

TERMINATING SENDER LINK AND CONTROLLER TESTS NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section describes a method of testing the terminating sender link and controller.

1.02 This section is reissued for the following reasons:

- (a) Test of locking paths for TA2 relay is moved from Test B to its more logical location in Test A.
- (b) Tests of leads, double connections, etc, formerly in Test B are now located in Test C.
- (c) Provision is made for testing of wire-spring-type multicontact relays in Test C.
- (d) Test of opens in common leads to sender group, part of Test C, is revised to indicate that the TMB or AMB and BMB relays may lock operated.

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

1.03 The tests covered are:

- **A. Minor Time Alarm—Transfer to Mate Controller:** This test checks that a call will be served by the home controller and that in the event of trouble in the home controller, a minor alarm will sound and the call will be served by the mate controller.
- **B. Minor Time Alarm—Transfer from Mate Controller:** This test checks that in the event of trouble while the mate controller is serving a call, a minor alarm will sound and the call will be served by the home controller.
- C. Minor Time Alarm Tests and Auxiliary Tests:** This test checks that opens and grounds in various parts of the circuit will cause a minor alarm. This test also checks holding paths of FA and FB relays, operating paths of CA and CB relays and the feature that plugs in both the EA and EB jacks cancels the exercise test.

- **D. Major Time Alarm with Home Controller Made Busy:** This test checks that in the event of trouble in the mate controller with the home controller made busy a major alarm will sound.

- **E. Major Time Alarm with Mate Controller Made Busy:** This test checks that in the event of trouble in the home controller with the mate controller made busy a major alarm will sound.

- **F. Major Time Alarm with Both Home and Mate Controllers Made Busy:** This test checks that if both controllers are made busy a major alarm will sound.

G. Major Time Alarm—Cancel Transfer to Mate Controller: This test checks that in the event of a failure in the home controller with a plug in the HD (hold) jack the call will not be transferred to the mate controller.

- **H. Major Time Alarm with Blocked Call:** This test checks that if a call is blocked with the TA1 and TB1 relays operated, a major alarm will sound.

I. Sender Group Selection—Regular and Reserve Features: This test checks that a sender subgroup is selected on a regular basis with and without the RS relay provided and on a reserve basis with the RS relay provided.

J. Trunk Group Selection: This test checks the preference of calls to be served if there are simultaneous calls in more than one trunk group.

K. Trunk Selection: This test checks the preference of calls to be served if there are simultaneous calls within a trunk group.

L. Sender Selection: This test checks the sender preference within a sender subgroup. This test need not be made when a test frame is provided and arranged to connect to all terminating senders.

M. Sender Subgroup Lockout Features — LL

Relay Chain: This test checks the function of the preference chain when a sender subgroup is selected by more than one terminating sender link controller simultaneously.

N. Test of Calls Waiting Circuit (“B”

Switchboard Incoming Trunks): This test checks that lamps will light and alarms will sound when “B” incoming calls are waiting.

O. Exercise Home Controller: This test causes all service calls to be handled by the home controller.

P. Exercise Mate Controller: This test causes all service calls to be handled by the mate controller.

1.04 Actions and verifications are required at locations other than at the terminating sender link frame for tests as listed.

- (a) Test A — at terminating trouble indicator and at mate terminating sender link frame.
- (b) Tests B and I — at terminating trouble indicator.
- (c) Test D — at floor alarm cabinet.
- (d) Test E — at mate terminating sender link frame and at floor alarm cabinet.
- (e) Tests F, O, and P — at mate terminating sender link frame.
- (f) Test L — at terminating trouble indicator and at sender selector unit on miscellaneous frame.
- (g) Test M — at terminating trouble indicator and at other terminating sender link frames in the LL relay chain.
- (h) Test N — at calls waiting circuit.

1.05 When performing Tests A through K and N it will be necessary to make busy all trunks served by the terminating sender link under test to prevent interference by service calls.

1.06 When performing Test L a subgroup of senders will be out of service.

1.07 When performing Test M all subgroups of senders having appearances on the terminating sender link under test will be out of service.

1.08 In this section, “stationary spring” and “operating spring” refer to springs of nonwire-spring-type multicontact relays; “fixed contact” and “movable contact” refer to contacts of wire-spring-type multicontact relays.

1.09 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 the test. Where a condition does not apply, all steps designated by the 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 as indicated by the number in parentheses.

TABLE A

APPARATUS	TESTS															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Test Circuit (2.02)	1	1	1	1	1	1	1									
Trouble Indicator (2.03)	1	1							1			1	1			
Receiver (2.04)			1											1	1	
Cord (2.05)			1													
Cord (2.06)													1			
Cord (2.07)														1		
Cord (2.08)																√
Tool (2.09)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No. 349A (make-busy) Plug			√	√	√	√	√	√	√	√	√	√	√	√	√	√
No. 322A (make-busy) Plug														√	√	
KS-3008 Stop watch or equivalent	1	1	1	1	1	1	1	1	1							

√ As required.

2.02 Test circuit, incoming trunk test set, SD-25187-01 or incoming trunk test frame, SD-25161-01 or outgoing trunk test frame, SD-25177-01 (used for originating test calls at terminating sender link frames).

2.03 Terminating trouble indicator, SD-25284-01.

2.04 Test receiver, No. 716C receiver attached to a W2AB cord equipped with two No. 360A tools (No. 2W21A cord) and one KS-6278 connecting clip and one No. 411A (test pick) tool (used for checking for presence of ground on relay contacts).

2.05 Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord), a KS-6278 connecting clip and a No. 419A (test connector) tool (used for connecting ground to relay contacts).

2.06 Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord), a KS-6278 connecting clip, and a No. 624B (terminal connector) tool or another KS-6278 connecting clip with a No. 108 cord tip (insulating tubing), as required (used for connecting ground to terminal strips).

2.07 Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord), a KS-6278 connecting clip and a No. 607A (winding connector) tool (used for connecting ground to relay windings).

2.08 Testing cord, No. 893 cord, 3 feet long, equipped with two No. 360A tools (No. 1W13A cord) and two No. 419A (test connector) tools (used for short-circuiting relay contacts).

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

3. PREPARATION

STEP	ACTION	VERIFICATION
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Tests A through K and N

- | | | |
|---|---|--|
| 1 | At originating office —
Make busy all trunks served by terminating sender link frame under test. | |
|---|---|--|

Tests A through E and G

- | | | |
|---|---|--|
| 2 | Establish a test connection to an incoming trunk which is served by the terminating sender link under test. Refer to Section 216-381-501 when using incoming trunk test set, to Section 216-277-501 when using incoming trunk test frame and to Section 216-372-501 when using outgoing trunk test frame. | |
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4. METHOD

STEP	ACTION	VERIFICATION
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- | | | |
|---|---|--|
| | A Minor Time Alarm — Transfer to Mate Controller | |
| 3 | Block TT relay nonoperated. | |
| 4 | Originate a test call. | 6 to 13 seconds later —
AL lamp lights.
Minor alarm sounds.
White aisle pilot lamp lights.
At terminating trouble indicator —
LA- lamp lights.
At terminating sender link frame —
After minor alarm sounds —
Call completed through mate controller. |

STEP	ACTION	VERIFICATION
5	Remove blocking tool from TT relay.	
6	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished. At terminating trouble indicator — LA- lamp extinguished.
7	Disconnect test call.	
8	At mate frame — Insert No. 349A plug into MB jack.	
9	At home frame — Block MA relay nonoperated.	
10	Momentarily operate TA2 relay.	TA2 relay does not lock.
11	Block operated TA1 relay.	
12	Operate TA2 relay (TA2 relay may operate from IA interrupter).	TA2 relay locks.
13	Remove blocking tool from TA1 relay.	TA2 relay releases.
14	At mate frame — Remove plug from MB jack.	
15	At home frame — Operate TA2 relay.	TA2 relay locks.
16	Momentarily operate TB1 relay.	TA2 relay releases.
17	Remove blocking tool from MA relay.	

B. Minor Time Alarm — Transfer from Mate Controller

3	Insulate contacts 7T, 7B, and 9B of TA2 relay.	
4	Operate TA2 relay.	TA2 relay locks.
5	Block FB relay nonoperated.	
6	Originate a test call.	After 6 to 13 seconds — AL lamp lights. Minor alarm sounds. White aisle pilot lamp lights. At terminating trouble indicator — LA- lamp lights. <i>Note:</i> Verification of LA- lamp need not be repeated if made in a previous test. At terminating sender link frame — TB2 relay operates. TA2 relay releases.
7	Remove insulators from TA2 relay.	Call completes through home controller.
8	Remove blocking tool from FB relay.	

STEP	ACTION	VERIFICATION
9	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished. At terminating trouble indicator — LA- lamp extinguished.
10	Disconnect test call.	
11	Insert No. 349A plug into MB jack.	
12	Block MA relay nonoperated.	
13	Momentarily operate TB2 relay.	TB2 relay does not lock.
14	Block operated TB1 relay.	
15	Operate TB2 relay (TB2 relay may operate from IB interrupter).	TB2 relay locks.
16	Remove blocking tool from TB1 relay.	TB2 relay releases.
17	Remove plug from MB jack.	
18	Operate TB2 relay.	TB2 relay locks.
19	Momentarily operate TA1 relay.	TB2 relay releases.
20	Remove blocking tool from MA relay.	

C. Minor Time Alarm Tests and Auxiliary Tests

Continuity of SL Lead

3	Block SL relay nonoperated.	
4	Originate a test call.	1 to 1-1/2 seconds after SS relay operates — AL lamp lights. Minor alarm sounds. White aisle pilot lamp lights.
5	Within 4 seconds after alarm operates — Remove blocking tool from SL relay.	Different SG- relays used before and after time-out. Call is not transferred to mate controller.
6	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished.
7	Disconnect test call.	

Double Connection Test

8	<i>Caution: This test should be made when there are no service calls in the sender link under test since the operation of the LR relay will interfere with any calls which may be connected through this sender link to associated subgroup of senders.</i>	
9	Block TST relay nonoperated.	

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STEP	ACTION	VERIFICATION
10	Originate a test call.	1 to 1-1/2 seconds after SS relay operates — AL lamp lights. Minor alarm sounds. White aisle pilot lamp lights.
11	Remove blocking tool from TST relay immediately (within 4 seconds).	Call handled by different sender group (check SG- and LR- relays). Call is not transferred to mate controller.
12	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished.
13	Disconnect test call.	
Opens in Common Leads to Sender Group		
14	Insulate contact 34 of HC relay.	
15	Originate a test call.	1 to 1-1/2 seconds after SS relay operates — AL lamp lights. Minor alarm sounds. White aisle pilot lamp lights. Test call completes.
16	Remove insulating tool from HC relay.	
17	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished.
18	Disconnect test call.	
19	Insulate contact 32 of HC relay.	
20	Block nonoperated TA, R, and SD relays.	
21	Originate a test call.	1 to 1-1/2 seconds after SS relay operates — AL lamp lights. Check which C- and SG- relays operate. SRL relay operated.
22	Check for presence of ground on contact 21 of operated C- relay.	Ground present.
23	Remove blocking tool from SD relay.	C-, SG-, and SRL relays release. Other C- and SG- relays operate. After 1 to 1-1/2 seconds — SRL relay operates.
24	Check for presence of ground on contact 21 of operated C- relay.	Ground present.
25	Disconnect test call.	
26	Momentarily operate TR key.	AL lamp extinguished.

STEP	ACTION	VERIFICATION
27	Block operated TMB or AMB and BMB relays associated with the two sender subgroups just used.	
28	Block nonoperated SD relay.	
29	Originate a test call.	Third subgroup of senders used. After 1 to 1-1/2 seconds — AL lamp lights.
30	Check for presence of ground on contact 21 of operated C- relay.	Ground present.
31	Remove insulating tool from HC relay.	
32	Remove blocking tools from TMB or AMB and BMB relays.	TMB or AMB and BMB relays release. <i>Note:</i> Due to circuit options these relays may lock up; if so, momentarily insulate contact 12T of each relay opening the locking path.
33	Remove blocking tools from SD relay, then R relay and then TA relay.	Test call completes.
34	Disconnect test call.	
35	Momentarily operate TR key.	AL lamp extinguished.
False Ground on Common Leads to Sender Subgroup		
36	Connect ground at stationary spring or movable contact 32 of HC relay.	FG relay operates. <i>Note:</i> If FG relay is held operated for 1 to 1-1/2 seconds minor alarm will sound.
37	Remove ground applied in Step 36.	FG relay releases.
38	Repeat Steps 36 and 37 grounding, in turn, springs or contacts 33, 34, and 35 of HC relay.	
Grounded Start Lead		
39	Insert No. 349A plug into EA jack.	
40	Apply ground to stationary spring or movable contact 10 of a TG- relay.	After 6 to 13 seconds — AL lamp lights. Minor alarm sounds. White aisle pilot lamp lights.
41	Remove ground from TG- relay.	
42	Momentarily operate TR key.	AL lamp extinguished. Minor alarm silenced. White aisle pilot lamp extinguished.
43	Remove plug from EA jack.	
44	Insert No. 349A plug into EB jack.	
45	Apply ground to stationary spring or movable contact 10 of a TG- relay.	After 6 to 13 seconds — AL lamp lights.

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STEP	ACTION	VERIFICATION
46	Remove ground from TG- relay.	
47	Momentarily operate TR key.	AL lamp extinguished.
48	Remove plug from EB jack.	
Resetting of Alarm Circuit		
49	Block DA relay operated.	Within 6 seconds — TA relay operates.
50	After TA relay operates but before TA1 relay operates (5 seconds) — Block FA relay operated.	TA relay releases.
51	Remove blocking tools from DA and FA relays.	
52	Block DB relay operated.	Within 6 seconds — TB relay operates.
53	After TB relay operates but before TB1 relay operates (5 seconds) — Block FB relay operated.	TB relay releases.
54	Remove blocking tools from DB and FB relays.	
Hold Path for the FA and FB Relays		
55	Block TA1 relay nonoperated.	
56	Block TA relay operated.	
57	Originate a test call.	FA relay operates.
58	Remove blocking tool from TA relay.	FA relay releases.
59	Disconnect test call.	
60	Remove blocking tool from TA1 relay.	
61	Insert No. 349A plug into EB jack.	
62	Block TB1 relay nonoperated.	
63	Block TB relay operated.	
64	Originate a test call.	FB relay operates.
65	Remove blocking tool from TB relay.	FB relay releases.
66	Disconnect test call.	
67	Remove blocking tool from TB1 relay.	
68	Remove plug from EB jack.	
GA and GB Relay Path for CA and CB Relays		
69	Apply ground to stationary spring or movable contact 10 of TG0 relay.	CA relay operates.
70	Remove ground from TG0 relay.	CA relay releases.

STEP	ACTION	VERIFICATION
71	Repeat Steps 69 and 70 applying ground, in turn, to stationary spring or movable contact 10 of all even-numbered TG- relays and stationary spring or movable contact 15 of odd-numbered TG- relays.	CA relay operates each time ground is connected and releases each time ground is removed.
72	Insert No. 349A plug into EB jack.	
73	Repeat Steps 69 through 71.	CB relay substituted for CA relay.
74	Remove plug from EB jack.	

EA and EB Jack Open Contact Test

75	Insert No. 349A plugs into both the EA and EB jacks.	
76	Originate a test call.	Call is handled by home controller.
77	Disconnect test call.	
78	Block operated TA2 relay.	AL lamp lights.
79	Originate a test call.	Call handled by mate controller.
80	Disconnect test call.	
81	Remove blocking tool from TA2 relay.	
82	Momentarily operate TR key.	TA2 relay releases. AL lamp extinguished.
83	Remove plugs from EA and EB jacks.	

D) Major Time Alarm with Home Controller Made Busy

3	At home controller — Insert No. 349A plug into MB jack.	At floor alarm cabinet — TSL lamp lights.
4	At home controller — Block FB relay nonoperated.	
5	Originate a test call.	After 6 to 13 seconds — M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.
6	Remove blocking tool from FB relay.	
7	Remove plug from MB jack.	At floor alarm cabinet — TSL lamp extinguished.
8	At home controller — Momentarily operate TR key.	Test call completes. M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.
9	Disconnect test call.	

STEP	ACTION	VERIFICATION
E. Major Time Alarm with Mate Controller Made Busy		
3	At mate controller — Insert No. 349A plug into MB jack.	At floor alarm cabinet — TSL lamp lights.
4	At home controller — Block FA relay nonoperated.	
5	Originate a test call.	After 6 to 13 seconds — M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.
6	Remove blocking tool from FA relay.	
7	At mate controller — Remove plug from MB jack.	At floor alarm cabinet — TSL lamp extinguished.
8	At home controller — Momentarily operate TR key.	Test call completes. M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.
9	Disconnect test call.	
F. Major Time Alarm with Both Home and Mate Controllers Made Busy		
2	At home controller — Insert No. 349A plug into MB jack.	
3	At mate controller — Insert No. 349A plug into MB jack.	M lamp lights. At home controller — M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.
4	At home controller — Remove plug from MB jack.	
5	Momentarily operate TR key.	M lamp extinguished.
6	At mate controller — Remove plug from MB jack.	
7	Momentarily operate TR key.	M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.
G. Major Time Alarm — Cancel Transfer to Mate Controller		
3	Insert No. 349A plug into HD jack.	
4	Block TT relay nonoperated.	
5	Originate a test call.	After 6 to 13 seconds — M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.

STEP	ACTION	VERIFICATION
6	Remove blocking tool from TT relay.	
7	Momentarily operate TR key.	Test call completes. M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.
8	Disconnect test call.	
9	Block FB relay nonoperated.	
10	Insert No. 349A plug into EB jack.	
11	Originate a test call.	After 6 to 13 seconds — M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.
12	Remove blocking tool from FB relay.	
13	Remove plug from EB jack.	
14	Momentarily operate TR key.	Test call completes. M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.
15	Disconnect test call.	
16	Remove plug from HD jack.	

H. Major Time Alarm with Blocked Call

2	Block TA1 and TB1 relays operated.	M lamp lights. White aisle pilot lamp lights. Major audible alarm sounds.
3	Remove blocking tools from TA1 and TB1 relays.	
4	Momentarily operate TR key.	M lamp extinguished. White aisle pilot lamp extinguished. Major audible alarm silenced.

I. Sender Group Selection — Regular and Reserve Features MF 46

2	Block operated all but one TMB or AMB relay and all but one BMB relay.
3a	If RS relay is provided — Block RS relay nonoperated.
4a	At terminating trouble indicator — Insert No. 322A plugs into MB jacks of all but two senders in subgroup associated with TMB, AMB, or BMB relay not blocked operated.
5b	If RS relay is not provided — At terminating trouble indicator — Insert No. 322A plugs into MB jacks of all but one sender in subgroup associated with TMB, AMB, or BMB relay not blocked operated.

STEP	ACTION	VERIFICATION
6	At terminating sender link controller — Originate a test call having access to the selected sender subgroup.	Associated SG- relay operates. Test call completes.
7	Disconnect test call.	
8a	If RS relay is provided — At terminating trouble indicator — Insert No. 322A plug into MB jack of one of two remaining senders in subgroup.	
9a	At terminating sender link controller — Originate a test call.	No SG- relay operates.
10a	Remove blocking tool from RS relay.	Test call completes.
11a	Disconnect test call.	
12	At terminating trouble indicator — Insert No. 322A plug into MB jack of remaining sender in subgroup.	
13	At terminating sender link controller — Originate a test call.	No SG- relay operates.
14	Disconnect test call.	
15	At terminating trouble indicator — Remove plugs from sender subgroup MB jacks.	
16	Repeat Steps 2 through 15, as required, testing all subgroups associated with other TMB, AMB, or BMB relays.	
17	At terminating sender link controller — Remove blocking tools from TMB or AMB and BMB relays.	
18	Block SS relay nonoperated.	
19	Originate a test call.	SG0, SG1, and SG2 relays operate. One LL- relay operates.
20	Remove blocking tool from SS relay.	Test call completes.
21	Disconnect test call.	

J. Trunk Group Selection

2	Block TA and MA relays nonoperated.	
3	Block GTA and GTB relays operated.	
4	Operate GST0 to 9 relays.	GST0 to 9 relays lock operated. GA0 to 9 and GB0 to 9 relays remain unoperated.

STEP	ACTION	VERIFICATION
5	Remove blocking tools from GTA and GTB relays.	GA0 to 9 and GB0 to 9 relays operate. Controller attempts to serve a call in trunk group 0 — G0 relay operates. GB0 and GST0 relays release. When controller releases — GA0 relay releases. GST1 to 9 remain operated. Controller attempts to serve calls in trunk groups 1 to 9 in numerical order and associated G-, GB-, GST-, and GA- relays function as above.
6	Remove blocking tools from TA and MA relays.	

K. Trunk Selection

2	Block G0, TA, and MA relays nonoperated.	
3	Block GST0 relay operated.	T0 to T9 relays operate.
4	Block TE relay operated.	T1 to T9 relays release. T0 remains locked operated.
5	Momentarily insulate contact 1T of T0 relay.	T0 relay releases.
6	Operate T9 relay.	T9 relay locks operated.
7	Operate T8 relay.	T9 relay releases. T8 relay locks operated.
8	Repeat Step 7 operating T- relays in descending order until all T- relays are checked.	Operation of lower numbered T- relays releases higher numbered T- relay.
9	Remove blocking tools from G0, TA, MA and GST0 relays.	

L. Sender Selection

Where there is only one kind of sender in the subgroup

1	At terminating trouble indicator — Operate BAT key and insert No. 322A plug into GB jack of associated sender subgroup.	Associated T- lamp lights.
2	At sender selector unit on miscellaneous frame — Connect ground to punching 7 of terminal strip A or B of lowest numbered sender in subgroup.	At terminating trouble indicator — Associated S- lamp lights.
3	At terminating trouble indicator — Insert No. 322A plug into MB jack of selected sender.	S- lamp extinguished. S- lamp associated with highest numbered sender in subgroup lights.

STEP	ACTION	VERIFICATION
4	Insert No. 322A plug into MB jack of highest numbered sender in subgroup.	S- lamp extinguished. S- lamp associated with next lower numbered sender in subgroup lights.
5	Repeat Step 4 making senders busy in descending sequence for remaining senders in subgroup.	As senders are made busy, associated S- lamp is extinguished and next lower numbered S- lamp lights.
6	Remove plugs from MB jacks.	
7	At sender selector unit on miscellaneous frame — Disconnect ground from punching 7 of terminal strip A or B.	
8	At terminating trouble indicator — Remove plug from GB jack.	T- lamp extinguished.

Where there are two kinds of senders in a group

9	At terminating trouble indicator — Operate BAT key and insert No. 322A plug into GB jack of associated sender subgroup.	Associated T- and B- lamps light.
10	At sender selector unit on miscellaneous frame — Connect ground to punching 7 of terminal strip A or B of lowest numbered sender of first kind in subgroup.	At terminating trouble indicator — Associated S- lamp lights.
11	At terminating trouble indicator — Insert No. 322A plug into MB jack of selected sender.	S- lamp extinguished. S- lamp associated with next lower numbered sender in subgroup lights.
12	Repeat Step 11 making senders busy in descending sequence for remaining senders of first kind in subgroup.	As a sender is made busy, associated S- lamp is extinguished and lower numbered S- lamp lights.
13	Remove plugs from MB jacks.	
14	At sender selector unit on miscellaneous frame — Disconnect ground from punching 7 of A or B terminal strip.	
15	Connect ground to punching 7 of terminal strip A or B of lowest numbered sender of second kind in subgroup.	At terminating trouble indicator — Associated S- lamp lights.
16	At terminating trouble indicator — Insert No. 322A plug into MB jack of selected sender.	S- lamp extinguished. S- lamp associated with next lower numbered sender in subgroup lights.
17	Repeat Step 16 making senders busy in descending sequence for remaining senders of second kind in subgroup.	As a sender is made busy, associated S- lamp is extinguished and lower numbered S- lamp lights.
18	Remove plugs from MB jacks.	

STEP	ACTION	VERIFICATION
19	At sender selector unit on miscellaneous frame — Disconnect ground from punching 7 of A or B terminal strip.	
20	At terminating trouble indicator — Remove plug from GB jack.	T- and B- lamps extinguished.

M. Sender Subgroup Lockout Features — LL Relay Chain

1	Select the terminating sender link controller that is associated with the last LL-relay in the chain in a sender subgroup to be tested.	
2	At terminating trouble indicator — Insert No. 322A plugs into MB jacks of sender subgroups that have appearances on the selected terminating sender link frame.	
3	At terminating sender link frame — Connect battery to B winding terminal of selected LL- relay.	LL- relay operates.
4	At other terminating sender link frames — Check for presence of ground on contact 3B of all lower numbered LL- relays in the chain.	Ground not present.
5	At selected terminating sender link frame — Insulate contacts 1T and 2T of operated LL- relay.	
6	At other terminating sender link frames — Momentarily operate each lower numbered LL- relay in the chain, one at a time.	At selected terminating sender link frame — Operated LL- relay releases while a lower numbered LL- relay in the chain is operated.
7	At selected terminating sender link frame — Remove insulating tool from contacts 1T and 2T of operated LL- relay.	
8	Disconnect battery from B winding terminal of LL- relay.	LL- relay releases.
9	At terminating trouble indicator — Remove plugs from MB jacks of sender subgroups made busy in Step 2.	
10	Select the terminating sender link controller that is associated with the next lower numbered LL- relay in the chain of the sender subgroup being tested.	

STEP	ACTION	VERIFICATION
11	Repeat Steps 2 through 10 for other LL-relays in the chain.	
12	Repeat Steps 1 through 11 for other sender subgroups to be tested.	
N. Test of Calls Waiting Signal ("B" Switchboard Incoming Trunks)		
<i>Note:</i> Office records should be consulted to find the specified number, as referred to in Steps 5 and 7, of calls waiting that are necessary to cause the white pilot lamp or the red pilot lamp to light at the calls waiting circuit.		
2	At terminating sender link frame — Check for presence of ground on contact 4T of GST- relays serving "B" incoming trunk groups.	Ground is present.
3	Short-circuit contacts 4T and 5T of a GST-relay serving "B" incoming trunks.	At calls waiting circuit — Green pilot lamp does not light.
4	Short-circuit contacts 4T and 5T of another GST- relay serving "B" incoming trunks.	At calls waiting circuit — Green pilot lamp lights.
5	Short-circuit contacts 4T and 5T of a specified number of GST- relays serving "B" incoming trunks.	At calls waiting circuit — After approximately 29 seconds — White pilot lamp lights. Buzzer audible alarm sounds.
6	At calls waiting circuit — Operate B key.	Buzzer audible alarm silenced.
7	At terminating sender link frame — Short-circuit contacts 4T and 5T of a specified number of GST- relays serving "B" incoming trunks.	At calls waiting circuit — Red pilot lamp lights.
8	At calls waiting circuit — Restore B key.	Buzzer audible alarm sounds.
9	At terminating sender link frame — Remove short circuits from GST- relay contacts.	At calls waiting circuit — Green, white, and red lamps extinguished. Buzzer audible alarm silenced.

O. Exercise Home Controller

1	At home controller — Insert No. 349A plug into EA jack.	Service calls handled by "A" side of start circuit.
2	At mate controller — Insert No. 349A plug into EA jack.	Service calls handled by "A" side of start circuit.
3	Remove plug from EA jack.	
4	At home controller — Remove plug from EA jack.	

STEP	ACTION	VERIFICATION
P. Exercise Mate Controller		
1	At home controller — Insert No. 349A plug into EB jack.	Service calls handled by "B" side of start circuit.
2	At mate controller — Insert No. 349A plug into EB jack.	Service calls handled by "B" side of start circuit.
3	Remove plug from EB jack.	
4	At home controller — Remove plug from EB jack.	

