113-TYPE DATA STATION

TEST PROCEDURES USING 921A DATA TEST SET

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1. GENERAL

1.01 This section contains test procedures to be followed when using a 921A (version 2 or higher) data test set (DTS) to test data sets (DS) 113B-L1, 32A1 data mountings, and the optional data auxiliary set (DAS) 804T-type that comprise the 113-type data station. These procedures are to be followed when needed on an initial installation or during a maintenance visit. Maintenance requirements for the 113-type data station are contained in Section 591-814-300.

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

1.03 The DS 113B-L1 provides asynchronous, full-duplex transmission and reception of serial binary data over the switched network at bit rates up to 300 bits per second (bps). The DS 113B-L1 also provides a single mode of operation, originate only.

1.04 The 921A DTS (Fig. 1) is a portable, general purpose, data test set that provides the serial testing capabilities of the 914C DTS and is compatible with the 914C DTS for end-to-end testing. In addition, the 921A DTS is compatible with the 911A and 911NA DTSs for end-to-end start-stop distortion measurements. Additional information concerning the 921A DTS is contained in Section 107-402-100.

1.05 Input to the 921A DTS is made through a 20-button keyboard. A 32-character alphanumeric display provides operator prompting and test results.

1.06 The tests covered in this section are as follows:

(a) Power source output test

(b) Data set 113B-L1 loopback test from 904-type data test center (DTC)

(c) Data set 113B-L1 interface test using 921A data test set (DTS)

1.07 Test A requires a 921A DTS or a KS-20538-L1 volt-ohm-milliammeter, or equivalent. Test B requires no test equipment. Test C requires a 921A DTS.

1.08 After installation of a 113A-type data station, tests A and B are to be performed. Before proceeding with the tests, verify that the local loop meets the requirements specified in Section 314-205-501.

1.09 When maintenance tests are required at a 113A-type data station, tests A, B, and C can be performed. Use of these tests should be in accordance with the maintenance requirements specified in Section 591-814-300.

1.10 If the 113A-type data station fails test A, replace the 41D power unit. If a DS 113B-L1 fails test B or C, replace the DS 113B-L1.

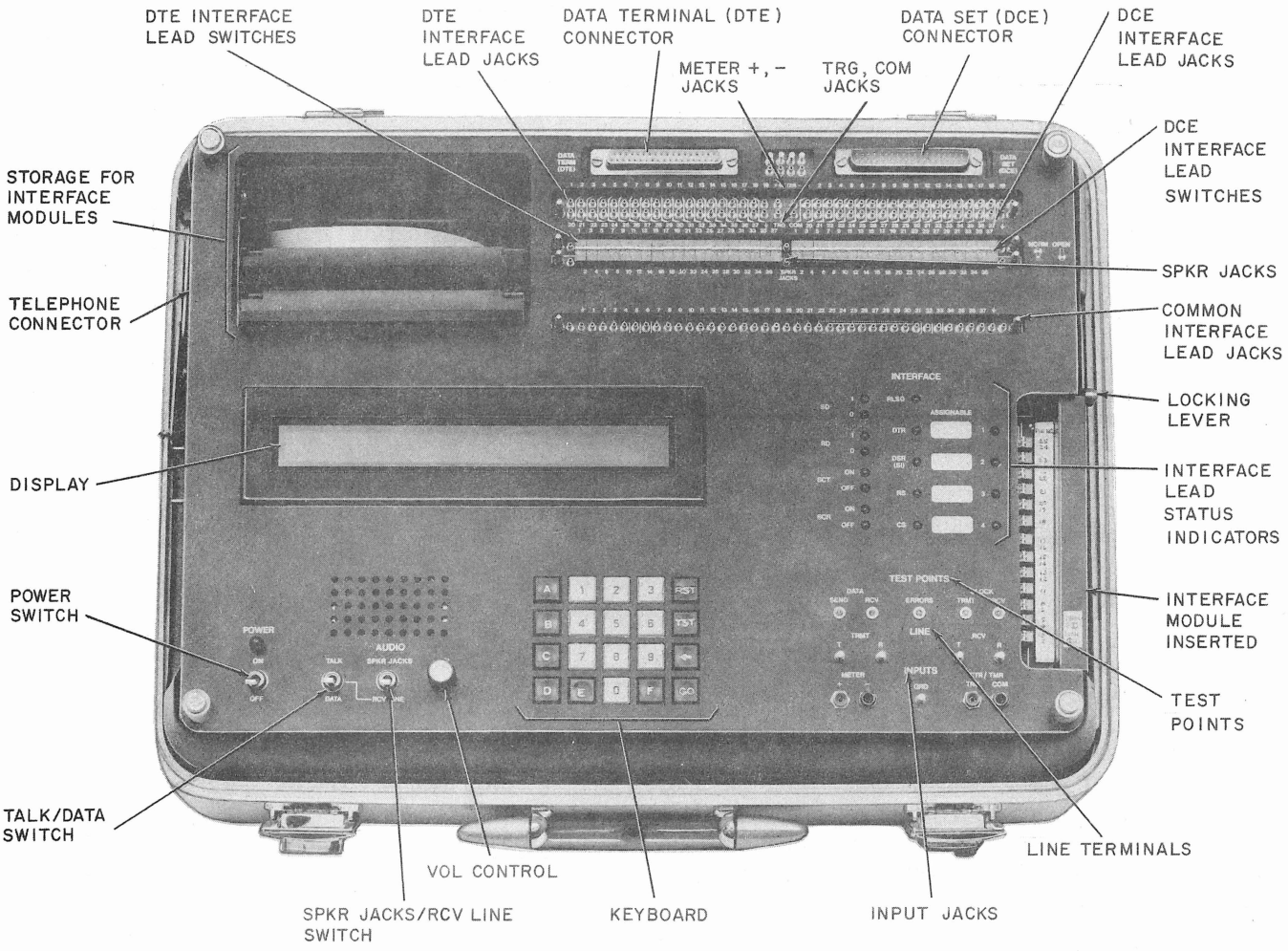

Fig. 1—921A Data Test Set—Front Panel

2. TEST PROCEDURES

A. Power Source Output Test

2.01 This test checks the +18, -18, and +4.5 volt dc outputs of the 32A1 data mounting power source.

2.02 Perform the test as follows:

Note: A KS-20538-L1 volt-ohm-milliammeter, or equivalent, can be used instead of the 921A DTS.

STEP	ACTION	VERIFICATION
1	Ensure that 32A1 data mounting under test is connected to a 105- to 129-Vac 60-Hz power source.	
2	Connect 921A DTS to a 105- to 129-Vac 60-Hz power source.	
3	On front of DTS, set POWER switch to ON.	Power lamp lights.

STEP	ACTION	VERIFICATION
4	Press RST on keyboard. ***Note:*** If RST is pressed during a test, the test is ended and the DTS recycles to this step.	Display reads (briefly) version number of DTS. DTS then performs self tests. If DTS is defective, display reads— TEST FAILED. If DTS is satisfactory, display reads— DATA SET:
5	Press TST. ***Note:*** If GO or TST is pressed at an unauthorized point in the test, the test is ended and the DTS recycles to this step.	Display reads— TEST SEQ:
6	Enter 12 on keyboard. ***Note:*** If option U is installed in 32A1 data mounting under test, omit Steps 7 through 11.	Display reads— TEST SEQ: 12
7	Connect meter lead from — METER jack on DTS to pin 5 of screw switch (SS) 3 on 32A1 data mounting. ***Note:*** Screw switch pin numbers are read from left to right.	
8	Connect meter lead from + METER jack on DTS to pin 6 of SS3 on 32A1 data mounting.	
9	On DTS, press GO.	***Requirement:*** DTS display reads -17.5 to -20.5 volts.
10	Move - meter lead from pin 5 of SS3 to pin 8 of SS4 and move + meter lead from pin 6 of SS3 to pin 7 of SS4.	***Requirement:*** DTS display reads +17.5 to +20.5 volts.
11	Move - meter lead from pin 8 of SS4 to pin 10 of SS5 and move + meter lead from pin 7 of SS4 to pin 9 of SS5. ***Note:*** If option U is ***not*** installed in 32A1 data mounting under test, omit Steps 12 through 17.	***Requirement:*** DTS display reads +4.4 to +4.6 volts.
12	Remove fuse caps and fuses associated with unused slots in 32A1 data mounting as shown in Table A. ***Example:*** If slots 10 through 20 are not being used, remove F3, F7, and F11, or remove F4, F8, and F12.	

STEP	ACTION	VERIFICATION

TABLE A

SLOT NO.	FUSE DESIG	VOLTAGE FUSED
1-5	F1	+18
	F5	−18
	F9	+4.5
6-10	F2	+18
	F6	−18
	F10	+4.5
11-15	F3	+18
	F7	−18
	F11	+4.5
16-20	F4	+18
	F8	−18
	F12	+4.5

13 Connect meter lead from - METER jack on DTS to pin 2 of screw switch (SS) 2 on 32A1 data mounting.

Note: Screw switch pin numbers are read from left to right.

14 Connect meter lead from + METER jack on DTS to side contact of fuse holder for removed fuse F1, F2, F3, or F4.

Note: There are two side contacts on the fuse holders. If, while performing Steps 15 through 17, a DTS display reading is not obtained when using one side contact, connect the + meter lead to the other side contact. If a display reading is not obtained from the second contact, a power trouble is indicated.

Caution: Do not short the output to ground as this will damage the 41D power unit.

STEP	ACTION	VERIFICATION
15	On DTS, press GO.	***Requirement:*** DTS display reads +17.5 to +20.5 volts.
16	Move + meter lead to side contact of fuse holder for removed fuse F5, F6, F7, or F8.	***Requirement:*** DTS display reads -17.5 to -20.5 volts.
17	Move + meter lead to side contact of fuse holder for removed fuse F9, F10, F11, or F12.	***Requirement:*** DTS display reads +4.4 to +4.6 volts.
18	Disconnect meter leads and restore 32A1 data mounting to normal operating condition.	

B. Data Set 113B-L1 Loopback Test From 904-Type Data Test Center (DTC)

2.03 This test checks the sensitivity of DS 113B-L1, frequency and level of mark and space signals, and the slicing point.

Note: If a dynamic test is desired, the DTC must be a 904G or 904H.

2.04 Perform the test as follows:

(1) Ensure that data set to be tested is in idle mode. Refer to Section 591-814-300.

(2) Using service line, call DTC and request a loopback test of DS 113B-L1.

(3) When directed by DTC, perform Steps (4) through (6).

(4) At 32A1 data mounting, momentarily set TALK-CLEAR/DATA switch to DATA. If a DAS 804T-type or a key telephone set is provided, ensure that DATA button is depressed.

(5) Plug 32A1 data mounting service line twin plug (grooves up) into service line twin jack on faceplate of data set to be tested.

(6) Remove customer interface connector from data set to be tested and replace with test mode (TM) connector.

Note: The TM connector is stored on the 32A1 data mounting.

(7) The DTC waits about 5 minutes and then calls and performs test.

Note: When DTC calls to perform test, service line phone rings once. Do ***not*** answer phone at this time.

(8) If option Z is ***not*** installed in data set under test, about 10 minutes after phone rings first time, it will ring a second time. Answer phone this time by lifting handset and then depressing TALK-CLEAR button on DAS 804T-type or key telephone set.

(9) If option Z is installed in data set under test, about 10 minutes after phone rings first time, lift handset and set TALK-CLEAR/DATA switch at 32A1 data mounting to TALK-CLEAR.

(10) DTC supplies test results.

(11) Remove TM connector from data set under test and replace with customer interface connector.

(12) Remove 32A1 data mounting service line twin plug from data set under test.

C. Data Set 113B-L1 Interface Test Using 921A Data Test Set (DTS)

2.05 This test checks the BB, CB, CC, CD, CE, and CF interface leads. The abort timer is also checked. This test requires assistance from a data test center (DTC).

2.06 Perform the test as follows:

STEP	ACTION	VERIFICATION
1	Ensure that data set to be tested is in idle mode. Refer to Section 591-814-300.	
2	Plug 32A1 data mounting service line twin plug (grooves up) into service line twin jack on faceplate of data set to be tested.	
3	Connect data set to be tested to DTS using interface cable and Electronic Industries Association (EIA) adapter cord provided with DTS. ***Note:*** The interface cable is equipped with two 37-pin connectors. The 6-inch adapter cord is equipped with a 37-pin female connector and a 25-pin male connector. Connect interface cable from DATA SET (DCE) connector on DTS to 37-pin connector on adapter cord. Insert 25-pin connector on adapter cord into customer interface connector on data set.	
4	Connect DTS to a 105- to 129-Vac 60-Hz power source.	
5	On front of DTS, set POWER switch to ON.	POWER lamp lights.
6	Press RST on keyboard. ***Note:*** If RST is pressed during a test, the test is ended and the DTS recycles to this step.	Display reads (briefly) version number of DTS. DTS then performs self tests. If DTS is defective, display reads— TEST FAILED. If DTS is satisfactory, display reads— DATA SET:
7	Remove EIA interface module from storage and ensure that all 25 interface module switches are in TERM position.	
8	On right side of DTS, ensure that locking lever is in OPEN position.	
9	Insert interface module into slot.	
10	Move locking lever to CLOSE position.	

STEP	ACTION	VERIFICATION
11	On front of DTS, ensure that all 37 DCE interface lead switches are in NORM position.	
12	Enter 20 on keyboard. ***Note:*** To delete a wrong entry on keyboard during any test, press back arrow (←).	Display reads— DATA SET: 20
13	Press GO.	Display reads— BIT RATE:
14	Enter 03.	Display reads— BIT RATE: 03
15	Press GO. ***Note:*** If GO or TST is pressed at an unauthorized point in the test, the test is ended and the DTS recycles to this step.	Display reads— TEST SEQ:
16	Enter 37.	Display reads— TEST SEQ: 37 DTR=? (0 OR 1)
17	Enter 1.	Display reads— TEST SEQ: 37 DTR=1 (0 OR 1)
18	Press GO.	Display reads (briefly)— TEST COMPLETE Display then reads— TEST SEQ:
19	Enter 12.	Display reads— TEST SEQ: 12
20	Connect jumper wire from DCE interface lead jack 7 to - METER jack.	
21	Connect jumper wire from DCE interface lead jack 3 to + METER jack.	
22	Press GO.	Display reads voltage present on jack 3. ***Requirement:*** -5.0 to -25.0 volts. ***Note:*** Interface lead BB is in mark condition.
23	Move jumper wire from jack 3 to jack 22.	Display reads voltage present on jack 22.

STEP	ACTION	VERIFICATION
		Requirement: -5.0 to -25.0 volts. ***Note:*** Interface lead CE is ***off.***
24	Move jumper wire from jack 22 to jack 6.	Display reads voltage present on jack 6. ***Requirement:*** -5.0 to -25.0 volts. ***Note:*** Interface lead CC is ***off.***
25	At 32A1 data mounting, momentarily set TALK-CLEAR/DATA switch to DATA.	DTS display continues to read voltage on jack 6. ***Requirement:*** +5.0 to +25.0 volts. If a DAS 804T-type is provided, DATA lamp on 804T-type is lighted. ***Note:*** Interface lead CC is ***on.***
26	At 32A1 data mounting, set TALK-CLEAR/DATA switch to TALK-CLEAR.	DTS display continues to read voltage on jack 6. ***Requirement:*** -5.0 to -25.0 volts. If a DAS 804T-type is provided, DATA lamp on 804T-type is off. ***Note:*** Interface lead CC is ***off.***
27	On DTS, move jumper wire from jack 6 to jack 8.	Display reads voltage present on jack 8. ***Requirement:*** -5.0 to -25.0 volts. ***Note:*** Interface lead CF is ***off.***
28	Move jumper wire from jack 8 to jack 5.	Display reads voltage on jack 5. ***Requirement:*** -5.0 to -25.0 volts. ***Note:*** Interface lead CB is ***off.***
29	At 32A1 data mounting, set TALK-CLEAR/DATA switch to mid-position. ***Note:*** If a DAS 804T-type or a key telephone set is provided, ensure that TALK-CLEAR and DATA buttons are not depressed before local operator calls service line number in next step.	
30	Using service line, call and inform a local operator that a test is being performed. Have	

STEP	ACTION	VERIFICATION
	local operator call service line number, listen for tone, and when tone is heard, hang up.	
31	When local operator calls service line number, service line phone rings once.	***Requirement:*** On DTS, DSR indicator lights at end of first ring and remains lighted for at least 15 seconds but not more than 30 seconds. ***Note:*** This test checks the automatic abort feature of the data set.
32	Using service line, call and inform DTC that f2 mark will be sent and to respond with f1 mark after 1 second; then sweep to f1 space.	
33	At 32A1 data mounting, momentarily set TALK-CLEAR/DATA switch to DATA; then place handset on-hook.	***Requirements:*** On DTS, DSR indicator lights and shortly thereafter RLSD and CS indicators light. When DTC sweeps to f1 space, RD-1 indicator lights. If a DAS 804T-type is provided, DATA lamp on 804T-type is lighted. ***Note:*** This test checks the ability of the carrier detector to hold during a space signal.
34	On DTS, move jumper wire from jack 5 to jack 3.	Display reads voltage present on jack 3. ***Requirement:*** +5.0 to +25.0 volts. ***Note:*** Interface lead BB is in space condition.
35	Move jumper wire from jack 3 to jack 5.	Display reads voltage present on jack 5. ***Requirement:*** +5.0 to +25.0 volts. ***Note:*** Interface lead CB is ***on.***
36	Move jumper wire from jack 5 to jack 8.	Display reads voltage present on jack 8. ***Requirement:*** +5.0 to +25.0 volts. ***Note:*** Interface lead CF is ***on.***
37	Move jumper wire from jack 8 to jack 6.	Display reads voltage present on jack 6. ***Requirement:*** +5.0 to +25.0 volts. ***Note:*** Interface lead CC is ***on.***
38	At 32A1 data mounting, take handset off-hook; then set TALK-CLEAR/DATA switch to TALK-CLEAR.	***Requirements:*** On DTS, RD-1, CS, RLSD, and DSR indicators go off. If DAS 804T-type is provided, DATA lamp on 804T-type goes off.

STEP	ACTION	VERIFICATION
39	On DTS, remove jumper wires from DCE interface lead and METER jacks.	

3. REFERENCES

3.01 Additional information concerning testing of the 113-type data station is contained in the following publications:

SECTION	TITLE
107-402-100	921A Data Test Set—Description and Operation
314-205-501	Data Systems—DATAPHONE® Service and Data Access Arrangements Direct Distance Dialing Network—Test Requirements for Subscriber, Foreign Exchange, and Remote Exchange Lines
591-814-100	113-Type Data Station—Description and Operation
591-814-200	113-Type Data Station—Installation
591-814-300	113-Type Data Station—Maintenance
591-814-500	113-Type Data Station—Test Procedures
668-010-300	Data Systems—DATAPHONE® Service on Direct Distance Dialing Network—Data Test Center—Trouble Analysis Procedures