E1L-A AND E2L-A AUXILIARY SIGNALING CIRCUITS OUT-OF-SERVICE TESTS USING TESTING CIRCUIT SD-96519-01 OR SD-96519-02

1. GENERAL

1.01 This section describes methods of making out-of-service tests on the E1L-A and E2L-A auxiliary signaling circuit SD-98142-01 or SD-98142-02 using testing circuits SD-96519-01 or SD-96519-02.

1.02 This section is reissued to revise Test E. Test E formerly known as ***Verification of Release Circuit*** is now ***Forward Disconnect Delay Circuit Test.*** This reissue does not affect the Equipment Test List.

1.03 The tests covered are:

1.04 If the requirements of this section cannot be met after readjustment of relays, the unit should be returned to a repair center because of special techniques involved in testing and clearing trouble on some of the components.

1.05 The J94021A (21A) transmission measuring set is referred to in this section as the TMS. An alternative set such as the 13A may be used.

1.06 The DET INPUT switch on the 21A TMS is referred to in this section as the TMS attenuator switch. The specific settings of the TMS attenuator switch are not given in the procedure, unless necessary to prevent overload and possible damage to the instrument. The proper setting will be that which results in an on-scale reading on the TMS meter and will depend upon whether the 21A TMS or another is used and the specific value to be measured.

1.07 The pulse checking test set is referred to in this section as PCTS.

1.08 The J98613AY test panel (SD-96519-01 or SD-96519-02) is referred to in this section as test circuit. KEYERS switch 1 and RECEIVER switch 2 on this panel are referred to as SW1 and SW2, respectively. Jacks and keys mentioned in this section are part of the test circuit unless otherwise specified.

1.09 The volt-ohm-milliammeter is referred to in this section as VOM.

1.10 The tests should be made in the order specified in this section.

1.11 The following designations are used in this section to relate to groups of units:

E1L-A	Applies to all E1L-A units without dash numbers.

E1L-A-( ) Applies to all E1L-A units with dash numbers.

E2L-A Applies to all E2L-A units without dash numbers.

E2L-A-( ) Applies to all E2L-A units with dash numbers.

1.12 Calibration of the TMS is covered in the 103 division of the plant series sections.

1.13 ***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. APPARATUS

2.01 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.

2.02 Test circuit, J98613AY (SD-96519-01 or (SD-96519-02), including folding test fixture.

2.03 The J94021A (21A) TMS. (or equivalent)

2.04 Pulse checking test set, J94723A (SD-96362-01).

2.05 VOM KS-14510.

2.06 2B test set, J94730B (SD-56134-02) W option or later includes power cords and patch cords for E and M leads (2P1D and 2P3B cords).

2.07 Monitoring cord, P8E, 12 feet long, equipped with one KS-8585, L10 plug and one KS-8586.

2.08 Patching cord, P3E cord, 3 feet long, equipped with two 310 plugs (3P7B cord assembly).

2.09 Testing cord, for 21A TMS, P3N cord 6 feet long equipped with 241A plug and 310 plug (3P17B cord assembly); for 13A TMS, W2DL cord 6 feet long equipped with a 310 plug and two 35 cord tips (2W42A cord assembly).

TABLE A

APPARATUS	TESTS				
	A	B	C	D	E
Test Circuit (2.02)	1	1	1	1	1
TMS (2.03)	1			1	
PCTS (2.04)		1			
VOM (2.05)			1		1
2B Test Set (2.06)					1
Cord (2.07)		1	1	1	
Cord (2.08)		1	1	1	
Cord (2.09)	1			1	
Cord (2.10)		1			
Cord (2.11)			1		
Cord (2.12)					1
Cord (2.13)					1
Tool (2.14)	1	1	1	1	1
Blocking tools (2.15)	✓	✓	✓	✓	✓

✓ As required

2.10 Testing cord, W3M, 6 feet long, equipped with a 310 plug and 360 A, B, C tools (3W4A cord assembly).

2.11 Testing cord, P2CH cord, 8 feet long, equipped with one 310 plug.

2.12 Testing cord, P2A, 6 feet long, equipped with two 347A plugs (2P1D cord assembly).

2.13 Testing cord, 893, 6 feet long, equipped with two 360A tools (1W13B cord assembly), and a 365 (test connector) tool connected to one end.

2.14 The 725A tool is used in prying loose the auxiliary signaling unit from connectors.

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

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	At test circuit— Set all keys to normal position before starting any tests. ***Note:*** Twist keys in the test circuit are operated when the white line is in the vertical position and normal when the white line is in the horizontal position.	
2	The TMS must be known to be correctly calibrated.	
3	Obtain release of signaling circuit in accordance with approved procedures.	
4	Remove signal circuit from its in-service position, using 725A tool, as shown in Fig. 1 or Fig. 2.	
5	Plug signaling unit into folding test fixture.	

4. METHOD

STEP	ACTION	VERIFICATION
A. Transmitted Tone Level		
6	Using appropriate cord, (see 2.08) connect DET IN jack of TMS to TMS jack of test circuit.	
7	Set attenuator switch of TMS to 25 or 30.	
8	Set SW1 to position 3, SW2 to position 1.	
9	Simultaneously press TMS A, TMS B keys.	TMS indicates between -28.0 and -31.0 dB.
10	Release TMS A, TMS B keys.	
11	Block CT relay nonoperated.	
12	Simultaneously press TMS A, TMS B keys.	TMS indicates less power than -45 dBm.
13	Release TMS A, TMS B keys.	
14	Remove blocking tool from CT relay.	CT relay operates.

STEP	ACTION	VERIFICATION

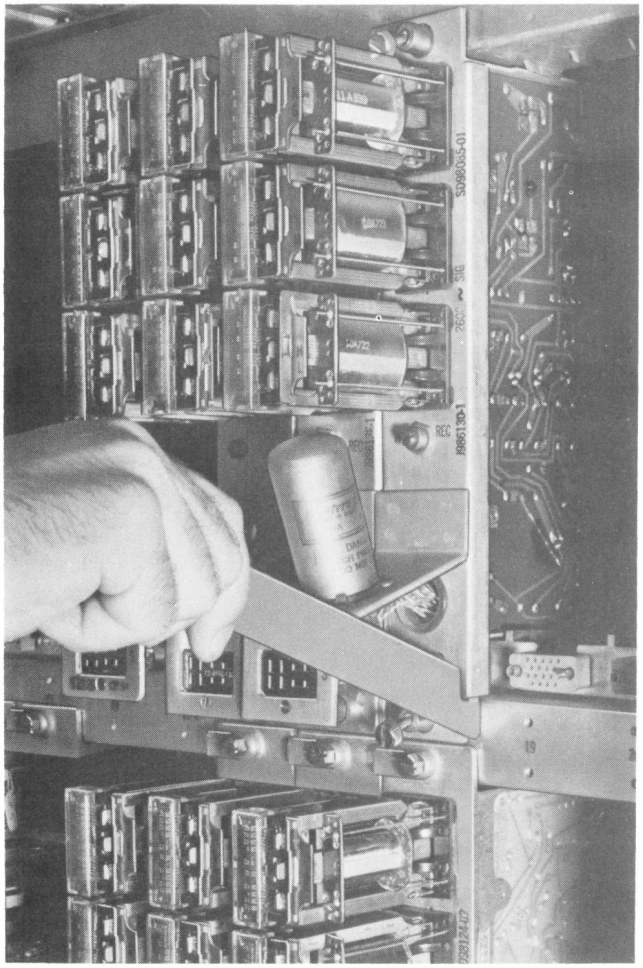

Fig. 1—Method of Removal of Fabricated Chassis

15a If no other tests are to be made—
Remove all cords, restore all keys to normal, return signaling unit to service or spare position.

B. Oscillator Output

Note: This test applies to E1L-A units only.

6 At test circuit—
Set SW1 to position 7, SW2 to position 4.

STEP	ACTION	VERIFICATION

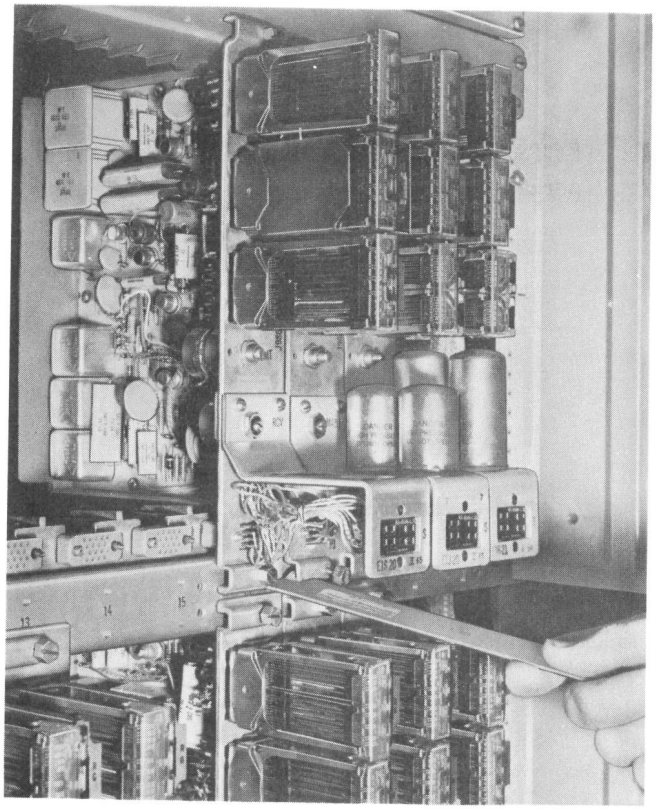

Fig. 2—Method of Removal of Die Cast Chassis

7	Connect S socket of signaling unit to S1 connector on test panel using P8E monitoring cord.	
8	Connect –48 volts on tip conductor and ground on sleeve conductor, to BAT G jack of PCTS with 3W4A cord.	
9	Connect P jack on PCTS to E & M jack on test panel using 3P7B cord.	
10	Set SCALE SWITCH on PCTS to 40.	
11	Operate key on PCTS to PPS. ***Note:*** There is interaction between the TM1 and TM2 potentiometers; therefore, repetition of Steps 12a and 14b may be necessary until the requirements are met.	PCTS meter indicates between 38.5 and 40.0 PPS.

STEP	ACTION	VERIFICATION
12a	If requirement of Step 9 is not met— Adjust TM1 potentiometer on signaling unit to obtain reading of 39.5 PPS, or as close to 39.5 PPS as possible, on PCTS meter.	
13	Operate key on PCTS to PCB.	PCTS meter indicates between 45 and 55 percent break.
14b	If requirement of Step 11 is not met— Adjust TM2 potentiometer to obtain reading of 50 percent break or as close to 50 as possible, on PCTS meter.	
15	Repeat Steps 11 through 14b until adjustments of Steps 12a and 14b are met.	
16c	If no other tests are to be made— Remove all cords, restore all keys to normal, return signaling unit to service or spare position.	
C. Ringing Detector Action		
6	At test circuit— Set SW1 to position 7, SW2 to position 4.	
7a	If testing E1L-A signaling unit— Set VOM switch to 60-Vac scale.	
8b	If testing E1L-A-( ), E2L-A-( ) signaling units— Set VOM switch to 60-Vac scale.	
9	Patch between SENS 1 jack and VOM using P2CH cord.	
10	Connect S socket on signaling unit to S1 connector on test panel using P8E cord. ***Caution: To avoid blowing the 20~ fuse when the 20~ P key is not provided, follow sequence exactly as stated. Never leave one end of a cord hanging loose while the other end is plugged into the 20~ R jack, because the loose end may touch frame ground. Also be sure to hold the plugs of the cord by insulating shell to avoid shock when inserting into or removing from the 20~ R jack.***	
11	Patch 3P7B cord first from 2W or EQ RCV jack and then to 20~ R jack. On test panel,	If testing E1L-A signaling unit— VOM meter needle vibrates within 10- to

STEP	ACTION	VERIFICATION
	depress 20~ P key when provided.	20-volt range. If testing E1L-A-( ) or E2L-A-( ) signaling unit— VOM indicates between 20 and 40 volts.
12	Remove end of 3P7B cord from 20~ R jack first, then remove cord from 2W or EQ RCV jack.	
13a	If no other tests are to be made— Remove all cords, restore all keys to normal, return signaling unit to service or spare position.	

D. Transmission Test

Note: This test applies to E1L-A-( ) and E2L-A-( ) units only.

6	Set attenuator switch of TMS to 0.	
7	Using appropriate cord (see 2.09), connect DET IN jack on TMS to AMPL OUT jack of test circuit.	
8	At test panel— Set SW1 to position 2, set SW2 to position 2.	TMS indicates 0 dB.
9a	If requirement of Step 9 is not met— Adjust gain control of MON AMPL on test panel to obtain a reading of 0 dB on TMS.	
10	Disconnect TMS from AMPL OUT jack, connect TMS to LINE RCV jack.	
11	Block CT relay released, block S1 relay operated.	
12	Connect S socket on signaling unit to S1 connector on test panel using P8E cord.	
13	Using 3P7B cord connect AMPL OUT jack to 2W or EQ RCV jack.	TMS indicates between –0.2 and +0.2 dB.
14	Remove blocking tool from CT relay and S1 relay.	
15	Remove all cords, restore all switches and keys to normal.	

STEP	ACTION	VERIFICATION
E. Forward Disconnect Delay Circuit Test		
6	On 2B test set— Set all keys to normal position.	
7	Set SCALE SEL switch to PPS.	
8	Plug power cords of 2B test set into A and B jacks of test circuit.	After 1 minute, PULSES PER SECOND meter indicates other than 0.
9	Operate CONT PLS key to DIAL PLS.	PERCENT BREAK meter indicates 0 on ***black*** scale. See Step 10.
10a	If requirement of Step 9 is not met— Adjust pointer adjustment screw of PERCENT BREAK meter to obtain 0 reading.	
11	Insert 258D plug into P jack.	PERCENT BREAK meter indicates 100 on ***black*** scale. See Step 12.
12b	If requirement of Step 11 is not met— Unlock CAL % BK control, adjust to obtain reading of 100 on ***black*** scale of PERCENT BREAK meter and relock control taking care not to change 100 reading.	
13	Remove 258D plug.	
14	Restore CONT PLS key to normal. ***Note:*** Repeat Steps 9 to 13 if Test E extends beyond 30 minutes.	
15	Block CT relay on E1L-A or E2L-A unit non-operated.	
16	Set selector switch on the VOM to 1.2 ma.	
17	Connect negative test lead of VOM to pin number 4 of male octal GS plug on E1L-A or E21-A unit; connect positive lead of VOM to ground.	VOM indicates between .85 and 1.2 ma.
18	Remove blocking tool from CT relay.	
19	Set selector switch on VOM to .06 ma. ***Note:*** Leave VOM connected while performing remainder of the steps in this test.	VOM indicates less than .05 ma.

STEP	ACTION	VERIFICATION
20	Insert one end of 2P1D cord to M jack of 2B test set.	
21	Connect 365 tool on 1W13B cord to tip of 2P1D cord (other end of cord from Step 20).	
22	Connect 360A tool on 1W13B cord to pin number 1 of male octal GS plug on E1L-A or E2L-A unit.	
23	On 2B test set— Operate TWD-L key to OFF-HOOK.	VOM indicates less than .05 ma.
24	Set selector switch on VOM to 1.2 ma.	
25	Block S1 relay operated, and CT relay non-operated in E1L-A or E2L-A unit.	VOM indicates between .85 and 1.2 ma.
26	At 2B test set— Restore TWD-L key to normal.	
27	Rotate SCALE SEL switch to PPS.	
28	Adjust the ADJ PPS control to obtain 3 PPS on PULSES PER SECOND meter.	
29	Rotate ADJ % BK switch to M.	
30	Adjust ADJ % BK potentiometer to obtain reading of 32 on ***black*** scale of PERCENT BREAK meter.	
31	Operate PLS key to LINE.	VOM meter pulsates.
32	Restore PLS key to normal.	
33	Rotate ADJ % BK switch to L.	
34	Adjust ADJ % BK control to obtain reading of 70 on ***black*** scale of PERCENT BREAK meter.	
35	Operate PLS key to LINE.	
36	Set selector switch on VOM to .06 ma.	VOM indicates less than .05 ma and does not pulsate.
37	Remove all cords, restore all keys to normal, and return auxiliary signaling units to bay position.	