LINE CONCENTRATOR NO. 2A
SD-94815-01 AND SD-94816-01
SYSTEM TESTS

1. GENERAL

1.01 This is one of a group of sections for use with line concentrator No. 2A. This section contains tests to be performed on concentrator systems after cutover when the system is in service.

1.02 This section is reissued for the following reasons:

(a) To revise title

(b) To add Test K and Table D

(c) To redesignate Operational Tests as follows:

- A1 to AA
- A2 to BB
- A3 to CC
- A4 to DD
- B to EE
- C to FF

(d) To revise all tests except Maintenance Tests B and F

(e) To revise Parts 1, 2, and 3

(f) To make minor changes as required.

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

1.03 The following tests are covered.

Maintenance Tests

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1.04 All maintenance tests except A and F should be made during light traffic conditions because test conditions may prevent service calls from completing.

1.05 Performance of Tests G, H, I, and J will cause additional alarms and trouble indications. When the test(s) are completed, silencing of alarms and extinguishing of trouble indicator lamps are necessary at both remote and control units.

1.06 During Test E, the dial tone speed registers (T- and D-) will score. The reporting of these operations should be in accordance with local instructions.

1.07 ***Test Line Assignment:*** Reference to local records is required to establish the arc terminal number for each test line associated with the concentrator conrol unit under test and for location information on the associated D- and T-registers.

1.08 Reference should be made to local records for information on measured transmission losses for the trunks connecting the control unit to the remote unit(s).

1.09 Tests in this section are used with the control unit and both remote units. Actions upon and/or verifications by keys, switches, relays, lamps, etc, are therefore associated with the remote unit (0 or 1) under test and that part of the control unit (0 or 1) associated with the specific remote unit under test.

1.10 The location statement, At MTF—, is used to refer to all apparatus located on the four basic bays of the master test frame.

1.11 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 4 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. REFERENCE MATERIALS AND APPARATUS

Reference Materials

2.01 The following reference material should be used with this section:

- CD- and SD-94815-01, Common Systems, Line Concentrator No. 2A, Control Circuit
- CD- and SD-94816-01, Common Systems, Line Concentrator No. 2A, Remote Circuit
- CD- and SD-94817-01, Common Systems, Line Concentrator No. 2A, and No. 2B Circuit Pack Schematics
- Section 067-109-301 Line Concentrator No. 2A, Trouble Location.

Apparatus

2.02 The apparatus required for each test is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.

2.03 Testing cord, 893 cord, 3 feet long, equipped with two 360A tools (1W13A cord) and two 624B (terminal connector) tools (for making test connection on terminal strip).

2.04 High impedance test receiver or hand test set.

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

2.06 Hewlett-Packard VTVM 412A or equivalent with a dc voltage range from 0.1 to 60 volts with accuracy in the range 10 to 14 volts within 0.5 volt.

2.07 A 908A logic circuit test set (J79908A). Use in accordance with Section 100-171-101.

2.08 Hewlett-Packard 400H VTVM or equivalent capable of indicating rms voltages in the range 0.010 to 15.0 volts, with a dB scale calibrated to indicate dBm into 600-ohm circuits.

2.09 Testing cord, 893 cord, 3 feet long, equipped with two 360A tools (1W13A cord), one 624B tool, one 639A tool, and one 651-type tool.

2.10 Operated (blown) fuses used in Tests C and D as required are furnished by plant personnel.

2.11 3C noise measuring set (NMS).

2.12 Patching cords, P3E cord, 6 feet long, equipped with two 310 plugs (3P7A cord) (to connect 3C NMS to control unit).

3. PREPARATION AND PRECAUTIONS

3.01 Tests in this section require testing, or testing and verifications at control unit and remote unit(s) or at dial tone speed register (DTSR) and traffic register rack (TRR) simultaneously.

3.02 A talking circuit is required between units to coordinate testing. The talking circuit should use facilities such as order wire or DDD network.

3.03 There should not be any adjustments made to relays or crossbar switches without consulting the appropriate requirement and adjusting procedure section for the particular relay or switch.

3.04 The dial tone speed register and dial tone speed indicating circuit(s), if provided, will not be available for use by the traffic department while Test E is in progress.

Dry-Reed Relays

3.05 Before testing on contacts of dry-reed relays, reference should be made to Section 040-275-301 for dry-reed-type relays and precautions to be observed when testing.

3.06 Contacts of reed relays may be damaged if test connections which cause these contacts to make or break 1/2 ampere or more are made. A high-impedance telephone test set or headset should be used when testing reed relay contacts and the circuits containing them.

Mercury Relays

3.07 Before testing mercury relays, reference should be made to Section 040-263-501 for

TABLE A

APPARATUS	TESTS																
	A	B*	C	D	E	F	G	H	I	J	K	AA	BB	CC	DD	EE	FF
Cord (2.03)	1		2	1			1	1	2	1	1	1				1	1
Test Receiver (2.04)			1	1								1	1	1	1	1	
Blocking and Insulating Tools (2.05)			√	√	√		√	√		√							
DC Voltmeter (2.06)						1											
908A Test Set (2.07)							1	1	1								
AC Voltmeter (2.08)										1†							
Cord (2.09)					1												
Operated Fuses (2.10)			√	√													
Noise Measuring Set (2.11)											1						
Cords (2.12)											1						
262C Plug											1						

√ As required.

* Refer to Section 067-109-302.

† At each unit under test

relays 275-, 276-, 291-, 292-, 301-, and 303-types using test sets SD-95439-01 (J94725A).

Magnetic Latching Crossbar Switches

3.08 The hold magnets in both units are magnetic latching. These switches should not be operated or released electrically or manually during testing except by normal circuit operation or in strict accordance with approved procedures. Indiscriminate operation or release of these switches and relays will cause malfunctions in the system.

Diodes and Transistors

3.09 Before testing diodes, transistors, or circuits containing them, reference should be made to Section 032-173-301 for testing, replacing, and handling of circuit packs and semiconductor devices.

3.11 Maintenance Tests G, H, and I use the 908A logic circuit test set. Expected instrument error is included in the tolerances given for specified measurements. Since the accuracy of the 908A logic circuit test set for measuring frequencies is relatively low, a marginal trouble condition due to an out-of-limits operating frequency of an oscillator could exist and still be within tolerances specified. It is expected, however, that oscillators will operate within limits or not at all in the large majority of cases. If the tests do not indicate a trouble but troubles are occurring, the use of more precise test equipment may be necessary. In particular, the use of an accurate counter to measure precisely

the operating frequencies of the modulator oscillator and the 3200-Hz clock may be necessary.

3.12 To determine which trunk is connected to any line, the following procedure may be followed. At the control unit, check for crosspoints closed on the line appearance.

(a) Customer line terminal appearances 00 through 77 and test line appearances 78 and 79 appear on verticals of the crossbar switches SWOA-D for group 0 and SWIA-D for group 1 in accordance with Table B.

(b) Trunks 00 to 15 appear on the first 8 levels (0-7) of the crossbar switches, two trunks per level. Like numbered levels on each switch of the group are multipled. The top two levels (8 and 9) are used to steer to one of the two trunks on each level (0-7).

(c) Knowing a line number and using Table C, the trunk number of the trunk connected to that line can be determined.

TABLE B

LINE APPEARANCE ON SWOA-D AND SWIA-D

LINE NUMBER	SWITCH	VERTICAL
00-19	A	00-19
20-39	B	00-19
40-59	C	00-19
60-79	D	00-19

4. MAINTENANCE TESTS

STEP	ACTION	VERIFICATION
A.	**Service Denial Call and Release Service Denial Call**	
1	At control unit— Connect SD- terminal to S- terminal associated with line to be denied service.	
2	Operate and hold SD- key.	CC lamp lighted.
3	Within 2 seconds after CC lamp lights— Restore SD- key.	CC lamp extinguished. At remote and control units— For line under test— Hold magnets operated. Select fingers ***not*** engaged.
4	At control unit— Disconnect SD- terminal from S- terminal. ***Note:*** Steps 5 through 8 restore line to service.	

STEP	ACTION	VERIFICATION

TABLE C

TRUNK APPEARANCE ON SW0/1

TRUNK NUMBER	SELECT LEVEL	STEERING LEVEL	
		EVEN NUMBER TRUNK	ODD NUMBER TRUNK
00-01	0	8	9
02-03	1	8	9
04-05	2	8	9
06-07	3	8	9
08-09	4	8	9
10-11	5	8	9
12-13	6	8	9
14-15	7	8	9

Example: Customer line 43 connected to trunk number 12 would have crosspoints closed on switch C vertical 03 and levels 6 and 8.

5	Connect RSD- terminal to S- terminal associated with line being restored to service.	
6	Operate and hold RSD- key.	CC lamp lighted.
7	Within 2 seconds after CC lamp lights— Restore RSD- key.	CC lamp extinguished.
8	Disconnect RSD- terminal from S- terminal.	
	Note: Steps 9 through 14 are for a terminating test call which verifies that line under test has been restored to service.	
9	Connect TC- terminal to S- terminal of line restored to service.	
10	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
11	Operate and hold TC- key.	
12	Operate and hold TST- key.	CC lamp lighted.
13	Within 2 seconds after CC lamp lights— At same time— Release TC-, TST- keys.	CC lamp extinguished. For line under test— Hold magnet operated. Select fingers engaged.
14	Disconnect TC- terminal from S- terminal.	

STEP	ACTION	VERIFICATION
B. Permanent Signal Release		
	Note: Refer to Section 067-109-302 for procedures to release permanent signals. A permanent signal may be simulated by placing an off-hook signal on a line at the remote unit. At conclusion of test, remove off-hook signal from line at remote unit(s).	
C. Alarm Circuits and Trouble Recording at Remote Unit		
	Note 1: Refer to 1.04 and 1.09.	
	Note 2: While performing these tests, service calls will be blocked. If interference to service occurs, the circuits should be restored to service by removing all blocking tools, disconnecting all test connections, etc, and momentarily operating the AR and RR keys at the remote unit and the AR key at the control unit. Momentarily release the operated TK- relay in the control unit. When circuits are idle, testing can be resumed by restarting with Step 1, 13, 25, 36, 47a, 64, or 70.	
1	At control unit— Block operated TA- relay associated with remote unit under test.	TRT, SF- lamps lighted.
2	At remote unit— Block nonoperated EP, TM5 relays.	
3	Connect ground to terminal 11 of terminal strip A.	
4	Connect ground to ring lead terminal on frame terminal strip of an idle line (hold magnet not operated for that line).	TM1 relay released. AL relay operated. At control and remote units— Major alarms sound.
5	At remote unit— Disconnect ground from ring lead terminal.	TM1 relay operated.
6	Momentarily operate RL1 relay.	
7	Remove blocking tools from EP, TM5 relays.	
8	Disconnect ground from terminal 11 of terminal strip A.	
9	Momentarily operate AR, RR keys.	AL relay released. Major alarm silenced.

STEP	ACTION	VERIFICATION
10	At control unit— Remove blocking tool from TA- relay.	TRT, SF- lamps extinguished.
11	Momentarily operate AR key.	Major alarm silenced.
12	Momentarily release TK- relay associated with group under test.	New trunk preselected.
13	At control unit— Block operated TA- relay associated with remote unit under test.	TRT, SF- lamps lighted.
14	At remote unit— Block nonoperated TM3, TM5 relays.	
15	Connect ground to terminal 11 of terminal strip A.	
16	Connect ground to ring lead terminal on frame terminal strip of an idle line (hold magnet not operated for that line).	RC1 relay momentarily operated. SF1, AL relays operated. Trouble record lamps lighted (including SF lamp). At control and remote units— Major alarms sound.
17	At remote unit— Disconnect ground from ring lead terminal.	
18	Remove blocking tools from TM3, TM5 relays.	
19	Momentarily operate RL1 relay.	SF1 relay released.
20	Disconnect ground from terminal 11 on terminal strip A.	
21	At control unit— Remove blocking tool from TA- relay.	TRT, SF- lamps extinguished.
22	Momentarily operate AR key as required.	Major alarm silenced.
23	At remote unit— Momentarily operate AR, RR keys.	AL relay released. Major alarm silenced. Trouble record lamps extinguished.
24	At control unit— Momentarily release TK- relay associated with group under test.	New trunk preselected.
25	At control unit— Block operated TA- relay associated with remote unit ***not*** under test.	TRT, SF- lamps lighted.

STEP	ACTION	VERIFICATION
26	Block nonoperated TM1, TM5 relays.	
27	At remote unit— Block nonoperated RT, TM3, TM5, RL1, TNK relays.	
28	Connect ground to ring lead terminal on frame terminal strip of an idle line (hold magnet not operated for that line).	TCF, AL relays operated. Trouble record lamps lighted (including TCF lamp). At control and remote units— Major alarms sound.
29	At remote unit— Disconnect ground from ring lead terminal.	
30	Remove blocking tools from RT, TM3, TM5, RL1, TNK relays.	
31	At control unit— Remove blocking tools from TM1, TM5 relays.	
32	At remote unit— Momentarily operate AR, RR keys.	AL relay released. Major alarm silenced. Trouble record lamps extinguished.
33	At control unit— Remove blocking tool from TA- relay.	TRT, SF- lamps extinguished.
34	Momentarily operate AR key as required.	Major alarm silenced.
35	Momentarily release TK- relay associated with group under test.	New trunk preselected.
36	At control unit— Block operated TA- relay associated with remote unit ***not*** under test.	TRT, SF- lamps lighted.
37	Block nonoperated TM5 relay.	
38	At remote unit— Block nonoperated ABK, RL1, TM3, TM5 relays.	
39	Connect ground to ring lead terminal on frame terminal strip of an idle line.	AL, RT, SF2 relays operated. Trouble record lamps lighted (including SF lamp). At control and remote units— Major alarms sound.
40	At remote unit— Disconnect ground from ring lead terminal.	

STEP	ACTION	VERIFICATION
41	Remove blocking tools from ABK, RL1, TM3, TM5 relays.	
42	Momentarily operate RL1 relay.	RT, SF2 relays released.
43	At control unit— Remove blocking tools from TA-, TM5 relays.	TRT, SF- lamps extinguished.
44	Momentarily operate AR key as required.	Major alarm silenced.
45	At remote unit— Momentarily operate AR, RR keys.	Al relay released. Major alarm silenced. Trouble record lamps extinguished.
46	At control unit— Momentarily release TK- relay associated with group under test.	New trunk preselected.
47a	If test line 79 is connected to a trunk (hold magnet operated)— At control unit— Set TST- switch as required to select trunk for use in test.	
48a	Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
49a	Operate and hold TC- key.	
50a	Momentarily operate TST- key.	CC lamp momentarily lighted.
51a	Restore TC- key.	
52a	Disconnect TC- terminal from S- terminal. ***Note:*** Test line 79 is now disconnected from the trunk.	
53	At control unit— Set TST- switch as required to select an idle trunk (TB- relay not operated).	
54	Block operated TA- relay associated with remote unit ***not*** under test.	TRT, SF- lamps lighted.
55	At remote unit— Block nonoperated TRL, TM5, SQ2 relays.	
56	At control unit— Block nonoperated TM5 relay.	

STEP	ACTION	VERIFICATION
57	When trunk selected in Step 53 is idle (TB- relay not operated)— Momentarily operate TST- key.	
58	Within 2 seconds— Reset TST- switch to OFF.	At remote unit— TM3 relay operated. Trouble record lamps lighted (including TM3 lamp).
59	Remove blocking tools from TRL, TMS, SQ2 relays.	AL relay operated. TM3 relay released. At control unit and remote units— Major alarms sound.
60	At control unit— Remove blocking tools from TM5, TA- relays.	TRT, SF- lamps extinguished.
61	Momentarily operate AR key as required.	AL relay released. Major alarm silenced.
62	At remote unit— Momentarily operate AR, RR keys.	Major alarm silenced. Trouble record lamps extinguished.
63	At control unit— Momentarily release TK- relay associated with group under test.	New trunk preselected.
64	At control unit— Block operated TA- relay associated with remote unit ***not*** under test.	TRT, SF- lamps lighted.
65	Block nonoperated ABK, RL2, TM5 relays.	
66	Operate and hold TST- key until TM1 relay momentarily operates. When TM1 relay released— Restore TST- key.	At remote unit— AL relay operated. Trouble record lamps lighted (including CF lamp). At control and remote units — Major alarms sound.
67	At control unit— Remove blocking tools from TA-, ABK, RL2, TM5 relays.	TRT, SF- lamps extinguished.
68	Momentarily operate AR key as required.	Major alarm silenced.
69	At remote unit— Momentarily operate AR, RR keys.	AL relay released. Major alarm released. Trouble record lamps extinguished.
70	At remote unit— Remove battery fuse and insert an operated	FA relay operated. FA lamp lighted.

STEP	ACTION	VERIFICATION
	fuse.	At control and remote units— Major alarms sound.
71	At remote unit— Replace operated fuse with original fuse.	FA relay released. FA lamp extinguished.
72	Momentarily operate AR key.	Major alarm silenced.
73	At control unit— Momentarily operate AR key.	Major alarm silenced.
74	At remote unit— Repeat Steps 70 through 73 for two remaining battery fuses.	

D. Alarm Circuits and Trouble Recording at Control Unit

Note 1: Refer to 1.04 and 1.09.

Note 2: While performing these tests, service call will be blocked. If interference to service occurs, the circuit should be restored to service by removing all blocking tools, disconnecting all test connections, etc, and momentarily operating the AR key in the control unit and AR and RR keys at the remote unit. When circuits are idle, testing can be resumed by restarting with Step 1, 10, 22, 34, 46, 58, 70, 82, 93, 97, 109, 117, or 129.

1	At control unit— Block nonoperated TA-, RL1, TM4, TM5 relays.	
2	Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
3	Set TST- switch as required to select an idle trunk.	
4	When trunk is idle (TB- relay not operated)— Operate and hold TC- key.	
5	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— TRT, SF-, RLT lamps lighted. Major alarm sounds.
6	At same time— Restore TC-, TST- keys.	

STEP	ACTION	VERIFICATION
7	Remove blocking tools from TA-, RL1, TM4, TM5 relays.	TRT, SF-, RLT lamps extinguished.
8	Disconnect TC- terminal from S- terminal.	
9	Momentarily operate AR key.	
10	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
11	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
12	Block nonoperated TCK, TM5, RLS relays.	
13	At remote unit— Block nonoperated RT, TM5 relays.	
14	At control unit— Operate and hold TC- key.	
15	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— TCF, ALM1 relays operated. TRT lamp lighted. At remote and control units— Major alarms sound.
16	At control unit— At same time— Restore TC-, TST- keys.	
17	Disconnect TC- terminal from S- terminal.	
18	Remove blocking tools from TCK, TM5, RLS relays.	TCF relay released.
19	Momentarily operate AR key.	ALM1 relay released. Major alarm silenced.
20	At remote unit— Remove blocking tools from RT, TM5 relays.	
21	Momentarily operate AR, RR keys as required.	Major alarm silenced.
22	At control unit— Connect TC- terminal to S- terminal of an	

STEP	ACTION	VERIFICATION
	idle line (hold magnet not operated for that line).	
23	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
24	Block nonoperated TA-, TM5, RLS relays.	
25	At remote unit— Block nonoperated RT, TM5 relays.	
26	At control unit— Operate and hold TC- key.	
27	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— ALM1, TM6 relays operated. TRT, SF- lamps lighted. At remote and control units— Major alarms sound.
28	At control unit— At same time— Restore TC-, TST- keys.	
29	Disconnect TC- terminal from S- terminal.	
30	Remove blocking tools from TA-, TM5, RLS relays.	TM6 relay released.
31	Momentarily operate AR key.	ALM1 relay released. TRT, SF- lamps extinguished. Major alarm silenced.
32	At remote unit— Remove blocking tools from RT, TM5 relays.	
33	Momentarily operate AR, RR keys as required.	Major alarm silenced.
34	At control unit— Connect TC- terminals to S- terminal of an idle line (hold magnet not operated for that line).	
35	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
36	Block nonoperated ABK, TM5, RLS relays.	
37	At remote unit— Block nonoperated TM5 relay.	

STEP	ACTION	VERIFICATION
38	At control unit— Operate and hold TC- key.	
39	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— ALM1, TM1 relays operated. TRT lamp lighted. At remote and control units— Major alarms sound.
40	At control unit— At same time— Restore TC-, TST- keys.	
41	Disconnect TC- terminal from S- terminal.	
42	Remove blocking tools from ABK, TM5, RLS relays.	TM1 relay released.
43	Momentarily operate AR key.	ALM1 relay released. TRT lamp extinguished. Major alarm silenced.
44	At remote unit— Remove blocking tool from TM5 relay.	
45	Momentarily operate AR, RR keys as required.	Major alarm silenced.
46	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
47	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
48	Block nonoperated RL1 relay.	
49	At remote unit— Block nonoperated RT, TM5 relays.	
50	At control unit— Operate and hold TC- key.	
51	Operate and hold TST- key.	Within 12 to 14 seconds— At MTF— Trouble record taken. At control unit— ALM1, TM5 relays operated. TM5, TRT lamps lighted.

STEP	ACTION	VERIFICATION
		At remote and control units— Major alarms sound.
52	At remote unit— At same time— Restore TC-, TST- keys.	
53	Disconnect TC- terminal from S- terminal.	
54	Remove blocking tool from RL1 relay.	TM5 relay released.
55	Momentarily operate AR key.	ALM1 relay released. TM5, TRT lamps extinguished. Major alarm silenced.
56	At remote unit— Remove blocking tools from RT, TM5 relays.	
57	Momentarily operate AR, RR relays as required.	Major alarm silenced.
58	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
59	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
60	Block nonoperated TM5, RLS, RL1, TCF relays.	
61	At remote unit— Block nonoperated ABK, TM5 relays.	
62	At control unit— Operate and hold TC- key.	
63	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— ALM1, RF relays operated. TRT lamp lighted. At remote and control units— Major alarms sound.
64	At control unit— At same time— Restore TC-, TST- keys.	
65	Disconnect TC- terminal from S- terminal.	

STEP	ACTION	VERIFICATION
66	Remove blocking tools from TM5, RLS, RL1, TCF relays.	
67	Momentarily operate AR key.	ALM1 relay released. TRT lamp extinguished. Major alarm silenced.
68	At remote unit— Remove blocking tools from TM5, ABK relays.	
69	Momentarily operate AR, RR keys as required.	Major alarm silenced.
70	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
71	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
72	Block nonoperated RL2, TM5 relays.	
73	At remote unit— Block nonoperated TM5 relay.	
74	At control unit— Operate and hold TC- key.	
75	Operate and hold TST- key.	ALM2, TM2 relays operated. RLT lamp lighted. At remote and control units— Major alarms sound.
76	At control unit— At same time— Restore TC-, TST- keys.	
77	Disconnect TC- terminal from S- terminal.	
78	Remove blocking tools from RL2, TM5 relays.	TM2 relay released.
79	Momentarily operate AR key.	ALM2 relay released. RLT lamp extinguished. Major alarm silenced.
80	At remote unit— Remove blocking tool from TM5 relay.	
81	Momentarily operate AR, RR keys as required.	Major alarm silenced.

STEP	ACTION	VERIFICATION
82	At control unit— Connect TC- terminal to S- terminal of a line connected to a trunk.	
83	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
84	Remove relay cover from NK relay and replace with 651-type tool.	
85	Using 893 cord, connect 624B tool to ground and 639A tool to contact 6F of NK relay.	
86	Operate and hold TC- key.	
87	Operate and hold TST- key.	TM3 relay momentarily released. ALM2 relay operated. RLT lamp lighted. Major alarm sounds.
88	At same time— Restore TC-, TST- keys.	
89	Disconnect ground from contact 6F of NK relay.	
90	Remove 651-type tool and replace relay cover on NK relay.	
91	Disconnect TC- terminal from S- terminal.	
92	Momentarily operate AR key.	ALM2 relay released. RLT lamp extinguished. Major alarm silenced.
93	At control unit— Block nonoperated OP relay.	
94	Block operated TA- relay.	TRT, SF- lamps lighted. ALM1 relay operated. Major alarm sounds.
95	Remove blocking tools from OP, TA- relays.	
96	Momentarily operate AR key.	TRT, SF- lamps extinguished. Major alarm silenced.
97	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	

STEP	ACTION	VERIFICATION
98	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
99	Block nonoperated HMK, RLS, TM5 relays.	
100	At remote unit— Block nonoperated TM5, RT relays.	
101	At control unit— Operate and hold TC- key.	
102	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— HMF1, ALM1 relays operated. TRT lamp lighted. At remote and control units— Major alarms sound.
103	At control unit— At same time— Restore TC-, TST- keys.	
104	Disconnect TC- terminal from S- terminal.	
105	Remove blocking tools from HMK, RLS, TM5 relays.	HMF1 relay released.
106	Momentarily operate AR key.	ALM1 relay released. TRT lamp extinguished. Major alarm silenced.
107	At remote unit— Remove blocking tools from TM5, RT relays.	
108	Momentarily operate AR, RR keys.	Major alarm silenced.
109	At control unit— Block nonoperated HMK, RL1, TM2, TM5 relays.	
110	Block operated TM3 relay.	
111	At remote unit— Block nonoperated TM5 relay.	
112	Connect ground to ring lead terminal of an idle line (hold magnet not operated for that line).	At MTF associated with control unit— Trouble record taken. At control unit— HMF2, ALM1 relays operated. TRT lamp lighted.

STEP	ACTION	VERIFICATION
		At control and remote units— Major alarms sound.
113	At remote unit— Disconnect ground from ring lead terminal.	
114	At control unit— Remove blocking tools from HMK, RL1, TM2, TM5 relays.	
115	Momentarily operate AR key.	ALM1 relay released. TRT lamp extinguished. Major alarm silenced.
116	At remote unit— Momentarily operate AR, RR keys as required.	Major alarm silenced.
117	At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
118	Set TST- switch as required to select an idle trunk (TB- relay not operated).	
119	Block nonoperated ABK, TM5, RLS, LA, TRC relays.	
120	At remote unit— Block nonoperated TM5 relay.	
121	At control unit— Operate and hold TC- key.	
122	Operate and hold TST- key.	At MTF— Trouble record taken. At control unit— TRT lamp lighted. TR1 relay operated. After 2 to 3 seconds— TM4 relay operated. At remote and control units— Major alarms sound.
123	At control unit— At same time— Restore TC-, TST- keys.	
124	Disconnect TC- terminal from S- terminal.	
125	Remove blocking tools from ABK, TM5, RLS, LA, TRC relays.	TR1, TM4 relays released.

STEP	ACTION	VERIFICATION
126	Momentarily operate AR key.	TRT lamp extinguished. Major alarm silenced.
127	At remote unit— Remove blocking tool from TM5 relay.	
128	Momentarily operate AR, RR keys as required.	Major alarm silenced.
129	At control unit— Remove battery fuse and replace with an operated fuse.	FA relay operated. FA lamp lighted. Major alarm sounds.
130	Replace operated fuse with original fuse.	FA relay released. FA lamp extinguished.
131	Momentarily operate AR key.	Major alarm silenced.
132	Repeat Steps 129 through 131 for two remaining battery fuses.	

E. Dial Tone Speed Register (DTSR)

Note 1: Since one terminal on a DTSR selector switch arc is assigned to each control unit group of 15 trunks and the DTSR circuit may test as many as 19 terminals per arc not associated with the concentrator group under test during one cycle of testing, one test cycle for each of Steps 8, 11, 14, and 17 is required by the DTSR circuit.

Note 2: Refer to 1.06, 1.07, 3.01, and 3.04.

1a	If DTSR is arranged with 6-position rotary switches— At DTSR— Record switch settings of A2 through A6 and B2 through B6 rotary switches.	
2a	Set rotary switches to 6 as required to skip selector switch arcs not associated with concentrator control unit under test.	
3a	Set rotary switch(es) as required to test selector switch arc(s) associated with concentrator control unit under test.	
4b	If DTSR is arranged with two position toggle switches— At DTSR— Record switch settings of TA2 through TA6 and TB2 through TB6 toggle switches.	

STEP	ACTION	VERIFICATION
5b	Set switches to 2 as required to skip selector switch arcs not associated with concentrator control unit under test.	
6b	Set switch(es) to 1 as required to test selector switch arc(s) associated with concentrator control unit under test.	
7	At control unit— Insulate 5B of TGB0 relay.	
8	At DTSR or TRR— Operate ST key (for one cycle of testing).	At TRR— D- register associated with group 0 of concentrator control unit under test scores once. T- register associated with group 0 of concentrator control unit under test scores once.
9	At DTSR or TRR— Restore ST key.	
10	At control unit— Remove insulator from TGB0 relay.	
11	At DTSR or TRR— Operate ST key (for one cycle of testing).	At TRR— T- register associated with group 0 of concentrator control unit under test scores once.
12	At DTSR or TRR— Restore ST key.	
13	At control unit— Insulate 5B of TGB1 relay.	
14	At DTSR or TRR— Operate ST key (for one cycle of testing).	At TRR— D- register associated with group 1 of concentrator control unit under test scores once. T- register associated with group 1 of concentrator control unit under test scores once.
15	At DTSR or TRR— Restore ST key.	
16	At control unit— Remove insulator from TGB1 relay.	
17	At DTSR or TRR— Operate ST key (for one cycle of testing).	At TRR— T- register associated with group 1 of

STEP	ACTION	VERIFICATION
		concentrator control unit under test scores once.
18	At DTSR or TRR— Restore ST key.	
19	At DTSR— Reset rotary or toggle switches in accordance with record of initial switch setting.	
F.	**12-Volt Power Supply (Control or Remote Unit)**	
1	Measure dc voltage at 12-volt power supply across terminals +12, GRD.	Voltage indicates between 10.8, 13.2 (12 volts ±10%).
G.	**Modulator Analog Frequency Measurement (Control Unit)**	
	Note: Refer to 1.04 and 1.05.	
1	At control unit— Connect GRD, +12 terminals of 908A test circuit to GRD, +12 terminals, respectively, of 12-volt power supply.	
2	Connect INPUT terminal of 908A test set to terminal 13 of OLA0 relay.	
3	Set selector switch of 908A test set to 2500 CPS and slide switch to AF.	
4	Block nonoperated OL0 relay.	
5	Connect ground to terminal 11 of terminal strip A.	Meter indicates 40.5 ±2.0.
7	Disconnect ground from terminal 11.	
8	Connect ground to terminal 45 of terminal strip C.	Meter indicates 44.5 ±2.0.
9	Disconnect INPUT terminal of 908A test set from terminal 13 of OLA0 relay.	
10	Remove blocking tool from OL0 relay.	
11	Block nonoperated OL1 relay.	
12	Connect INPUT terminal of 908A test set to terminal 23 of OLA1 relay.	

STEP	ACTION	VERIFICATION
13	Connect ground to terminal 11 of terminal strip A.	Meter indicates 40.5 ±2.0.
14	Disconnect ground from terminal 11.	
15	Connect ground to terminal 45 of terminal strip C.	Meter indicates 44.5 ±2.0.
16	Remove blocking tool from OL1 relay.	
17	Disconnect ground from terminal 45.	
18	Disconnect 908A test set from terminal 23 of OL1 relay, GRD, +12 terminals.	
19	Momentarily operate AR key.	
20	At remote unit— Momentarily operate AR, RR keys.	

H. Modulator Analog Frequency Measurement (Remote Unit)

Note: Refer to 1.04 and 1.05.

1	At remote unit— Connect GRD, +12 terminals of 908A test set to GRD, +12 terminals, respectively, of 12-volt power supply.	
2	Connect INPUT terminal of 908A test set to terminal 1 of FS filter.	
3	Set selector switch of 908A test set to 2500 CPS and slide switch to AF.	
4	Block nonoperated OL relay.	
5	Connect ground to terminal 11 of terminal strip A.	Meter indicates 21.4 ±2.0.
6	Disconnect ground from terminal 11.	
7	Connect ground to terminal 23 of terminal strip B.	Meter indicates 25.4 ±2.0.
8	Disconnect 908A test set from terminal 1 of FS filter, GRD, +12 terminals.	
9	Remove blocking tool from OL relay.	
10	Momentarily operate AR, RR keys.	

STEP	ACTION	VERIFICATION
11	At control unit— Momentarily operate AR key.	

I. Clock Digital Frequency Measurement (Control or Remote Unit)

Note: Refer to 1.04 and 1.05.

1	At control or remote unit— Connect GRD, +12 terminals of 908A test set to GRD, +12 terminals, respectively, of 12-volt power supply.	
2	Set selector switch of 908A test set to 5000 CPS and slide switch to DF.	
3a	If remote circuit clock is under test— At remote unit— Connect ground to terminals 36, 55 of terminal strip B.	
4a	Connect INPUT terminal of 908A test set to terminal 34 of terminal strip B.	Meter indicates 32 $\pm$1.5.
5b	If control circuit clock is under test— At control unit— Connect ground to terminals 23, 52 of terminal strip C.	
6b	Connect INPUT terminal of 908A test set to terminal 13 of terminal strip C.	Meter indicates 32 $\pm$1.5.
7	Disconnect ground from terminals 36, 55 of terminal strip B or terminals 23, 52 of terminal strip C.	
8	Disconnect 908A test set connections from concentrator.	
9	At control or remote unit— Momentarily operate AR or AR, RR key(s).	

J. Transmission Level Measurement [Control and Remote Unit(s)]

Note: Refer to 1.04, 1.05, and 1.08.

1	At control unit— Block nonoperated OL0, OL1 relays.	
2	Connect ground to terminal 11 of terminal strip A.	

STEP	ACTION	VERIFICATION
3	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
4	Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
5	At remote unit 0— Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
6	At remote unit 1— Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
7	At control unit— Disconnect ground from terminal 11.	
8	Connect ground to terminal 45 of terminal strip C.	
9	Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
10	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
11	At remote unit 0— Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
12	Momentarily operate AR, RR keys as required.	Major alarm silenced.
13	At remote unit 1— Measure ac voltage level across terminals 14, 24 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
14	Momentarily operate AR, RR keys as required.	Major alarm silenced.
15	At control unit— Remove blocking tools from OL0, OL1 relays.	
16	Disconnect ground from terminal 45.	
17	Momentarily operate AR key as required.	Major alarm silenced.
18	At remote unit 0— Block nonoperated OL relay.	
19	Connect ground to terminal 11 of terminal strip A.	
20	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.

STEP	ACTION	VERIFICATION
21	At control unit— Measure ac voltage level across terminals 17, 27 of terminal strip E.	Meter indicates −18 dBm ±7 db.
22	At remote unit 0— Disconnect ground from terminal 11.	
23	Connect ground to terminal 23 of terminal strip B.	
24	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
25	At control unit— Measure ac voltage level across terminals 17, 27 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
26	At remote unit 0— Disconnect ground from terminal 23.	
27	Remove blocking tool from OL relay.	
28	At remote unit 1— Block nonoperated OL relay.	
29	Connect ground to terminal 11 of terminal strip A.	
30	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
31	At control unit— Measure ac voltage level across terminals 15, 25 of terminal strip E.	Meter indicates −18 dBm ±7 dB.
32	At remote unit 1— Disconnect ground from terminal 11.	
33	Connect ground to terminal 23 of terminal strip B.	
34	Measure ac voltage level across terminals 12, 22 of terminal strip E.	Meter indicates −18 dBm ±7 dB + measured loss (dBm) of transmission facilities.
35	At control unit— Measure ac voltage level across terminals 15, 25 of terminal strip E.	
36	At remote unit 1— Disconnect ground from terminal 23.	
37	Remove blocking tool from OL relay.	

STEP	ACTION	VERIFICATION
38	At remote units 0 and 1— Momentarily operate AR, RR keys as required.	Major alarm silenced.
39	At control unit— Momentarily operate AR key as required.	Major alarm silenced.

K. 2-Way Noise Measurement

Note 1: All test equipment shall be known to be correctly calibrated.

Note 2: Refer to 1.04, 1.09, 2.11, 3.01, and 3.02.

Note 3: The results of the measurements taken in the test(s) should be recorded on appropriate forms.

1	At control unit— Set FUNCTION switch of 3C NMS to NM 600/900.	
2	Set DBRN switch of 3C NMS to 85.	
3	Patch IN jack of 3C NMS into TL00 or TL10 jack.	
4	Set TST- switch as required to select trunk for use in test.	
5	When trunk is idle (TB- relay not operated)— Operate and hold TST- key.	CC lamp lighted. 1000-Hz tone indication on 3C NMS meter.
6	Within 2 seconds after CC lamp lights— Restore TST- key.	CC lamp extinguished.
7	At remote unit— Insert 262C plug into line 79 jack.	At control unit— Tone indication on 3C NMS meter removed.
8	Adjust DBRN switch of 3C NMS for indications between +2 and +9 on meter. ***Note:*** Observe the meter for 10 to 30 seconds to establish where the needle appears most of the time—disregarding the highest occasional peaks. Set DAMP-NORM switch to DAMP as required.	
9	Record the noise value. ***Note:*** The total noise value is the meter indication plus the DBRN switch setting.	

STEP	ACTION	VERIFICATION
10	Disconnect cord plug from TL00 or TL10 jack.	
11	At remote unit— Remove plug from line 79 jack.	
12	At control unit— Set TST- switch to select trunk connected to line 79.	
13	Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
14	Operate and hold TC- key.	
15	Operate and hold TST- key.	CC lamp lighted.
16	Within 2 seconds after CC lamp lights— At same time— Restore TC-, TST- keys.	CC lamp extinguished.
17	Disconnect TC- terminal from S- terminal. *Note:* Steps 12 through 17 caused the trunk connected to test line 79 to be disconnected and reconnected to a different line. Test line 79 is now free for use with a different trunk.	
18	Repeat Steps 2 through 17 for remaining trunks to be tested.	

5. OPERATIONAL TESTS

General

5.01 The tests in this part are for use to aid in the determination of the most logical testing sequence for trouble location. If trouble occurs, a visual analysis should be made to establish which operational test(s) can be performed upon what equipment and, in turn, lead to a minimized testing effort. Accordingly, a comprehensive understanding of circuit functions, results of faulty signaling, and effects of latching equipment by magnetic circuits is a basic essential.

5.02 Reference should be made to Section 067-109-301 for line concentrator, No. 2A, trouble location for method of locating trouble and causes of troubles, analysis of trouble records for line concentrator perforations and trouble indicating lamps in remote unit(s).

5.03 Most trouble reports can be classified as originating or terminating service denials. Originating service denial classification would include no dial tone, cannot call out, cannot break dial tone, denied service, or other similar reports. Terminating service denial classification would be reached wrong party, cannot trip ringing, cannot reach party, and other similar reports.

Selection of Test Calls

5.04 Basically, there are three types of test calls that can be initiated from the control unit:

- Terminating test call to either remote unit
- Requesting either remote unit to make a service request call from test line 78
- Causing loop around test call.

5.05 A terminating test call can be made to any line in either remote unit. If it is made to test line 79, the remote unit supplies 1000-Hz tone as an indication of successful completion. If it is made to a customer line, no tone will be returned.

5.06 The control unit can request either remote unit to make a service request call from test line 78. The remote unit also supplies tone to this line.

5.07 The control unit can also cause a loop around connection to be made. Test lines 78 and 79 are connected together in either remote unit. Transmission tests can be made using this connection.

5.08 The remote unit can request the control unit to make a terminating call to test line 79. The control unit supplies tone to this connection.

5.09 Service request calls may be made from the remote units on a service basis by bridging the tip and ring conductors with a telephone set.

Use of Test Lines

5.10 Successful completion of Tests AA, BB, CC, and DD indicate that the concentrator is capable of completing a call on one line only in each control unit group and can test a connection that can be made with each trunk to the test line by selecting each trunk. Other lines may fail due to circuit troubles or apparatus failures when connected to these trunks. The test line may complete a call to a particular trunk, but another line may fail because of bent select fingers. Therefore, test lines may be used to determine if the concentrator system is operative. However, if trouble continues or analysis shows that a trouble is associated with certain lines, it will be necessary to make the associated service test calls.

Note: It is preferable to test all trunks during light load period.

STEP	ACTION	VERIFICATION
AA. Terminating Test Call From Control Unit		
	Note: Refer to 1.09.	
1	At control unit— Plug headset into TL00 or TL10 jack associated with remote unit under test.	
2	Set TST- switch as required to select trunk for use in test.	
3	When trunk is idle (TB- relay not operated)— Operate and hold TST- key.	CC lamp lighted. 1000-Hz tone heard.
4	Within 2 seconds after CC lamp lights— Restore TST- key.	CC lamp extinguished.
	Note: Steps 1 through 4 cause a terminating call to be set up to test line 79 using a selected trunk. Test line 79 provides the 1000-Hz tone. To check other trunks during this call, release the selected trunk (Step 2) by making a terminating test call to an idle customer line (which is not connected to a trunk) using the trunk selected in Step 2. Always disconnect test line 79 when testing is completed.	

STEP	ACTION	VERIFICATION
5	Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
6	Operate and hold TC- key.	
7	Operate and hold TST- key.	Tone silenced. CC lamp lighted.
8	Within 2 seconds after CC lamp lights— Restore TST- key.	
9	Restore TC- key.	
10	Disconnect TC- terminal from S- terminal.	
	Note: Steps 5 through 10 caused the trunk connected to test line 79 to be disconnected and reconnected to a different line. Test line 79 is now free for use with a different trunk.	
11	Repeat Steps 2 through 10 for remaining trunks to be tested.	
12	Remove headset from TL- jack.	

BB. Terminating Test Call From Remote Unit

1	At remote unit— Plug headset into 79 jack.	
2	Place headset in off-hook condition.	
3	Determine which trunk is preselected by observing TK0-7 and TK8-9 relays and using Table D.	
4	Operate and hold TER key.	TCR lamp lighted.
5	Within 2 seconds after TCR lamp lights— Restore TER key.	1000-Hz tone heard. TCR lamp extinguished.
6	Place headset in on-hook condition.	Tone silenced.
	Note: Steps 1 through 5 cause the control unit to set up a terminating test call to test line 79 using the preselected trunk and provides the 1000-Hz tone. To use test line 79 for other trunks, wait until the trunk connected to test line 79 is used on a service call. Then repeat Steps 2 through 6 when a different trunk is preselected.	

STEP	ACTION	VERIFICATION

TABLE D

OPERATED TK- RELAYS AT REMOTE UNIT
TO DETERMINE PRESELECTED TRUNK

OPERATED RELAYS		PRESELECTED TRUNK
TK0 THRU 7	TK8 OR TK9	
0	8	0
0	9	1
1	8	2
1	9	3
2	8	4
2	9	5
3	8	6
3	9	7
4	8	8
4	9	9
5	8	10
5	9	11
6	8	12
6	9	13
7	8	14
7	9	15

7	When hold magnet of test line 79 is released and trunk under test is preselected— Repeat Steps 2 through 6 for remaining trunks to be tested.	
8	Remove headset from 79 jack.	

CC. Service Request Test Call at Control Unit

Note: Refer to 1.09.

1	At control unit— Plug headset into TL01 or TL11 jack associated with remote unit under test.	
2	Place headset in off-hook condition.	
3	Operate and hold SRT- key.	SRC- lamp lighted.
4	Within 2 seconds after SRT- lamp lights— Restore SRT- key.	SRT- lamp extinguished. 1000-Hz tone heard.
5	Place handset in on-hook condition.	Tone silenced.

Note: To make further service request test calls using different trunks, release the trunk

STEP	ACTION	VERIFICATION
	connected to test line 78 and cause the trunk to be connected to an idle line (if a different trunk is required). The trunk can be released by making a terminating test call to an idle line (not connected to a trunk) and selecting the trunk used in Steps 1 through 5 of Test FF. An alternate method is to wait until service calls have caused the trunk to be disconnected from test line 78 and reconnected to another customer line.	
6	When trunk is preselected (Table D)— Repeat Steps 2 through 5 for remaining trunks to be tested.	
7	Remove headset from TL- jack.	

DD. Loop Around Test at Control Unit

Note: Refer to 1.09.

1	At control unit— Plug headset into TL01 or TL11 jack associated with remote unit under test.	
2	When required trunk is preselected (Table D)— Place handset in off-hook condition.	
3	Operate and hold SRT- key.	SRT- lamp lighted.
4	Within 2 seconds after SRT- lamp lights— Restore SRT- key.	SRT- lamp extinguished. 1000-Hz tone heard.
5	Set TST- switch as required to select trunk to be used in test.	
6	When trunk is idle (TB- relay not operated)— Operate and hold TST- key.	CC lamp lighted. Tone silenced.
7	Within 2 seconds after CC lamp lights— Restore TST- key.	CC lamp extinguished. 1000-Hz tone ***not*** heard.
8	Manually operate S- relay.	1000-Hz tone heard.

Note: The 1000-Hz tone heard in Step 8 is transmitted from the control unit over the trunk connected in Step ▶5◀ and is looped back in the remote unit over the trunk selected in Step ▶3.◀ Test line 78 (TL01/TL11 jacks) is now connected to test line 79 (TL00/TL10 jacks) through the remote unit. Transmission

STEP	ACTION	VERIFICATION
	measuring equipment may be connected to TL01/TL11 and TL00/TL10 jacks for transmission measurements. To release trunks connected on this call in order to perform further loop around test calls, refer to Test AA, BB, CC, DD, or FF. A loop around test is accomplished by making terminating test calls to idle lines not connected to trunks and selecting the two trunks used in Steps 1 through 8.	
EE.	**Service Request Call From Lines in Remote Unit**	
	Note: Refer to 1.09.	
1	At remote unit— Place an off-hook signal on line under test using handset.	Dial tone heard.
2	Determine that correct crosspoints are closed.	At control and remote units— Line under test is connected to same trunk.
3	Dial first digit of terminating test line code associated with control unit central office location.	Dial tone silenced. At control unit— TB- relay associated with trunk used in test remains operated.
4	At remote unit— Within 15 seconds after Step 3— Dial remaining digits of terminating test line.	
5	At control unit— Dial associated office code and directory number of line under test.	Busy tone heard.
6	Disconnect call to line under test.	
7	At remote unit— Place on-hook signal on line under test.	At control unit— TB- relay associated with trunk used in test released.
8	Set TST- switch as required to select trunk used with line under test.	
9	Connect TC- terminal to S- terminal of idle line (hold magnet not operated for that line).	
10	Momentarily operate TC- key.	
11	Operate and hold TST- key.	CC lamp lighted.

STEP	ACTION	VERIFICATION
12	Within 2 seconds after CC lamp lights— Restore TST- key.	CC lamp extinguished. Hold magnet associated with line under test released.
13	When trunk to be connected to line under test is preselected (Table D)— Repeat Steps 1 through 12 for remaining trunks to be tested.	

FF. Terminating Call to Remote Unit

Note: Refer to 1.09.

1a	If line under test is connected to a trunk (hold magnet operated for that line)— At control unit— Connect TC- terminal to S- terminal of an idle line (hold magnet not operated for that line).	
2a	Set TST- switch as required to select trunk connected to line under test.	
3a	Operate and hold TC- key.	
4a	Operate and hold TST- key.	CC lamp lighted.
5a	Within 2 seconds after CC lamps light— At same time— Restore TC-, TST- keys.	CC lamp extinguished.
6a	Disconnect TC- terminal from S- terminal.	
7	Connect TC- terminal to S- terminal associated with line under test.	
8	Set TST- switch as required to select trunk under test.	
9	When trunk under test is idle (TB- relay not operated)— Operate and hold TC- key.	
10	Operate and hold TST- key.	CC lamp lighted.
11	Within 2 seconds after CC lamps light— At same time— Restore TC-, TST- keys.	CC lamp extinguished.
12	Disconnect TC- terminal from S- terminal.	

STEP	ACTION	VERIFICATION
13	At remote and control units— Check that line under test is connected to same trunk.	Hold magnet and select magnet indicate the same trunk connected to same line.
14	At control unit— Repeat Steps 2a through 6a.	
15	Repeat Steps 7 through 13 for remaining trunks to be tested with remaining lines to be tested.