MISCELLANEOUS TESTS ON

SUBSCRIBER SENDER LINK FRAME

CONTENTS

1. GENERAL INFORMATION

1.1 Description of Test: This section describes the miscellaneous tests to be made on the subscriber sender link frame and the associated sender selector units. The tests in this section may be applied to subscriber sender link and controller circuits SD-25004 and SD-25554.

1.2 Interference: These tests should be given preference over the sender tests per Sections 161 and 162 where one interferes with the other. This is suggested so that these tests may be completed as early in the test period as possible in order to minimize interference with other tests. These tests should be completed before the miscellaneous tests are made on the line link frame.

1.3 Testing Additions

1.31 The tests per Paragraphs 4 to 12 (except 8.03) and 18 to 25 should be made before the DJGF connections and sender multiple transitions are made.

NOTE: If new district junctor groups are added to a working frame, the crosspoint tests cannot be made. The remaining tests should be made on the new district junctor position (Figure 4 of SD-25004 or SD-25554)only.

1.32 The cable must be connected between the sender link frame and associated sender selector unit before the tests per Paragraphs 8.03, 14 and 15 can be applied.

1.33 The test per Paragraph 13 cannot be made on additions. The wiring of the chain circuits are established.

1.34 The tests per Paragraphs 16 and 17 are to be made after the sender multiple transition.

1.4 Special Test Connections

1.41 When circuits under test are equipped with CA6A and similar type wire wrap terminal strips, ITE-4026 multicontact relay T.S. fixture should not be used for making these connections. Instead, ITE-4085 push-on clips should be used at the terminal strip punchings as required and the test cord connected to these clips by means of alligator clips. Test cord must be supported in order to remove weight of cord from terminal strip connections.

1.42 Where this section calls for tests to be made using the Emergency Controller, place the subscriber sender link frame under test on Emergency Controller in the following manner:

(1) Make Busy subscriber sender link frame (SSLF)
(2) Insert 349A plug into jack ET on SSLF.
(3) Remove make busy condition.

To restore SSLF to its regular controller:

(1) Make Busy SSLF
(2) Remove 349A plug from jack ET on SSLF.
(3) Remove make busy condition.

2. RECORDS AND REQUIREMENTS

2.1 Records

Forms SD-4-1313 and SD-4-1315 are required for recording the results of these tests. For further information on records see Section 3 of Handbook 50.

2.2 Requirements

The tests covered by this section are listed in Section 0.2 of this handbook.

3. TESTING EQUIPMENT

3.1 Test Sets

Amt	ITE	Description
1	4009	Crosspoint, Link and Junctor Test Set
1	4033	Link Frame Test Set
%1	4137	AC Continuity Test Set

% Required cords furnished with set.

3.2 Cords Required With ITE-4009

Amt	ITE	Lgth	Cdrs	One End	Other End	Furnished With ITE
1	9598	12'	2	110 Plug	110 Plug	4009
11	1690	12'	4	2-110 Plugs	325A "	4009
1	9627	12'	3	110 Plug	508A Key	%4023
1	9947	12'	10	Yaxley Recept. Plugs	10 ITE-8507 Alligator Clips	4009

3.3 Cords Required With ITE-4033

Amt	ITE	Lgth	Cdrs	One End	Other End	Furnished With ITE
1	9598	12'	2	110 Plug	110 Plug	4033
2	9947	12'	10	Yaxley Recept. Plug	10 ITE-8507 Alligator Clips	4033
1	9547	12'	1	ITE-2455	ITE-2455	4033

3.4 Accessories

Amt	ITE or Code	Description	Furnished With ITE
15	298A	Make Busy Plugs	%4023
1	325C	Make Busy Plugs	%4023
10	508A	Relay Blocking Tools	%4023
As Req.	ITE-8507	Alligator Clips	%4023
1	R-1824	Portable Pencil Lamp	%4023
1	ITE-8253	Contact Protection Circuit Test Set	%4023
As Req.	ITE-4069	Multi-Contact Relay Blocking Tool	%4023
As Req.	ITE-9547	Cords	%4023
10	R-2818	Connectors	R
2	ITE-2260	Call Wire Tel. Jacks	%4023
2	ITE-9650	Tel. Set	%4023

% - Crossbar Test Accessory Kit.
R - Requisition.

4. FUSING

4.1 Using a test receiver or volt-ohmmeter check each fuse post for absence of battery and ground. (See Note.)

NOTE: If the D fuse at the SMB frame is installed, battery over the AL lead will be present on the B fuse post on the SSL frame under test, therefore the D fuse at the SMB frame should be removed during the test of the B fuse post on the SSL frame.

4.2 Using fuses of correct type as indicated by circuit drawings and fuse panel designations, install the fuses in accordance with Note 124 shown on SD-25004 or Note 101 on SD-25554, as provided, and the CHJ fuse of the Common Hold jack circuit SD-25522 at the SMB or CTI frame as provided, one at a time. Check at one point in the circuit that each fuse is associated with its proper equipment and is free from crosses with other unfused posts on the fuse panel.

5. CONTACT PROTECTION CIRCUITS

5.1 Using equivalent circuits on two sender link frames, check the following contact protection circuits using the method described in Section 2 of Handbook 50.

5.11 When SD-25004 is Provided:

Contact Protection Ckt.	Block Operated	Type of Ckt. as Shown in Fig. 7 Sect.2 HB 50	Test At
C (0 to 9)		1	Wdg.of C-Rel.
E		2	1T ON "
F		2	7T ON "
F1		2	9T ON "
G (0 to 4)		1	Wdg.of G- "
SL		1	1B SL "
BA		1	13T BA "
BB		1	13T BB "
J1	DO to D9	2	1B OH "
K	"	2	1T OH "
K1	"	2	3T OH "
L	"	2	7T OH "
L1	"	2	5T OH "
R1		1	1T DS "
SG0		1	2B SS "
SG1		1	4B SS "
SG2		1	6B SS "
SG3		1	8B SS "
SG4		1	10B SS "
SG5		1	2T SS "
SG6		1	4T SS "
SG7		1	6T SS "
SG8		1	8T SS "
SG9		1	10T SS "

Block RL relay operated and check for high resistance ground (3000^{W}) at 2B of RL relay. This circuit is through the M(KS-8038) resistance.

5.12 When SD-25554 is Provided

5.121 Refer to SD-25554-0101, Note 111, for schematic location of contact protection circuits.

NOTE: Circuits included in the same bracket may be tested together as equivalents for purpose of this test.

Circuits not included in brackets may be tested by using equivalent circuits on two sender link frames.

Networks on the sender link frame under test may be of the same type as those not included in brackets but due to varied resistances of relay windings to which networks are connected they cannot be used as equivalent circuits.

Contact Protection Circuit	Type of Ckt. as Shown in Fig. 7 Sect. 2 HB 50	Block or Insulate	Test At
Net. A	2	-	8T GH Rel.
" SS(0-9)	2	-	4B S(0-9) "
" SL	2	-	8B ON "
" C(0-9)	1	-	Wdg.of C(0-9) "
" G(0-4)	1	-	Wdg.of G(0-4) "
" CA(0-4)	1	-	13T CA(0-4) "
" CB(0-4)	1	-	13T CB(0-4) "
" CR (When Prov)	1	-	Wdg.of CR "
" GR (When Prov)	1	-	Wdg.of GR "
" DPN(0-4)	1	-	13TF DP(0-4) "
" SGN(0-9)	1	-	9TF SG(0-9) "
" RA(0-4)	1	-	5T RA(0-4) "
" RB(0-4)	1	-	5T RB(0-4) "
" RLP	1	-	4B RL "
" AB Rel.	2	-	2B CIA "
" BA(0-4) "	2	-	13T BA(0-4) "
" BB(0-4) "	2	-	13T BB(0-4) "
" CD "	2	-	4T CD "
" CW(3-4) "	2	-	10T CW(3-4) "
" DA(0-4) "	2	-	2B BA(0-4) "
" DB(0-4) "	2	-	2B BB(0-4) "
" GH "	2	-	3B GH "
" GPO "	2	(CK)norm.	8B HD "
" GP1 "	2	(CK)norm.	4T HD "
" GP2 "	2	(CK)norm.	6T HD "
" GP3 "	2	(CK)norm.	8T HD "
" GP4 "	2	(CK)norm.	10T HD "
" GRL(3-4) "	2	-	3T AG(3-4) "
" ON "	2	-	6T AB "
" ON1 "	2	-	3B ON1 "
" S(0-9) "	2	S(0-9) oper.	3B S(0-9) "
" TS "	2	-	3T RS "
" DS "	2	(DS)oper.	8B ON1 "
" LL(0-9) "	2	LL(0-9) oper.	6B LL(0-9) "
" CK	2	-	4B GPO "
" TM "	2	-	6B ON1 "
" CWA(3-4) "	2	-	7T CWA(3-4) "
" CWB(3-4) "	2	-	7T CWB(3-4) "
" H(3-4) "	2	-	7T AG(3-4) "
" FS "	2	-	4T FS "
" TA "	2	(TA)nor.	1T TS "
" AG(3-4) "	2	-	9T AG(3-4) "
" BG(3-4) "	2	-	1B AG(3-4) "
" ZA "	2	(WA)oper.	3B ZA "
" DR "	2	(DR)oper.	5T DR "
" D(0-9) "	2	D(0-9) oper.	9T D(0-9) "
" SB(0-9) "	2	-	8T SB(0-9) "
" SGE "	2	-	11T SGE "
" DP(0-4) "	2	-	14TR DP(0-4) "
" SG(0-9) "	2	-	10TR SG(0-9) "
" W "	2	(W)oper.	2B Z "
" WA "	2	(WA)oper.	2B ZA "
" DP(3-4) "	2	-	6T DP(3-4) "
" DPA(3-4) "	2	-	1B CW(3-4) "
" OC "	2	-	12B SS "
" P "	2	-	6T P "
" R1&R2 "	2	-	7B R1 "
" CH1 "	2	(LL)Fig.D oper.	3T CH1 "
" CH2 "	2	Insulate 1 & 2T (CH1)	1T CH1 "
" DC "	2	(ON)oper.	4BR DC "
" DE "	2	-	2B RS "
" FS1 "	2	-	1T FS "
" OH "	2	-	1T DE "
" RL "	2	-	2B GH "
" RS "	2	-	3T DS "
" SS "	2	-	1B SL "

NOTE: At completion of test of each network remove block or insulation from relays used for test purpose.

6. CROSSPOINT TEST - SENDER LINK PRIMARY SWITCHES A AND B

NOTE: Remove battery from the district junctor circuits, by removing the 20 ampere frame fuses, before making this test. Also remove the FC-1 and FC-2 fuses, and the charge interrupter fuse.

6.1 Setup for Test (See Figure 1)

6.11 Connect the 48V battery and ground to the BAT jack of the crosspoint, link and junctor test set, ITE-4009, using cord ITE-9598.

6.12 Insert plugs H and H-1 of an ITE-9690 cord into jacks JG and JG1 respectively of the test set. Connect the other end of this cord to vertical 9 of the right half switch. This cord will be referred to in the test operations as the JG cord.

6.13 To check the left half switch insert plugs H and H1 of 10 ITE-9690 cords into jacks H and H1 0-9 of the test set. Connect the other ends of these cords to verticals 0 to 9 respectively of the left half switch.

(a) To check the right half switch insert plugs H and H1 of 9 ITE-9690 cords into jacks H and H1 0-8 of the test set. Connect the other ends of these cords to verticals 0 to 8 respectively of the right half switch and operate key PB9 on the test set.

The above mentioned cords will be referred to in the test operations as the H cords.

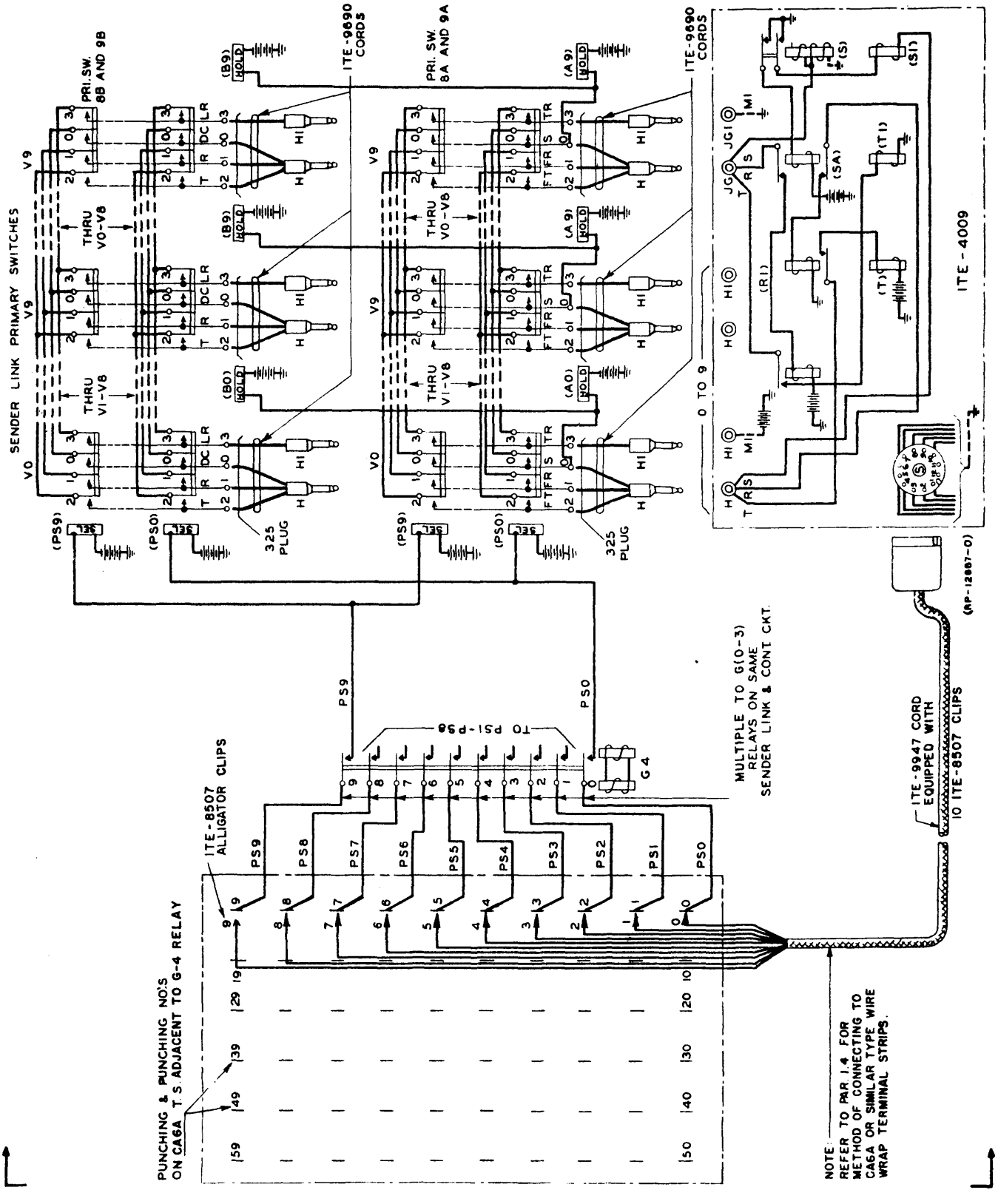

FIG. 1 SETUP FOR CROSSPOINT TEST SENDER LINK PRIMARY SWITCHES A AND B

6.14 On the terminal strip adjacent to the G-4 relay, obtain the following association, using cord ITE-9947. (See Par. 1.4.)

ITE-9947 Leads	G-4 T.S. Pchgs.	Leads	Test Set Receptacle
0-9	0-9	PS 0-9	S

6.15 Block normal the ON, CA and CB relays of the controller circuit and also the C 0-9 sender group connector relays.

6.16 Perform following operations as required depending upon district junctor circuits associated with primary switches under test.

(a) SD-25620-01 & 02 - Insulate 9 & 10B of TA relays.
(b) SD-26201-01 - Block operated OT CH relays.
(c) Coin District Junctors - Block AO relays operated
(d) AMA, coin and non-coin Junctors- Block T relays normal.
(e) Dial Pulsing Junctors - Insulate 3 & 4 of LC relays.

6.17 Operate and leave operated the XPT, SM and 4-W keys of the test set.

6.18 Lamps HO and SO should be lighted to begin the test. If necessary, momentarily operate the RS key to light these lamps.

6.19 Perform the tests under Paragraphs 6.2 and 6.3 alternately starting with switch 8B and 9B and proceeding down through switches 8A and 9A, 6B and 7B. etc., down to OA and 1A in order to eliminate the possibility of dirt falling into tested switches from switches being tested.

6.2 Primary Switch B (Leads DC, R, T and LR)

NOTE: Insulate the hold off-normal springs of the vertical unit to which the JG cord is connected and leave insulated during test of associated Primary A sw. per Paragraph 6.3.

6.201 Block operated the G relays as follows:

When Testing A & B Primary Switches	Block Operated Relay
8 and 9	G - 4
6 and 7	G - 3
4 and 5	G - 2
2 and 3	G - 1
0 and 1	G - 0

6.202 If the buzzer is desired for an OK test indication, operate the BZ key.

6.203 Operate the DS key of the test set.

6.204 With the test set connected as in Paragraph 6.1 to the left half of primary switch B, select magnet PS-0 should now operate. To begin test, operate key ST.

6.205 Manually operate and hold the hold magnet to which the JG cord is connected and then operate and release in turn hold magnets 0 to 9 (0 to 8 for the right half switch) to which the H cords are connected. The test set advances, lights lamp S-1 and operates select magnet PS-1. Release the hold magnet to which the JG cord is connected.

6.206 Manually operate and hold the hold magnet to which the JG cord is connected and then operate and release in turn hold magnets 0 to 9 to which the H cords are connected. The test set advances and lights lamp S-2 and operates select magnet PS-2. Release the hold magnet to which the JG cord is connected.

6.207 Continue operations as indicated in Paragraphs 6.205 and 6.206 for the remaining crosspoints on horizontals 2 to 9.

6.208 An OK check of each crosspoint is indicated by the buzzer if the BZ key is operated. When the last crosspoint is checked the EC lamp lights.

If the test set stops, the following table shows typical troubles indicated by the lamps being lighted or extinguished for the crosspoint under test.

Lamps	Trouble Indication
X lamp lighted S & S1 not lighted	Cross between S and R,T or 4th wire.
None lighted	Sleeve cross to ground or circuit to hold magnet open
S not lighted	Sleeve open
R and R1 not lighted	Ring open
R1 not lighted	Ring cross to ground
R1 not lighted with X lighted	Ring cross with T or 4th wire
T and T1 not lighted	Tip open
T1 not lighted	Tip cross to ground
T1 not lighted with X lighted	Tip cross with 4th wire
V or V1 not lighted	4th wire open
V1 not lighted	4th wire cross with ground

Other trouble indications, such as crosses with battery may occur, but are not listed above.

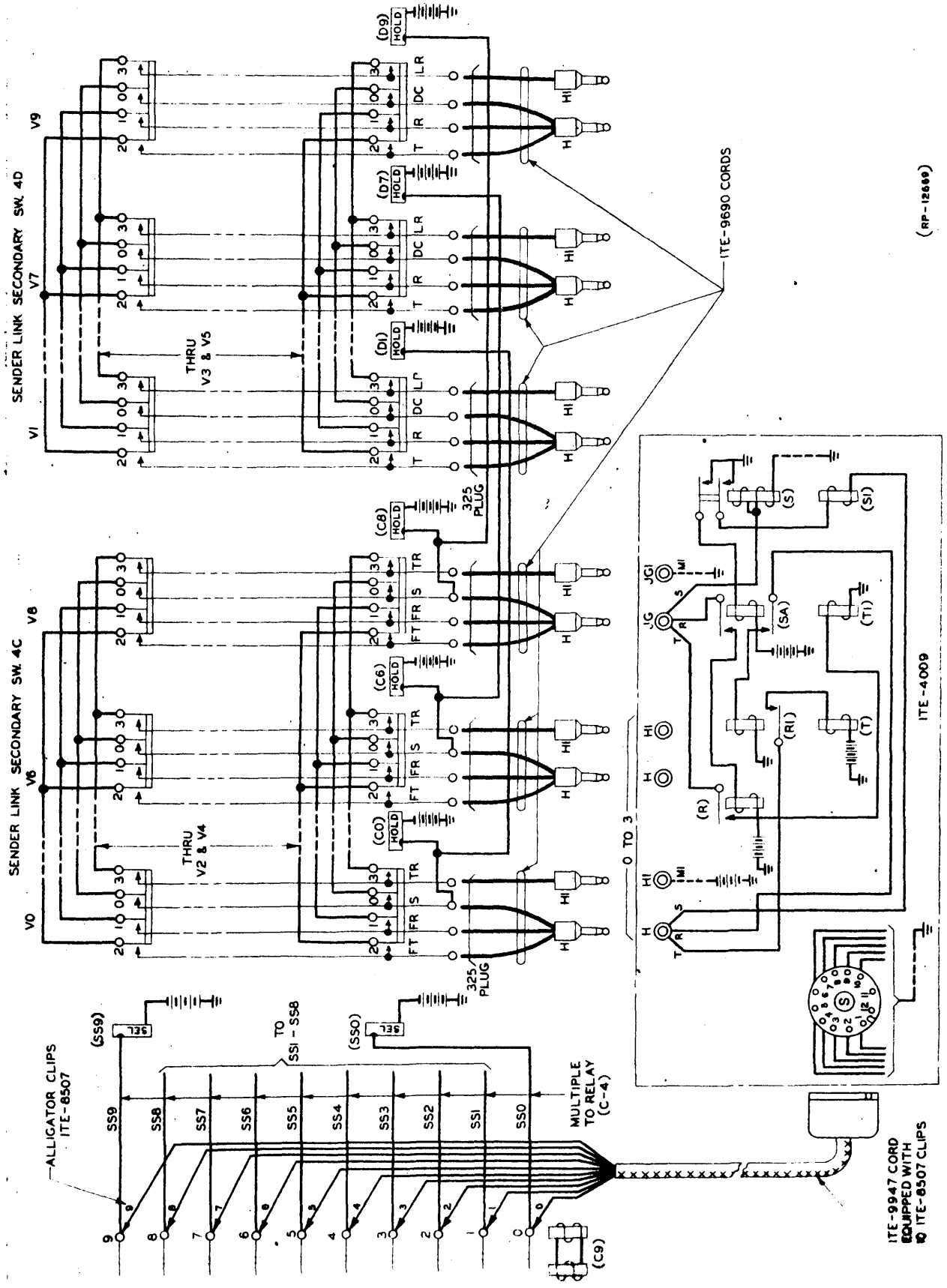

FIG. 2 SETUP FOR CROSSPOINT TEST SENDER LINK SECONDARY SWITCHES C AND D

6.209 After the left half of the switch has been tested shift the 0 to 8 H cords to the right half and remove H cord No. 9 from the test set.

6.210 Test the right half of the switch as in 6.205 to 6.208 with key PB9 operated.

6.3 Primary Switch A (Leads S, FR, FT and TR)

6.31 Block relays as indicated in the table associated with Paragraph 6.201 and see note in Paragraph 6.2.

6.32 If the buzzer is desired for an OK test indication, operate the BZ key.

6.33 Connect the test set as in Paragraph 6.1 to the left half of primary switch A.

6.34 Release DS key and operate the ST key. The test set automatically checks the 100 crosspoints of the half switch under test. When the test is completed the ED lamp lights and the test is stopped. An OK check of the crosspoints of each vertical is indicated by the buzzer. If the test set stops, the table in Paragraph 6.208 above show typical trouble indications.

6.35 After the left half of the switch has been tested shift the 0 to 8 H cords to the right half and remove H cord No. 9 from the test set.

6.36 Test the right half of the switch as in 6.34 and 6.35 with key PB9 operated.

6.37 Remove the connections and insulators and release the blocked relays of the district junctors and the sender link and control circuit when all the primary switches on the frame have been tested.

7. CROSSPOINT TEST - SENDER LINK SECONDARY SWITCHES C AND D

NOTE: Do not test crosspoints of verticals on secondary switches that are not connected to primary horizontals.

7.1 Setup for Test (See Figure 2)

7.11 Connect 48V battery and ground to the BAT jack of the crosspoint, link and junctor test set, ITE-4009, using cord ITE-9598.

7.12 Insert plugs H and H1 of an ITE-9690 cord into jacks JG and JG1 respectively of the test set. Connect the other end of this cord to vertical C8 (for C switch) or D9 (for D switch).

7.13 Insert plugs H and H1 of 4 ITE-9690 cords into jacks H and H1 0 to 3. Connect the other ends of these cords to verticals C-0, 2, 4, and 6 (for C switch) or D-1, 3, 5 and 7 (for D switch).

7.14 Using an ITE-9947 cord and alligator clips, connect leads 0 to 9 to punchings 0 to 9 (SS leads) of relay C-5, C-6, C-7, C-8 or C-9 when testing switches 0-5, 1-6, 2-7, 3-8, 4-9 respectively. Connect the other end of the cord to the S receptacle.

7.15 Operate and leave operated the 4W, SM, XPT and PB9 keys of the test set until the completion of the test.

7.16 Lamps HO and SO should be lighted to begin the test. If necessary, momentarily operate the RS key to light these lamps.

7.17 Check the switches in the following order: 4C, 9C, 4D, 9D, 3C, 8C, 3D, 8D, etc., to 0C, 5C and CD, 5D.

7.2 Secondary Switch C (Leads S, FR, FT and TR)

7.21 Operate the BZ key if the buzzer is desired for an OK test indication.

7.22 Operate the ST key. The test set automatically checks the 5 crosspoints of level 0 after which lamp H-4 lights.

7.23 Using key STP-H advance the test circuit to light lamp H-0. Lamp S-1 should light and the test circuit should proceed to test the crosspoints of level 1 after which lamp H-4 lights. If desired the circuit may be advanced by means of remote control cord ITE-9627 connected to the RC jack.

7.24 Continue as in 7.23 until all levels of switch C have been tested.

7.25 Test all C switches as in 7.21 to 7.24 in the order specified in Paragraph 7.17, shifting the JG and H cords to the switch under test.

7.26 If the test set stops, typical trouble indications may be found in the table in Paragraph 6.208.

An OK check of the crosspoint under test is indicated by the buzzer if the BZ key is operated.

7.3 Secondary Switch D (Leads DC, R, T and LR)

7.31 If the buzzer is desired for an OK test indication, operate the BZ key.

7.32 Operate the DS key of the test set.

7.33 With test connections as in Paragraph 7.1, operate the ST key.

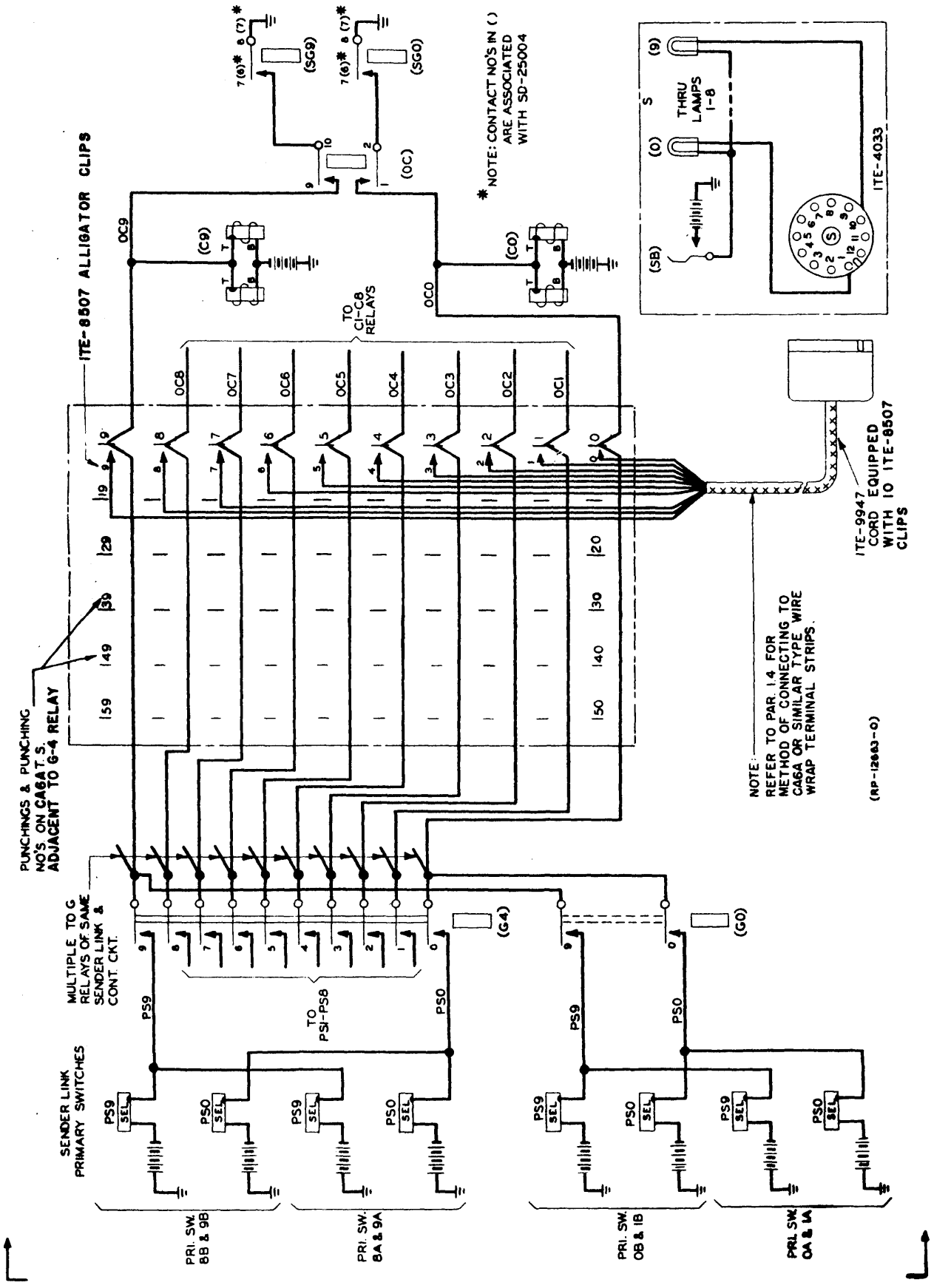

FIG. 3 SETUP FOR TEST FOR CROSSES IN PS AND OC LEADS

7.34 Manually operate and hold the hold magnet to which the JG cord is connected and then operate and release in turn hold magnets D-1, 3, 5 and 7. An OK check of the crosspoints is indicated by the buzzer. The test set advances through positions H-0, H-1, H-2, and H-3. After the crosspoints of vertical 7 have been tested lamp H-4 lights. Release the hold magnet to which the JG cord is connected.

7.35 Using key STP-H advance the test circuit to light lamp H-0. Lamp S-1 should light. Test the crosspoints of level 1 as in Paragraph 7.34.

7.36 Continue as in 7.35 until all levels of switch D have been tested.

7.37 Test all D switches as in 7.31 to 7.36 in the order specified in Paragraph 7.17, switching the JG and H cords to the switch under test.

7.38 If the test set stops, typical trouble indications may be found in the table in Paragraph 6.208. An OK check of the crosspoint under test is indicated by the buzzer if the BZ key is operated.

7.39 Remove test connections.

8. COMMON LEADS

8.01 Setup for Test

8.011 Connect 48V battery and ground to the BAT jack of ITE-4033, Link Frame Test Set, using cord ITE-9598. Block the W relay of the control circuit normal.

8.02 PS and OC Leads (See Figure 3)

8.021 On the terminal strip adjacent to the G-4 relay obtain the following association, using cord ITE-9947. (See Par. 1.4.)

ITE-9947 Leads	G-4 T.S. Pchgs.	G-4 T.S. Leads	Test Set Receptacle
0-9	0-9	PS 0-9	S

8.022 Operate the SB key. No lamps light.

8.023 Block operated the SS and the OC relays of the controller circuit. Block operated relays DA-0 to DA-4. Relays G0 to G4 operate.

8.024 Manually operate and release in turn relays SG-0 to SG-9 and observe that the associated select magnet in each switch operates and only the corresponding S lamp of ITE-4033 lights as each SG relay operates. Crossed PS leads would cause more than one lamp to light and improper select magnets to operate.

8.025 Release the DA relays.

8.026 Again operate the SG relays and observe that no primary switch select magnets operate. The operation of a select magnet would indicate falsely closed contacts on a G relay.

8.027 Release the OC and SS relays.

8.028 On one frame in the office repeat test operations 8.023 to 8.027 using the emergency control circuit. (See Par. 1.42.)

8.03 GT and RT Leads (See Figure 4)

8.0301 On the terminal strip adjacent to the G-4 relay, obtain the following association, using cord ITE-9947. (See Par. 1.4)

ITE-9947 Leads	G-4 T.S. Pchgs.	G-4 T.S. Leads	Test Set Receptacle
0-9	10-19	GT 0-9	S

8.0302 Operate the SG key of ITE-4033. Lamps S-0 to S-9 should light dimly in series with relays SG-0 to SG-9. A false closure of G- relay contacts would shunt out the corresponding S lamp. Operate and release in turn relays GB-0 to GB-9 and observe that the corresponding S lamp is extinguished as each relay is operated.

8.0303 Block the ON relay normal and the G-0 relay operated. Lamps S-0 to S-9 are shunted out.

8.0304 Observe that S-0 lamp flashes once when the C-0 magnet on 0 switch is operated and released; S-1 with the C-0 magnet on 1 switch, etc.

8.0305 Release G-0 relay and block G1 relay operated. Momentarily operate in turn the C2 hold magnets of secondary switches 0 to 9. Observe that the S-0 to S-9 lamps flash in turn.

8.0306 Repeat the test with G2 relay operated, flashing C-4 magnets; G-3 relay operated flashing C-6 magnets; and G-4 relay operated flashing C-8 magnets. Observe that the S-0 to S-9 lamps flash as before.

8.0307 With G-4 relay operated, operate and release the SGE-0 to SGE-9 relays on the sender selector unit at the miscellaneous frames and observe that S-0 to S-9 lamps light in turn as each SGE relay is operated.

8.0308 Block normal the GB-0 to GB-9 relays in the sender link frame under test. Operate and release each SGB-0 to SGB-9 relay. The S-0 to S-9 lamps are lighted as the corresponding SGB relay is operated. Remove blocks from GB-0 to GB-9 relays.

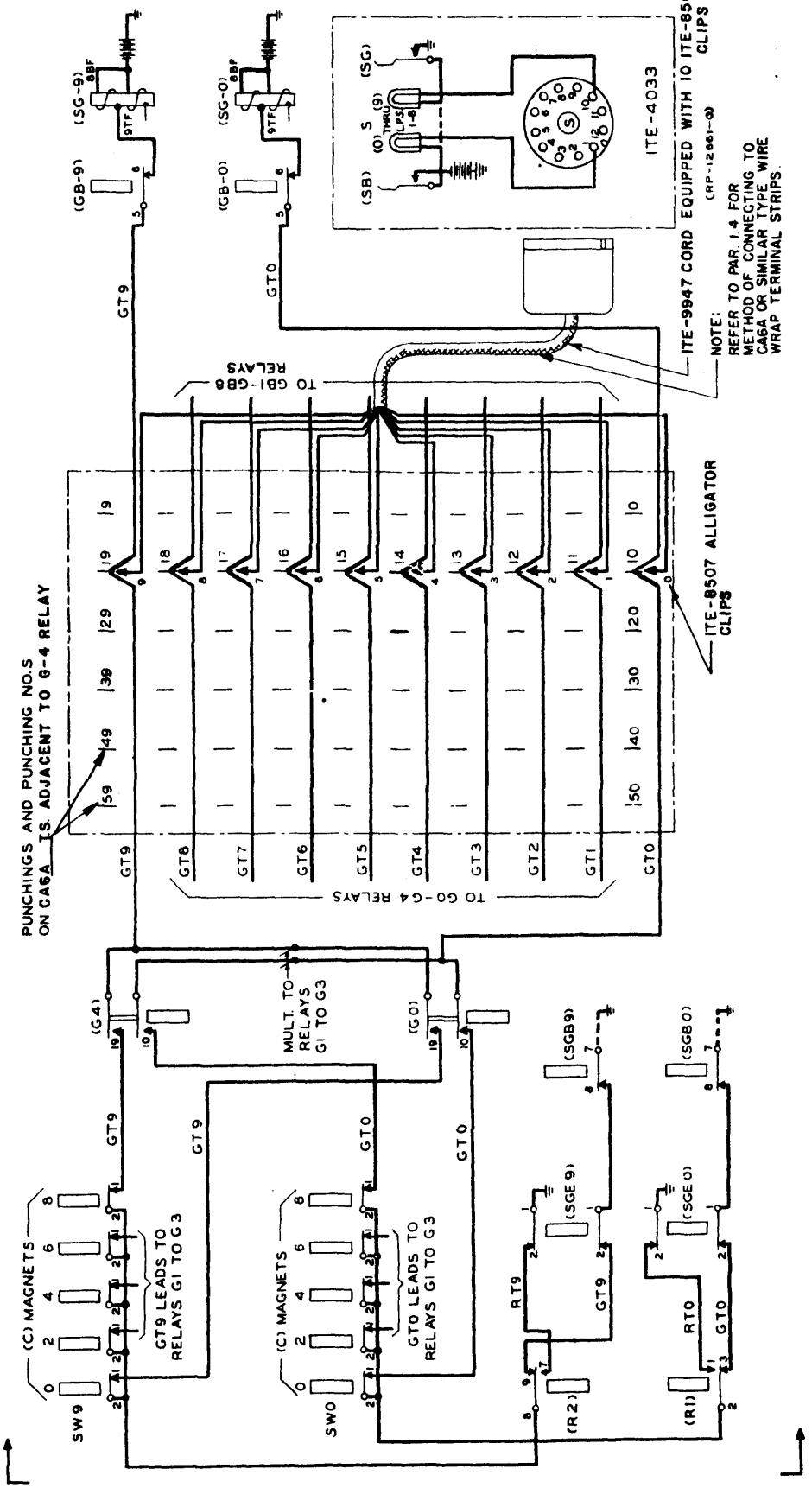

FIG. 4 SETUP FOR TEST OF GT AND RT LEADS

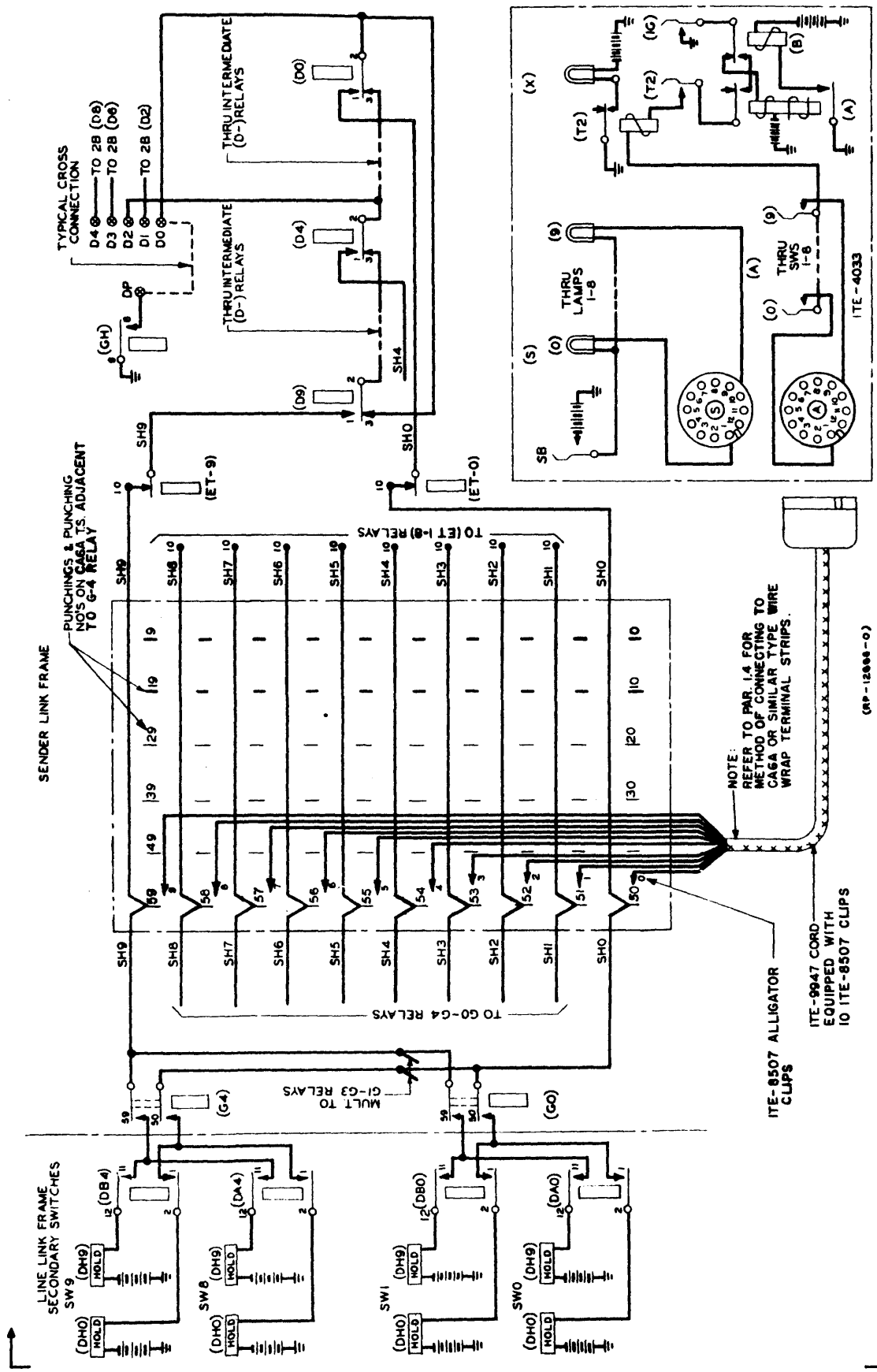

FIG. 5 SETUP FOR TEST OF SH LEADS (ORIGINAL INSTALLATIONS)

8.0309 Operate test set key SB. The S-0 to S-9 lamps light. Block operated each SGB-0 to SGB-9 relay in turn and observe that the associated S lamp is extinguished.

8.0310 Block operated R1 and R2 relays. The S0 to S9 lamps light. Manually flash relays SGE-0 to S lamp flashes. Release all relays. Remove test equipment.

8.04 SH Leads (Original Installation) (See Figure 5)

8.0401 Connect leads (0-9) of an ITE-9947 cord to terminals (50-59) of the terminal strips adjacent to the G-4 relay. Plug the cord into receptacle A of ITE-4033. Operate keys 2 and 1G.

8.0402 Block ON relay normal and G-0 relay operated.

8.0403 Operate A0 to A9 toggle switches and observe that no hold magnets are flashing on the secondary switches of the first line link frame associated with the district group circuit under test. Release A1 to A9 switches.

8.0404 Block operated the DA and DB relays associated with the first appearance line link secondary switches. The 0 magnet flashes on the odd and even switches. If any leads are crossed or if there is false continuity of DA or DB relays at other appearances, the test set X lamp will flash.

8.0405 Release the A0 switch and check each SH lead by operating each switch A1 to A9 in turn releasing one switch before operating the next. Release the DA and DB relays.

8.0406 Repeat the tests of Paragraph 8.0403 to 8.0405 at each line link appearance of the district group 0.

8.0407 Perform the tests on each district group circuit, associated with line link frame, operating the G-1 to G-4 relays as required.

8.0408 Release the operated G- relay. Remove the plug from the A receptacle and insert in the S receptacle of ITE-4033 and operate the SB key.

8.0409 Block the GH relay operated. Operate and release in turn the D0 to D9 relays. The corresponding S lamp should flash.

8.0410 Block operated the D relay associated with the DP to D punching cross-connection and note that the associated S lamp lights. Refer to the following chart to determine which relay to block operated.

DP Pchg. Cross Conn. to	Block Operated
D0	D0
D1	D2
D2	D4
D3	D6
D4	D8

8.0411 Operate and release the D- relay next lower in the chain and note that the S lamp does not change. Operate and release the D- relay next higher in the chain. The S lamp should not change.

8.0412 Make the tests per Paragraphs 8.0409 to 8.0411 on one frame with the frame connected to the emergency control circuit. (See Par. 1.42.)

8.0413 Release all relays and remove the test connections.

8.05 SH Leads (Additions Only) (See Figure 6)

8.051 At the horizontal side of the DJGF connect leads 0 to 9 of an ITE-9947 cord to 0 to 9 punchings (SH0 to SH9 leads) associated with the first district junctor group (Group 0-1) of the sender link frame under test. Plug the cord into the S receptacle of ITE-4033 and operate the SB key.

8.052 Block operated relay (G4). Momentarily ground each SH0 to SH9 lead in the district junctor group associated with (G4). Observe that no lamps light. This checks false continuity of the G0 relay contacts. Release relay G4.

8.053 Block operated relay (G0). Momentarily ground each SH0 to SH9 lead in the district junctor groups associated with relays (G1 to (G4). Observe that no lamps light. This checks false continuity of the G1 to G4 relay contacts. Release relay (G0).

8.054 Block normal the ON relay and block operated the G0-G4 relays that are associated with line link frames. No lamps should light.

8.055 Momentarily ground the SH0-9 leads of each district junctor group at the DJGF. One of the S-0 to S-9 lamps light as the corresponding numbered punching is grounded. More than one lamp lighting at a time will indicate crossed leads. Release the G1-G4 relays.

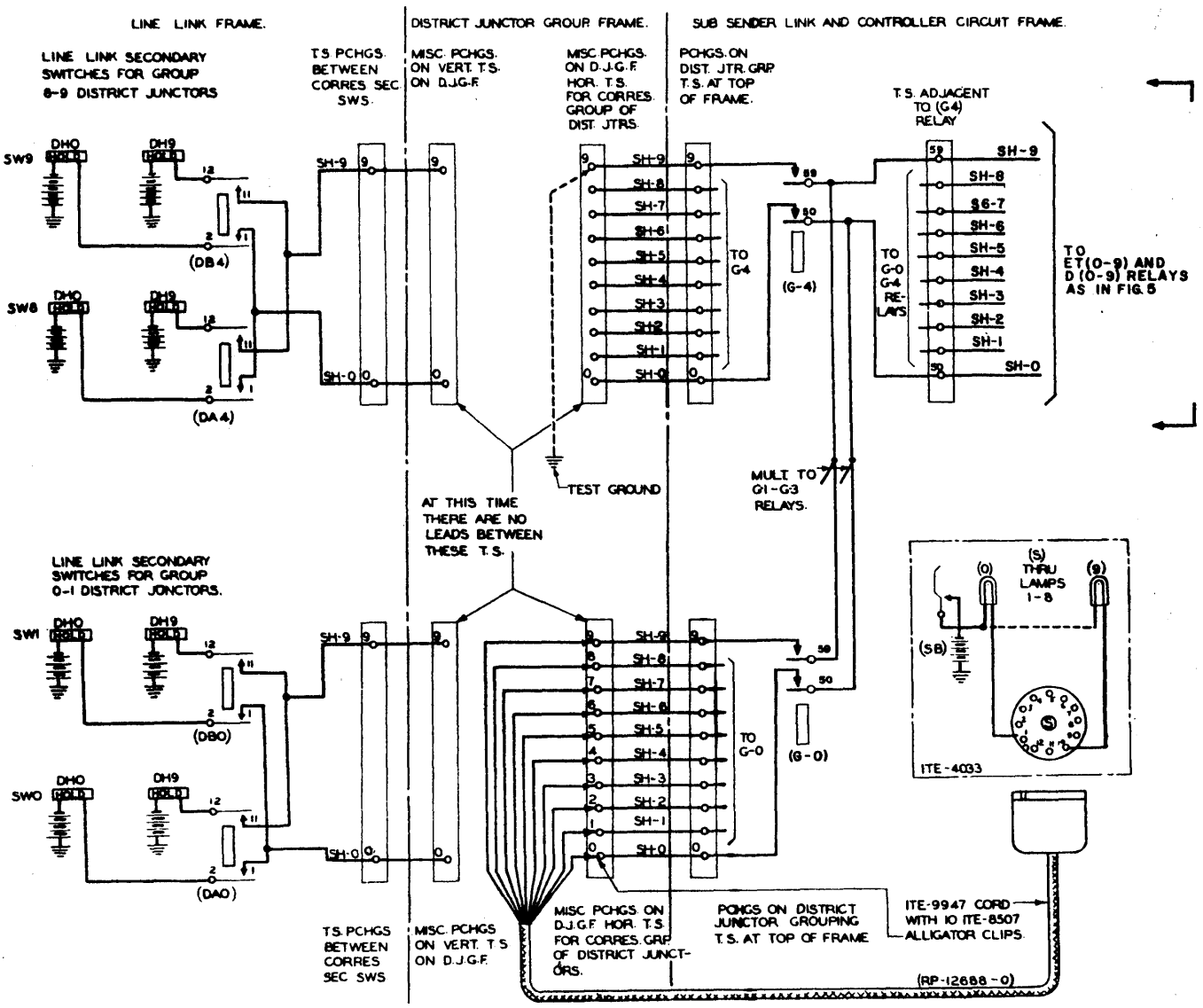

FIG. 6 SETUP FOR TEST OF SH LEADS (ADDITIONS ONLY)

8.06 TA, TB, RA and RB Leads (Additions Only) (See Figure 10)

NOTE 1: This test should be made on additions only since these leads are checked on original installations as outlined in Section 101.

NOTE 2: Make the following test connections and tests only on district junctor group circuits associated with subscriber districts (Figure 4 of SD-25004-011 or SD-25554-0102). They are not made on group circuits per Figure 14 of SD-25004-013 or SD-25554-0105.

NOTE 3: Extend the leads of the ITE-9947 cord, where required, by the use of ITE-9547 cords with R-2818 connectors.

8.061 At the horizontal side of the DJGF connect leads 0 to 9 of an ITE-9947 cord (see Note 3), to the TA and TB leads of the five district junctor groups as follows: Connect leads 0, 2, 4, 6 and 8 to the TA leads punchings #27, of district junctor groups 0-1, 2-3, 4-5, 6-7 and 8-9 respectively. In like sequence connect the 1, 3, 5, 7 and 9 leads to the TB leads, punchings #28. Plug the cord into the S receptacle of ITE-4033.

8.062 Plug a second ITE-9947 cord (see Note 3) into the S1 receptacle. Connect the 0, 2, 4, 6 and 8 conductors to the RA leads, #25 punchings, and connect the 1, 3, 5, 7 and 9 conductors to the RB, #26 punchings, in the same order as the connections were made to the TA and TB punchings per Paragraph 8.061.

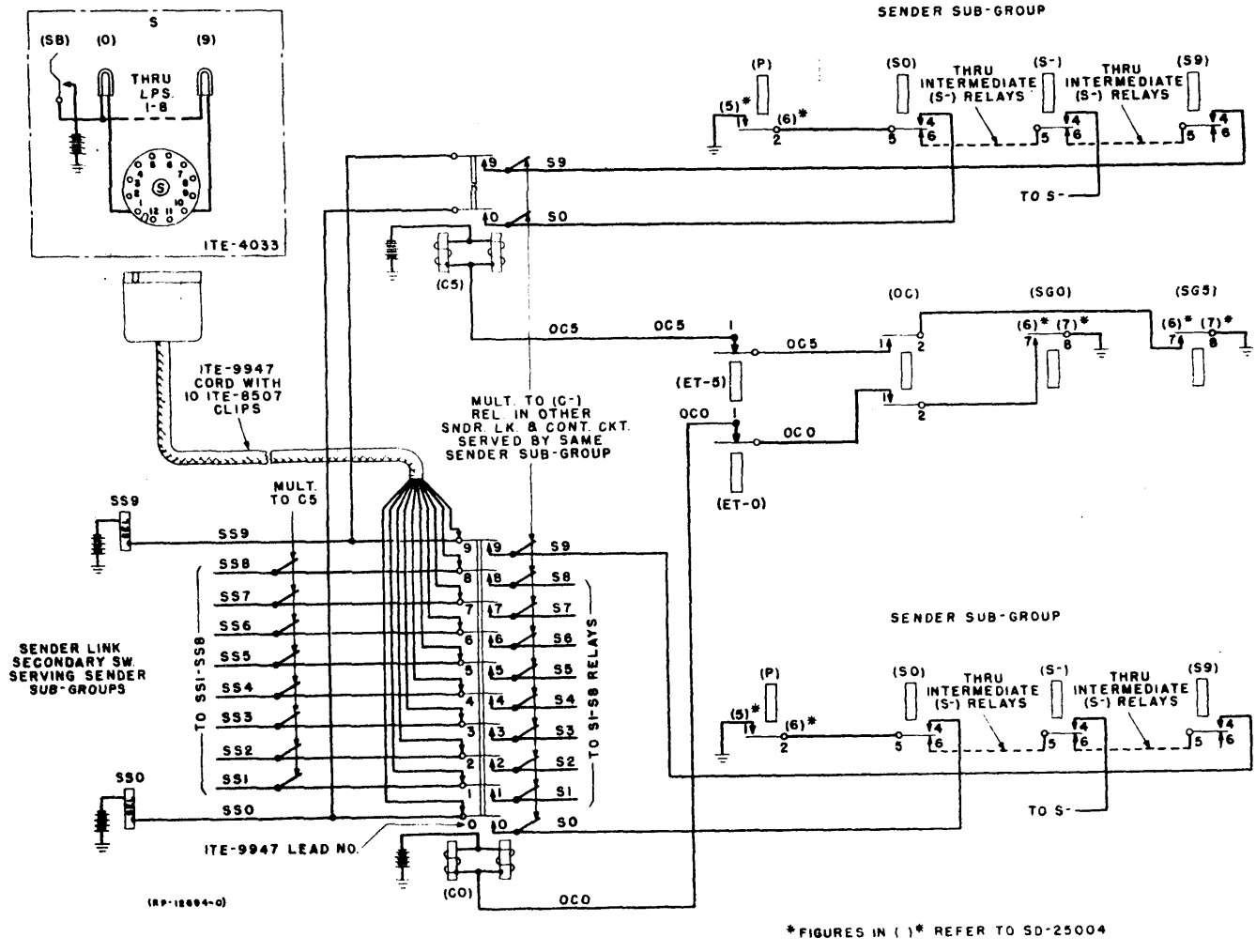

FIG. 7 SETUP FOR TESTING SSO TO SS9 LEADS

8.063 Operate the SB and S1B keys. Lamp S-0 to S-9 and S1-0 to S1-9 light.

8.064 Insert a make busy plug into the MB0 jack. Lamps S0, S1, S1-0 and S1-1 are extinguished. Remove the plug and insert in MB1 to MB4 jacks in turn and observe the lamps are extinguished as follows:

Plug in Jack	Lamp Extinguished	Plug in Jack	Lamp Extinguished
MB1	S2,S3,S1-2,S1-3	MB3	S6,S7,S1-6,S1-7
MB2	S4,S5,S1-4,S1-5	MB4	S8,S9,S1-8,S1-9

8.065 Open the 1T-2T contacts of CA relay of the first (0-1) district junctor group. The S-0 and S1-0 lamps are extinguished. While holding open the relay contacts manually flash the RA relay. The S1-0 lamp flashes. Reclose the contacts of CA relay. Lamps S-0 and S1-0 light.

8.066 Repeat the tests with the CB and RB relays. S-1 and S1-1 lamps will be observed.

8.067 Make the tests on the remaining district junctor groups observing the associated lamps in each case.

8.07 SS-0 to SS-9 Leads (See Figure 7)

8.071 Using an ITE-9947 cord and alligator clips, connect leads 0 to 9 terminals 0 to 9 (SS leads) of relay C-0. Insert the plug end of the cord into the S receptacle of ITE-4033. The SS leads are multipled at the C relays as follows: Relays C-0, and C-5, C-1 and C-6, C-2 and C-7, C-3 and C-8, C-4 and C-9, therefore the (SS) leads should be tested through the C- relay to which the test connection is made and the relay in multiple before shifting the test connection.

8.072 Operate the SB key of ITE-4033 and observe that no S- lamps light.

8.073 Block operated the SGB relay and the P relay of the sender selector circuit serving the C-0 relay.

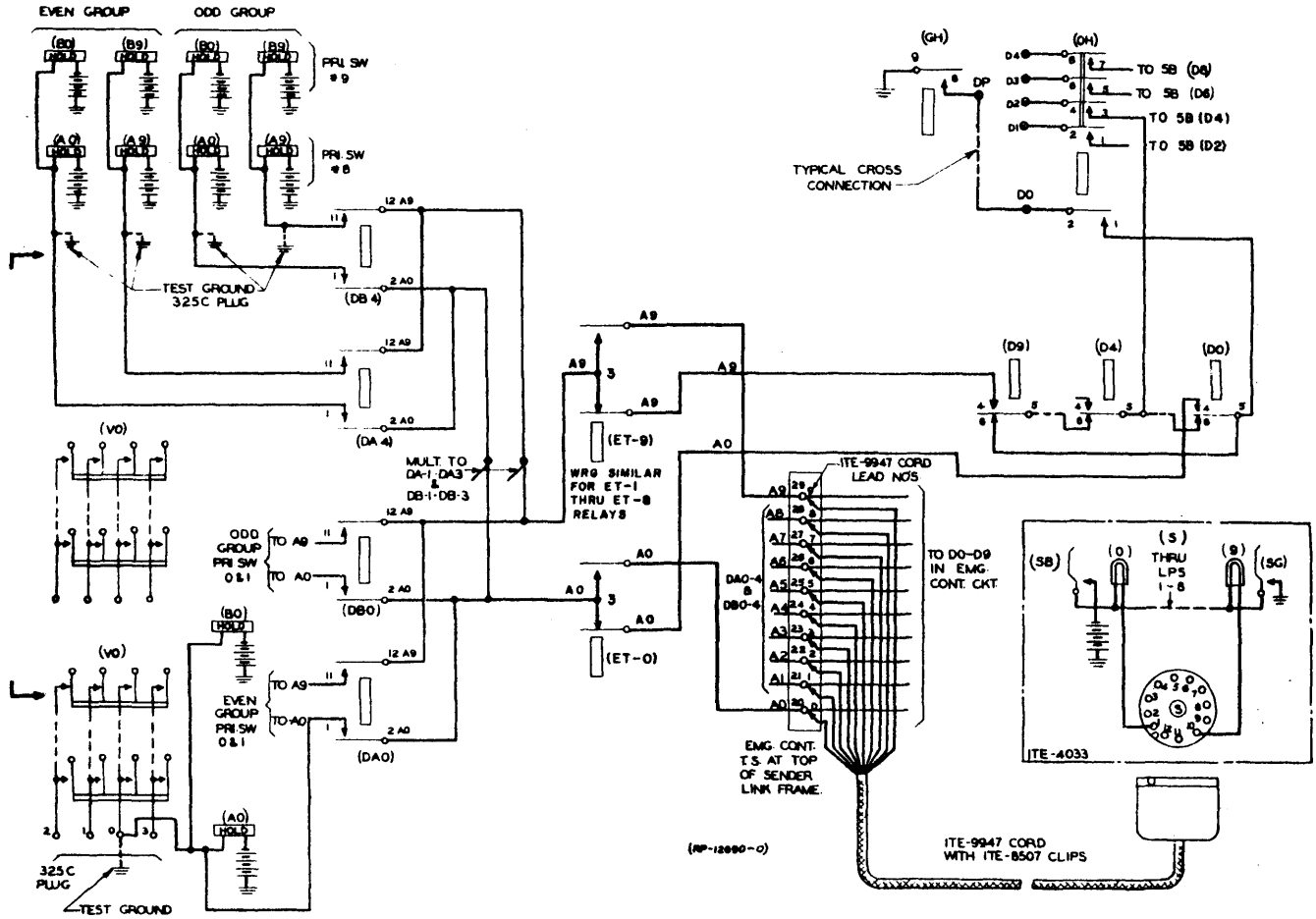

FIG. 8 SETUP FOR TEST OF A0-A9 LEADS

8.074 Manually operate and release sender selector relays S-9 to S-0 of the sender selector circuit and observe that no S lamps light. An S lamp lighting would indicate a false closure of contacts on relay C-0.

8.075 Insulate #16 contact of C0 relay. Block relays 0C and SG-0 operated. Relay C-0 operates.

CAUTION: Under no circumstances should the SG key be operated while this test is being made. The SG key operated would cause the SC-1 relay of all senders of a sub-group to operate when a C- relay is operated. With the SC-1 relays operated, the frame indication leads of the sub-group are connected in parallel, causing an excessive current flow through the F- contacts of the operated C- relay.

8.076 Again operate and release relays S-9 to S-0 and observe that the corresponding S lamp lights while the relay is operated. More than one lamp lighting would indicate crossed S, SS or SC leads. Release relays SG-0, SGB and P of the sender selector circuit and remove insulation from contact #16 of relay C0.

8.077 Perform operations 8.073 to 8.076, blocking relays of the sender selector circuit serving relay C-5 and relay SG-5. Insulate contact #16 of C-5.

8.078 Test succeeding appearances through the C- relays as in Paragraph 8.073 to 8.077 shifting the test connection to one C- relay of each pair.

8.79 Upon completion of the test, release all blocked relays and remove the test connections and contact insulation.

8.08 A 0-9 Leads (See Figure 8)

8.081 Using alligator clips, connect the 10 leads of an ITE-9947 cord to punchings 20 to 29 on the EM.CONT. terminal strip at the top of the frame. Connect the plug end of the cord to the S receptacle of ITE-4033. Block relays G(0-4) normal and ET(0-9) operated.

8.082 Operate the SG key. No lamps should light. A lighted S lamp would indicate false closure of contacts on a DA or DB relay which would cause the S lamp to light in series with the A and B hold magnets in parallel.

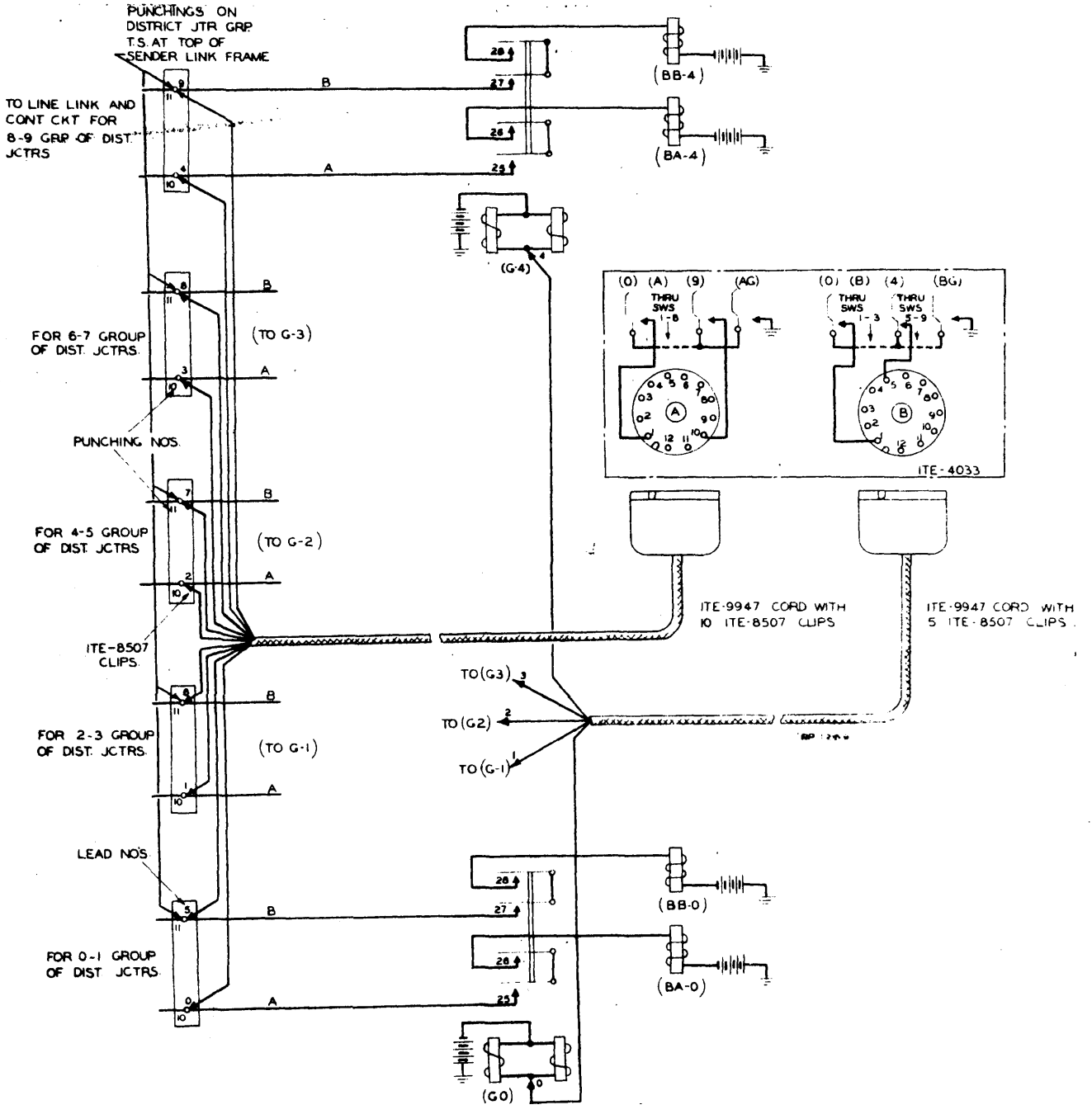

FIG. 9 SETUP FOR TEST OF A AND B LEADS

8.083 Block relays DA 0-4 and DB 0-4 operated. Lamps S 0-9 should light in series with the A and B hold magnets in parallel.

8.084 Momentarily connect a 325-C make busy plug to the test jack of verticals 0 to 9 of the A primary switch for the first sub-group of 10 district junctors. Observe that only one lamp is extinguished while the make busy plug is in the test jack. Continue the test for the remaining A primary switches in the frame under test.

8.085 Release key SG and relays DA and DB. Remove the ITE-9947 cord from the Emergency Co.. roller T.S. at the top of the frame. Using alligator clips, connect the 10 leads of this cord to terminal 3 of relays ET (0-9). Operate the SB key of the test set. Block operated the GH and OH relay. Manually operate and release in turn D (0-9) relays and observe that the associated S lamp lights. During this test while the relay under test is operated, operate and release the next higher relay in the chain and observe that the associated S lamp does not light except when the one with the DP cross-connection is the next higher in the chain at which time its associated S lamp will light and the S lamp of the relay under test will be extinguished. Block operated relay DA-0, manually operate and release in turn the D0-9 relays. Observe hold magnets 0-9 on switch A-0 left will operate as each D0-9 relay is operated. Remove blocking tool from relay DA-0.

Block operated relay DB-0, manually operate and release in turn relays D0-9. Observe relays hold magnets 0-9 on switch A-0 right will operate. Remove blocking tool from relay DB-0 and block operated relay DA-1. Continue checking the primary switch A0-9 hold magnets left and right.

8.086 Remove the blocking tools and the test connections.

8.087 On one frame in the office, repeat the tests per Paragraph 8.085 with the frame connected to the emergency control circuit (See Paragraph 1.42).

8.09 A and B Leads (See Figure 9)

8.091 Using alligator clips, connect the leads of an ITE-9947 cord as follows: Leads 0 to 4 to terminal 10 and leads 5 to 9 to terminal 11 of each of the groups designated 0-1, 2-3, 4-5,6-7, 8-9 respectively at the district junctor group terminal strips at the top of the sender link frame. Insert the plug end of the cord into the A receptacle of the ITE-4033.

8.092 Using another ITE-9947 cord and alligator clips connect leads 0 to 4 to the windings of the G0 to G4 relays respectively. Insert the plug end of the cord into the B receptacle. Operate the AG and GB keys.

8.093 When testing district group circuits arranged for dialing district junctors (Fig. 14 of SD-25004-013 or SD-25554-0105), operate AB key on the test set. For other district group circuit (Figure 4 of SD-25004-011 or SD-25554-0102) operate the AG key

NOTE: During the test, observe that only the BA or BB relay under test operates.

8.094 Operate the A-0 key and observe that no BA or BB relays operate. Operate the B-0 key and observe that the BA-0 relay operates when the G-0 relay operates. Release the A-0 and B-0 keys and the relays release. Repeat this test using the A-1 to A-4 and the B1 to B4 keys checking the BA-1 to BA-4 relays respectively.

8.095 Operate the A-5 key and observe that no BA or BB relays operate. Operate the B-0 key and observe that the BB-0 relay operates when the G-0 relay operates. Release the A-5 and B-0 keys and the relays release. Repeat this test using the A-6 to A-9 keys with the B1 to B4 keys checking the BB-1 to BB-4 relays respectively.

8.10 DA 0-4, DB 0-4 and DG 0-9 Leads

8.101 Block relay TC operate in order to extend the G leads to the test circuit.

8.102 Manually operate and release in turn, relays BA-0 to BA-4 and BB-0 to BB-4 and observe that only one DA or DB relay operates as each BA or BB relay is operated. More than one DA or DB relay operating indicates crossed DG leads when SD-25004 is provided, or crossed DA or DB leads when SD-25554 is provided.

8.103 Release the TC relay.

8.104 On one frame in the office, repeat the test with relays ET (0-9) blocked operated.

8.11 PA Leads (See Figure 11)

8.111 Plug a cord ITE-9947 into the S receptacle of ITE-4033 and connect leads 0 to 4 to the five district junctor groups as follows connecting lead 0 to group 0-1, lead 1 to group 2-3, etc.

(a) District junctor groups arranged for dialing district junctors (Figure 14 of SD-25004-013 or SD-25554-0105): connect the corresponding lead to MISC punching #2 on VERT.T.S. on district junctor unit.

(b) District junctor groups associated with line link frames (Figure 4 of SD-25004-011 or SD-25554-0102): connect the corresponding leads to the TA leads, punchings #27, on the DIST.JCTR.T.S. at the top of the sender link frame.

8.112 Operate test set key SB. Lamps S0 to S4 light. Block operated relays GB-1 to DB-9 and observe that no lamps are extinguished. The lamps light through GB0 to ground at the D hold magnet normal springs.

8.113 Flash in turn hold magnet D1, D3, D5, D7 and D9 on secondary switch 0 associated with sender group 0. The S0 lamp flashes with the D1 magnet, S1 with the D3 magnet, etc. If any leads are crossed the lamps will not flash.

8.114 Block GB-0 relay operated, all lamps are extinguished. Release GB-1 relay. All lamps light.

8.115 Repeat the tests of Paragraph 8.113 flashing the D hold magnets associated with sender group 1.

8.116 Repeat the tests of Paragraphs 8.114 and 8.115 using relays GB-2 to GB-9 and flashing the D magnets of the associated sender groups.

8.12 BT0-9 and D0-9 Leads - District Group Circuits Arranged for Subscriber District Junctors (Fig. 4 of SD-25004-011 or SD-25554-0102 (See Figure 12)

NOTE: Omit the following tests on any district group circuits arranged for dialing district junctors.

8.1201 Using alligator clips, connect the 10 leads of an ITE-9947 cord to punchings 100 to 109 on the EM.CONT T.S. at the top of the frame. Insert the plug end into the S receptacle of ITE-4033.

8.1202 Block relays ON normal and ET (0-9) operated. Perform those tests per Paragraph 8.1205 through Paragraph 8.1213 before proceeding with Paragraphs 8.1203 and 8.1204.

8.1203 Using alligator clips, connect the 10 leads of an ITE-9947 cord to terminal 11 of relays ET (0-9). Insert the plug end into receptacle S of ITE-4033.

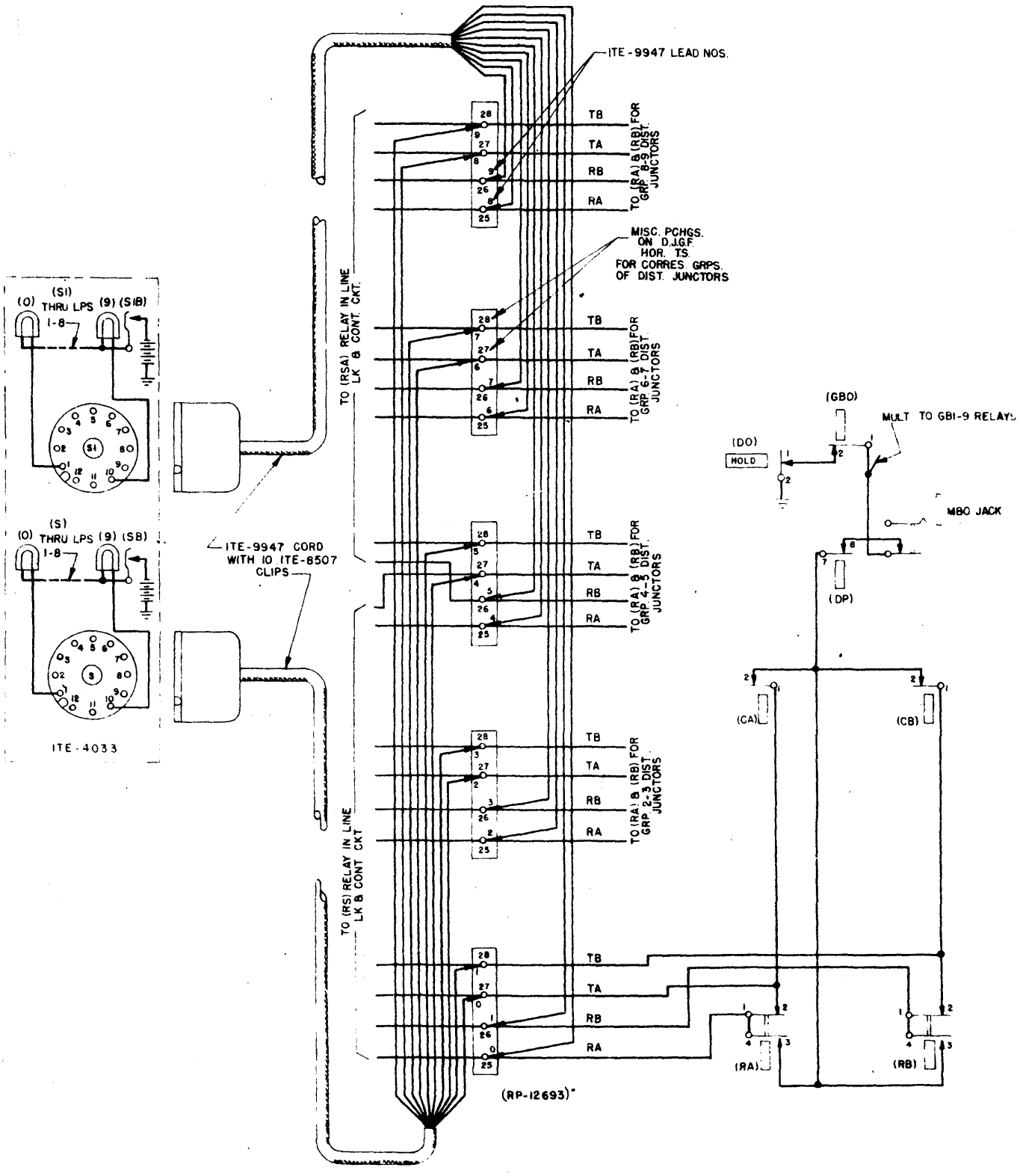

FIG. 10 SETUP FOR TESTING TA, TB, RA AND RB LEADS (ADDITIONS ONLY)

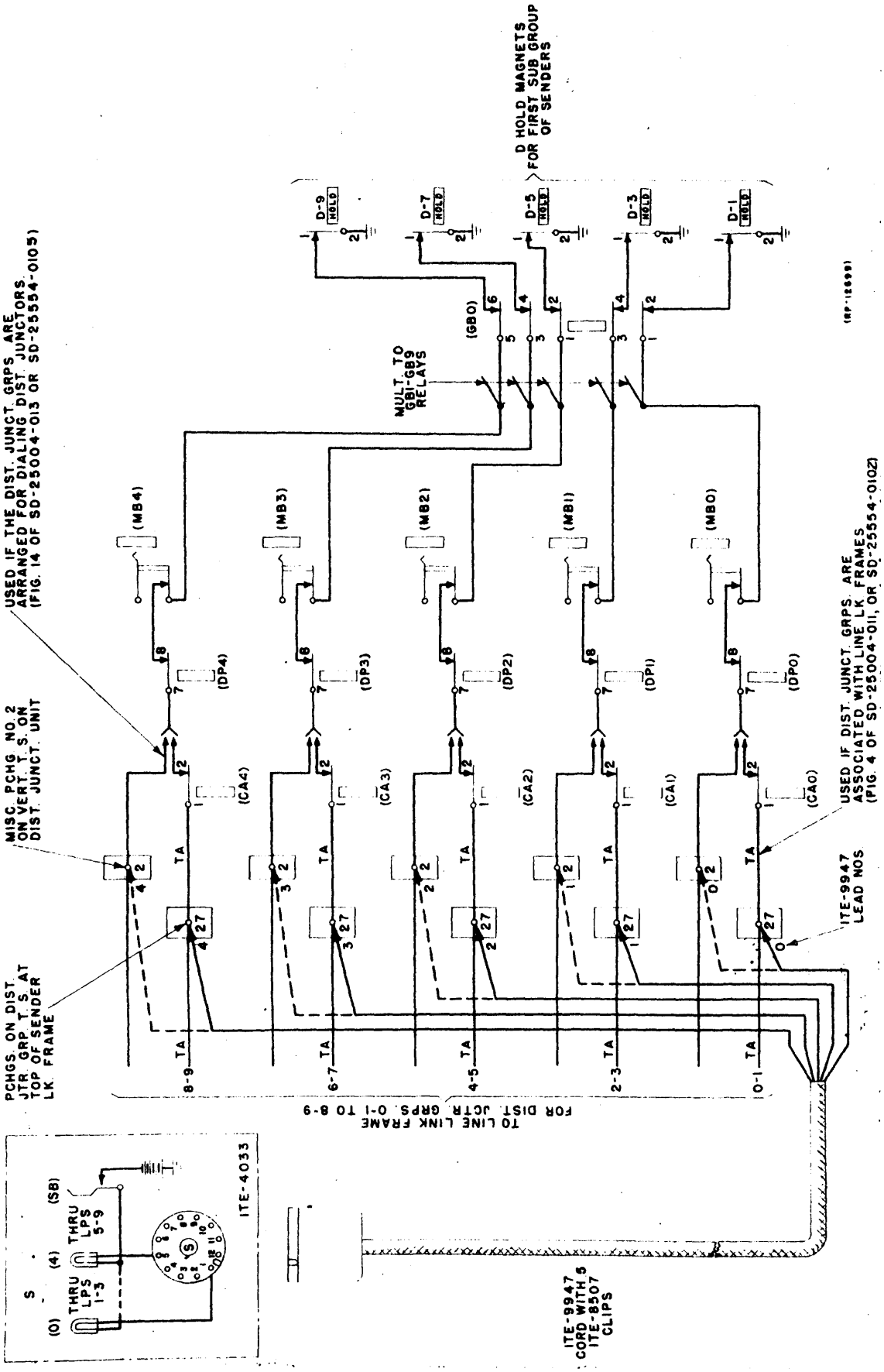

FIG. 11 SETUP FOR TEST OF PA LEADS

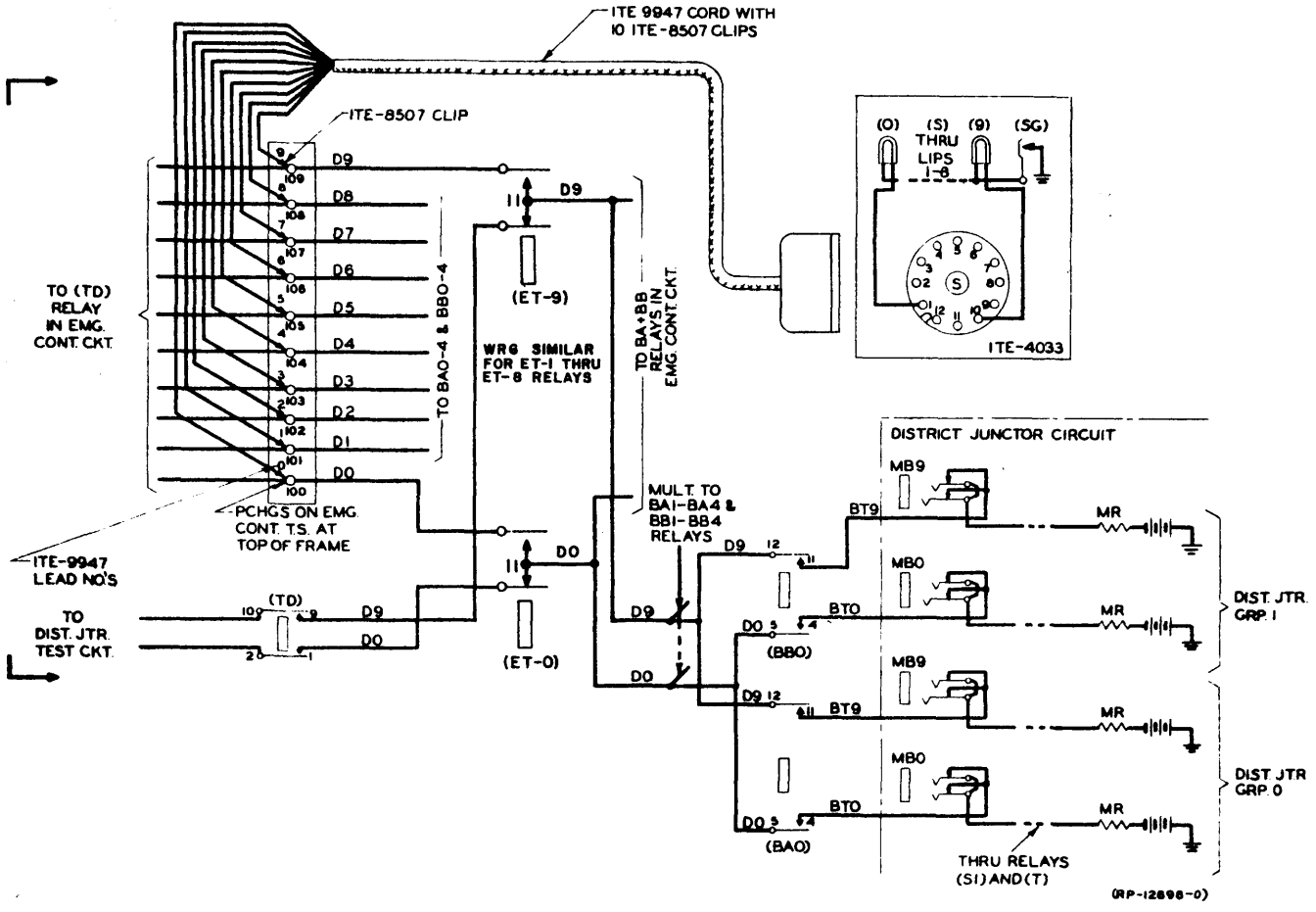

FIG. 12 SETUP FOR TESTING BTO-9 AND DO-9 LEADS - DISTRICT GROUP CIRCUITS ARRANGED FOR SUBSCRIBERS DISTRICT JUNCTORS

8.1204 Block relay ON normal and performs tests per Paragraph 8.1205 through Paragraph 8.1217.

8.1205 Operate the SG key. No S lamps should light. A lighted S lamp would indicate false closure to contacts on a BA or BB relay which would cause the S lamp to light in series with the MR resistance of a district junctor.

8.1206 Momentarily operate in turn, relays BA-0 to BA-4 to BB-0 to BB-4 and note that lamps S 0-9 light each time a relay is operated.

NOTE: If a district junctor circuit is not equipped the corresponding lamp will not light.

8.1207 Block relays TD, BA 0 and BB 0 operated. Lamps S 0-9 should light in series with a parallel combination of the MR resistances of the district junctors.

8.1208 Using 2 make busy plugs insert plugs into the MB jacks of district junctors 0 of district junctor subgroups 0 and 1. Observe that lamp S0 is extinguished indicating that the BT leads serving the 0 district junctors are not crossed with other BT leads.

8.1209 Remove the plugs from the 0 MB jacks and insert them in the 1 MB jacks. Lamp S1 is extinguished.

8.1210 Test the remaining BT leads in the same manner inserting plugs into the associated MB jacks.

8.1211 Repeat the tests on each district group circuit blocking BA-1 and BB-1 relay for the (2-3) group, BA-2 and BB-2 relays for the (3-4) group, etc.

8.1212 On one frame block operated the TD relay of the emergency control circuit in addition to the TD relay of the frame circuit while making the test.

8.1213 Remove the blocking tools from the TD, ON, BA- and BB- relays. Remove the test connections.

8.1214 Block the W relay normal. Insert make busy plugs in the MB jacks of the ten circuits of district junctor subgroup 0 and block operated the BA-0 relay. The DA-0 and G-0 relays operate. The ON relay operates. Observe that no D relays operate.

8.1215 Insulate contacts 1B and 3B of TM relay. Remove and reinsert the plug at the MB0 to 9 jacks in turn. No D relays should operate.

8.1216 Block relay DE operated. Again remove and reinsert the plugs at the MB jacks. Observe that as each plug is removed the associated D relay operates and locks.

8.1217 Remove all plugs and relay blocking tools. Remove insulation from contacts 1 and 3B of TM relay.

8.13 BTO-9 and DO-9 Leads of District Group Circuits Arranged for Dialing District Junctors (Fig. 14 of SD-25004-013 or SD-25554-0105)

8.131 Block normal the AG and BG relays of the district group circuit. Block operated the BA- relay associated with the first subgroup of dialing district junctors. The associated DA and G relays operate. Relays ON and CD operate. Block the W relay normal.

8.132 Block operated the DE relay and observe that no D- relays operated. Manually operate and release the ST-0 to ST-9 relays of the first subgroup of dialing district junctors. Observe that only the corresponding D- relay operates when an ST- relay is operated, that is, the D-0 operates with ST-0, D-1 with ST-1, etc.

8.133 Release the BA- relay. The DA-, G-, etc. relays release.

8.134 Block operated the BB- relay. The DB-, G-, ON and CD relays operate.

8.135 Make the tests of Paragraph 8.132 operating the ST relays of the odd subgroup of district junctors.

8.136 Remove all blocking tools.

8.14 T and R Lead Reverses

8.141 From the job sender multiple drawing T- (job base No.) -5840 determine the sender link frame secondary switches on which the first sender has appearances.

8.142 At the sender the T and R leads are on punchings 50 and 60 respectively on the terminal strip on the sender unit. At the secondary switch appearances on the sender link frames the T and R leads appear at the 2 and 1 terminals respectively on the horizontal multiple of the D switches. Sender 0 of the subgroup is on 0 horizontal, sender 1 on horizontal 1 and so forth.

8.143 Using ITE-4137 AC continuity test set as outlined in Handbook 50 Section 2 check the continuity of the T and R leads from the sender unit terminal strip punchings 50 and 60 respectively to each of the secondary switch appearances at the sender link frames. Do not use frame ground as the return path to the test set from the distant end of the lead under test, run a wire for that purpose.

8.144 Repeat Paragraphs 8.141 to 8.143 for each sender furnished.

9. CA, CB, RA, RB, A AND B RELAYS

9.1 Make the ten district junctors of sub-group 0 of the associated district junctor frame busy.

9.2 Manually operate relay (CA-0) and note that it locks.

9.3 Remove and reinsert the plug from each district junctor MB jack and note that relay (RA-0) operates each time that a plug is removed.

9.4 Remove the plugs from any two MB jacks and observe that relay (CA-0) is shunted down by the operation and release of marginal relay (A-0) which is designed to operate only when two or more district junctors are available.

9.5 Release the district junctors of sub-group 0 and insert the 298A plugs into the MB jacks of district junctor sub-group 1.

9.6 Manually operate relay (CB-0) and note that it locks.

9.7 Perform test operations 9.3 to 9.5 to check relays (RB-0), (CB-0) and (B-0).

9.8 Repeat the test using relays (CA-1), (CB-1), etc., to (CA-4) and (CB-4).

10. DP RELAYS

10.1 Manually operate and release relay ON-1 of the sender link frame under test and observe that relays DP-0 to DP-4 operate while relay ON-1 is operated.

10.2 Insert make busy plugs into the 0 to 4 MB jacks and note that relays DP-0 to DP-4 operate.

10.3 Block relays RA 0 to 4 and RB 0 to 4 normal.

10.4 Manually operate relays CA-0 to CA-4 and CB-0 to CB-4 and note that they lock.

10.5 Remove the plugs from the MB jacks and note that the DP relays remain operated. Remove the blocks from all RA and RB relays. All relays release.

11. TROUBLE HOLDING PATH FOR GP RELAYS

11.1 Block relay HD operated.

11.2 Manually operate relay GP-4 and note that it locks.

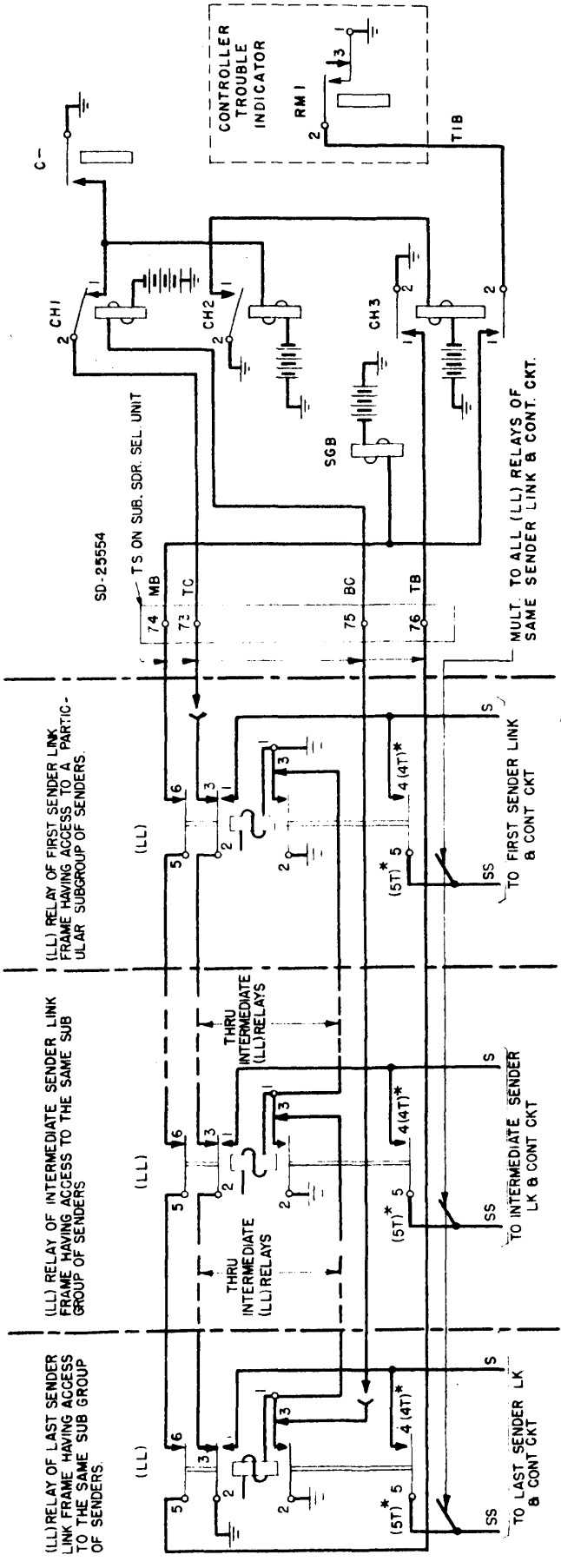

FIG. 13 CHECK OF LL- AND CH- RELAYS

11.3 Manually operate relay GP-3 and note that it locks and that GP-4 releases.

11.4 Manually operate in turn relays GP-2, GP-1 and GP-0 and note that each relay remains locked up until the next lower number relay is operated.

11.41 Release relay HD.

11.5 This test should also be made on the emergency control circuit. (See Par. 1.42.)

12. HOLDING PATHS FOR RL RELAY

12.1 Apply ground through a test receiver to contact 2B of relay RL. Manually operate relay RL and note that it locks. Remove the ground from contact 2B and note that relay RL releases.

12.2 Apply the ground to contact 2T of relay FS. Manually operate relay RL and note that it locks. Remove the ground from contact 2T of relay FS and note that relay RL releases.

13. LL- AND CH- RELAYS (See Figure 13)

NOTE: This test cannot be made on additions. The wiring of the chain circuits must be checked as the new chain circuits are established.

13.1 LL- Relay Chain

13.11 Starting with the sender link frame having first access to sender sub-group 0, check that contact 3T of the corresponding LL- relay is grounded. Block the LL- relay operated and check that the ground is removed. Check the 3T contacts of the LL- relays at each succeeding appearance in the same manner leaving the LL- relay blocked operated.

NOTE: When a sender subgroup has more than one secondary switch appearance on the same sender link frame, insulate contacts 4T and 5T for SD-25004 or 4B and 5B contacts when SD-25554 is provided of the LL- relay at which the test is being made.

13.12 Starting with the LL- relay at the last appearance check that contact 1B is grounded and that the ground is removed when the relay blocking tool is removed and the relay released. Check the 1B contacts of the LL- relays at each preceding appearance except the first in the same manner.

13.13 Remove the relay blocking tool from the first LL- relay and then check that contact 3B of the last appearance is grounded.

13.14 Repeat test operations 13.11 to 13.13 until all LL- relays controlling the order of preference to all sender subgroups have been tested.

13.2 CH1, CH2 and CH3 Relays

NOTE: Perform this test when Figures 9 and D, E and F per SD-25554 are provided. Do not perform this test when Figure 151 or 152 per SD-25554 is provided or SSL per 25004 is furnished.

13.21 At the sender link frame, having first position in the LL chain for sender subgroup 0, momentarily insulate in turn contacts 2 & 3T and 1 & 3B of the LL- relay associated with subgroup 0. Observe that the CH3 and SGB relays at the sender selector unit located on the miscellaneous frame operate, and the minor alarm sounds each time a contact is insulated.

13.22 Block normal AL relay and block operated the LL- relay and observe that the CH3 relay operates but the SGB relay does not.

13.23 At the sender link frame momentarily operate relay C- associated with sender subgroup 0. Observe that relay CH3 momentarily releases.

13.24 At the controller trouble indicator block operated relay RM1. Observe that sender selector unit relay SGB operates.

13.25 Momentarily insulate 1 & 2B contacts of relay CH3. Observe that relay SGB momentarily releases. Release relay RM1.

13.26 Release relays AL and LL- at the sender link frame.

13.27 Repeat Paragraphs 13.21, 13.22, 13.23 and 13.26 at the remaining sender link frames having access to sender subgroup 0. Paragraphs 13.24 and 13.25 need be performed only once for each subgroup.

13.28 Repeat Paragraphs 13.21 to 13.27 for each remaining sender subgroup.

14. GP, SG AND LL RELAYS (See Figure 14)

14.1 Setup for Test

14.11 Connect 48 volt battery and ground to the BAT jack of ITE-4033, link frame test set using cord ITE-9598.

14.12 When SD-25554 is provided block the W and CK relays of the control circuit normal. When SD-25004 is provided, block only the W relay normal.

14.13 Using 5 alligator clips connect leads 0 to 4 of an ITE-9947 cord to punching 37 of each group on the DIST. JUNCTOR GRP. terminal strips on the top of the frame. This punching is the GP lead to the associated line link and group controller circuit. Insert the plug end of the cord into the A receptacle of ITE-4033.

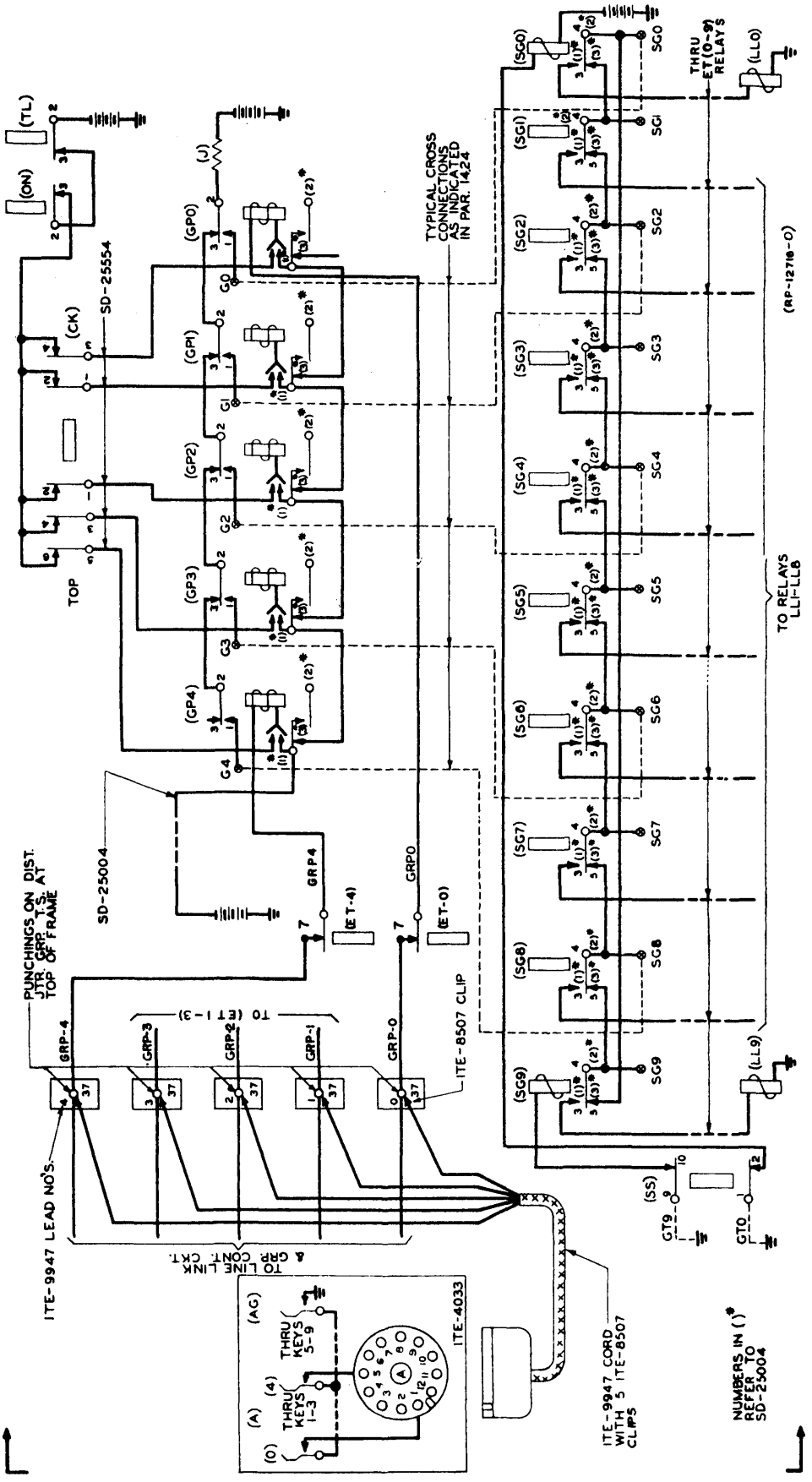

FIG. 14 SETUP FOR TEST OF GP, SG AND LL RELAYS

14.2 Test Operations

14.21 Operate keys A 0-4 and then key AG on test set. Relays GP 0-4 operate. Check that the proper (L--) and (SG-) relays operate as determined by the cross-connection information furnished for the G- and SG- punchings on the wiring list. The (SG-) relay operated should be the one whose SG- punching is cross-connected to the GO punching. The (L--) relay associated with the operated (SG-) relay should operate. Release the A 0-4 keys and AG key. This constitutes step (a) in test sequence, Paragraph 14.24.

14.22 Operate the A 1-4 keys and then the AG key. Relays GP 1-4 operate. Check that the (SG-) relay associated with the SG- punching that is cross-connected to the G1 punching, and its associated (LL-) relay operate. Release the A 1-4 and AG keys. Step (b) in test sequence Paragraph 14.24.

14.23 Continue the test operations through the remaining steps (c to j) as indicated in the typical example given in Paragraph 14.24. It is to be noted that the (SG-) relay to be blocked normal in step (f) is the one whose SG- punching is cross-connected to the GO punching, in step (g) it is the (SG-) relay whose SG- punching is cross-connected to the G1 punching, and so on to G4 in step (j).

14.24 Test operations for a typical set of cross-connections, with punchings G-0, SGO, G-1 - SG2, G-2 - SG4, G-3 - SG6 and G-4 - SG8 connected, (see Figure 14), are given in the following table:

Test Sequence	SG Rel. Blocked Normal	A Keys Operated	GP Relays Operate	LL Relay Operates	SG Relay Operates
(a)	-	0-4	0-4	0	0
(b)	-	1-4	1-4	2	2
(c)	-	2-4	2-4	4	4
(d)	-	3-4	3-4	6	6
(e)	-	4	4	8	8
(f)	0	0-4	0-4	1	1
(g)	2	1-4	1-4	3	3
(h)	4	2-4	2-4	5	5
(i)	6	3-4	3-4	7	7
(j)	8	4	4	9	9

Release the AG key between key setups.

14.25 Remove the test equipment from the district junctor group terminal strips and release the blocked relays.

14.26 On one frame, test the emergency control circuit as in Paragraphs 14.21 to 14.25 (See Paragraph 1.42).

15. SENDER SELECTOR S, SB, P AND SGE RELAYS

15.1 When SD-25004 is provided perform operations described in Paragraphs 15.11 to 15.19 and 15.4 to 15.7 on each sender selector unit.

15.11 Block operated the OC, SS and then the SGO relays of the sender link frame under test. Relay C-0 operates at the sender link frame.

15.12 The particular S- relay of the sender selector circuit to which relay C-0 has access should operate in accordance with the SP to P punching cross-connection. This association is given in the following table:

If Pchg. SP is X-Conn. to Punching	The following S- Relay should operate
P0	S0
P2	S2
P4	S4
P6	S6
P8	S8

NOTE: Punchings SP, P0, 2, 4, 6 and 8 appear on the subscribers sender selector unit T.S. as punchings 9 and 10 to 14 respectively.

15.13 Check that relays SGE and P of the sender selector unit are operated.

15.14 Block relay (P) normal and insulate #16 contact of the operated C relay.

15.15 Block operated the SB relay associated with the operated S relay. The S relay releases and the S relay associated with SB relay next lower in the chain operates. Continue blocking the SB relays in turn until all SB relays are blocked operated checking that the proper S relays operate and release. Remove the blocking tools from the SB and P relays and the insulation from the C relay.

15.16 Release relay SG-0.

15.17 Repeat test operations 15.11 to 15.16 using in turn relays SG-1, SG-2, etc. to SG-9 instead of relay SG-0.

15.18 Release relays OC, SG and SS.

15.19 Check the continuity of the wiring between the P- punchings and the S- relays of the sender selector unit by applying ground through a test receiver to the punchings indicated in the following table:

Apply Ground to P- Pch.	Appears on T.S. of Sender Sel. Unit as Pchg. No.	Observe that Following S- Relay operates
P0	10	S0
P2	11	S2
P4	12	S4
P6	13	S6
P8	14	S8

15.2 When SD-25554 is provided perform operations described in Paragraphs 15.21 to 15.29 and 15.4 to 15.7 on each sender selector unit.

15.21 Block operated the OC, SS and then the SGO relays of the sender link frame under test. Relay C-O operates at the sender link frame.

15.22 The preference leads PO, P2, P4, P6 and P8 and SPO to SP4 are permanently arranged to distribute the wear over the various senders and the link secondary crosspoints in accordance with the district group being served. In order to operate a particular (S-) relay (Figure A, B, & C), its associated (G-) relay must be operated. The GO-4 relays are associated with the SO, S2, S4, S6 and S8 relays respectively. Operate and release the GO-4 relays in turn and observe that their associated (S-) relays operate and lock.

15.23 Check that relays SGE and P of the sender selector unit are operated.

15.24 Block relay (P) normal and insulate #16 contact of the operated C relay. Observe that the locked (S-) relays release.

15.25 When Figure 15 of SD-25554 is provided block operated the LC relay and observe that relay SO operates. Operate and release the GO-4 relays in turn and observe that no other (S-) relay operates. Release the (LC) relay, check that relay SO releases.

15.26 Block operated any one of the (G-) relays and check that the proper (S-) relay operates.

15.27 Block operated the SB relay associated with the operated S relay. The S relay releases and the S relay associated with SB relay next lower in the chain operates. Continue blocking the SB relays in turn until all SB relays are blocked operated checking that the proper S relays operate and release. Remove the blocking tools from the SB and P relays and the insulation from the C relay. Release relay SG-O and the blocked (G-) relay.

15.28 Repeat test operations 15.21 to 15.27 using in turn relays SG-1, SG-2, etc. to SG-9 instead of relay SG-O.

15.29 Release relays OC, SG and SS.

15.3 When Figure 9 per SD-25554 is Arranged to Work With SD-25004 Circuits or Figure 9 per SD-25004 is Arranged to Work With SD-25554 Circuits, Perform Paragraphs 15.31 to 15.35

15.31 Block operated the OC, SS and then the SGO relays of the sender link frame under test. Relay CO operates at the sender link frame.

15.32 When testing from an SD-25554 SSL circuit block operated a G- relay.

15.33 Perform operations of Paragraphs 15.12 to 15.17.-

15.34 Release relays OC, SG-, SS and the G- relay if operated.

15.35 Perform operations of Paragraph 15.19 and Paragraphs 15.4 to 15.7.

15.4 Make all of the senders of the subgroup busy at the sender make busy frame and check that all SB relays and the SGB relay of the subgroup operate and that the proper GB relay at each of the sender link frames served by the subgroup operate.

NOTE: On additions this test is omitted until after the sender multiple transition has been completed.

15.5 Release the senders at the sender make busy frame.

15.6 Block all of the SB relays of the group operated. Relay SGB operates. Momentarily release each SB relay in turn and observe that relay SGB releases as each SB relay is released.

15.7 Test that contact 1B (7B when SD-25004 is provided) of relay SGB is not grounded when only one SB relay is released and that it is grounded when two SB relays are released. Make the test with SBO and SB1 released, SB1 and SB2 released, etc., including the last and the first SB- relays released. Release all SB relays.

16. CS- LEADS (SENDER SUBGROUP MULTIPLE) (See Figure 15)

NOTE A: Section 102, Paragraph 5.071 checks CS leads through sender link G relays.

16.1 Select a subscriber sender link frame to be used for the performance of the multiple tests so that the maximum number of sender subgroups may be checked from the same frame.

16.11 Make busy the subscriber sender subgroups associated with the multiple under test, by inserting make busy plugs into the associated sender subgroup MB jacks on the sender make busy frame. Insert make busy plugs into the MB jacks of the sender link frames under test.

16.12 Establish a talking connection, as required, by means of the frame link circuit and two ITE-9650 tel. sets, between the link frame used for test and a second link frame which has access to one or more of the same sender subgroups.

16.13 On the link frame used for test; block relay CO operated and connect ground to terminal 22 for SD-25004 or terminal 20 when SD-25554 is provided of the associated 218B terminal strip by means of an ITE-9547 cord equipped with alligator clips. Block operated the C relay associated

with the same sender subgroup and check for ground on the corresponding terminal of the 218B terminal strip of the second link frame. Move the grounded test cord from terminal 22 to 23 for SD-25004 or from terminal 20 to 21 when SD-25554 is provided, and check for this ground on the corresponding terminal of the second 218B terminal strip. Continue the test in this way until the continuity of all CS- leads have been tested. Release C relays.

16.14 Perform the test described in Paragraph 16.13 on the multiple between other C relays on the two link frames.

16.15 Perform the test described in Paragraph 16.13 and 16.14 on the multiple between the C relays of the link frame used for test and the C relays of all other subscriber sender link frames associated with one or more of the same sender subgroups.

16.16 On the sender link frame used for test block relay CO operated and connect ground to terminal 22 for SD-25004 or terminal 20 for SD-25554 of the associated 218 T.S. by means of an ITE-9547 cord equipped with alligator clips. Check for ground on terminal 20 of the terminal strip on the senden frame associated with the operated C relay. Check the remaining leads CS 1 to CS 9 in a similar manner. Release the operated CO relay.

16.17 Perform the test described in Paragraph 16.16 for the punchings on terminal strips on sender frames associated with relays C1 to C9 on the sender link frame used for test.

16.2 On the sender link frame used for test: (1) Strap to ground terminals 22 to 29, 36 and 37, for SD-25004 or terminals 20 to 29 when SD-25554 is provided of the 218B - T.S. for the C relays. #32 strap wire (P-314962) may be used for this purpose. Verify that terminals are grounded by means of a test receiver connected to 48 volt battery. (2) Block relays CO to C9 operated as equipped, by means of ITE-4069 relay blocking tools.

16.21 Check for absence of ground on terminals 22 to 29, 36 and 37 for SD-25004 or terminals 20 to 29 when SD-25554 is provided of the 218B T.S. of all sender link frames associated with one or more of the same sender subgroups.

16.22 Release relay CO and any other C- relay on the same sender link frame if it is associated with the same sender subgroup and check for absence of ground on make contact terminals 22 to 29, 36 and 37 for SD-25004 or terminals 20 to 29 when SD-25554 is provided of the same relay. Release relay C1 and perform the check for absence of ground on the make contacts of this relay. Continue the test in this way until all equipped C relays on the sender link frame used for test have been checked as described for relays CO and C1.

16.3 Block relays CO to C9 operated as equipped on the sender link frame used for test. Remove the #32 ground strap from terminal 22 when SD-25004 or terminal 20 when SD-25554 is provided and check for absence of ground on the same terminal. Remove the ground strap from the remaining terminals, one at a time, and check that each terminal is cleared of ground as the grounded strap wire is removed. Remove the block from the C relays and the make busy plugs from the MB jacks.

16.4 Using one or more additional link frames for test as required test the multiple for the remaining sender subgroups in a manner similar to that described in Paragraphs 16.1 to 16.3 inclusive.

16.5 When SD-25004 is provided, check that punching 58 (CSA leads) and 59 (CS leads) of each group on the DIST. JUNCTOR GRP terminal strip on top of the sender link frame are strapped to proper punchings in accordance with the wiring list for the subscriber sender link frame.

16.6 When Figure 4, SD-25554 is provided, check that punchings 55, 42 and 59 (leads CSA, CSB and CSC respectively) of each group on the district junctor group T.S. on top of the sender link frame are strapped to the proper punchings in accordance with the wiring list for the subscriber sender link frame.

16.7 When Figure 14, SD-25554 is provided, check that punchings 53, 54, 40, 41, 57 and 58 (leads 1A, 2A, 1B, 2B, 1C and 2C respectively) of each group on the district junctor group T.S. at the top of the sender link frame are strapped to the proper punchings in accordance with the wiring list for the subscriber sender link frame.

17. FRAME INDICATION LEADS (F, F00 AND F10)

NOTE: On additions this test is omitted until after the sender multiple transition has been completed.

17.1 When SD-25004 is provided insulate contact #14 of the (C) relay associated with the (SG) relay to be blocked operated in Paragraph 17.11.

17.11 Block operated the OC and SGO relays of the frame under test. Relay C-O operates, operating the SGE relay in the associated sender selector circuit.

17.2 Manually operate the S-O relay of the subgroup sender selector circuit associated with the operated C-O relay. The S-O relay should lock and the P relay should operate.

17.3 Observe that relays SC1, SC2 (SC3 if furnished) and SM1 of the first sender of the subgroup operate and that the off normal group lead of the sender is not grounded when there are 10 or less district frames in the office and is grounded when there are more than 10 district frames in the office. The off normal ground lead may be checked at contact 6B of any CS relay of the sender.

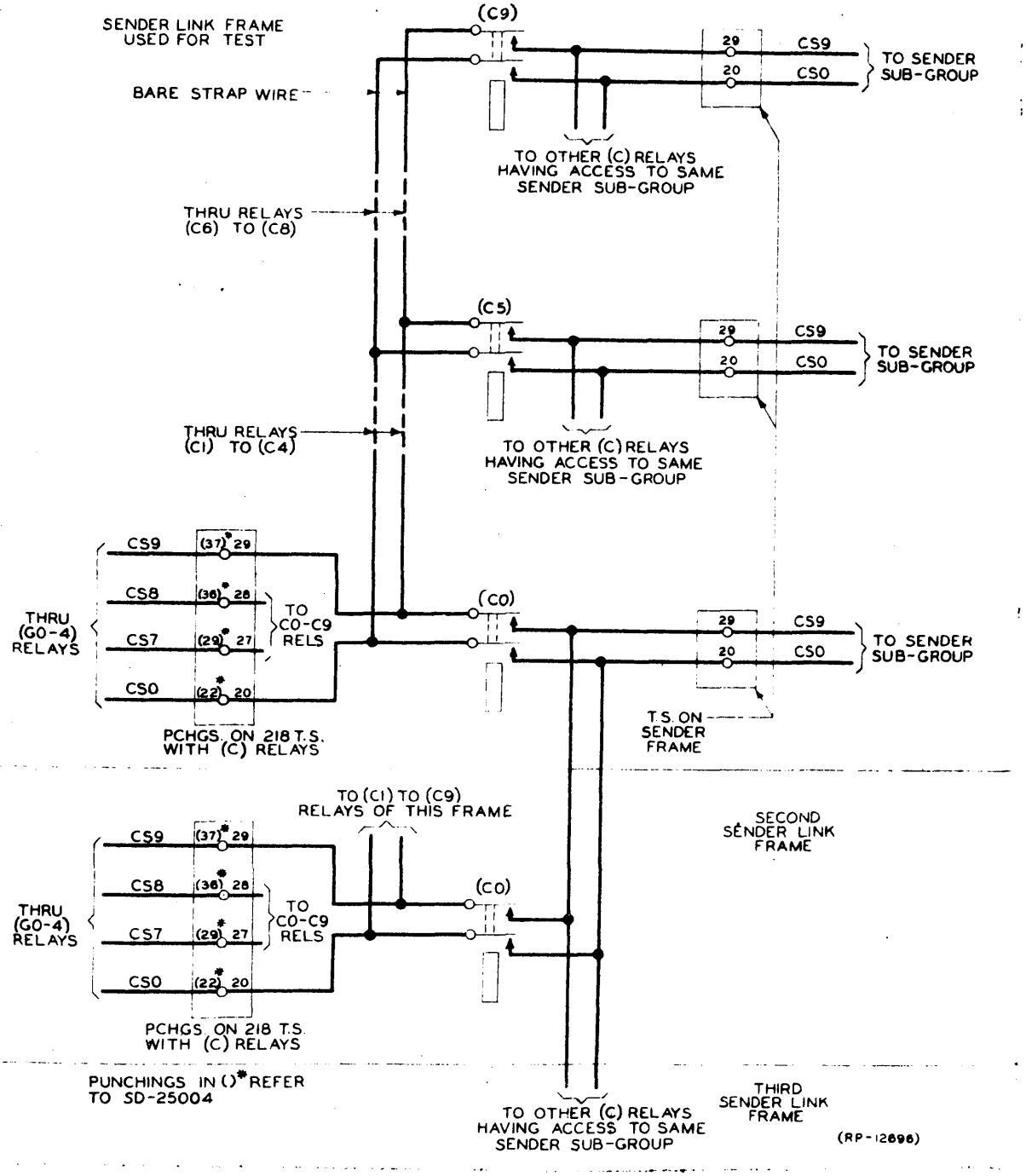

FIG. 15 SIMPLIFIED SCHEMATIC OF CLASS OF SERVICE LEADS

17.4 If there are more than 10 district junctor frames in the office, relay F00 or F10 of the sender should operate depending on whether the district junctor frame is numbered below or above 10.

17.5 Observe that the select magnet of the dial registration switch of the sender corresponding to the district junctor frame number is energized.

17.51 When SD-25004 is provided, remove insulation from contact #14 of the operated (C-) relay.

17.6 Release relay SG-0 and block operated relay SG-1 and perform operations 17.1 to 17.51 using relay C-1.

17.7 Check the F00, F10 and F leads through the remaining C relays of the sender link frame as in 17.1 to 17.6.

17.8 Release relay OC and SG.

18. MINOR TIME ALARM

18.1 Block the SS and GPO relays operated. Insert MB plug into the controller trouble indicator TIB jack associated with the subscriber sender link frame under test.

18.2 When Figure C, SD-25004-018 is provided, observe that after an interval of approximately 1.5 to 2.6 seconds the white aisle pilot lamp lights when the floor alarm frame fuse and time alarm circuit is furnished and the green aisle pilot lights when the audible and visual alarm circuit is furnished. The frame alarm lamp AL light and the minor intermittent alarm sounds.

18.21 When Figure D, SD-25004-018 or Figure 8, SD-25554-0103 is provided observe that after an interval of approximately 2 to 2.5 seconds the white aisle pilot lamp lights when the floor alarm frame fuse and time alarm circuit is furnished and the green aisle pilot lights when the audible and visual alarm circuit is furnished. The frame alarm lamp AL light and the minor intermittent alarm sounds.

18.22 In both 18.2 and 18.21 also check that the LA lamp corresponding to the sender link frame lights at the sender make busy frame or controller trouble indicator frame as specified.

18.3 Operate the AR key on the sender link frame momentarily to silence the alarm.

18.4 Observe that the associated guard lamp in the floor alarm cabinet does not light until after the AR key has been operated.

18.5 Remove the GPO relay block and observe that the guard and alarm lamps are extinguished.

18.6 Block operated the GP1 relay and observe that relay TS operates, then release the GP1 relay. Repeat the test using the GP2, GP3 and GP4 relays. Then remove the block from the SS relay.

19. MAJOR TIME ALARM

19.1 Insert a 298A plug into the HD jack. Block the SS and GPO relays operated.

19.2 Observe that the associated white aisle pilot lamp lights when the floor alarm frame fuse and time alarm circuit is furnished and the green aisle pilot lights when the audible and visual alarm circuit is furnished. The major alarm sounds approximately 1.5 to 2.5 seconds after the GPO relay is operated.

19.3 Remove the block from the GPO relay and observe that the GPO relay does not release.

19.4 Remove the plug from the HD jack. Observe that the major alarm is silenced and that the minor intermittent alarm sounds but that the aisle pilots remain lighted. Also observe that the GPO relay releases.

19.5 Operate the AR key momentarily to restore the alarm.

19.6 Repeat operations 19.1 to 19.5 using the GP1 to GP4 relays. Then remove the block from the SS relay.

19.7 Test the emergency control circuit as in 19.1 to 19.6 (See Paragraph 1.42).

20. CALLS AWAITING ALARM

NOTE: This test is made on district group circuits arranged for dialing district junctors (Figure 14 of SD-25004-013 or SD-25554-0105).

20.1 Insert a make busy plug in the MB jack. Block operated the CW relay. When the B contact of the interrupter makes the CWA relay operates and locks. Observe that the CWB relay operates about 5 seconds later. If the B and F leads to interrupter are reversed the CWB relay will operate within 1 second after CWA operates. The CW lamp lights.

20.2 Check that the major alarm functions and that the alarm signal appears at the sender busy frame or controller trouble indicator frame as specified.

20.3 Release the CW relay and observe that the alarm is not retired. Momentarily operate the release key R to retire the alarm.

20.4 Block operated DP relay. Observe that CWB relay operates when the B contacts of the interrupter make and that the CWA relay operates about 5 seconds later. The alarm functions.

20.5 Release DP relay and retire the alarm by operating the R key.

20.6 Manually flash the TC relay of each dialing district associated with the district group circuit under test. Observe that the CW flashes with each TC relay.

20.7 Block CW relay operated. Observe that the DP relays in the other district group circuit on the frame are not operated.

20.8 Remove the plug from the MB jack. The DPA relay operates and operates the DP relay of the remaining group circuits that are associated with line link frames.

21. HOLD BUSY AFTER TROUBLE RELEASE

21.1 Manually operate relay TS. After about 2 to 2.5 seconds the AL lamp lights and the minor alarm functions. Observe that relays TR, OS and ON-1 operate and release at about one second intervals. This test checks that relay ON-1 holds up for about one second after a trouble release is given to the line link.

22. EF, EM AND EC LAMPS

22.1 Place the subscriber sender link frame under test on Emergency Controller (See Paragraph 1.42). Check lamps EM, EF and EC (for this frame if a lamp panel is furnished) light. Check lamp EM lights on all sender link frames. Restore subscriber sender link frame to its regular controller.

22.2 Repeat test operations 22.1 on all subscriber sender link frames except that it is not necessary to check the EM lamp on frames other than the one under test.

23. LT INTERRUPTER

Momentarily operate relay SGL. Observe that relays GS and GS1 operate and lock. When the F contact of the interrupter makes the TT relay operate and locks. Observe that relay LCR operates about 29 seconds later and that relays GS, GS1 and TT release after the operation of relay LCR. If the B and F leads to the interrupter are reversed, relay LCR will operate within 1 second after relay TT operates.

24. COMMON HOLD JACK CIRCUIT (SD-25522)

24.1 Common Hold Feature

24.11 Insert a 298A plug into the H jack of the common hold jack circuit at the sender make busy frame or the controller trouble indicator frame as specified. Observe that the HL relay in each subscriber sender link is operated.

24.12 Block the SS and GPO relays operated on the sender link frame under test.

24.13 Observe that after an interval of approximately 1.5 to 2.5 seconds the white aisle pilot lamp and the frame alarm lamp AL light and that the major alarm sounds. Also check that the HL relay on the sender link frame under test locks up (indicating trouble on this frame) while all other HL relays are released. At the SMB or CTI frame, as specified, observe that the HD lamp is lighted.

24.14 Remove the blocks from the SS and GPO relays.

24.15 Momentarily operate the HR key to restore the circuit and retire the alarm. Observe that the HL relay in each subscriber sender link is operated. At the SMB or CTI frame as specified observe that the HD lamp is extinguished.

24.16 Remove the 298A plug from the H jack and observe that all HL relays are released.

24.2 Time Alarm

24.21 False Ground on Lead "L"

(a) Apply ground to lead L at contact 11B of the HD relay on the sender link frame under test.

(b) Observe that after an interval of approximately 1 to 2 seconds the Hd lamp lights at the SMB frame or CTI frame, as specified, and that the alarm sounds.

(c) Remove ground from lead L. Observe that the alarm is not silenced and that the HD lamp remains lighted.

(d) Momentarily operate the HT key at the SMB frame or CTI frame. as specified, and observe that the HD lamp is extinguished and that the alarm is silenced.

24.22 Failure of any A- Relay to Release

(a) Insulate the 4B and 5B contacts and block operated the B relay of the common hold jack circuit located at the SMB frame or CTI frame as specified.

(b) Block operated any equipped A- relay of the common hold jack circuit. Observe that lamp HD lights and the alarm sounds.

(c) Remove block from the A- relay. Operate the HT key and observe that the HD lamp is extinguished and that the alarm is silenced.

(d) Repeat operations (b) and (c) using the remaining A- relays. Then remove the block from the B relay and remove the insulation from the 4B and 5B contacts.

25. MISCELLANEOUS CIRCUITS

25.1 Test miscellaneous circuits such as the following that are not covered in other tests; (1) Frame test battery, (2) Spare jack to MDF; (3) Fuse alarm. Test that fuse alarm is not stopped when the FA or 20A lamp is burned out or removed. (4) Frame line circuit.

→ Arrowed lines indicate new or changed information.

Manager, Crossbar Product Engineering
Control Center

Reason for Reissue:
To make corrections necessitated by the Regular and Emergency Switch (Mfr. Disc.) being replaced by Emergency Transfer Relays ET0 to ET9(AT & T Co. Std). To make minor corrections.

Replaces Section 136 dated 7-18-63.