

MISCELLANEOUS TEST ON LINE LINK FRAME

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1. GENERAL INFORMATION

1.1 Description of Test: The miscellaneous tests contained in this section are for the purpose of clearing major wiring troubles from the line link frames prior to the application of the line controller test outlined in Section 102. The tests in this section may be applied to line link and controller circuits SD-25003 and SD-25553.

1.2 Testing Original Installations: In order to minimize interference, the tests covered in Paragraphs 9 to 13 inclusive should be deferred until after the miscellaneous tests described in Section 136 have been completed on the subscriber sender link frames.

1.3 Testing Additions: All tests outlined in this section except the D relay lockout chain as outlined in Paragraph 12 and the test of the DA leads as outlined in Paragraph 13 should be completed before making the transition at the DJGF.

When testing additions to existing equipment and the mate controller circuit for the line link frame under test in a working frame, reference to the mate frame in any of the following tests (Paragraphs 9 to 11 inclusive) should be construed to mean the home frame and likewise reference to mate frame relays should be construed to mean home frame relays. When a new line link controller circuit is to be tested on additions without being wired to associated working controller circuit, the following terminals on the controller terminal strip at top of basic unit of the new circuit shall be closed through temporarily for test. Use ITE-9548 cords equipped with alligator clips for the test connections.

Terminals

121 to 122	Home Controller T.S.		
123 to 124	Mate	"	"
125 to 126	Home	"	"
127 to 128	Mate	"	"

1.4 Cross Connections: The DJGF jumper cables should be connected for this test except for additions. The primary switch crosspoint test should be made before the message registers are cross connected.

1.5 The sketches included in this section show test sets, test cords, test point locations and guide test paths. This supplementary information is given to assist in setting up, making tests, and locating troubles. The sketches do not necessarily show all apparatus in the circuit under test or in test sets and do not replace the printed test methods.

1.6 Special Test Connections: 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.

2. RECORDS AND REQUIREMENTS

2.1 Records

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

2.2 Requirements

The tests covered by this section are listed in Section 0.1 of this handbook.

3. TESTING EQUIPMENT

3.1 Test Sets

<u>Amt</u>	<u>ITE</u>	<u>Description</u>
1	4009	Crosspoint, Link and Junctor Test Set
1	4033	Link Frame Test Set
1	4261	Whistler Test Set

3.2 Cords Required with ITE-4009

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9598	12'	2	110 Plug	110 Plug	4909
11	9690	12'	4	2-110 Plugs	325A Plug	4009
1	9947	12'	10	Yaxley Receptacle Plug	2455 Plugs	4009
11	9708	12'	5	2-110 Plugs	325B Plug	4023
2	9650	6'	4	Oper.Tel. Set	137 Plug	4023
2	#760 or 9404	20"	1	Conn.Clip	Susp.Clip	4023
1	9601	12'	3	110 Plug	110 Plug	4023
1	9548	9"	1	ITE-2455 Plug	ITE-2455 Plug	4023

3.3 Cords Required With ITE-4033

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9598	12'	2	110 Plug	110 Plug	4033
2	9947	12'	10	Yaxley Receptacle Plug	10 ITE-2455 Plugs	4033
1	9547	12'	1	2455 Plug	2455 Plug	4033
1	9690	12'	4	2-110 Plugs	325A Plug	4023

3.4 Cords Required With ITE-4261

<u>Amt</u>	<u>ITE</u>	<u>Lgth</u>	<u>Cdrs</u>	<u>One End</u>	<u>Other End</u>	<u>With ITE</u>
1	9408	6'	1	ITE-2455 Plug	ITE-2174 Test Pick	4261
1	9637	12'	3	110 Plug	325A Plug	4032

3.5 Accessories

<u>Amt</u>	<u>ITE or Code</u>	<u>Description</u>	<u>With ITE</u>
5	ITE-9548	Cords	4023
1	ITE-2260	Call Wire Tele. Jacks	4023
15	298A	Make Busy Plugs	4023
10	508A	Relay Blocking Tools	4023
or			
10	R-2931	Toothpicks	4023
As Req.	ITE-8507	Alligator Clips	4023
1	R-1824	Pencil Lamp	4023
10	ITE-4069	Relay Blocking Tools	4023
20	ITE-2601	Rubber Insulators	4023

4 Crossbar Test Accessory Kit

4. FUSING AND CONTACT PROTECTION

4.1 Fusing

NOTE 1: The A, B, C and D fuses listed below should not be inserted until the tests of the marker multiple of the line choice connector frames have been completed per HB 62 Section 241.

NOTE 2: Do not install fuses until the marker multiple test on the line choice connector has been completed per HB 62 Section 241 Par. 6.

4.11 Using a test receiver or voltohmmeter check for resistance ground (700^w) on the F fuse post (SD-25553 relay LP normal) and for absence of battery and ground on the remaining fuse posts.

4.12 Using fuses of correct type as indicated by circuit drawings and fuse panel designations, install the following fuses 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.

4.121 When SD-25003 Is Provided

<u>Fuse</u>	<u>Test</u>
HOR GR 0-9	Check ring spring of any vert. in last supp. bay of assoc. hor. grp. for batt. thru L relay.
SEL MAG 0	Block relays HC-3 and DAO oper. Manually oper. relays HG-0 to HG-9 in turn and note that corresponding sel. mag. on sec. sw. 0 operates together with the 0 level sel. magnets on pri. sws. 0 to 9. Check for battery through B-0 coil at terminal 50 of the T.S. adjacent to the HG-0 relay.
SEL MAG 1 to 9	Test in the same manner as fuse SEL MAG 0 but block relays DB-0 1, 2, 3 and 4 respectively when checking fuses 1, 3, 5, 7 and 9; and block relays DA-1, 2, 3 and 4 respectively when checking fuses 2, 4, 6, and 8.
TBS	Check for battery across the 48V and GRD terminals of test battery supply panel.
0-1 JUNC 8-9 HM	There is one fuse for each pair of sec. sws. and assoc. DA, DB and DF relays. Check for batt. through wdg. of (DH) hold mag. at contact 2B of DA- and DB- relay. Check for batt. through wdg. of DF-relay at contact 4T of D-relay.
A	Check at cont. 12B for batt. through wdg. of GTA relay. Also check for battery through wdg. of relay RSA at wdg. lug 10T and through wdg. of relay TRL at contact 3B.
B	Check at cont. 12B for batt. through wdg. of GTB relay.
CONT	Check for res. batt. at cont. 1B of PR relay.
NT 0-4	Check that no batt. is present on any hold magnets of the no test verticals. Insert the NTO-4 fuse and check for battery at the NT hold magnets of hor. grps. 0-4 and that is not present at the NT hold magnets of hor. grps. 5-9. Insert the NT 5-9 fuse and check for batt. at the NT hold magnets for hor. grps. 5-9.
NT 5-9	

4.122 When SD-25553 Is Provided

<u>Fuse</u>	<u>Test</u>
D HOR GR O-9	Check ring spring of any vertical in last supp. bay of associated hor. grp. for batt. thru L relay.
E SEL MAG O	Block relays HC-3 and DA-0 operated. Manually operate relays HG-0 to HG-9 in turn and note that corresponding sel. mag. on sec. sw. O operates together with the O level sel. magnets on pri. sws. O to 9. Check for battery through B-0 coil at terminal 50 of the T.S. adjacent to the HG-0 relay. Remove block from relay DA-0.
E SEL MAG	Test in the same manner as fuse (SEL MAG O) but block relays DB-0, 1, 2, 3 and 4 respectively when checking fuses 1, 3, 5, 7 and 9; and block relays DA-1 2, 3 and 4 respectively when checking fuses 2, 4, 6 and 8. Check for battery through B-1 to 9 coils at terminals 51 to 59 of the T.S. adjacent to the HG-0 relay. At completion of test remove blocks from HC-3 and DA- or DB- relays.
TBS	Check for battery across the 48V and GRD terminals of test battery supply panel.
C JUNC HM O-1 to 8-9	There is one fuse for each pair of sec. sws. and assoc. DA, DB and DF relays. Check for battery through winding of DH hold mag. at contact 2B of DA- and DB- relay. Check for batt. through winding of DF- relay at contact 1T of D- relay.
A	Check at contact 12B of GTA relay for batt. through winding of GTA relay. Also check for batt. through winding of relay RSA at winding lug 10T and through winding of relay TRL at contact 3B of relay TRL.
B	Check at contact 12B of GTB relay for battery through winding of GTB relay.
F	Check for battery through resistance (B) at contact 1B of relay RP. Also check for direct battery at contact 4T of LT-9 relay.
G NT O-4 H NT 5-9	Check that no batt. is present on any hold magnets of the no-test verticals. Insert the G (NT O-4) fuse and check for battery at the NT hold magnets of hor. grps. O-4 and that it is not present at the NT hold magnets of hor. grps. 5-9. Insert the H(NT 5-9) fuse and check for batt. at the NT hold magnets for hor grps. 5-9.

<u>Fuse</u>	<u>Test</u>
J(When Figs. 20 & 23 are equipped)	Check for batt. through winding of DG relay at contact 3B of associated DF-relay.
K(when Fig. 19 is equipped)	Check for batt. through winding of VC relay at winding lug 7T of relay VC.
M	Check for batt. through winding of TT relay at contact 8T of relay RL.

4.2 Contact Protection

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

NOTE: Circuits included in the same bracket may be tested together as equivalents for purposes of this test. Circuits not included in brackets may be tested by using equivalent circuits on two line link frames. Networks on the line link 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.

4.211 When SD-25003 Is Provided

<u>Contact Protection Ckt.</u>	<u>Type of Ckt. as Shown in Fig.7, Sect.2, HB 50</u>	<u>Connect To</u>
Network AC	1	7T, FA Relay
" DA	2	Terms. 20-24 & 30-34
" DB	2	of T.S. Adjacent to HG-0 Relay
" HG	2	1B, LA Relay
" VS	2	1T, VS "
" LA	2	2T, LA "
" SR	1	2B, PA "
" VT	1	2B, VT "
" HC	1	11T, FA "
" AP	1	12T, HC2 "
" RS	1	3, AC "
" CA	1	12B, GTA "
" FA	1	10B, FA "
" DS	1	12, GE "
" LS	1	6T, LS "
" RL	1	11B, RL "
" VE	1	2T, VS "
" GO	1	3T, TT "
" G1	1	7T, TT "
" G2	1	5T, TT "
" G3	1	9T, TT "
" G4	1	8B, TT "
" G5	1	3T, VT "
" G6	1	5T, VT "
" G7	1	7T, VT "
" G8	1	4B, VT "
" G9	1	6B, VT "

4.212 When SD-25553 Is Provided

NOTE: Refer to SD-25553-0101, Note 105, for schematic location of contact protection circuits.

Contact Protection Ckt.Network	Type of Ckt.as Shown in Fig. 7, Sect.2, HB 50	Block of Insulate	Connect to Relay
AC	1	-	7T, FA
BC	1	-	7T, FB
HC	1	TA2 Operated	11T, FA
MC	1	TB2 Operated	11T, FB
HPO-9	1	-	5T, HAO-9
GE	1	RP Operated	5B, RP
CA	1	(CA) Normal	5B, CA
DGQ-4	1	-	3B, DFO-4
(When Provided)			
RL (When	2	(VO) and (DS) operated.	11B, RL (RL) Normal
CB	1	(CB) Normal	2T, CA
DAO-4 Rel.	2	-	13T, DAO-4
DBO-4 "	2	-	13T, BDO-4
DFO-4 "	2	-	13T, DFO-4
DS	2	-	12B, GE
GO	2	-	3T, TT
G1	2	-	7T, TT
G2	2	-	5T, TT
G3	2	-	9T, TT
G4	2	-	9B, TT
G5	2	-	3T, VT
G6	2	-	5T, VT
G7	2	-	7T, VT
G8	2	-	4B, VT
G9	2	-	6B, VT
GTA	2	-	12B, GTA
GTB	2	-	12B, GTB
HO-9	2	-	5T, HBO-9
LA	2	(FA) Operated	8B, LA
LB	2	(FB) Operated	8B, LB
LE	2	-	1T, LS
LP	2	RP Normal	7B, RP
LS	2	-	6T, LS
LTO-9	2	-	9T, LTO-9
RE	2	Insulate 8 and 9B (LTO)	8B, LTO
TT	2	-	8T, RL
VO-6	2	(VE) Operated	9T, VO-6
VE	2	-	6B, LS
AP	2	-	12T, HC2
CSO-5	2	-	5T, CSO-5
PA	2	-	3T, PA
TO-9	2	-	30-39 AC
TA	2	(TA1) Normal Insulate 9 and 10T(TA)	5T, TA.
TB	2	(TB1) Normal Insulate 9 and 10T (TB1)	5T, TB
FA	2	-	10B, FA
FB	2	-	13T, FB
HGA	2	-	1B, LA
HGB	2	-	1B, LB
SMAO-4	2	-	12B, DAO-4
SMBO-4	2	-	12B, DBO-4
SR	2	-	2B, PA

Contact Protection Ckt.Network	Type of Ckt. as Shown in Fig. 7, Sect. 2, HB 50	Block or Insulate	Connect To Relay
VS & VT Rel.	2	-	2B, VT
RS & RSA "	2	-	3 Arm.AC
LR	2	Insulate 4 and 5T of (VP) Rel. Operated	2T, S
L	2	Insulate 5 and 6B (LTO)	5B, LTO
HA	2	(LA) and (TA1) Operated	1T, LA
HB	2	(LB) and (TB1) Operated	1T, LB
VP Rel.	2	(LP) Operated	10T, LP
DO-4 Rel.	2	(DO-4) Operated	12B, DO-4

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

5. CHECK FOR CROSSES

5.01 Plug the power cord of the ITE-4261 whistler test set into any available 110 volt DC or AC power supply. Permit about 30 seconds for the set to warm up.

5.02 Plug the ITE-2455 plug of the ITE-9408 cord into the receptacle on the test set.

5.03 If an AC power supply is used touch the test pick of the ITE-9408 cord to ground and reverse the polarity of the power plug in the power source until the position of least hum is found.

5.04 Touch the test pick to one of the conductors under test. A tone should be heard. Adjust the volume control on the test set to the desired position. If DC power is used the polarity of the power plug may have to be reversed in order to make the test set operate.

5.05 T.R.S. & M Leads (PRI to Sec. Sw. Horizontal Multiple

5.051 Touch the pick to the horizontal multiple soldering terminals T.R.S. & M associated with horizontal O on primary line switch 9 of horizontal group 9, column O.

Each should produce a tone of the same pitch. If a wire connected to any terminal is crossed with equipment connected to battery or ground, a ground click will replace the tone. If a wire is crossed with another wire that is otherwise clear, the tone will drop to another pitch. If the crossed wires are of about the same length, such as two wires in the same cable,

the pitch will drop about one-half an octave, that is, it will be very noticeable. If the false wire is much shorter than the wire under test the change in pitch may not be great but this is unimportant for the change will be great when the shorter wire is tested.

5.052 Repeat operations described in Paragraph 5.051 on all remaining horizontal multiple terminals 1 to 9 of the primary switch under test.

5.053 Continue operations described in Paragraphs 5.051 and 5.052 on the remaining primary switches for horizontal groups 8 to 0 in column 0, on the line link frame.

5.06 T and R Leads. (Line Junctors)

NOTE: The line junctor assignment chart will be required to determine the associated verticals on the incoming link and line link secondary switches in the event that troubles are encountered.

5.061 Touch the pick to each T and R punching on the terminal strips at the line junctor grouping frame. Each punching within each group of 10 line junctors on a terminal strip should produce a tone of the same pitch. A battery indication on one of these punchings indicates a cross with an S punching, which would be the battery through an incoming link secondary hold magnet.

5.062 Continue operations per Paragraph 5.061 on all terminal strips associated with all line junctors installed.

5.07 HM and LR Leads

NOTE: Figure 1 shows the multiplying of leads HM and LR through the equipment.

5.071 Touch the pick to punchings of the 216A terminal strip at the bottom of the originating unit associated with leads HM 0-9 and LR 0-9. Each terminal in a group of 10 HM or 10 LR leads should produce a tone of the same pitch.

On Additions

This test should be applied before connecting a supplementary bay or bays to the equipment of a working line link frame.

5.072 Perform the test of Paragraph 5.071 once for each line link frame installed.

5.08 ST and VG Leads

NOTE 1: Figure 2 shows the method of distribution for ST- leads between the vertical columns and the link controller, and the multiplying of leads VG- between the HG- relays and the associated controller connector relays.

NOTE 2: The line load control assignment of class A, B or C lines should be obtained from the line link frame wiring list. Differences in tone which may be encountered in a group of ST- leads for a given horizontal line group will be readily identified as being caused by class A, B or C lines. Class A lines will produce a tone higher in pitch than class B and C lines. This is due to ST- leads run direct to the line (L) relays whereas ST- leads for class B & C lines are connected through the spring contacts of the B or C line load control relays at the top of the line bays.

5.081 Block operated GTA, GTB and H(0-9) relays.

5.082 Touch the pick to punchings of the 218D terminal strip adjacent to the HG-0 relay associated with leads VG 0-6 as follows:

<u>Lead</u>	<u>Pchg.</u>
VG0	6
VG1	7
VG2	8
VG3	9
VG4	15
VG5	16
VG6	17

Each VG- lead should produce a tone of the same pitch.

5.083 Block operated HG-0 relay. The STO-6 leads for horizontal group 0 are now connected through the HG-0 relay contacts to punchings 6-9 and 15-17.

5.084 Touch the pick to punchings 6-9 and 15-17.

Changes in pitch between the ST- leads may be encountered due to lines assigned to line load control. See Note 2 of this Paragraph 5.08.

5.085 Restore the H-0 relay to normal.

Each STO-6 lead should now produce a tone of the same pitch however about an octave lower. It may be necessary to readjust the test set in the event the tone disappears as the H-0 relay is restored to normal.

5.086 Restore the HG-0 relay to normal.

5.087 Perform tests per Paragraphs 5.083 to 5.086 on the remaining horizontal groups 1 to 9 by successively operating and restoring the associated HG(1-9) and H(1-9) relays on the line link frame.

5.09 VS Leads

NOTE: Figure 3 shows the method of distribution of the VS- leads between the vertical columns and the associated controller connector.

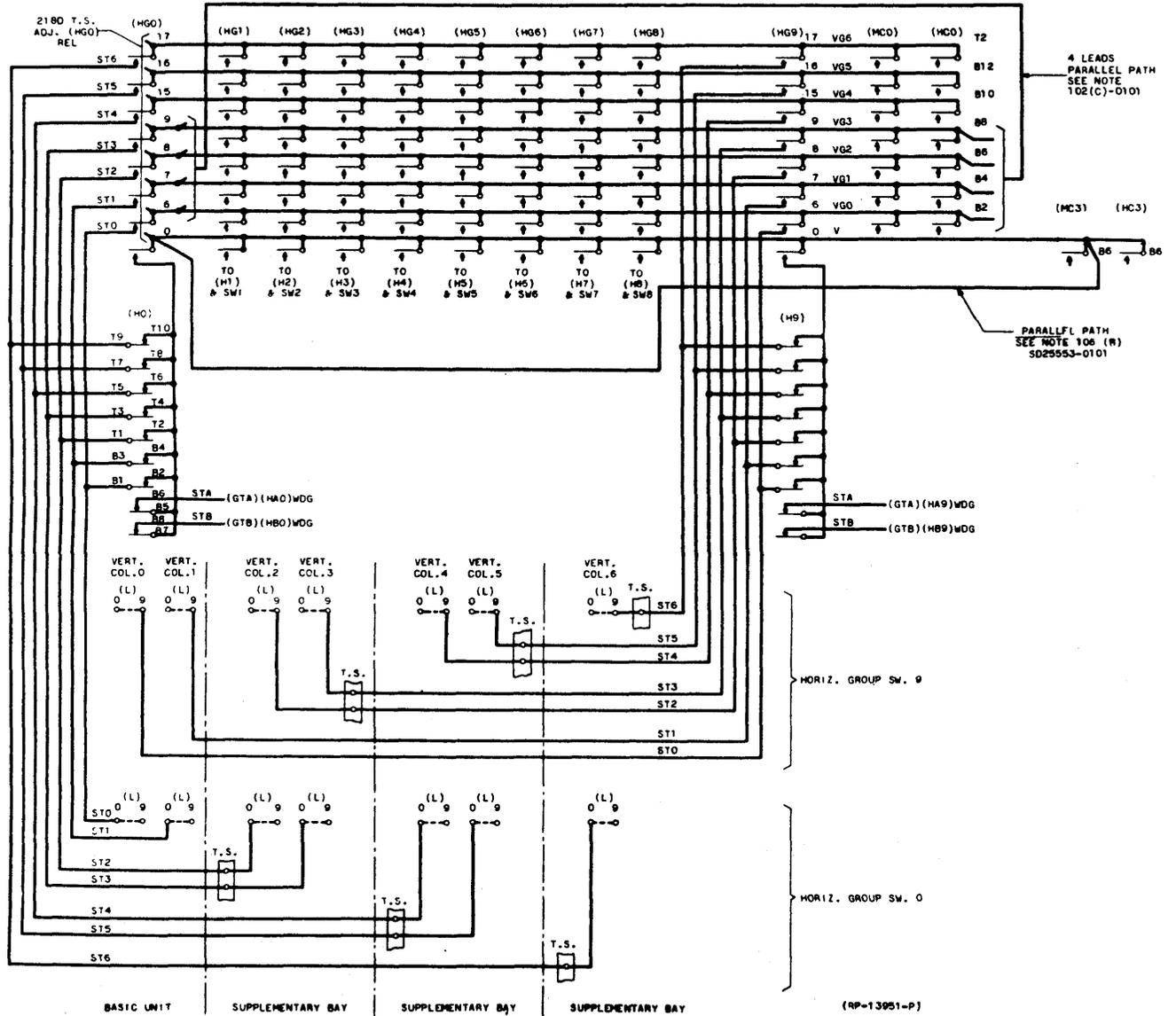


FIG. 2 LEADS STO-6 AND VGO-6

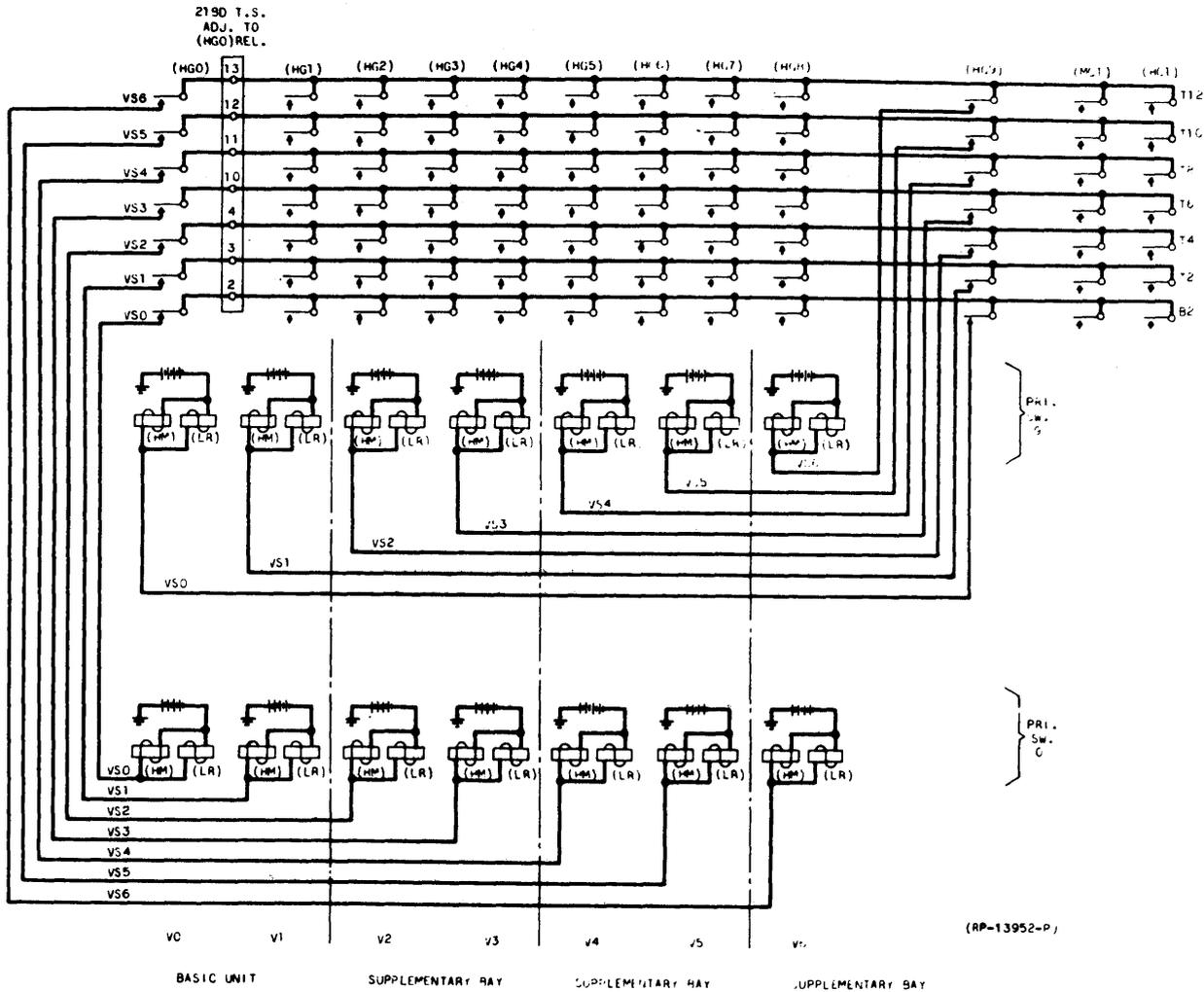


FIG. 3 LEADS VSO-6

5.091 Touch the pick to punchings of the 218D terminal strip adjacent to the HG-0 relay associated with leads VSO-6 as follows:

Lead	Pchg.
VSO	2
VS1	3
VS2	4
VS3	10
VS4	11
VS5	12
VS6	13

Each should produce a tone of the same pitch.

False battery on any of the punchings may be battery from the (HM) or (LR) relays due to crossed or shorted HG-relay contacts.

5.10 SM Leads

NOTE: Figure 4 shows the multiplying of the primary and secondary switch select magnet leads through the equipment.

5.11 LLO-9 Leads

NOTE: Figure 5 shows the multiplying of leads B and LL between horizontal group relays, controller connector relays and the line junctor connector frame.

5.111 Touch the pick of the whistler test set to the punchings 25-29 and 35-39 of the 218D terminal strip adjacent to the HG-0 relay associated with leads LL(0-9). Each should produce a tone of the same pitch.

5.112 Perform the test of Paragraph 5.111 once for each line link frame installed.

5.12 SHO-9, A and B Leads

NOTE 1: Figure 6 shows the method of multiplying leads SH(0-9) A and B, which are common to one group of 20 district junctors, between the various associated LL and SSL frames.

NOTE 2: The district junctor assignment chart will be required to determine the associated verticals on the secondary switches of the line link frames for each group of district junctors, in the event that trouble is encountered. This test should be applied on both original installations and additions, before or after the DJGF cross-connection cables are closed down.

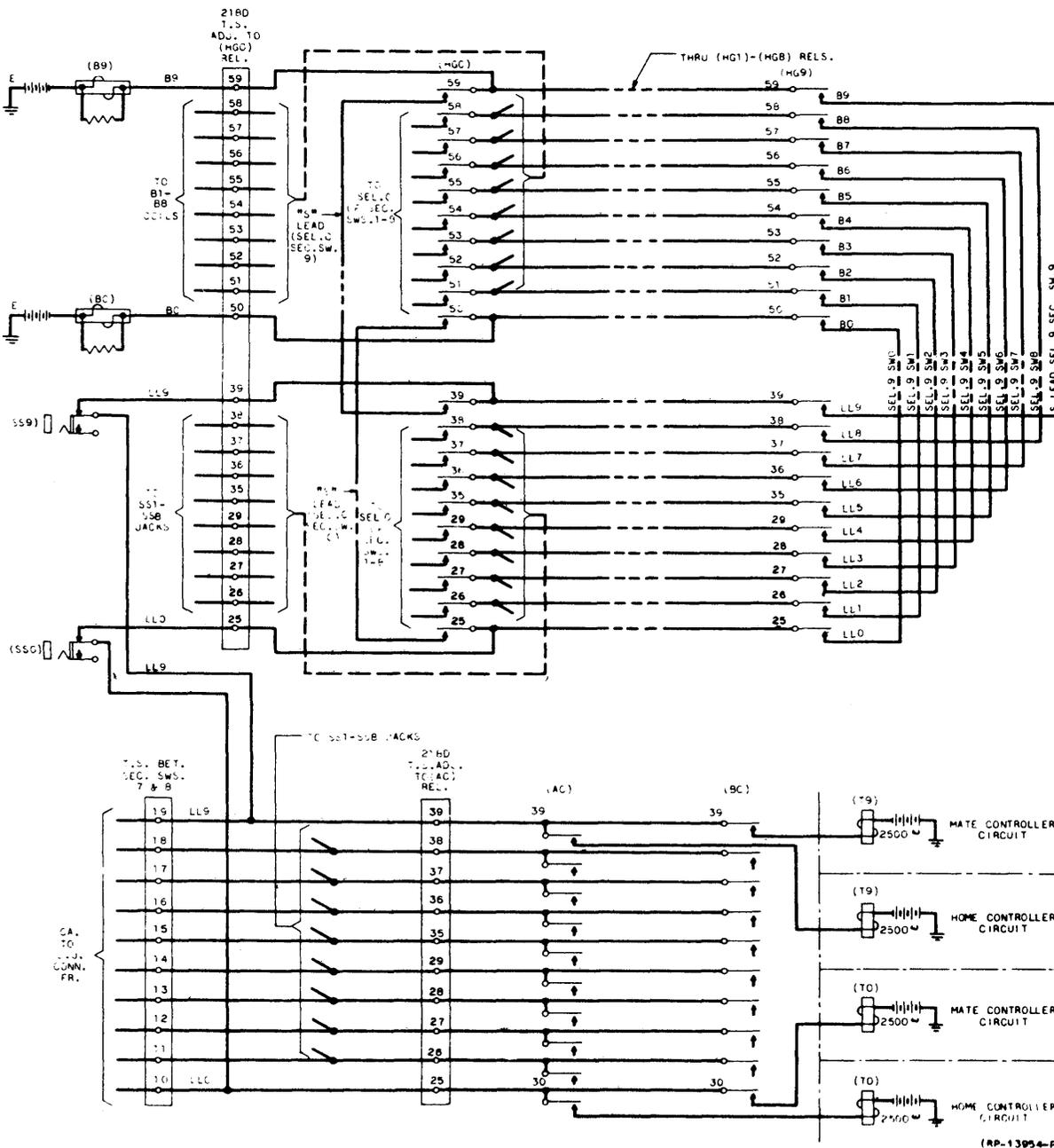


FIG. 5 LEADS BO-9 AND LLO-9

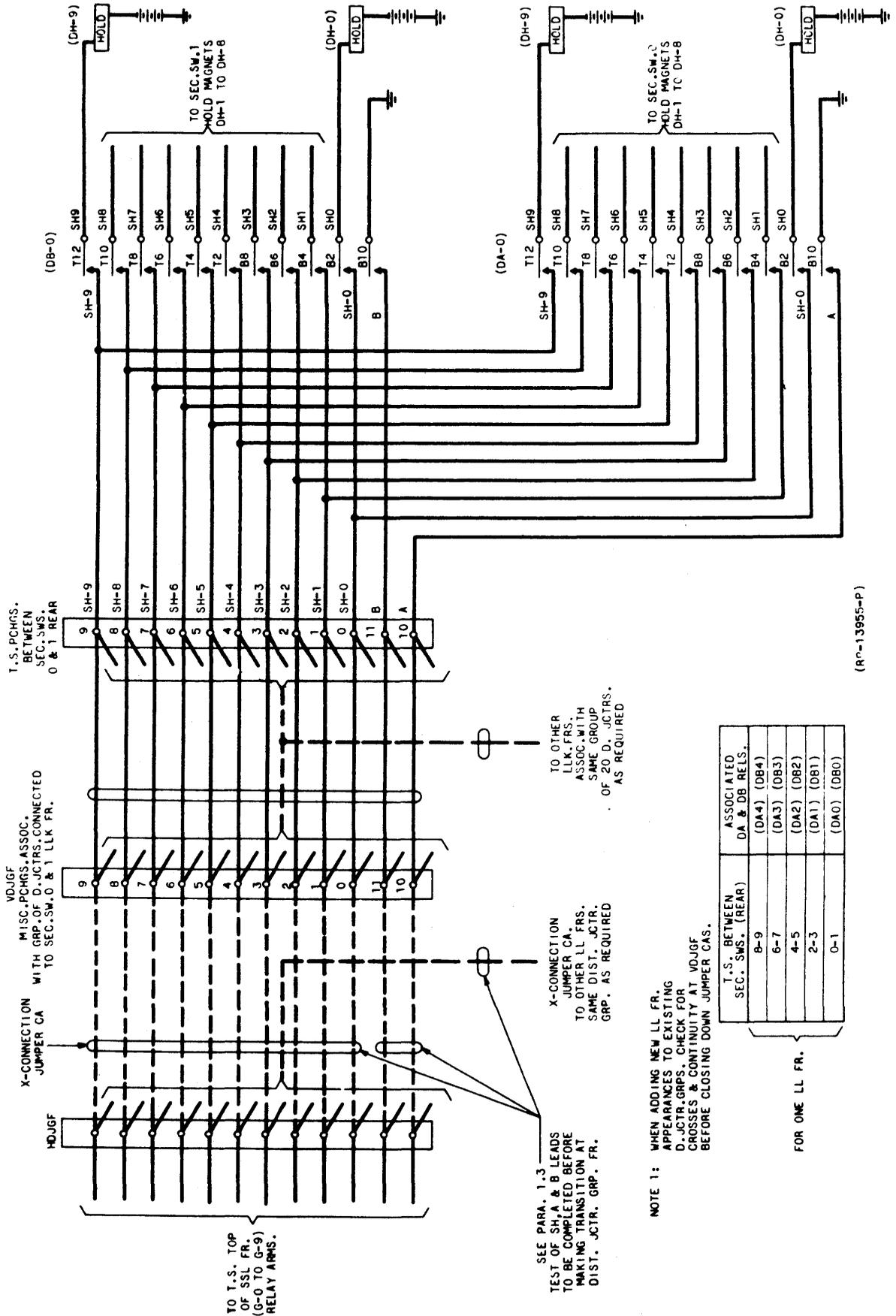


FIG. 6 LEADS SHO-9, A AND B

5.121 Touch the pick to punchings 0-11 on the terminal strips of the vertical district junctor grouping frame associated with miscellaneous control leads SH(0-9), A and B common to one group of 20 district junctors. Each SH punching should produce a tone of the same pitch. Each A and B punching should produce the same tone but of a higher pitch than the SH punchings. This is due to one less relay spring contact multiplied at the DA and DB relays than for the SH leads.

5.122 Perform the test operation of Paragraph 5.121 once on the miscellaneous punchings for each terminal strip at the VDJGF associated with line link frames.

5.13 T, R, S and M Leads

(District Junctors)

NOTE: The district junctor assignment chart will be required to determine the associated verticals on the secondary switches of the line link frames for each group of district junctors in the event that trouble is encountered. This test should be applied on both original installations and additions.

5.131 Touch the pick to each T, R, S and M punching on the terminal strip at the vertical district junctor grouping frame associated with one group of 20 district junctors. Each punching within the group of 20 junctors should produce a tone of the same pitch.

5.132 Continue operations per Paragraph 5.131 on all terminal strips for all secondary switch verticals associated with each group of district junctors installed.

5.14 SL, ON, GP, TRL, RL and H Leads

NOTE 1: Figure 7 shows the method of multiplying leads SL, ON, GP, TRL, RL and H, which are common to one group of 20 district junctors, between the various associated LL and SSL frames.

NOTE 2: The district junctor assignment chart will be required to determine the line link frame secondary switch appearances associated with each group of district junctors in the event that trouble is encountered.

This test should be applied on both original installation and additions.

5.141 Touch the pick to punchings 34 to 39 on the terminal strips of the vertical district junctor grouping frame associated with miscellaneous control leads SL, ON, GP, TRL, RL and H common to one group of 20 district junctors. Each should produce a tone of the same pitch.

5.142 Perform the test operation of Paragraphs 5.141 once on the miscellaneous punchings for each terminal strip at the VDJGF connected to the secondary switch appearances on each line link frame associated with one group of 20 district junctors.

5.15 TA, TB, RA and RB Leads

NOTE 1: Figure 8 shows the method of multiplying leads TA, TB, RA and RB, which are common to one group of 20 district junctors, between the various LL and SSL frames.

NOTE 2: The district junctor assignment chart will be required to determine the line link frame secondary switch appearances associated with each group of district junctors in the event that trouble is encountered.

NOTE 3: This test should be applied on original installations and additions.

5.151 Operations (Original Installations)

This test may be performed before or after the cross-connection cables are closed down at the VDJGF. If performed after the cross-connections are closed down it will be necessary to first prepare the associated district group relays on the SSL frame as follows:

5.152 At the sender link frame, block operated the CA and CB relays and insulate the top 7 & 8 contacts of the DP relay and top 1 & 2 contacts of the RA and RB relays associated with the district junctor group serving the line link frame under test. The leads should now be clear and free of ground.

5.153 Touch the pick to punchings 25 to 28 on the terminal strips of the vertical district junctor grouping frame associated with miscellaneous control leads TA, TB, RA and RB which are common to one group of 20 district junctors. Each of the two TA and TB or RA and RB leads will produce a tone of the same pitch, however, the TA and TB leads will be slightly lower in tone due to the added normally made contacts of the RS or RSA relays in the associated LL frame.

5.154 Perform the test of Paragraph 5.153 once on the miscellaneous punchings for each terminal strip at the VDJGF connected to the secondary switch appearances on each line link frame associated with one group of 20 district junctors.

5.155 Operations (Additions)

Perform the test operation per Paragraph 5.153 once on the miscellaneous punchings for each terminal strip at the VDJGF associated with each line link frame to be added to new or existing district junctor groups.

NOTE: As the test should be performed prior to the closing down of the cross-connection cables at the DJFG it will not be necessary to prepare SSL frames, which may be in service, as outlined in Paragraph 5.152.

5.16 NT Leads

NOTE: Figure 9 shows the method of multiplying the NT leads through the HG- relays.

5.161 Using an ITE-9404 cord, connect ground to terminal 14 on the 218D terminal strip adjacent to the HGO relay. Block operated HG4 relay and observe that only the hold magnet associated with HGO to 4 on the no test connector operates.

5.162 Release HG4 relay. Block operated HG5 relay and observe that only the hold magnet associated with HG5 to 9 on the no test connector operates.

5.163 Release HG5 relay and remove ITE-9404 cord.

5.164 Perform tests 5.161 and 5.162 on each line link frame.

5.17 Home to Mate Controller Leads

NOTE 1: Figures 10 and 11 are provided as an example to show the method of associating home and mate controllers for mated line link frames. All other control leads run between the link frames will follow this method in general

NOTE 2: Original Installations: This test is to be applied to one link frame of a pair of mated link frames or to a link frame mated with a control unit on the miscellaneous frame.

NOTE 3: Additions: This test for crosses should be made at the new line link frame being added, immediately after the cables have been connected to the terminal strips on the new link frame. (See transition Handbook 40, Section 3, Paragraph 4.2).

Operations (Original Installations)

5.171 Block operated relays DS, LE, RL and VE on the two mated line link frames under test.

5.172 Touch the pick to the punchings on the home control terminal strip at the top of the basic unit of the link frame associated with control leads as shown in the following summary.

NOTE: Each punching, identified with the letter (A) in the summary, will produce a tone of varying pitch which will indicate these leads are clear of false battery or ground only.

Each punching identified with the letter (B) will produce a tone of the same pitch within its own group of ten or less leads. A tone produced which is about one half an octave lower will indicate a lead crossed with another within its own group or with some other lead connected to the terminal strip.

Each punching identified with the letter (C) will require a test for regular battery or ground, using a test receiver, as indicated.

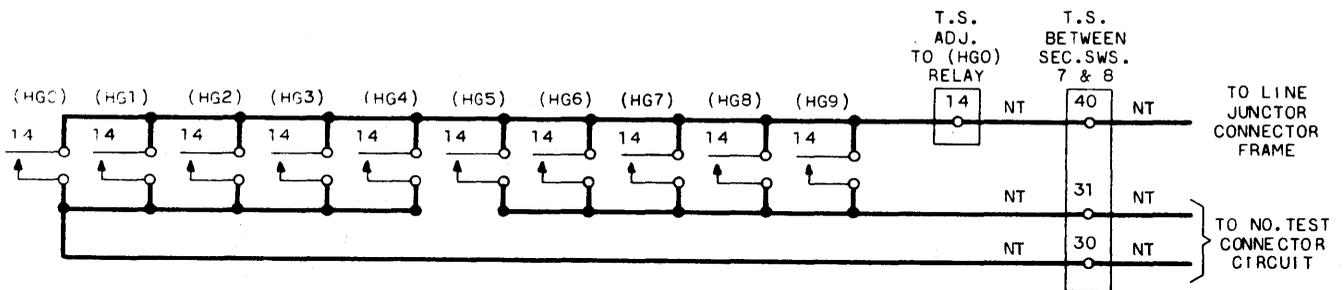


FIG. 9 LEADS NT

SUMMARY

<u>LEAD</u>	<u>PCHG.</u>	<u>CHECK FOR CONDITION</u>	<u>LEAD</u>	<u>PCHG.</u>	<u>CHECK FOR CONDITION</u>
RS	3	A	DF(0-4)	10-14	B
DK	4	A	D(0-4)	15-19	B
DA	6	A	G(0-9)	20-29	B
GS	7	A	LR(0-9)	40-49	B
MC	8	A	L(0-9)	50-59	B
M	9	A	VF(0-2, 4, 7)	60-64	B
SR	91	A	VG(0-6)	70-76	B
LS	92	A	A, B	87-88	B
DM	93	A	HN(0-9)	100-109	B
SA	110	A			
SB	111	A	LL(0-9)	30-39	C (Batt)
GP	113	A	SL	116	C (Batt)
V	114	A	S	90	C (Grd)
RL	115	A	ON	5	C (Grd)
H	117	A	LK	112	C (Grd)
			RE	118	C (Network)
			VS	80-86	

5.173 Perform the test per Paragraph 5.172 on the punchings of the mate control terminal strip at the top of the basic unit of the line link frame under test.

The punchings should produce tone conditions similar to those for identical punchings on the home control terminal strip.

5.174 Restore relays DS, LE, RL, and VE to normal.

Operations (Additions)

(See Paragraph 5.17. Note 3)

5.175 Block operated relays DS, LE, RL and VE on the new link frame to be added, only.

5.176 Perform operations per Paragraphs 5.172 to 5.174 on the punchings of the home and mate control terminal strips at the top of the basic unit of the new link frame.

The tones produced on these punchings will be slightly higher in pitch than those produced on link frames which have their inter-connecting cables closed down at both ends, as in original installations.

5.18 T, R, S, M1 and M2 Leads

(Primary Line Switch)

NOTE 1: This test checks for crosses in line circuit leads T, R, S & M which are connected between the vertical of the primary line switch and the main and line distributing frames.

NOTE 2: The condition of the T, R, S & M leads with the line switch vertical in the normal and the operated position is as follows:

<u>PRI. SW.</u>	<u>VERTICAL CONTACT LEAD</u>	<u>STRIP NO.</u>	<u>CABLE TERM. ON</u>	<u>NON-COIN LINES HOLD MAGNET</u>		<u>COIN & COIN FIRST LINES HOLD MAGNET</u>	
				<u>NORMAL</u>	<u>OPERATED</u>	<u>NORMAL</u>	<u>OPERATED</u>
S	0		HLDF	Batt.	Batt.	Batt.	Batt.
R	1		HMDF	Batt.	Clear	Batt.	Clear
T	2		HMDF	Grd.	Clear	Clear	Clear
M1	3		HLDF	Clear	Clear	Clear	Clear
M2	4		HLDF	Clear	Clear	Clear	Clear

5.181 Manually operate the No. 1 vertical hold magnet armature for the No. 9 primary line switch, in column 0, horizontal group 9.

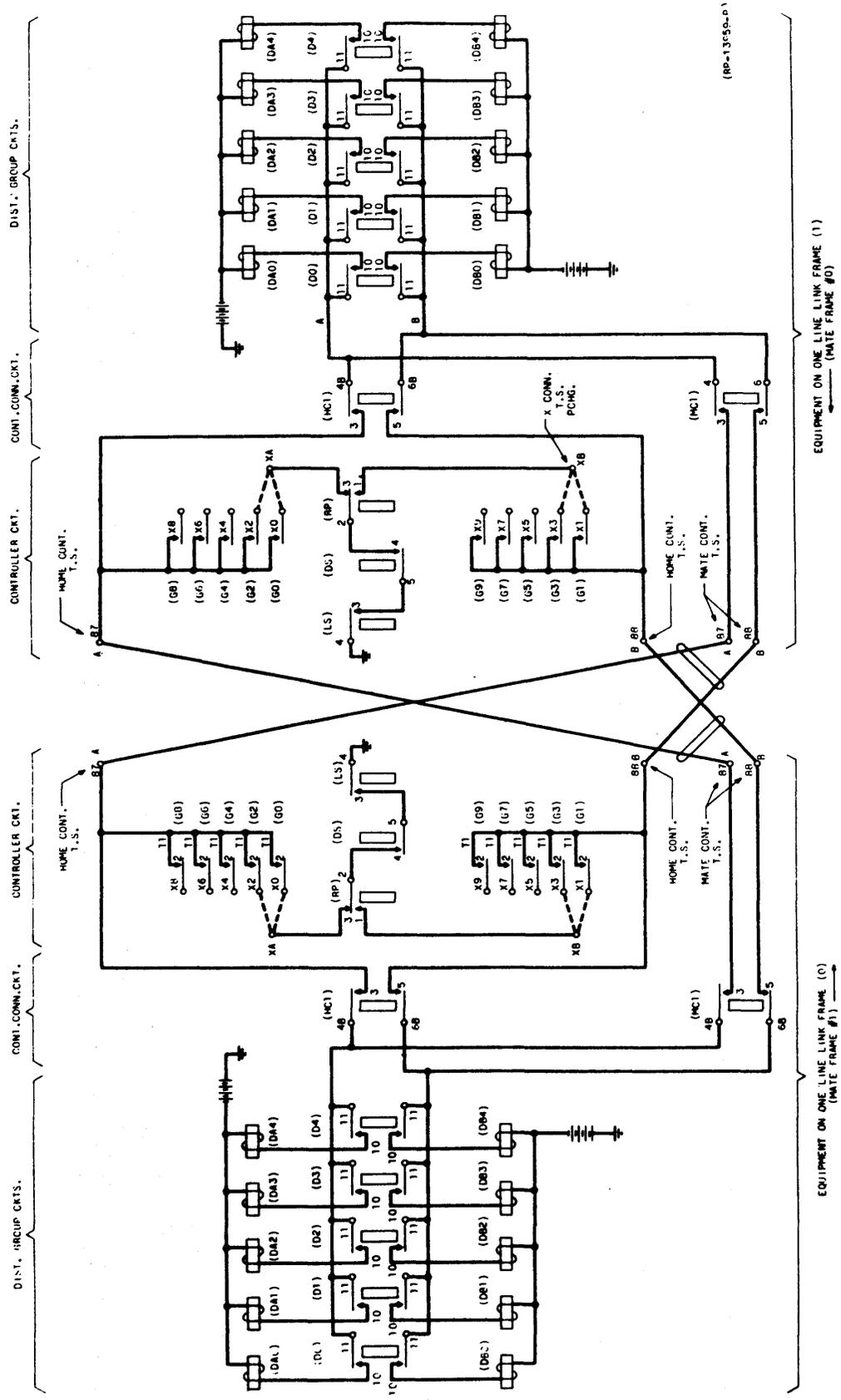


FIG. 10 LEADS A AND B

5.182 Touch the pick to the vertical contact strips 0 to 4 for line hold vertical No. 1 associated with leads S, R, T, M1 and M2 for the No. 9 line switch in column 0 and note the following:

- (A) Each T & R lead should produce a tone of the same pitch.
- (B) Each M1 & M2 lead should produce a like tone but higher in pitch than the tone of the T & R leads.
- (C) Each S lead will produce a click only due to battery through the hold magnet.

5.183 Restore vertical No. 1 hold magnet armature to normal.

5.184 Perform operations per Paragraphs 5.181 to 5.183 successively on each of the remaining verticals No. 2 to 9 for column 0 and the No. 0 to 9 verticals for all No. 9 primary line switches in horizontal group 9.

5.185 Perform operations per Paragraphs 5.181 to 5.184 on the primary line switches in each of the remaining horizontal line groups 8 to 0 on the line link frame.

5.19 DA and DB Relay Cores

5.191 Touch the pick to the cores of the DA and DB relays of the line link frame. Each core should produce a tone of the same pitch. A click will indicate a false battery or ground condition. An SH lead crossed to the core will appear as a battery cross.

6. PRIMARY SWITCH CROSSPOINT TEST

NOTE: This test should be made before the message register cross-connections are connected.

6.1 Setup For Test (See Figure 12)

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

6.12 Block relays CA and CB of the line controller circuit normal.

6.13 Connect 10 ITE-9690 (4 wire) or ITE-9708 (5-wire) cords to the half switch in horizontal Group 9, column 0 as follows:

Jacks H for 3 wire Sw. or
Jacks H & H1 for 4 or 5 wire Sw. to Verticals

0-9

0-9

NOTE: When testing the right half of line link primary switches which do not have supplementary horizontal groups, leave the 0 cord

connected to the 0 vertical of the left half and connect cords 1-9 to verticals 0-8 respectively of the right half of the switch. In these cases the connection specified per 6.14, 6.15, and 6.16 is made to the 9th vertical of the right half of the switch.

6.14 3-Wire Switch: Insert plug H of an ITE-9690 cord into the JG jack of the test set. Connect the other end of this cord to vertical 9 of the last switch of the same horizontal group as the half switch under test.

6.15 4-Wire Switch: Insert plug H of an ITE-9690 cord into the JG jack and plug H-1 into the JC-1 jack. Connect the other end of this cord to vertical 9 of the last switch of the same horizontal group as the half switch under test.

6.16 5-Wire Switch: Insert plug H of an ITE-9708 cord into the JG jack and plug H-1 of the cord into the JG1 jack. Connect the other end of the cord to vertical 9 of the last switch of the same horizontal group.

6.17 On the terminal strip adjacent to relay HG-0, obtain the following association; using cord ITE-9947 equipped with insulated alligator clips.

ITE-9947 Leads	T.S.HG-0 Pchgs.	Leads	Test Set Receptacle
0-4	20-24	PS 0-4	S
5-9	30-34	PS 5-9	S

6.18 Operate and leave operated the XPT and SM keys and also the 4W key when testing 4-wire switches or the 5W key when testing 5-wire switches.

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

6.2 Test Operations

6.21 Block operated the HG-9 relay associated with the first horizontal group to be tested.

6.22 Using #760 or ITE-9404 cords, connect the hold magnet operating terminal (top) to the sleeve terminal (0) of no-test vertical 0 on switches 4 and 5.

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

6.24 Operate the ST key. The test circuit automatically checks the 100 crosspoints associated with the verticals connected to the test set. Since 5 hold magnets operate in parallel when testing no-test verticals, it may sometimes be necessary to assist the no-test magnet to fully operate. Ordinarily, however, the 100 crosspoints are tested automatically after which the EC lamp lights and the test is stopped.

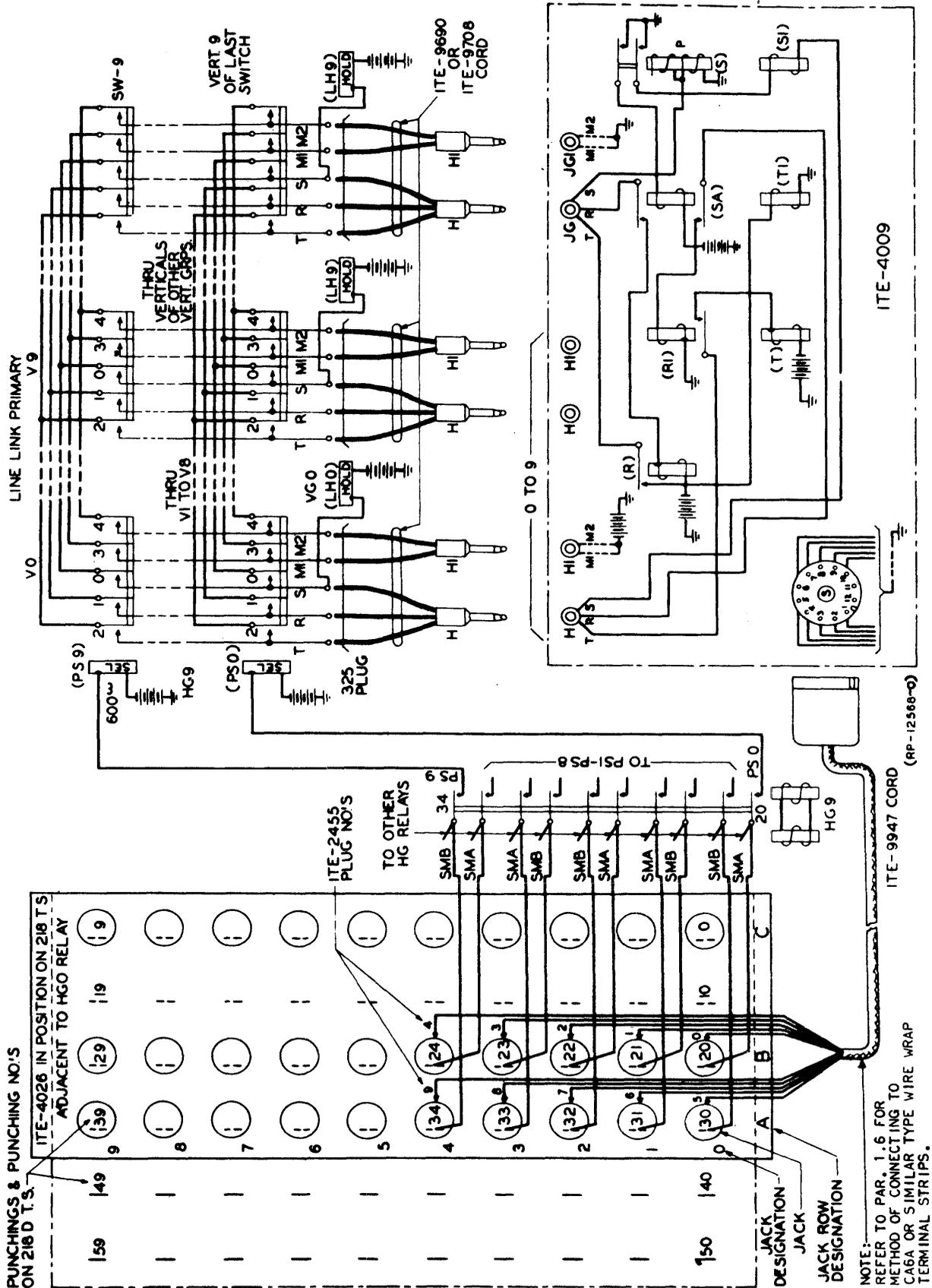


FIG. 12 SETUP FOR PRIMARY SWITCH CROSSPOINT TEST

6.25 Lamps S, S1, R, R1, T, T1, V, V1, W and W1 light momentarily as each crosspoint is tested. The lighted (S) O-9 and (H) O-9 lamps indicate respectively the operated select and hold magnets.

6.26 If the test set stops with the X lamp lighted, a cross between conductors of the crosspoint under test is indicated. If the test set stops without the X lamp being lighted a cross to ground or an open is indicated. The SMG lamp lighted indicates a grounded select magnet lead.

6.27 Shift the connections to the verticals of the next switch of the same horizontal group, restore and reoperate the ST key and test as in 6.24.

6.28 After all switches in that horizontal group have been tested, release the HG-9 relay and operate the HG-relay of the next lower horizontal group and repeat the test on all the switches in the horizontal group.

6.29 Restore the HG- relay to normal and remove the test connections when all of the primary switches on the frames have been checked.

6.3 No-Test Verticals (See Figure 14)

6.31 Using an ITE-9690 cord, insert the H plug in the JG jack of the crosspoint set, ITE-4009. Insert the 325A plug end of the cord into the no-test vertical of horizontal group 0. This cord will be referred to as the A cord.

6.32 Using another ITE-9690 cord, insert the H plug into the H-0 jack of the test set and the 325A plug into the no test vertical of horizontal group 1. This cord will be referred to as the B cord.

6.33 Operate keys XPT, REP, DS, BZ and BSM.

6.34 Lamp S0 should be lighted. If necessary operate key RS long enough to light lamp S0.

6.35 Operate the ST key. The T, T1, R, R1, S and S1 lamps light and the buzzer operates indicating an OK test.

6.36 Shift the B cord in turn from horizontal group 1 to 2, 3 and 4 noting the continuity is OK.

6.37 Shift the A cord to horizontal group 5 and note that the multiple is not falsely connected between horizontal groups 4 and 5.

6.38 Shift the B cord to horizontal group 6. Test the continuity of the wiring between horizontal groups 5 to 9 the same way that horizontal groups 0 to 4 were tested.

6.39 Make this test on each line link frame.

7. SECONDARY SWITCH CROSSPOINT TEST

7.1 Setup for Test (See Figure 13)

7.11 Connect 48 volt battery and ground to the BAT jack of ITE-4009.

7.12 Insert the H and H-1 plugs of an ITE-9690 cord (4-wire) or ITE-9708 (5-wire) into jacks JG and JG1 respectively. Connect the other end of this cord to vertical 9 of the district junctor secondary switch under test. Start with secondary switch 9 (highest) and work toward secondary switch 0 (lowest).

At the district junctor circuit, associated with vertical 9 of the secondary switch under test, remove the ground from the M1 lead by insulating the 2B and 3B contacts of relay CH for a non-coin district circuit or the 9T and 10T contacts of relay CH for a coin district circuit, also remove ground from the M2 lead, when testing 5 wire switches, by insulating the 5T and 6T contacts of relay TP.

7.13 To permit automatic operation of the secondary switch hold magnets on the switch under test, close the off-normal springs of each vertical by placing an ITE-8507 alligator clip equipped with an ITE-2601 insulator across the springs at the point of contact.

7.14 Connect 9 ITE-9690 (4-wire) or ITE-9708 (5-wire) cords from jacks H and H1 O-8 of the set to verticals 0 to 8 respectively of the switch under test.

7.15 Connect ground to terminal 49 of terminal strip adjacent to the HG-0 relay using an ITE-9548 cord equipped with an ITE-8507 clip.

7.16 Using an ITE-9947 cord with 10 alligator clips on the plugs, connect clips to T windings of HG-0 to HG-9 relays. Insert the other end of the cord into the S receptacle of the test set.

7.17 Lamps H-0 and S-0 should be lighted to begin the test. If necessary, momentarily operate the RS key to light these lamps.

7.2 Test Operations

NOTE: On additions, leads M1 and M2 cannot be checked for presence of ground where the secondary switches are to be tied in with working district

junction groups. Therefore, the PB9 key should be operated in place of the M key in the following tests. A continuity test of the M1 and M2 leads should be made between the secondary switches and district junction groups after the cables have been connected.

7.21 Operate the M, XFT and SM keys in the set. Also operate the 4W or 5W key when testing 4 or 5 wire switches. With the M key operated the test set checks for the presence of ground on the M1 and M2 leads. 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 crosspoints of the district junction half of the secondary switch. Lamps S, S1, R, R1, T, T1, V, V1, W and W1 light momentarily as each crosspoint is tested. The lighted (S) 0-9 and (H) 0-9 lamps indicate respectively the operated select and hold magnets.

7.23 If the test set stops with the X lamp lighted a cross between conductors of the crosspoint under test is indicated. If the test set stops without the X lamp being lighted a cross to ground or an open is indicated.

7.24 The EC lamp lights when the district junction half of switch has been tested. Repeat operations 7.12 to 7.23 on district junction half of switches 8-0. Move ground from punching 49 of terminal strip adjacent to HG-9 relay to punching 48 to 40 respectively as test proceeds.

7.25 After completion of tests on district junction half of switches, remove insulation from contacts of CH and TP relays. Place H cords to verticals 0 to 8 of line junction half of switch 9. Using another cord, make connections from 9 vertical to H9 jack of the set. Restore to normal keys 4W or 5W and PB9 or M and remove the H-1 plug from jack JG-1. Restore and re-operate ST key.

7.26 At completion of this test move cords to switch 8 and repeat test for line junction half of switches 8 to 0. Move ground from punching 49 of terminal strip adjacent to HG-9 relay to punchings 48 to 40 respectively as test proceeds.

8. LINE JUNCTION TEST

8.1 Setup for Test (See Figure 15)

8.11 Locate the crosspoint, link and junction test set, ITE-4009 at the incoming link frame and connect 48V battery and ground to the BAT jack.

8.12 Insert the H plug of an ITE-9690 cord into the JG jack of the test set. Using cord ITE-9601, connect the HO jack of the test set to the spare jack B on the incoming trunk frame and at the MDF temporarily cross-connect this

jack to spare jack B at the line link frame. Insert the H plug of an ITE-9690 cord into the B jack at the line link frame.

8.13 Lamp SO should be lighted. If necessary, step selector H using key STP-H or RS to light this lamp.

8.14 If required, set up a talking circuit and extend the buzzer signal to the line link frame using two leads and a call wire telephone jack, ITE-2260, at the line link frame. At the test set connect the CW terminals to the two leads. Insert operator's telephone sets into the TEL jacks of the test set and call wire telephone jack.

8.15 Operate keys REP, BZ, BSM and ST.

8.2 Test Operations

8.21 Using the line junction assignment chart to determine the associated verticals on the incoming link and line link secondary switches, connect the jig end of the two ITE-9690 cords to these verticals. If the sleeve, ring and tip of the junction between these verticals are continuous and free from crosses, the buzzer operates. Move the jig to two other associated verticals of the frames under test and test this junction. Continue in this manner to check all junctions between all incoming link frames and line link frames.

8.22 With the test set located at the line link frame, make a test of the multiple cables between the junction verticals on the secondary switches on the first and the second line link frames of the half choice. (See Figure 16)

NOTE: The line link secondary hold magnets associated with line junctions should be operated manually where this equipment is not connected to incoming link secondary hold magnets.

9. B AND LL LEADS

NOTE: When testing additions to existing equipment see Paragraph 1.3 before performing this test.

9.1 Test Set Preparation (See Figure 17)

(See Figure 5 for reference purpose)

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

9.12 Connect leads 0-9 of an ITE-9947 cord equipped with insulated alligator clips to terminals 50-59 of the terminal strip adjacent to the HG-0 relay. Connect the other end of this cord to the A connector of the ITE-4033.

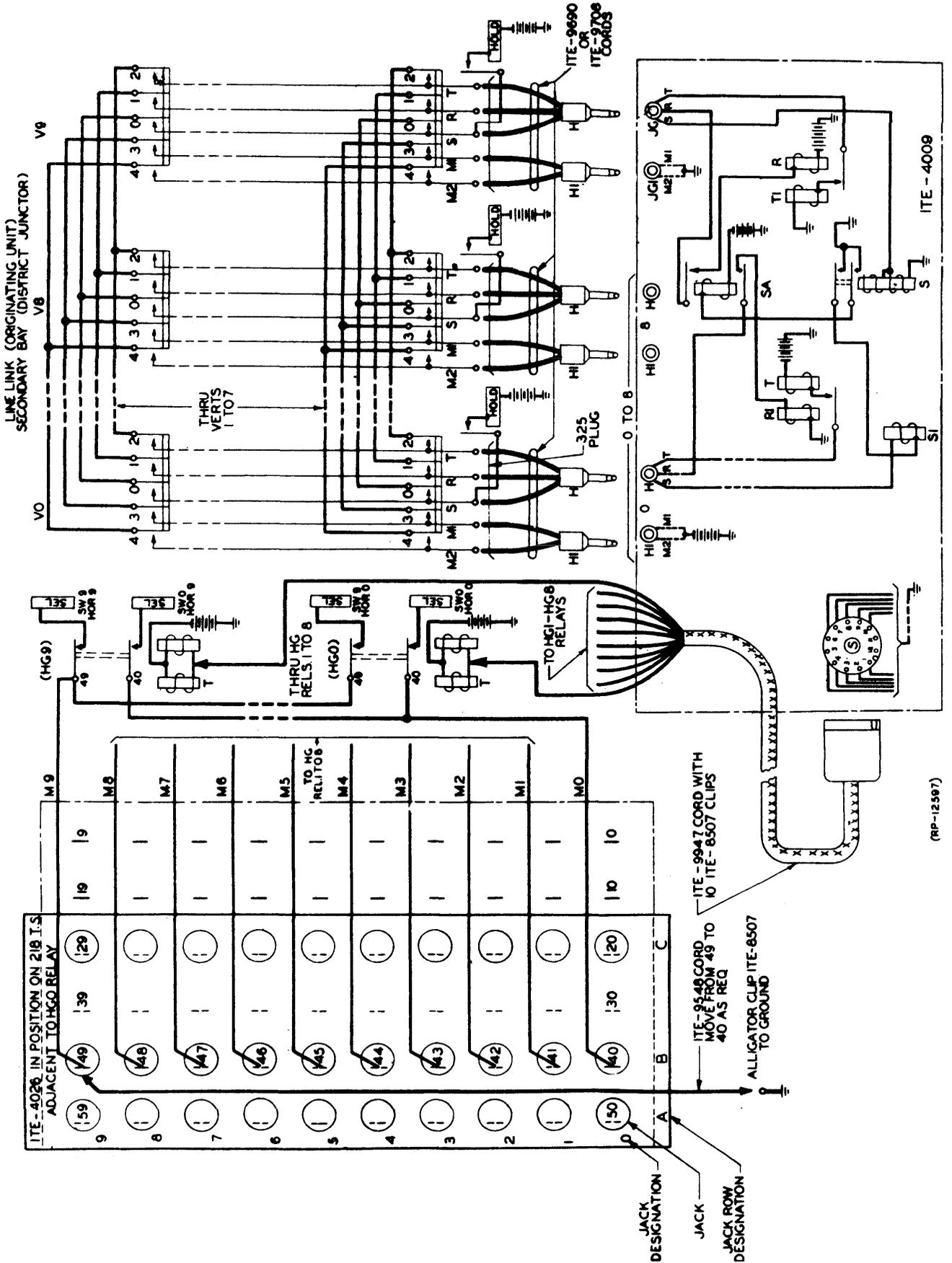


FIG. 13 SETUP FOR SECONDARY SWITCH CROSSPOINT TEST

(RP-12967)

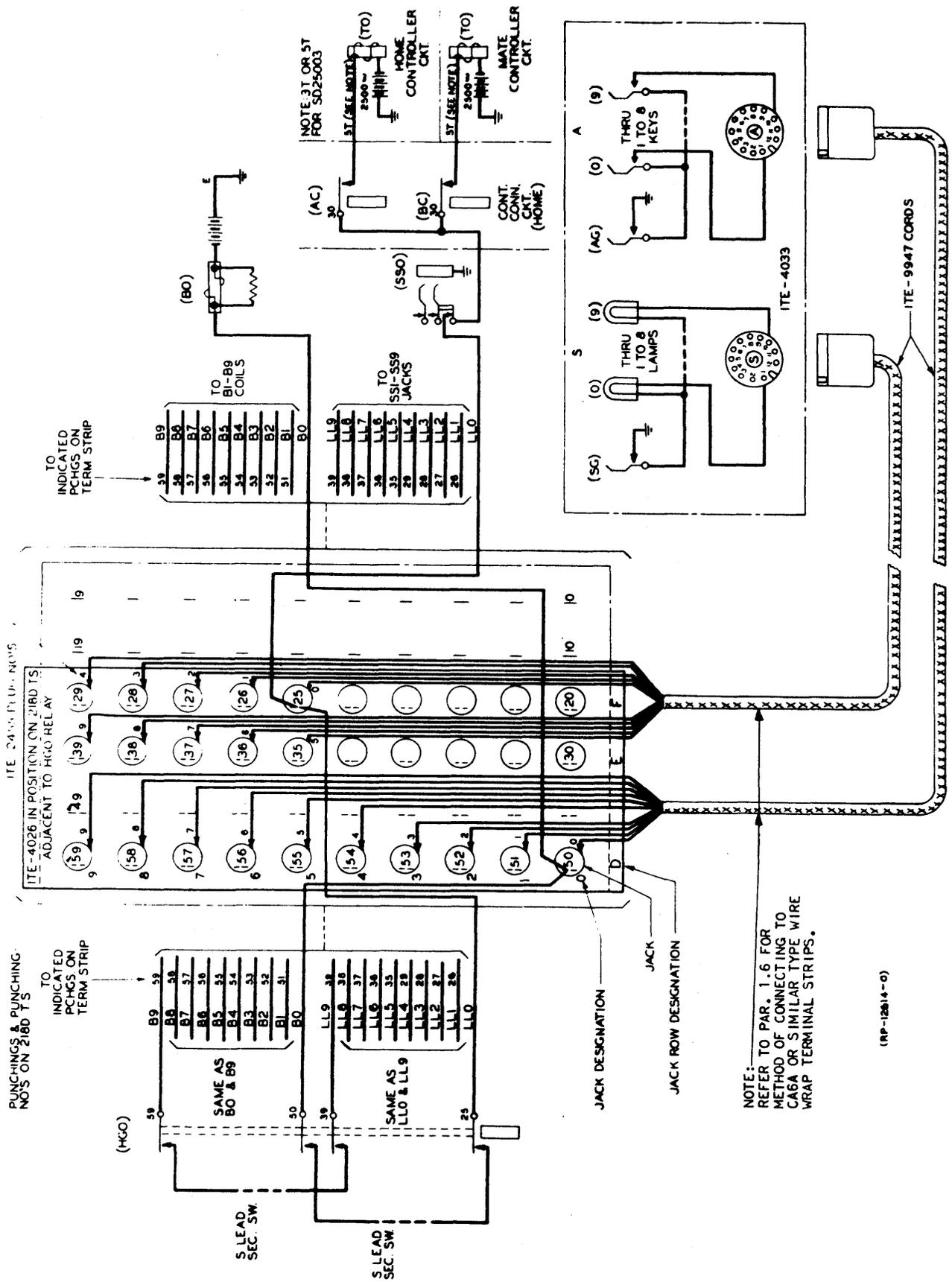


FIG. 17 SETUP FOR TEST OF B AND LL LEADS

9.13 Using another ITE-9947 cord equipped with insulated alligator clips, connect leads 0-4 to terminals 25-29 of the terminal strip adjacent to the HG-0 relay, and connect leads 5-9 to terminals 35-39. Connect the other end of this cord to the S connector on the ITE-4033.

9.2 Operations

9.21 Operate the SG key in the test set. Block operated the AC and BC relays in the associated controller connector circuit using ITE-4069 blocking tools and verify that S lamp (0-9) in the test set light dimly at this time.

NOTE: The AC relay is blocked operated to provide additional current for lighting the S lamps in the test set.

9.22 Block operated the HG-0 relay. The S lamps (0-9) in the test set light brighter.

9.23 Insert make busy plugs into the SS (0-9) jacks each in turn, one at a time, and verify that as each jack is plugged the corresponding numbered S lamp in the test set goes out. Remove the plugs at the conclusion of the test.

9.24 Operate the AG key in the test set. Operate the A-0 key. The S-0 lamp is extinguished. Operate the A-1 key. The S-1 lamp is extinguished. In like manner continue operating A- keys verifying that as each A- key is operated the corresponding S- lamp is extinguished.

9.25 Release the A- keys and the HG-0 relay. All S lamps light dimly. Block operated the HG-1 relay. All S lamps light brighter. Repeat the operations in Paragraph 9.23 and 9.24.

9.26 In like manner repeat the operations outlined in Paragraphs 9.25 for each remaining horizontal group by using the proper HG- relay.

9.27 At the completion of these tests restore all test connections, relays and keys to normal except battery and ground to the set.

10. S LEADS

NOTE 1: On original installations this test should not be made until after LDF cross-connections are installed. Refer to the note under Paragraph 4.9 of Section 102 to determine the preference between these tests due to the M and S cross-connections at the LDF.

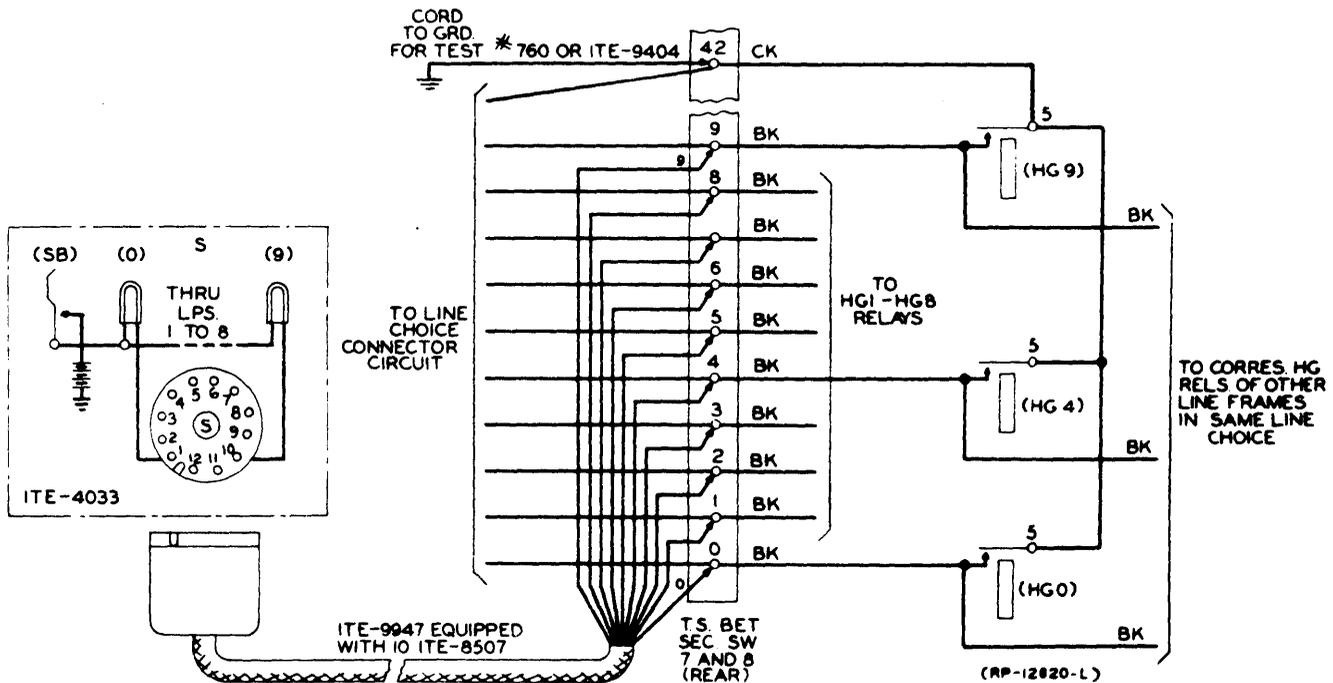


FIG. 18 SETUP FOR TEST CK AND BK LEADS

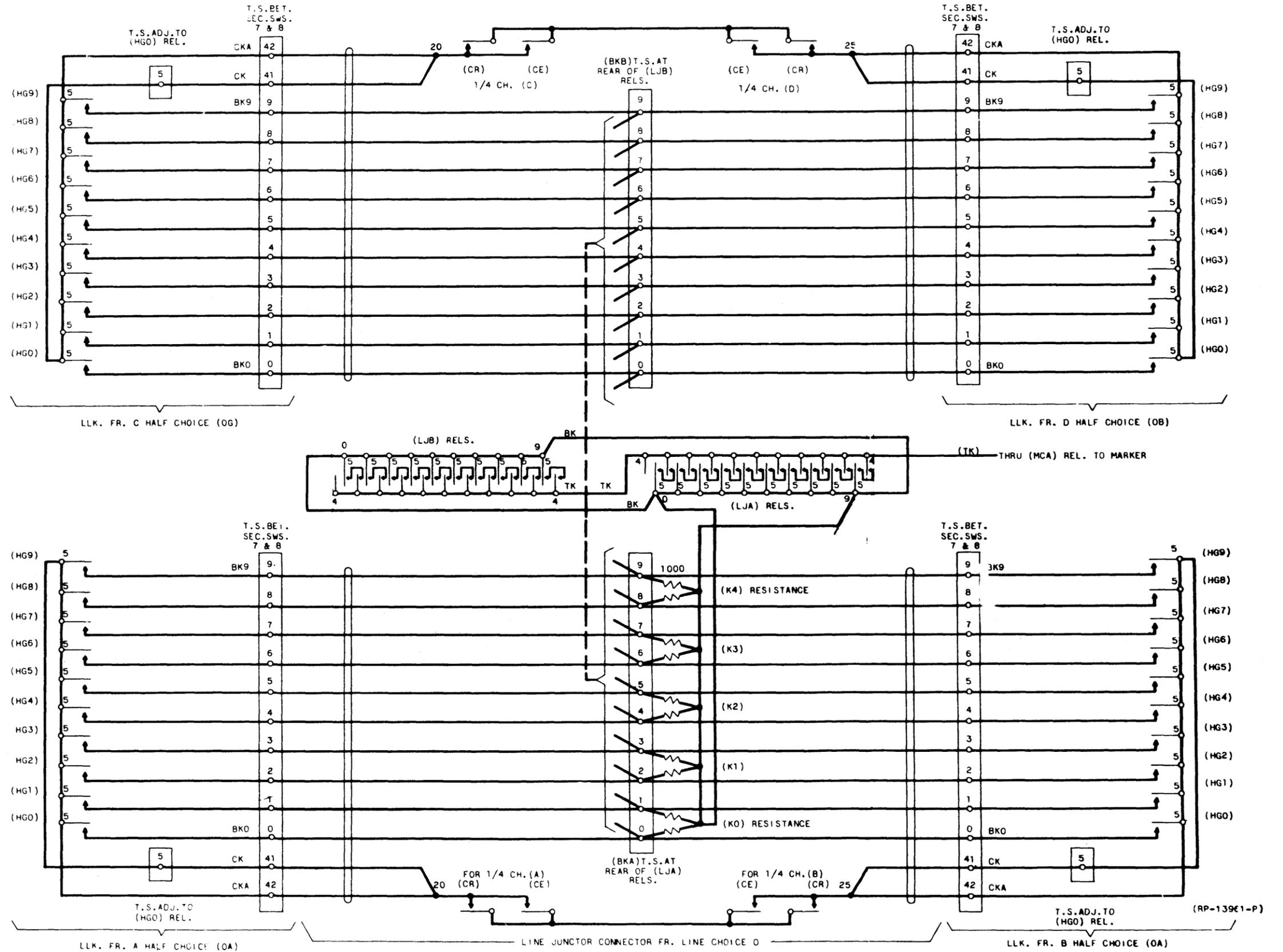


FIG. 19 LEADS CK AND BK

NOTE 2: When testing additions to existing equipment see Paragraph 1.3. before performing this test.

10.1 Test Set Preparation

10.11 Connect battery and ground to the set as outlined in Paragraph 9.11.

10.12 Connect the plug end of cord ITE-9547 to the C-0 jack of ITE-4033. Connect the other end of the cord, using an alligator clip, to the first S terminal to be tested at the HLDLF.

10.13 If required set up a talking circuit between the LDF and the line link frames.

10.2 Operations

10.21 Operate keys IG, T3, MR and X.

10.22 Operate key CO and have an assistant observe that the proper primary hold magnet of the line link frame operates and releases from the interrupted ground. If two S leads are crossed, the X lamp will flash. To verify that the cross detecting relays function properly, touch the end of the cord to two S terminals and observe that lamp X flashes.

11. CK AND BK LEADS

NOTE: When testing additions to existing equipment see Paragraph 1.3 before performing this test.

11.1 Test Set Preparation (See Figure 18)

(See Figure 19 for reference purpose)

11.11 Connect battery and ground to the set as outlined in Paragraph 9.11.

11.12 Connect ground to the CK lead (punching 42 of the terminal strip between secondary switches 7 and 8) using a #760 or ITE-9404 cord first checking that the punching is free of ground.

11.13 Using an ITE-9947 cord with alligator clips, connect the 10 leads to punchings 0 to 9 (BK-0 to BK-9 leads) of the terminal strip between secondary switches 7 and 8. Connect the other end of this cord to the S receptacle of the set.

11.2 Operations

11.21 Operate the SB key. No S lamps should light.

11.22 Manually operate relays HG-0 to HG-9 (upper half) in turn and observe that only one S lamp lights. The lighting of more than one lamp indicates crossed BK leads.

11.23 Remove the connections from the frame and restore all test set connections to normal.

12. CHECK OF G AND SL LEADS THROUGH D RELAY LOCKOUT CHAIN (SEE FIGURE 20)

12.1 Each group of 20 district junctors is multiplied to the verticals of the secondary switches on a number of line link frames either by direct cabling between line link frames or by jumper cable at the D.J.G.F. A lockout chain arrangement (D relay associated with each pair of line link secondary switches) establishes the sequence in which the secondary switches are given access to the district junctor group. The test described in the following paragraphs checks that the G and SL leads through the D relays are properly connected in the chain to give the associated pair of switches first, intermediate or last preference.

12.2 Temporarily connect ground to the SL-1 lead at contact 3B for SD-25003 or contact 9T when SD-25553 is provided of the D relay at the last line link appearance or at punching 46 of the terminal strip on the VDJGF serving the last pair of line link secondary switches having access to district junctor frame, first testing that the contact or punching is not grounded. Check that punching 39 on the HDFJG of the same district junctor group is grounded.

12.3 Check that contacts 2B and 3T for SD-25003 or contacts 8T and 3B when SD-25553 is provided of the D relay associated with the first line link appearance are grounded.

12.4 Block the first D relay operated and note that ground is removed from contacts 2B and 3T for SD-25003 or contacts 8T and 3B when SD-25553 is provided. Keep relay D operated and insulate contacts 1 and 2T for SD-25003 or contacts 1 and 2B when SD-25553 is provided.

12.5 Make the test per Paragraphs 12.3 and 12.4 at each succeeding appearance of the lockout chain. Once during the test of the chain recheck that punching 39 on the HDJGF is not grounded. As each D relay is blocked operated, check that contacts 3B and 1T for SD-25003 or contacts 9T and 1B when SD-25553 is provided of the preceding D relay are not grounded.

12.6 After the test has been completed all all secondary switches having access to district junctor group 0-1, release the D relays, remove the insulation from contacts 1 and 2T for SD-25003 or contacts 1 and 2B when SD-25553 is provided and remove the ground from punching 46 at the VDJGF.

12.7 Perform test operations 12.2 to 12.6 from each pair of secondary switches having access to district junctor groups 2-3, 4-5, 6-7 and 8-9 of the first district junctor frame.

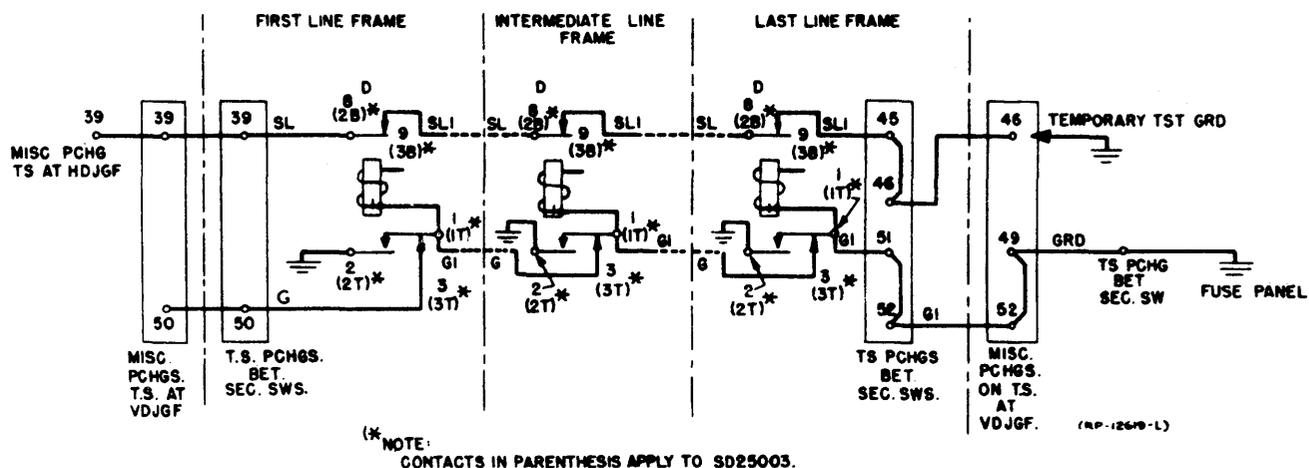


FIG. 20 CHECK OF G AND SL LEADS THRU D RELAY LOCKOUT CHAIN

12.8 Perform test operations 12.2 to 12.7 from the secondary switches having access to the remaining district junctor frames.

13. DA LEADS (SEE FIGURE 21)

NOTE: This test should not be made until after the D.J.G.F. cross-connections are cut in.

13.1 Connect one lead of an R-1824 pencil lamp to battery and the other lead to punching 29 of the terminal strip between line link secondary switches 0 and 1. The lamp should light. Check that the lamp lights when connected to punching 29 of the terminal strips between secondary switches 2-3, 4-5, 6-7, 8-9. Leave the lamp connected to punching 29 of the terminal strip between secondary switches 4-5.

13.2 Insert a 298-A make busy plug into the MB jack of each district group at the SSL frames to which the line link frame under test has access. The pencil lamp goes out.

NOTE: When testing additions this test must be performed at low traffic periods so that the associated five district group circuits may be made busy.

13.3 At the DP- relay on each sender link frame associated with the district group circuit serving the line link frame under test, manually close the proper contacts of the relay and verify that the pencil lamp lights each time these contacts are closed.

Refer to the job junctor grouping frame distributing diagram for information regarding proper contacts of DP- relay.

13.4 At the conclusion of the test remove the make busy plugs and disconnect the pencil lamp.

13.5 Perform test operations 13.1 to 13.4 inclusive on each line link frame.

14. TEST OF PL LEAD TO TRAFFIC REGISTER

14.1 Check that punching 44 (PL lead) of the T.S. between secondary switches 7 and 8 is free from ground.

14.2 At the traffic register rack operate the LK key to the HORIZONTAL LINE GROUP position.

14.3 Using a #760 or ITE-9404 cord, connect ground to punching PL associated with the line link frame under test on Misc. T.S. at top of any L.J.C. frame.

14.4 Verify that the proper GB register operates as each HG- relay is operated and released.

14.5 Remove the ground from the PL punching.

15. RL RELAY LOCKING PATH

15.1 Check that the RL relay can be locked up under control of each of the following relays: VS, PA, TT, AC, HC3 of the home controller and BC and MC3 of the mate controller.

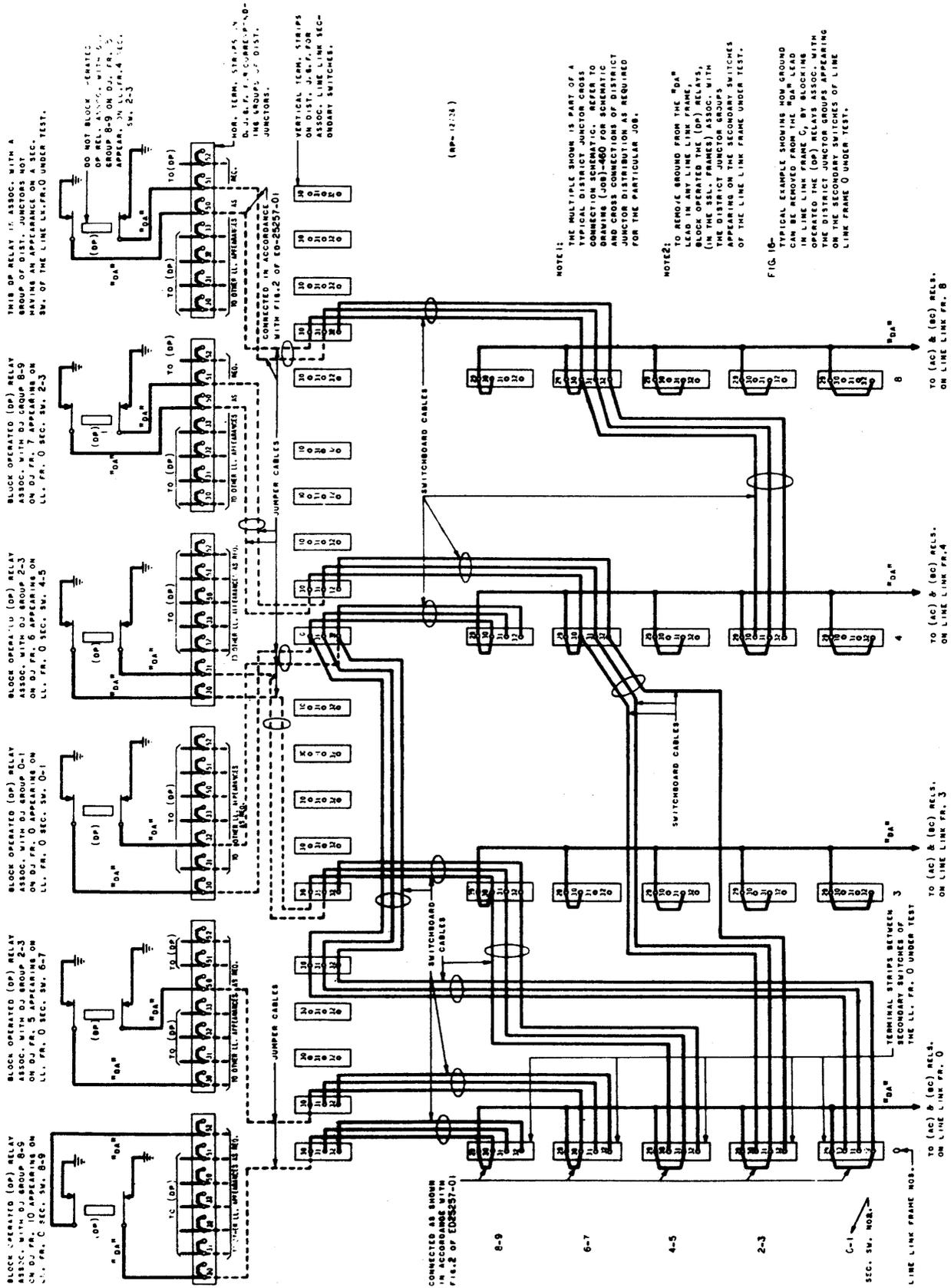


FIG. 21 TYPICAL EXAMPLE SHOWING HOW GROUND CAN BE REMOVED FROM THE "DA" LEAD IN LINE LINK FRAME 0, BY BLOCKING OPERATED THE (DP) RELAYS ASSOC. WITH THE DISTRICT JUNCTION GROUPS ON THE SECONDARY SWITCHES OF LINE LINK FRAME 0 UNDER TEST

15.2 Check that relay RL can be locked under control of relays RP and PR both normal and both operated.

16. PR AND RP RELAYS

16.1 Check that the PR and RP relays are in the unoperated position.

16.2 Manually operate the RL relay and observe that the PR relay operates. Release RL relay and observe that the RP relay operates.

16.3 Again operate the RL relay and observe that the PR relay releases. Release the RL relay and the RP relay releases.

17. LP AND VP RELAYS (SD-25553 ONLY)

17.1 Check that relay VP is operated and relays PR and RP are normal.

17.2 Cross contacts 7 and 8B of relay RP. Observe that relay LP operates and relay VP releases.

17.3 Remove cross from contacts of relay RP. Observe that relay LP releases and relay VP reoperates.

▶ 18. RD AND TD CROSS-CONNECTIONS

18.1 Strap together 11T-12T of HC3 relay. Momentarily strap across contacts 18M-18F of relays HGO-9 in turn. For horizontal groups arranged for Rotary-Dial, relay RD operates and relay TD is normal. For horizontal groups arranged for Touch-Tone, relay TD operates and relay RD is normal. If all horizontal groups are cross-connected to RD, momentarily ground punching 46(TD) of T.S. TTA to verify relay TD operates.

18.2 TL Diode: Strap together 11T-12T of HC3 or MC3 relay. Momentarily operate TRL relay. Relay should lock operated. Remove strap from HC3 or MC3 relay and connect ground to 4B of relay TRL with an ITE-9548 cord. Operate an HG- relay and verify that neither RD or TD relay operates, provided neither MC3 or HC3 relay is operated. Remove ground cord from relay TRL.

18.3 I.D.A. Lead (A.M.A. only): If XJ wiring (A.M.A.) is provided, block operated relay RD and block normal relay TD. Verify resistance battery is present at punching 9 of A.M.A. terminal strip (25 of TTA T.S. for SD-25003). Block normal relay RD and block operated relay TD. Verify ground is present at punching 9 of A.M.A. terminal strip. Remove blocks from relays RD and TD.

18.4 RD, TD and SLAO-4 Relays

CAUTION: Paragraph 18.4 will cause service interruptions of line link frame under test.

▶ Arrowed lines indicate new or changed information.

▶ 18.41 Block operated relays TT, VT and AC. The remainder of 18.4 and 18.5 will be performed at rear of frame. Using ITE-9598 cord supplied with test set ITE-4033B, connect -48V battery and ground from frame -48V TBS to jack A of ITE-4033B. Connect ITE-9984 cord supplied with test set to jack S of ITE-4033B test set and equip the ten leads at other end with ITE-4084 connectors. At the test set, turn key SB-SG to SB position. Attach leads 0-9 of ITE-9984 cord to 10TF of relays GO-9 respectively.

18.42 To operate relay RD, connect a ground cord to U of relay RD winding. At terminal strip located between secondary line switches 0-1, apply ground with cord ITE-9548 to punching 22 and, with a second cord, apply ground in turn to punchings 27 and 28. At the test set, lamps 0 and 1 respectively will light. Repeat procedure at terminal strips located between secondary switches 2-3, 4-5, 6-7, and 8-9 in turn and observe lamps 2-3, 4-5, 6-7, and 8-9 in turn and observe lamps 2-3, 4-5, 6-7 and 8-9 light respectively. Remove ground from U of RD relay.

18.43 Repeat Paragraph 18.42 with relay TD, instead of RD, operated and punching 24, instead of 22, grounded at each terminal strip. Release relays TT, VT, and AC. Remove Cords ITE-9548, 9598, and 9984.

18.5 I.D. Lead (Non A.M.A. only)

18.51 If XG wiring (Non A.M.A.) is provided, connect a ground cord to U of relay RD to operate it. Connect an I.T.E. cord across 3B and 4B (5B and 6B if Fig. 9 is used with SD-25003) of relay DFO. Verify resistance battery is present at punching 53 of terminal strip located between secondary line switches 0-1. Remove cord from 3B and 4B of relay DFO and connect it across 3B and 4B (5B and 6B if Fig. 9 is used with SD-25003) of relays DF1-DF4 in turn. Verify resistance battery is present at punching 53 of terminal strips between secondary switches 2-3, 4-5, 6-7, and 8-9 respectively. Remove ground cord from U of relay RD.

▶ 18.52 Repeat Paragraph 18.51 with ground connected to U or relay TD, instead of RD, and verify that ground, instead of resistance battery, is present at punching 53 of the terminal strips.

19. MISCELLANEOUS CIRCUITS

19.1 Test fuse alarm and that fuse alarm is not stopped when the FA or 20A lamp is removed. Check frame test battery.

19.2 Test miscellaneous circuits such as the following that are not covered in other tests: (1) spare jack to MDF; (2) service observing jacks, (3) message register test jacks (4) test line jack and (5) frameline circuit.

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Reason for Reissue:
To add Paragraph 18.

Replaces Section 101 dated 9-19-57.