E1S-A AND E2S-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 E1S-A and E2S-A auxiliary signaling circuits SD-98140-01 or SD-98140-02 using testing circuit SD-96519-01 or SD-96519-02.

1.02 This section is reissued:

(a) To include the E2S-A unit

(b) To add Fig. 2.

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

1.03 The tests covered are:

A. Operation of Amplifier and Frequency Detector: This test checks the signal amplifier and frequency detectors for proper operation on 20- and 40-Hz signals.

B. Transmission Test: This test checks the voice path.

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 components.

1.05 The 13A or the J94021A (21A) transmission measuring set is referred to in this section as the TMS.

1.06 The dial switch on the 13A TMS or 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 13A or 21A TMS is used and the specific value to be measured.

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

1.08 The vacuum tube voltmeter is referred to in this section as VTVM.

1.09 The oscillator is referred to in this section as OSC.

1.10 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.

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

E1S-A-( )	applies to all E1S-A units with dash numbers.
E2S-A-( )	applies to all E2S-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 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

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.

TABLE A

APPARATUS	TESTS	
	A	B
Test Circuit (2.02)	1	1
VOM (2.03)	1	–
VTVM (2.04)	1	–
OSC (2.05)	1	–
TMS (2.06)	–	1
Cord (2.07)	1	–
Cord (2.08)	1	–
Cord (2.09)	1	–
Cord (2.10)	1	1
Cord (2.11)	1	–
Cord (2.12)	–	1
Cord (2.13)	–	1
Tool (2.14)	1	1
Blocking Tools (2.15)	As required	

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

2.03 VOM, volt-ohm-milliammeter, KS-14510 L1, or equivalent.

2.04 VTVM, Hewlett-Packard 400D vacuum tube voltmeter, or equivalent.

2.05 OSC, Hewlett-Packard 200CD wide range oscillator, or equivalent, providing 20-Hz and 40-Hz outputs at 25 volts rms.

2.06 The 13A or the J94021A (21A) transmission measuring set (TMS).

2.07 Testing cord for VOM, P2CH cord, 6 feet long, equipped with 310 plug and two KS-14530 connectors.

2.08 Testing cord, P2BP cord, 3 feet long, equipped with two 274ND plugs.

2.09 Testing cord for OSC, P2CL cord, 3 feet long, equipped with a 310 plug and two GRIP-RITE plugs.

2.10 Monitoring cord, P8E cord, 12 feet long, equipped with one KS-8585 L10 plug and one KS-8586 L7 socket.

2.11 Testing cord, W1AP cord, 1 foot long, equipped with number 30 Mueller Electric Co. Mini-Gator clips at each end.

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

2.13 Patching cord, P3E cord, 6 feet long, equipped with two 310 plugs (3P7A cord).

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

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

3. METHOD

STEP	ACTION	VERIFICATION
	A. Operation of Amplifier and Frequency Detector	
1	Restore all keys to the normal position before starting tests.	

STEP	ACTION	VERIFICATION
	Note: The 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	Obtain release of signaling unit in accordance with approved procedures.	
3	Remove signaling unit from its service position, using 725A tool, as shown in Fig. 1 or 2.	
4	Plug signaling unit into folding test fixture.	
5	Set VOM switch for 3 Vdc.	
6	Plug power cords of VTVM and OSC into convenient outlets.	
7	Operate VTVM and OSC OFF-ON switches to ON and allow a warmup period of approximately 5 minutes.	
8	Set OSC FREQUENCY dial for either 20-Hz or 40-Hz output depending on option of equipment under test.	
9	Set VTVM to 30-volt scale.	
10	Connect OSC output to VTVM using P2BP cord, place strap between G terminal and center terminal on OSC.	
11	Adjust OSC AMPLITUDE dial for 21 volts.	VTVM reads 21 volts.
12	Remove connection between VTVM and OSC, being careful not to disturb dial settings on OSC.	
13	Set SW1 to position 7, SW2 to position 4.	
14	Patch P2CL cord between OSC and LINE XMT jack on test circuit connecting ring conductor to G terminal on OSC.	
15a	If testing E1S-A-( ), E2S-A-( ) signaling units—Using W1AP cord, connect pin 6 to pin 7 of PLR plug on signaling unit.	
16	Patch P8E cord from S socket on signaling unit to S1 connector on test circuit.	If testing E1S-A signaling unit—RV relay is operated. If testing E1S-A-( ), E2S-A-( ) signaling units—GS relay is operated.

STEP	ACTION	VERIFICATION
17a	Connect P2CH cord between LINE RCV jack on test circuit and VOM.	VOM reads at least 0.8 Vdc.
18a	Remove patch cord from VOM and LINE RCV jack.	
19b	If testing E1S-A signaling unit arranged to receive 20 Hz— Connect P2CH cord between E & M jack on test circuit and VOM. ***Note:*** In testing E1S-A signaling units check wiring on rear of GS relay— Units arranged to receive 20 Hz will have a strap between fixed contacts 8 and 10 of GS relay. Units arranged to receive 40 Hz will have a strap between fixed contacts 6 and 8 of GS relay.	VOM reads at least 0.8 Vdc.
20b	Remove plug from E&M jack and connect to LINE RCV jack.	VOM reads less than 0.5 Vdc.
21b	Remove patch cord from VOM and LINE RCV jack on test circuit.	
22c	If testing E1S-A signaling unit arranged to receive 40 Hz— Connect P2CH cord between LINE RCV jack on test circuit and VOM.	VOM reads at least 0.8 Vdc.
23c	Remove plug from LINE RCV jack and connect to E & M jack.	VOM reads less than 0.5 Vdc.
24c	Remove patch cord from VOM and E & M jack on test circuit.	
25	Remove patch cord connected to LINE XMT jack on test circuit.	If testing E1S-A signaling unit— RV relay is released. If testing E1S-A-( ), E2S-A-( ) signaling unit— GS relay is released.
26d	If no other tests are to be made— Remove all cords, restore all switches to normal, return signaling unit to spare or service position.	

B. Transmission Test

Note: This test applies to E1S-A-( ), E2S-A-( ) units ***only.***

1 Restore all keys to the normal position before starting tests.

STEP	ACTION	VERIFICATION

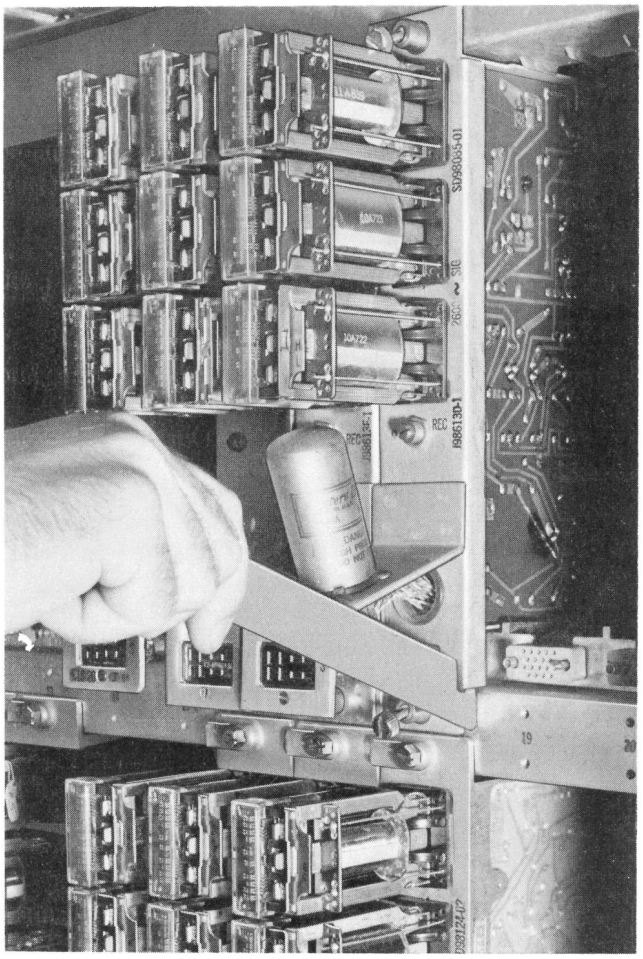

Fig. 1—Method of Removal of Fabricated Chassis

2 Obtain release of signaling unit in accordance with approved procedures.

3 Remove signaling unit from its service position, using 725A tool, as shown in Fig. 1 or 2.

4 Plug signaling unit into folding test fixture.

5 Set attenuator switch of TMS to 0.

6 Connect 2W42A cord to IN terminals of 13A TMS or 241A plug of 3P17B cord to DET IN jack of 21A TMS.

7 Connect TMS cord to AMP OUT jack of test circuit.

STEP	ACTION	VERIFICATION

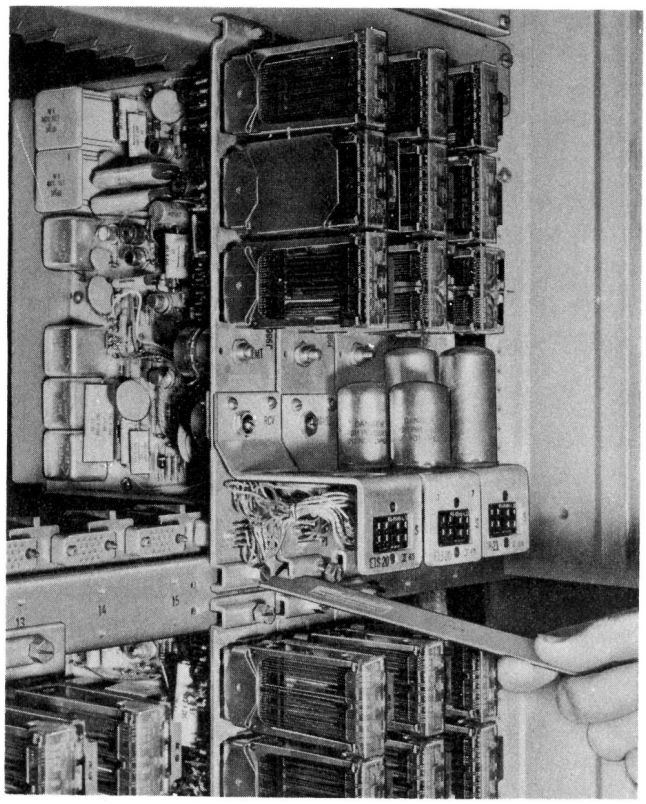

Fig. 2—Method of Removal of Die-Cast Chassis

8	Set SW1 to position 2, set SW2 to position 2.	TMS reads 0 dB.
9a	If requirement of Step 8 is not met, adjust GAIN control of MON AMPL to obtain reading of 0 dB.	
10	Disconnect TMS from AMP OUT jack, connect TMS to E & M jack.	
11	Patch between S socket on signaling unit and S1 connector on test circuit using P8E cord.	
12	Patch between 2W or EQ RCV jack and AMP OUT jack, using 3P7A cord.	TMS reads 0 dB ±0.2 dB.
13	Block GS relay operated.	TMS reads –45 dBm or less power.
14	Remove blocking tool from GS relay.	
15	Remove all cords, restore all switches to normal, return signaling unit to spare or service position.	