

**LINE CONCENTRATOR ASSOCIATED WITH 520-TYPE PBX**  
**CONTROLLER CIRCUIT TESTS**  
**USING TEST CIRCUIT SD-98067-01**  
**EMERGENCY REPORTING SYSTEM**

**1. GENERAL**

**1.01** This section describes a method of testing features of the controller circuit, not covered by the overall operating tests of Section 067-302-501. Miscellaneous tests which are made without the test circuit are also included.

**1.02** This section is reissued to bring it up to date with latest equipment changes. Since this issue constitutes a general revision, arrows ordinarily used to indicate changes are omitted.

**1.03** This issue is based on the following drawings:

SD-98057-01, Issue 12AC

SD-98067-01, Issue 19AR.

If this section is to be used with equipment or apparatus reflecting later issues of the drawings, reference should be made to the CDs and SDs to determine the extent of the changes and the manner in which the section may be affected.

**1.04** The tests covered are:

**A. Line Selection Chain:** This test checks the selection and control features of the line group and unit selection chains.

**B. Trunk Selection Chain:** This test checks the selection and control features of trunk group selection chains. Line and trunk selection reversal control is checked in connection with a control trunk group.

**C. First Trial Failure:** This test checks the short time-out circuit guarding the four basic controller functions: line selection, line connection to controller, line check and selective routing, and trunk selection.

**D. Second Trial Failure:** This test checks the action taken by the controller when two successive trial failures are encountered.

**E. Master Time-out:** This test checks the master time-out feature in the controller. Reversal of all selection chains is checked after the time-out circuit functions.

**1.05** *Tests A, D, and E will interrupt service and should only be performed at time of installation before turnover to the customer or when the controller is out of service for maintenance reasons.*

**1.06** Tests B and C require verification of calls to a headquarters. These tests shall be terminated temporarily at the request of headquarters operator when the tests might interfere with the efficient handling of service calls and dispatch duties at the headquarters switchboard.

**1.07** Test circuit SD-98067-01 can be equipped to test two concentrators and associated equipment. If the test circuit is arranged for testing two concentrators, Tests B, C, and D will require the CONT key to be operated to the 0 or 1 position to determine which concentrator will process the test call.

**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 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.

**SECTION 067-302-502**

**2. APPARATUS**

**Test A**

**2.01** Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two 624A (terminal connector) tools (for connecting to relay winding terminals).

**2.02** Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one KS-6278 connecting clip, and one 624A (terminal

connector) tool (for connecting ground to relay winding terminals).

**Tests A, C, D, and E**

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

**Tests A Through E**

**2.04** Central office test circuit, SD-98067-01 associated with 520-type PBX Emergency Reporting System circuits to be tested.

**3. PREPARATION**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
-------------	---------------	---------------------

**All Tests**

1a	If test circuit is in use on automatic test cycle— Wait until test cycle is completed before applying tests.	
----	---	--

**4. METHOD**

**A. Line Selection Chain**

*Caution: This test will result in service being interrupted to the Fire and Police Emergency Reporting System. This test should be performed only at time of installation or when controller is out of service for maintenance reasons.*

2	At line and switch unit— Connect one end of test cord to upper winding terminal of L- relay in line group 0, and other end to upper winding terminal of L-relay in line group 1.	
---	---	--

3b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Manually operate RV relay.	AW, AZ relays release.
----	---	------------------------

4	At controller— At line control unit— Block released UG-1 relay.	
---	---	--

5	At line and switch unit— Connect ground momentarily to upper winding	At line and switch unit— LG-0, LG-1, LU-0 relays operate.
---	---	--

STEP	ACTION	VERIFICATION
	terminal of L- relays connected together in Step 2.	
6	At controller— At line control unit— Remove blocking tool from UG-1 relay.	Controller checks selected lines. Restores to normal. At line and switch unit— LG-0, LG-1, LU-0 relays release. At test panel— First trial failure DF, DS, LHS, LHO, CT-, LTO, LU-, and ALM lamps light. PCT register scores. Office minor alarm sounds.
7	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
8	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
9b	At controller— At line control unit— If line selection is low to high (AW, AZ relays released)— Manually operate RV relay.	AW, AZ relays operate.
10	At controller— At line control unit— Block released UG-2 relay.	
11	Repeat Step 5.	At line and switch unit— LG-0, LG-1, LU-1 relays operate.
12	At controller— At line control unit— Remove blocking tool from UG-2 relay.	Controller checks selected lines. Restores to normal. At line and switch unit— LG-0, LG-1, LU-1 relays release. At test panel— First trial failure DF, DS, HLS, LHO, CT-, LT-1, LU- and ALM lamps light. PCT register scores. Office minor alarm sounds.
13	Repeat Steps 7 and 8.	
14	At line and switch unit— Remove test cord from upper winding terminals of L-relays.	
15	At controller— At line control unit— Block operated TG-1, TG-2 relays.	

STEP	ACTION	VERIFICATION
16	At line and switch unit— Connect ground to upper winding terminal of LG-0 relay.	At controller— At line control unit— LLG relay operates. At test panel— PCC register scores.
17	At line and switch unit— Remove ground from upper winding terminal of LG-0 relay.	At controller— At line control unit— LLG relay releases.
18	Repeat Steps 16 and 17 for all LG (1-9) relays provided.	Same as Steps 16 and 17.
19c	If high tens group is provided— Repeat Steps 16 and 17 for all LG (10-19) relays provided.	Same as Steps 16 and 17 with HLG relay replacing LLG relay in verification.
20	At controller— At line control unit— Remove blocking tools from TG-1, TG-2 relays.	
<b>B. Trunk Selection Chain</b>		
2d	If test circuit is equipped to test two concentrators— At test panel— Operate CONT key to the concentrator selected for test. Operate MAN ST key momentarily.	
3	At controller— At end chain relay unit— Manually operate the released TF or TL relay for headquarters trunk group under test.	At controller— At OGT group and headquarters unit— All idle T- relays release. If trunk group is noncontrol group (F option)— Relay manually operated releases. If trunk group is control group (T option)— Relay manually operated remains operated which indicates a reversal in trunk selection.
4e	At controller— At end chain relay unit— If TL relay in control trunk group (T option) is not operated— Manually operate TL relay.	At controller— At end chain relay unit— TL relay held operated. TF relay releases.  <i>Note: With TL relay operated, trunk selection is low to high. With TF relay operated, trunk selection is high to low.</i>
5	At OGT group and headquarters unit, and test panel— When minimum of two T- relays in headquarters trunk group under test are released—	At controller— At OGT group and headquarters unit— Lowest numbered idle T- relay in trunk group operates.

STEP	ACTION	VERIFICATION
	Remove handset from hanger, operate FHQ- or PHQ- key for headquarters trunk group under test.	At headquarters— Attendant answers. Transmission satisfactory.
	<i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	
6	At test panel— Restore FHQ- or PHQ- key to normal.	At headquarters— Release signal received.
7	Repeat Steps 3 through 6 for all headquarters trunk groups.	
8	Repeat Step 3.	
9e	At controller— At end chain relay unit— If TF relay in control trunk group (T option) is not operated— Manually operate TF relay.	At controller— At end chain relay unit— TF relay held operated. TL relay releases.
10	At OGT group and headquarters unit, and test panel— Operate FHQ- or PHQ- key for headquarters trunk group under test.	At controller— At OGT group and headquarters unit— Highest numbered idle T-relay in trunk group operates. At headquarters— Attendant answers. Transmission satisfactory.
	<i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	
11	At test panel— Restore FHQ-, or PHQ- key to normal.	At headquarters— Release signal received.
12	At test panel— Replace handset on hanger.	
13d	If test circuit is arranged to test two concentrators— At test panel— Return CONT key to normal. Operate RN key momentarily.	
14	Repeat Step 4e.	
	<i>Note:</i> At OGT group and headquarters unit, minimum of two T- relays should be released in control trunk group (T option).	

STEP	ACTION	VERIFICATION
15	At controller— At OGT group and headquarters unit— Manually operate idle T- relays in control trunk group (T option) beginning with lowest numbered relay.	After last T- relay is operated— At end chain relay unit— TL relay releases. TF relay operates. At OGT group and headquarters unit— All idle trunk T- relays release. Trunk selection reverses.
16	At controller— At OGT group and headquarters unit— Manually operate idle T- relays in control trunk group (T option) beginning with highest numbered relay.	After last T- relay is operated— At end chain relay unit— TF relay releases. TL relay operates. At OGT group and headquarters unit— All idle trunk T- relays release. Trunk selection reverses.
<b>C. First Trial Failure</b>		
2d	If test circuit is equipped to test two concentrators— At test panel— Operate CONT key to the concentrator selected for test. Operate MAN ST key momentarily.	
3b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Manually operate RV relay.	At controller— At line control unit— AW, AZ relays release.
4	At controller— At line control unit— Block released E1 relay.	
5	At test panel— Remove handset from hanger, operate FHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	At test panel— First trial failure FE-, LH-, LT-, LU-, CT-, and ALM lamps light. PCT register scores. Office minor alarm sounds. At fire headquarters— Attendant answers. Transmission satisfactory.
6	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
7	At test panel— Restore FHQ- key to normal.	At fire headquarters— Release signal received.
8	At test frame— Momentarily operate TIR key.	First trial failure lamps extinguish.

STEP	ACTION	VERIFICATION
9	At controller— At line control unit— Remove blocking tool from E1 relay.	
10b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Manually operate RV relay.	At controller— At line control unit— AW, AZ relays release.
11	At controller— At line control unit— Block XS-1 relay released.	
12	At test panel— Operate FHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	At test panel— First trial failure FI, XSM, CT-, LH-, LT-, LU-, and ALM lamps light. PCT register scores. Office minor alarm sounds. At fire headquarters— Attendant answers. Transmission satisfactory.
13	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
14	At test panel— Restore FHQ- key to normal.	At fire headquarters— Release signal received.
15	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
16	At controller— At line control unit— Remove blocking tool from XS-1 relay.	
17b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Momentarily operate RV relay.	At controller— At line control unit— AW, AZ relays release.
18	At controller— At line check, selective routing, and trouble indicator unit— Block released XH-1 relay.	
19	At test panel— Operate FHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request	At test panel— First trial failure FI, XHD, LH-, CT-, LT-, LU-, and ALM lamps lighted. PCT register scores. Office minor alarm sounds.

STEP	ACTION	VERIFICATION
	attendant to disconnect when release signal is received.	At fire headquarters— Attendant answers. Transmission satisfactory.
20	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
21	At test panel— Restore FHQ- key to normal.	At fire headquarters— Release signal received.
22	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
23	At controller— At line check, selective routing, and trouble indicator unit— Remove blocking tool from XH-1 relay.	
24b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Momentarily operate RV relay.	At controller— At line control unit— AW, AZ relays release.
25	At controller— At line check, selective routing, and trouble indicator unit— Block DD-1 relay released.	
26	At test panel— Operate FHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	At test panel— First trial failure DF, DS, DTR, LHS, CT-, LH-, LT-, LU-, and ALM lamps light. PCT register scores. Office minor alarm sounds. At fire headquarters— Attendant answers. Transmission satisfactory.
27	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
28	At test panel— Restore FHQ- key to normal.	At fire headquarters— Release signal received.
29	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
30	At concentrator— At line check, selective routing, and trouble indicator unit— Remove blocking tool from DD-1 relay.	

STEP	ACTION	VERIFICATION
31b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Momentarily operate RV relay.	At controller— At line control unit— AW, AZ relays release.
32	At controller— At fire OGT selection control unit— Block released X1 relay.	
33	At test panel— Operate FHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	At test panel— First trial failure FFO, LHS, DS, DTR, FTS-1, LHTS or HLTS, XFM, LH-, FHQ-, HQT-, CT-, LT-, LU-, and ALM lamps light. PCT register scores. Office minor alarm sounds. At fire headquarters— Attendant answers. Transmission satisfactory.
34	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
35	At test panel— Restore FHQ- key to normal.	At fire headquarters— Release signal received.
36	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
37	At controller— At fire OGT selection control unit— Remove blocking tool from X1 relay.	
38f	If selective routing to police headquarters is provided— At controller— At police OGT selection control unit— Block X1 relay released.	
39f	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Momentarily operate RV relay.	At controller— At line control unit AW, AZ relays release.
40f	At test panel— Operate PHQ- key.  <i>Note:</i> When attendant answers, tester should announce, "This is a test call," and request attendant to disconnect when release signal is received.	At test panel— First trial failure FPO, LHS, DS, DTR, PTS-1, LHTS or HLTS, XPM, LH-, PHQ-, HQT-, CT-, LT-, LU-, and ALM lamps light. PCT register scores. Office minor alarm sounds. At police headquarters—

**SECTION 067-302-502**

STEP	ACTION	VERIFICATION
		Attendant answers. Transmission satisfactory.
41f	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
42f	At test panel— Restore PHQ- key to normal.	At police headquarters— Release signal received.
43f	At test panel— Momentarily operate TIR key.	First trial failure lamps extinguish.
44f	At controller— At police OGT selection control unit— Remove blocking tool from X1 relay.	
45d	If test circuit is arranged to test two concentrators— At test panel— Return CONT key to normal. Operate RN key momentarily.	
46	At test panel— Replace headset on hanger.	

**D. Second Trial Failure**

*Caution: This test will result in service being interrupted to the Fire and Police Emergency Reporting System. This test should be performed only at time of installation or when controller is out of service for maintenance reasons.*

2d	If test circuit is equipped to test two concentrators— At test panel— Operate CONT key to the concentrator selected for test. Operate MAN ST key momentarily.	
3	At controller— At line control unit— Block released E1, E2 relays.	
4	At test panel— Operate FHQ- key.	At test panel— Failure indication lamps FE, STF, LH-, CT-, LT-, LU-, and ALM light. PCT and STF- registers score. Office major alarm sounds. Controller repeatedly attempts to complete call.

STEP	ACTION	VERIFICATION
5	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
6	At test panel— Restore FHQ- key to normal.	
7	At test panel— Momentarily operate TIR key.	Failure indication lamps extinguish.
8	At controller— At line control unit— Remove blocking tools from E1, E2 relays.	At controller— All circuits restore to normal.
9	At controller— At line check, selective routing, and trouble indicator unit— Block released DD-1, DD-2 relays.	
10	At test panel— Operate FHQ- key.	At test panel— Failure indication lamps DF, DS, DTR, LHS or HLS, STF, LH-, CT-, LT-, LU-, and ALM light. PCT and STF- registers score. Office major alarm sounds. Controller repeatedly attempts to complete call.
11	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
12	At test panel— Restore FHQ- key to normal.	
13	At test panel— Momentarily operate TIR key.	Failure indication lamps extinguish.
14	At controller— At line check, selective routing, and trouble indicator unit— Remove blocking tools from DD-1, DD-2 relays.	At controller— All circuits restore to normal.
15	At controller— At fire OGT selection control unit— Block released X1, X2 relays.	
16	At test panel— Operate FHQ- key.	At controller— Failure indication lamps FFO, DS, DTR, LHS or HLS, FTS-, LHTS or HLTS, XFM, STF, LH-, CT-, FHQ-, HQT-, LT-, LU-, and ALM light. PCT and STF- registers score. Office major alarm sounds.

**SECTION 067-302-502**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
		Controller repeatedly attempts to complete call.
17	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
18	At test panel— Restore FHQ- key to normal.	
19	At test panel— Momentarily operate TIR key.	Failure indication lamps extinguish.
20	At controller— At fire OGT selection control unit— Remove blocking tools from X1, X2 relays.	At controller— All circuits restore to normal.
21f	If selective routing to police headquarters is provided— At controller— At police OGT selection control unit— Block released X1, X2 relays.	
22f	At test panel— Operate PHQ key.	At test panel— Failure indication lamps FPO, DS, DTR LHS or HLS, PTS-, LHTS or HLTS, XPM, STF, LH-, CT-, PHQ-, HQT-, LT-, LU-, and ALM light. PCT and STF- registers score. Office major alarm sounds. Controller repeatedly attempts to complete call.
23f	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
24f	At test panel— Restore PHQ- key to normal.	
25f	At test panel— Momentarily operate TIR key.	Failure indication lamps extinguish.
26f	At controller— At police OGT selection control unit— Remove blocking tools from X1, X2 relays.	At controller— All circuits restore to normal.
27d	If test circuit is arranged to test two concentrators— At test panel— Return CONT key to normal. Operate RN key momentarily.	

STEP	ACTION	VERIFICATION
<b>E. Master Time-Out</b>		
<i>Caution: This test will result in service being interrupted to the Fire and Police Emergency Reporting System. This test should be performed only at time of installation or when controller is out of service for maintenance reasons.</i>		
2e	At controller— At end chain relay unit— If TL relay in control trunk group (T option) is not operated— Manually operate TL relay.	At controller— At end chain relay unit— TL relay held operated. TF relay releases.
3b	At controller— At line control unit— If line selection is high to low (AW, AZ relays operated)— Manually operate RV relay.	At controller— At line control unit— AW, AX relays release.
4	At controller— At line control unit— Block TG-1, TG-2 relays released.	After 10 to 15 seconds— At test panel— MTO, CT-, and ALM lamps light. PCT and MT- registers score. Major alarm sounds. At controller— At end chain relay unit— TF relay operates. TL relay releases. At line control unit— AW, AZ relays operate.
5	At test panel— Momentarily operate ACO key.	Audible alarm silenced.
6	At controller— At line control unit— Remove blocking tools from TG-1, TG-2 relays.	
7	At test panel— Momentarily operate TIR key.	At test panel— Failure indication lamps extinguished.