both VOM leads and reconnect as follows:

- Negative lead to terminal 29 of J terminal interface (J1-J8) as required for data set under test.
- Positive lead to terminal 8 of J terminal interface (J1-J8) as required for data set under test.

Requirement: VOM reads 11.4 to 12.6 volts.

5 Disconnect both VOM leads.

6 Set VOM FUNCTION switch to 10 Vdc.

7 Connect VOM leads as follows:

- Negative lead to terminal 29 of J terminal interface (J1-J8) as required for data set under test.
- Positive lead to terminal 32 of J terminal interface (J1-J8) as required for data set under test.

Requirement: VOM reads 4.8 to 5.2 volts.

8 Disconnect both VOM leads and reconnect as follows:

- Negative lead to terminal 28 of J terminal interface (J1-J8) as required for data set under test.
- Positive lead to terminal 29 of J terminal interface (J1-J8) as required for data set under test.

Requirement: VOM reads 4.8 to 5.2 volts.

9 Remove test leads and return station to pretest condition.