LOOP SIGNALING CONVERTER TERMINATING LINE, SD-98131-01 TESTS WIDE AREA DATA SERVICE (WADS) USING STATION ARRANGEMENT A

1. GENERAL

1.01 This section is reissued to revise the instructions for equipment made compatible with the B1 Data Trunking System. The title of the section has been revised to indicate a reference to the use of this equipment for Wide Area Data Service (WADS) using Station Arrangement A. The initial application of this equipment was in association with Developmental Line Switched Teletypewriter Service (DLSTTS). Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.02 The tests covered are:

A. In-Service Test of Logic: This test checks the relay logic of the signaling converter by setting up a call through the switching office.

B. 43A1 Channel Terminal Line-Up: This test checks the alignment and operation of the 43A1 channel terminal in the signaling converter.

C. Test of the Transmission Path: This test checks the transmission path in the on- and off-hook conditions.

D. Test of Timers: This test checks the timing interval of the timers in the signaling converter.

E. Out-of-Service Test of Logic: This test checks the relay logic of a signaling converter which is out of service.

1.03 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 3 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

Tests A Through E

2.01 165C dummy plug.

2.02 328D dummy plug (tip-tip plug with 600Ω).

2.03 Blocking and insulating tools, as required. Use tools and apply, as covered in Section 069-020-801.

Test B

2.04 AC voltmeter, Hewlett-Packard 400-type voltmeter or KS-16979 L1 (Triplett 310W) volt-ohm-milliammeter.

2.05 5A attenuator.

Tests B and C

2.06 21A test set.

Tests B and D

2.07 2AB auxiliary transmission test set.

2.08 166A1 station test set.

2.09 72A frequency meter. (If 21A TMS is used as a tone source, its frequency must be adjusted using a frequency counter.)

2.10 Testing cord, W1N cord, 10 feet long, equipped with one 278A plug (pin type) and test clip.

2.11 Testing cord, S3F cord, 6 feet long, equipped with a 241 plug (tip-tip) and spade tips (3W2A cord).

2.12 Patching cord, P3J cord, 6 feet long, equipped with 241 plugs (tip-tip) (3P14A cord).

Tests B and E

2.13 DC voltmeter, KS-16979 L1 (Triplett 310W), volt-ohm-milliammeter (or equivalent).

Test D

2.14 J24753A timing test set.

2.15 Testing cord, W3M cord, 6 feet long, equipped with one 310 plug (tip-ring-sleeve) and three 360 tools (spring chuck) (3W4A cord).

Tests D and E

2.16 365 tool (spring clip).

2.17 419A tool (clip for test connection to springs of relays).

2.18 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (spring chucks) (1W13A cord).

Test E

2.19 Volt-ohmmeter, KS-16979 L1 (Triplett 310W), volt-ohm-milliammeter (or equivalent).

3. METHOD

STEP	ACTION	VERIFICATION
	A. In-Service Test of Logic	
1	Insert 328D (termination) plug into T-R SUB jacks.	
2	Block operated RS relay.	RS relay only wire-spring relay operated.
3	At master test frame — With WADS — Dial terminating signaling converter line, 2-way subscriber transmission test (STT) line.	At master test frame — Ringing heard. At signaling converter — SR, SRA, RS relays operated.
4	At signaling converter — Block nonoperated RS relay.	OH, CT relays operate. SRA relay releases.
5	Block operated RS relay.	RS relay only wire-spring relay operated.
6	Repeat Steps 2, 3.	
7	Insert 165C (dummy plug) into LINE T jack.	SR, OH, CT relays release.
8	Block operated RS relay.	RS relay only wire-spring relay operated.
9	Remove all plugs, blocking tools.	
10	At master test frame — Restore equipment.	

STEP	ACTION	VERIFICATION
	B. 43A1 Channel Terminal Line-Up	
1	At 2AB test set — Operate TEST switch to REC 900, DIAL key to normal, 2DB pad to OUT.	
2a	If 72a frequency meter is provided — Calibrate in accordance with standard procedures. (Recalibrate every 30 minutes while in use.)	
3	At DC voltmeter — Operate switch to lowest DC scale including 20 volts.	
4	At signaling converter — Insert positive cord of voltmeter into F+ terminal, negative cord into F− terminal, adjust FIL ADJ potentiometer on signaling converter for 20-volt reading.	Voltmeter reads between 19.5 and 20.0 volts.
5	Insert 165C (dummy) plugs into T-R LINE jacks.	
6	Insert 328D (termination) plug into T-R SUB jacks.	
7	Insert 328D (termination) plug into T′-R′ CONV jacks.	
8	Operate switches SEND to HM, REC to L+, OSC to ON on 43A1 channel terminal.	
9	Block nonoperated CT relay.	
10	Block operated OH, SR relays.	
11	Connect MEAS jacks of 2AB test set to T-R CONV jacks, using 3P14A cord.	
12a	If 72A frequency meter is provided — Connect 600-ohm IN jacks to TMS terminals of 2AB test set, using 3W2A cord.	
13	Adjust OSC potentiometer of 43A1 channel terminal to obtain reading of 1140 cps.	72A frequency meter reads 1140 cps.
14	Insert 165C (dummy) plug into SEND jack.	At 72A frequency meter — Meter reads between 1070 ±1 cps.
15	Remove 165C plug from SEND jack.	
16b	If 166A1 station test set is provided — Connect GRD jack of 166A1 station test set to ground terminal on bay, using W1N cord.	
17b	Connect originating 48-volt jack of 166A1 station test set to 48-volt terminal on bay, using second W1N cord.	

STEP	ACTION	VERIFICATION
18	At 21A TMS — Operate DET INPUT switch to 0 db on ***white*** scale.	
19	Connect DET IN jacks of 21A TMS to TMS terminals of 2AB test set, using 3W2A cord.	
20	At signaling converter — Connect MEAS jacks of 2AB test set to T-R CONV jacks, using 3P14A cord.	
21	Adjust SEND LEV potentiometer on 43A1 channel terminal to obtain reading of −8 db on 21A TMS.	
22	At 21A TMS — Remove plug from DET IN jacks, insert into OUT jacks of 5A attenuator.	
23	At 5A attenuator — Operate 5-, 3-db keys.	
24b	If 166A1 station test set is provided — Connect FREQ STD OUT jacks to IN jacks of 5A attenuator.	
25b	Operate FREQ STD switch to 1140 cps, 40DB PAD to OUT.	
26	At AC voltmeter — Operate switch to 1-volt AC scale.	
27	Connect voltmeter test leads to OUT T-R terminals of 5A attenuator.	Meter needle swings slowly.
28	Adjust OSC potentiometer on 43A1 channel terminal to give desired reading.	Meter needle swings back and forth less than once per second.
29	Remove patch cord from 2AB test set TMS jacks.	
30	Patch 2AB test set to 21A TMS.	
31	Operate DET INPUT switch to −10 db.	
32	Adjust SEND LEV potentiometer of 43A1 channel terminal to give a reading of −17.5 db.	21A TMS reads −17.5 db.
33	At signaling converter — Remove blocking tools from relays.	
34	Operate OSC switch of 43A1 channel terminal to OFF.	
35	Remove voltmeter test leads.	

STEP	ACTION	VERIFICATION
36b	If 166A1 station test set is provided — Operate FREQ STD switch to 2090 cps.	
37a	If 72A frequency meter is provided — Patch OSC OUT to DET IN of 21A TMS, adjust OSC OUT potentiometer to give reading of +0.2 db on 21A TMS, at a frequency of 2090 cps.	
38	Patch either FREQ STD jacks of 166A1 test set or 72A frequency meter OSC OUT to 5A attenuator input.	
39	At 5A attenuator — Operate 10-, 20-db keys.	
40	Patch output of 5A attenuator to TMS jacks of 2AB test set. (MEAS jacks patched to T-R CONV jacks per Step 11.)	
41	At AC voltmeter — Operate switch to smallest ac voltage scale including 7 volts.	
42	At signaling converter — Connect negative test lead to G jack of 43A1 channel terminal, connect positive test lead to 43A1 channel terminal A2 jack.	
43	Adjust REC GAIN potentiometer on 43A1 channel terminal to give correct reading.	*If using KS-16979 L1* — Meter reads 5.6 volts. *If using Hewlett-Packard 400 Type* — Meter reads 5.9 volts.
44	Remove voltmeter test leads.	
45	At DC voltmeter — Operate switch to lowest range including 80 volts dc.	
46	Connect positive lead to LP jack of 43A1 channel terminal, negative lead to ground.	
47	Adjust LP CUR potentiometer on 43A1 channel terminal to give 80-volt reading.	Voltmeter reads 80 volts.
48	Remove voltmeter test leads.	
49	At signaling converter — Remove all connections to 2AB test set, 72A frequency meter, or 166A1 station test set, blocking tools, plugs.	
50	Adjust REC BIAS screw of 43A1 channel terminal to midrange position.	

STEP	ACTION	VERIFICATION
	C. Test of the Transmission Path	
1	Insert 165C (dummy) plugs into T-R LINE jacks.	
2	Insert 328D (termination) plug into T-R SUB jacks.	
3	At signaling converter — Operate OSC switch of 43A1 channel terminal to OFF.	
4	Block operated RS, CT, OH relays.	CT, OH, RS relays are only wire-spring relays operated.
5	At 21A TMS — Operate FREQ dial to 2300, OSC OUTPUT to 0 db, DET INPUT to 0 db on ***white*** scale.	
6	Connect OSC OUT jacks to TR CONV jacks on signaling converter.	
7	Connect DET IN jacks to T'-R' CONV jack of signaling converter.	21A TMS reads between 0 and −0.4 db.
8	At signaling converter — Remove all connections to 21A TMS, blocking tools, plugs.	
9	Operate OSC switch on 43A1 to ON.	
	D. Test of Timers	
1	At 2AB test set — Operate TEST switch to REC 900, DIAL key to normal, 2DB pad to OUT.	
2a	If 72A frequency meter is provided — Calibrate in accordance with standard procedures. (Recalibrate every 30 minutes while in use.)	
3	Insert 165C (dummy) plugs into T-R LINE jacks.	
4	Insert 328D (termination) plug into T-R SUB jacks.	
5	At timing test set — Connect 48-volt jack to 48-volt jack on bay.	
6	Operate BAT ON key to ON, SEND MK key to BK, REC switch to OC GRD, MCF key to NORM, MIL SEC switch to 0-100.	BAT lamp lights.

STEP	ACTION	VERIFICATION
7	Calibrate for half scale according to standard procedures.	
8	Insert plug end of 3W4A cord into TST1 jack; insert 419A tools into red, white, black leads on tool end of 3W4A cord. ***Caution: In Steps 9 through 12 care must be taken in making the connections to avoid shorting.***	
9	At signaling converter — Connect red lead of W3M cord to sleeve terminal of REC jack.	
10	Connect black lead of W3M cord to tip terminal of REC jack.	
11	Connect white lead of W3M cord to 12 fixed contact of RS relay.	
12	Insert 419A tool into one end, 365 tool into other end of 1W13A cord.	
13	Connect 12 make contact of RS relay to ground terminal on bay, using 1W13A cord.	
14	Insert 165C (dummy) plug into REC jack.	
15a	If 72A frequency meter is provided — Operate frequency dial to 1990 cps, adjust OSC OUT to approximately midrange, operate CAL-MEAS-SEARCH switch to MEAS.	
16a	Connect OSC OUT jacks of 72A to TMS binding posts of 2AB test set, using 3W2A cord.	
17	At signaling converter — Connect T-R CONV jack to MEAS jacks of 2AB test set, using 3P14A cord.	
18b	If 166A1 station test set is provided — Connect ground jack of 166A1 station test set to ground, and originating 48-volt jack to 48-volt terminal on bay, using W1N cord.	
19b	Operate 40DB PAD to OUT, FREQ STD switch to 2090 cps.	
20b	Connect FREQ STD OUT jacks to T-R CONV jacks of signaling converter, using 3P14A cord.	
21	At timing test set — Operate TST key to OPR, hold until meter is read.	Meter reads between 60 and 65, that is, 120 and 130 ms.

STEP	ACTION	VERIFICATION
22c	If requirement of Step 21 is not met — Restrap C2 capacitor in signaling converter to give desired reading. *Note:* Increasing the capacity increases the time, while decreasing the capacity decreases the time.	
23	Disconnect 166A1 station test set or 72A frequency meter, 2AB test set.	
24	At signaling converter — Remove 165C (dummy) plug from REC jack.	
25	Remove clips, tools from REC jack, spring of RS relay.	
26	At timing test set — Operate SEND MK switch to MK.	
27	Remove 419A tool from black lead of 3W4A cord, insert 360 tool. ***Caution: In Steps 28 through 30 care must be taken in making connections to avoid shorting.***	
28	At signaling converter — Connect red lead of 3W4A cord to tip terminal of CONV T′ jack.	
29	Connect black lead of 3W4A cord to ground terminal on bay.	
30	Connect white lead of 3W4A cord to 6 make contact of SR relay.	
31	Block operated RS relay.	
32	At timing test set — Operate TST key to OPR, hold until meter is read.	Meter reads between 45 and 55, that is, 90 and 110 ms.
33d	If requirement of Step 32 is not met — Restrap C7 capacitor in signaling converter to obtain desired reading. *Note:* Increasing the capacity increases the time, while decreasing the capacity decreases the time.	
34	At timing test set — Operate SEND MK switch to BK, REC switch to GRD OC, MIL SEC switch to 0-5000.	
35	Calibrate for full scale according to standard procedures.	

STEP	ACTION	VERIFICATION
36	At signaling converter — Remove red lead from CONV T' jack, connect to upper winding terminal of SRA relay.	SRA relay operates.
37	Block operated CT relay.	OH relay only wire-spring relay released.
38	At timing test set — Operate TST key to OPR, hold until meter is read.	Meter reads between 30 and 60, that is 1.5 and 3 seconds.
39	Remove all cords from timing test set.	
40	Operate BAT key to OFF.	
41	At signaling converter — Remove all connections, plugs, blocking tools.	

E. Out-of-Service Test of Logic

1	Insert 165C (dummy) plug into T-R LINE jacks.	
2	Insert 328D (termination) plug into T-R SUB jacks.	
3	At volt-ohmmeter — Operate switch to 150 volts on dc scale.	
4	At signaling converter — Connect volt-ohmmeter test leads to 8 make contact of OH relay and ground.	Meter reads 0 volts.
5	At volt-ohmmeter — Operate switch to XI on ohm scale.	Meter reads ∞ ohms.
6	Operate switch to 150 volts on dc scale.	Meter reads 0 volts.
7	Remove test lead from 8 make contact of OH relay, connect to 8 fixed contact of OH relay.	Meter reads 0 volts.
8	At volt-ohmmeter — Operate switch to XI on ohm scale.	Meter reads 0 ohms.
9	At signaling converter — Operate RS relay momentarily.	Meter reads ∞ ohms.
10	Operate manually SR relay momentarily.	Meter reads ∞ ohms.
11	Remove volt-ohmmeter test leads.	
12	Block operated RS relay.	RS relay only wire-spring relay operated.
13	Insert 365 tool into one end, 419A tool into other end of 1W13A testing cord.	
14	Connect 9 fixed contact of OH relay to ground terminal on bay, using 1W13A testing cord.	IC, SR, SRA, RS relays operated.

STEP	ACTION	VERIFICATION
15	Block nonoperated RS relay.	OH relay operates.
16	Insert 360 tool into one end, 419A tool into other end of second 1W13A testing cord.	
17	Connect 8 make contact of OH relay to −48V terminal on bay, using second 1W13A testing cord.	CC, CT relays operate. IC, SRA relays release.
18	Block operated RS relay.	IC, CT, RS relays operated. OH relay releases.
19	Remove test cord from 9 fixed contact of OH relay to ground terminal on bay.	IC, CT relays release. RS only wire-spring relay operated.
20	Remove test cord from 8 make contact of OH relay to −48V terminal on bay.	
21	Repeat Steps 12 through 17, 19, 20.	SR, OH, CT relays release.
22	Block operated RS relay.	RS relay only wire-spring relay operated.
23	Remove all plugs, blocking tools.	