

EMERGENCY MANUAL LINE CIRCUIT

SD-1A156-01 AND SD-1A243-01

TESTS

2-WIRE NO. 1 ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section describes a method of testing the emergency manual line circuits (EMLC) SD-1A156-01 and SD-1A243-01 in a 2-wire No. 1 Electronic Switching System (ESS). Upon receiving a transfer signal, these circuits connect associated customer lines to a switchboard.

1.02 This section is reissued to change Test A.

This reissue does not affect Equipment Test Lists.

1.03 The tests cover the following features.

A. *Emergency Manual Transfer Actions:*

This test checks the operation of the EMLC transfer key at the master control center or at some control point. This test further checks that appropriate lamp and alarm signals are generated to indicate that an EMLC transfer has taken place.

B. *Transfer of Individual Circuits:* This test checks that a transfer cannot occur if the customer line is off-hook and that the associated trunk, if one is provided, is busy unless an option to cancel this feature is provided.

C. *Busy Test of Associated Trunk:* This test checks that the associated trunk tests busy to the No. 1 ESS while the EMLC is in the transfer state.

D. *Customer Call to Operator and Operator*

Call to Customer: This test checks supervisory and ringing features between the customer line and the switchboard. It also checks that the line tests busy to the No. 1 ESS when a connection exists between the operator and the EMLC.

E. *Dial Incoming Calls:* This test checks that a call to an idle transferred line can be completed through No. 1 ESS and that the operator can monitor such a call. It checks that calls through No. 1 ESS will not disconnect falsely during the silent interval of the ringing cycle. It also checks that the EMLC will revert to the transfer state after either party disconnects on a call through No. 1 ESS.

F. *Power Cross Detection:* This test checks that when a cross to a power line or foreign voltage is detected by the EMLC, the following occurs:

- (a) Visual and audible alarms are given
- (b) The customer line will test busy to incoming calls through No. 1 ESS
- (c) Ringing current cannot be connected to the customer line.

1.04 Tests A, D, E, and F require action and verification at the distant DSA or toll switchboard.

Caution: Because customer service is affected by the transfer, before performing these tests, any customer line on which service cannot be temporarily interrupted should be given emergency service in accordance with local practices.

1.05 These tests should always be made during periods of light traffic.

1.06 The trunk and line test panel is referred to in this section as TLTP. The supplementary trunk test panel is referred to as STTP.

1.07 Emergency manual line circuit is referred to in this section as EMLC.

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1.08 Lettered Steps: A letter, a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required, depending upon local conditions. The condition under which a series of lettered steps should be carried out 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 for each apparatus item are covered in the paragraph indicated by the number in parentheses.

TABLE A

APPARATUS	TESTS					
	A	B	C	D	E	F
Test Set (2.02)	—	1	—	1	1	1
Tools (2.03)	*	—	*	*	—	—
411A Tool	1	—	—	—	—	—
651D Tool	—	—	—	1	—	—
639A Tool	—	—	—	2	—	—
Cord (2.04)	—	3	1	1	1	2
Resistor (2.05)	—	1	—	—	—	—
Display Panel (2.06)	1	—	—	—	1	—
Test Panel (2.07)	—	1	1	1	1	1

* As required

2.02 No. 1011G dial hand test set equipped with a No. 2 W41A cord assembly consisting of a W2CJ cord, a 471A jack, a 360A and a 360B tool, and two 624B (connector) tools.

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

2.04 Testing cord, No. 893 cord, 3 feet long, equipped with two No. 360A tools (No. 1W13A cord) and two 624B tools.

2.05 One 144E resistor, 4480 ohms.

2.06 Master control center control and display circuit, SD-1A122-01, or SD-1A122-02.

2.07 Master control center trunk and line test circuit, SD-1A132-01.

3. PREPARATION

STEP	ACTION	VERIFICATION
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Tests B, D, E, F

1 Operate switch of hand test set to MON.

2a If SD-1A156-01 is used—
At EMLC—

Ringing, conversation, dial tone are not heard.

STEP	ACTION	VERIFICATION
	Connect hand test set to terminals 41 and 31 of unit terminal strip A (TSA).	Note: If any of these signals are present or an attempt to use the line occurs, discontinue test until line is idle.
3b	If SD-1A243-01 is used— At EMLC— Connect hand test set to terminals 51 and 41 of unit terminal strip A (TSA).	Same as Step 2a.
4a	At TLTP or STTP— Make trunk associated with EMLC busy.	At MCC TTY— A TL01 output message is printed. Refer to output message manual.
5	Insulate break contact No. 1 of the S1 relay.	
	Caution: <i>When insulating movable springs of wire-spring relays, use care not to dislodge the movable spring from the groove of the comb.</i>	

4. METHOD

STEP	ACTION	VERIFICATION
A. Transfer Actions		
1	At EMLC— Block nonoperated all A transfer relays of circuits in all groups.	
	Note: Keys on the alarm, display, and control panel are labeled as used for CTX-4 and later generic programs. For CTX-3 and earlier generic programs, use ENABLE key and lamp instead of ENABLE EMERGENCY MANUAL SERVICE key and lamp; use EMERGENCY TRANSFER key and lamp instead of EMERGENCY MANUAL SERVICE key and lamp.	
2c	If emergency transfer is to be activated at alarm, display, and control panel— Operate TRAFFIC CONTROL—ENABLE EMERGENCY MANUAL SERVICE key.	ENABLE EMERGENCY MANUAL SERVICE lamp (amber) is lighted.
3c	Operate EMERGENCY MANUAL SERVICE key.	◆EMERGENCY MANUAL SERVICE lamp (red) is lighted.◆
4d	If emergency transfer is to be activated at control point other than alarm, display, and control panel—	EMERGENCY MANUAL SERVICE lamp (red) is lighted.

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STEP	ACTION	VERIFICATION
	Operate EMERGENCY MANUAL SERVICE key on alarm, display, and control panel.	
5	At EMLC— Test A relays for magnetization using 411A tool.	Relay E is operated and all A relays are energized.
6	At alarm, display, and control panel— Restore EMERGENCY MANUAL SERVICE key to normal.	EMERGENCY MANUAL SERVICE lamp (red) is extinguished.
7	At EMLC— Test A relays for magnetization using 411A tool.	Relay E is released and all A relays are deenergized.
8	Remove blocking tools from A relays.	
9c	If the emergency transfer is to be activated at alarm, display, and control panel— Restore TRAFFIC CONTROL—ENABLE EMERGENCY MANUAL SERVICE key.	ENABLE EMERGENCY MANUAL SERVICE lamp (amber) is extinguished.

B. Transfer of Individual Circuits

6	Operate switch of hand test set to TALK.	Dial tone is heard.
7	At EMLC— Momentarily operate A relay electrically (apply ground to 1L winding terminal using the 1W13A cord).	Dial tone is not interrupted.
8	Operate switch of hand test set to MON.	Dial tone stops.

Note: Step 8 must be done less than 15 seconds after Step 6 to prevent routing to permanent signal.

Emergency Line Circuits Not Having Associated Trunks

9	At EMLC— Momentarily operate A relay electrically.	T relay operates momentarily.
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Emergency Line Circuits Not Arranged to Transfer if Associated Trunk Is Busy

10e	If associated trunk is arranged for reverse battery supervision— Connect 4500-ohm resistor across terminals 43 and 33 of unit TSA using two 1W13A cords.	
11e	Momentarily operate A relay electrically.	D relay operates momentarily and T1 relay does not operate.

STEP	ACTION	VERIFICATION
12e	Disconnect 4500-ohm resistor from terminal 43 and 33 of unit TSA.	
13f	If associated trunk is arranged for E and M lead supervision— Apply ground to terminal 23 of unit TSA using 1W13A cord.	
14f	Momentarily operate A relay electrically.	M relay operates momentarily and T1 relay does not operate.
15f	Disconnect ground from terminal 23 of unit TSA.	

Emergency Line Circuits Arranged to Transfer If Associated Trunk Is Busy

16e	If associated trunk is arranged for reverse battery supervision— Connect 4500-ohm resistor across terminals 43 and 33 of unit TSA using two 1W13A cords.	
17e	Momentarily operate A relay electrically.	D and T1 relays operate momentarily.
18e	Disconnect 4500-ohm resistor from terminals 43 and 33 of unit TSA.	
19f	If associated trunk is arranged for E and M lead supervision— Apply ground to terminal 23 of unit TSA using 1W13A cord.	
20f	Momentarily operate A relay electrically.	M and T1 relays operate momentarily.
21f	Disconnect ground from terminal 23 of unit TSA.	
22g	If no further tests are to be made— Remove the insulator from 1 break contact of the S1 relay.	
23g	Disconnect hand test set.	
24g	At TLTP or STTP— Restore trunk to service.	At MCC TTY— A TL01 output message is printed.

C. Busy Test of Associated Trunk

1	At EMLC— Operate A relay electrically using 1W13A cord.	T1 relay operates.
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STEP	ACTION	VERIFICATION
2	At the TLTP or STTP— Determine busy-idle state of associated trunk using TNN of associated trunk.	EQPT ST lamp flashes at 60 ipm.
3	At EMLC— Disconnect operating ground from A relay.	
D. Customer Call to Operator and Operator Call to Customer		
6a	If SD-1A156-01 is used— At EMLC— Operate A relay electrically using 1W13A cord.	T1 relay operates.
7b	If SD-1A243-01 is used— At EMLC— Operate A relay electrically using 1W13A cord.	T relay operates.
EMLC Arranged for Connection to Loop Start Lines		
8	Operate switch of the hand test set to TALK.	At switchboard— Call is answered.
9	Operate switch of hand test set several times from TALK to MON.	Cord supervisory lamp flashes in response.
EMLC Arranged for Connection to Ground Start Lines		
10a	If SD-1A156-01 is used— At EMLC— Remove lead of hand test set from terminal 41 of unit TSA and connect to terminal 18.	
11b	If SD-1A243-01 is used— At EMLC— Remove lead of hand test set from terminal 51 of unit TSA and connect to terminal 18.	
12	Operate switch of hand test set to TALK.	At switchboard— Call is answered.
13a	If SD-1A156-01 is used— At EMLC— When call is answered— Remove lead from terminal 18 of unit TSA and connect to terminal 41.	Cord supervisory lamp may flicker but remains dark after connection is transferred.
14b	If SD-1A243-01 is used— At EMLC— When call is answered by operator— Remove lead from terminal 18 of unit TSA and connect to terminal 51.	At switchboard— Cord supervisory lamp is extinguished after connection is transferred.

STEP	ACTION	VERIFICATION
15	Operate switch of hand test set from TALK to MON to TALK.	Cord supervisory lamp flashes once.
16	Ask operator to ring back in 1 minute.	
17	Operate switch of hand test set to MON.	
18a	If SD-1A156-01 is used— At EMLC— Disconnect hand test set from terminals 41 and 31 of unit TSA.	
19a	Remove 524B connectors from 360A tools of hand test set and insert 639A tool in each 360A tool.	
20a	Insert 639A tools in 651A tool so that a connection is made to fixed contacts 10 and 11 of RC relay.	
21a	Insulate make contacts 1 and 2 of T1 relay..	
22b	If SD-1A243-01 is used— At EMLC— Insulate make contacts 4 and 6 of the T relay.	
23a	If SD-1A156-01 is used— At EMLC— Listen for 20-cycle ringing.	Ringing current heard in hand test set receiver. <i>Note:</i> For each pull of the ringing key, ringing is applied for approximately 1-1/2 seconds.
24b	If SD-1A243-01 is used— At EMLC— Listen for 20-cycle ringing.	Ringing current heard in hand test set receiver.
25	Operate switch of hand test set to TALK and ask operator to leave cord in trunk jack.	
26	At TLTP— Using one of the dialing lines— Call directory number of EMLC.	Busy-back tone is heard.
27	Disconnect call.	
28	Operate hand test set switch from TALK to MON to TALK and ask operator to disconnect.	
29a	If SD-1A156-01 is used— At EMLC— Remove insulators from T1 relays.	

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STEP	ACTION	VERIFICATION
30b	If SD-1A243-01 is used— At EMLC— Remove insulator from T relay.	
31	At EMLC— Remove test ground from A relay.	
32g	If no further tests are to be made— At EMLC— Remove insulator from 1 break contact of S1 relay.	
33g	Disconnect hand test set.	
34g	At TLTP or STTP— Restore trunk to service.	At MCC TTY— A TL01 output message is printed.

E. Dial Incoming Calls

Note: If it is desired to prevent ringing the customer, insulate the following contacts. If SD-1A156-01 is used, insulate 1 and 2 break contacts of T1 relay; or if SD-1A243-01 is used, insulate 4 and 6 break contacts of T relay. When these contacts are insulated, ringing current will not be heard in the hand test set receiver and conversation is not possible between EMLC and dialing line.

6	At EMLC— Operate A relay electrically using a 1W13A cord.	
7a	If SD-1A156-01 is used— At TLTP— Using one of the dialing lines— Call directory number of customer assigned to EMLC.	Audible ringing tone is heard in receiver of position telephone set. At EMLC— T1 relay releases. Ringing current is heard in receiver of position telephone set.
8b	If SD-1A243-01 is used— At TLTP— Using one of the dialing lines— Call directory number of customer assigned to EMLC.	Audible ringing tone is heard in receiver of position telephone set. At EMLC— T relay releases. Ringing current is heard in hand test set receiver.
9	At EMLC— Operate hand test set switch to TALK.	Ringing stops. Conversation is possible between EMLC and dialing line.

STEP	ACTION	VERIFICATION
10	At EMLC— Manually operate and release L1 relay several times.	Operator answers.
11	Ask operator to disconnect.	Conversation is still possible between EMLC and dialing line.
12	Disconnect call on dialing line.	12 seconds after disconnect, operator answers.
13	Ask operator to disconnect.	
14	Operate hand test set switch to MON.	
15a	If SD-1A156-01 is used— At TLTP— Using one of the dialing lines— Call directory number of customer assigned to EMLC.	Audible ringing tone is heard in receiver of position telephone set. At EMLC— T1 relay releases. Ringing current is heard in hand test set receiver.
16b	If SD-1A243-01 is used— At TLTP— Using one of the dialing lines— Call directory number of customer assigned to EMLC.	Audible ringing tone is heard in receiver of position telephone set. At EMLC— T relay releases. Ringing current is heard in hand test set receiver.
17a	If SD-1A156-01 is used— At TLTP— During the first spurt of audible ringing tone— Disconnect dialing line.	At EMLC— 10 to 18 seconds after disconnect— T1 relay operates.
18b	If SD-1A243-01 is used— At TLTP— During first spurt of audible ringing tone— Disconnect dialing line.	At EMLC— 10 to 18 seconds after disconnect— T relay operates.
19g	If no further tests are to be made— At EMLC— Remove insulator from 1 break contact of S1 relay.	
20g	Disconnect hand test set.	
21g	At TLTP or STTP— Restore trunk to service.	At MCC TTY— A TL01 output message is printed.
F. Power Cross Detection		
6a	If SD-1A156-01 is used— At EMLC— Operate A relay electrically using 1W13A cord.	T1 relay operates.

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STEP	ACTION	VERIFICATION
7b	If SD-1A243-01 is used— At EMLC— Operate A relay electrically using 1W13A cord.	T relay operates.
8	Electrically operate EM relay by using 1W13A cord to apply ground to 2U winding terminal.	At alarm, display, and control panel— MAJOR lamp (red) is lighted. Audible major alarm sounds. EM lamp of defective EMLC lights.
9	At alarm, display, and control panel— Operate ALM RLS key.	MAJOR lamp is extinguished. Major alarm is silenced. EM lamp of defective EMLC remains lighted until trouble is corrected.
10	At TLTP— Using a dialing line— Call directory number of EMLC.	Busy-back tone is heard.
11	Disconnect call on dialing line.	
12	Operate switch on hand test set to TALK.	Operator answers.
13	Request operator to ring back on EMLC when a disconnect is received.	
14	Operate switch on hand test set to MON.	Operator sees disconnect and rings back. Ringing current is not heard in hand test set receiver.
15	Operate switch on hand test set to TALK.	Operator answers.
16	Request operator to disconnect.	
17	At EMLC— Remove operating ground from 2U winding terminal of EM relay.	
18c	If no further tests are to be made— At EMLC— Remove insulator from break contact No. 1 of S1 relay.	
19c	Disconnect hand test set.	
20c	At TLTP or STTP— Restore trunk to service.	At MCC TTY— A TL01 output message is printed.