LINE CONTROLLER TEST

CONTENTS

1. GENERAL INFORMATION

1.1 Description of Test: This Section describes a test of the operating features of line controller circuits.

SD-25003-01 - Subscriber Line, Line Link and Controller Circuit
SD-25553-01 - Subscriber Line, Line Link and Controller Circuit

1.11 These tests should be made after the miscellaneous test on the line link and the subscriber sender link frames described in other sections of this handbook have been completed. The following terms are used in these tests and are intended as follows:

Line Group - The lines served by one link frame (190 to 690 lines).

Line Subgroup - A group of ten lines served by the ten verticals of a 100 point primary switch or ten verticals of one-half of a 200 point primary switch.

Horizontal Line Group or Horizontal Group - The lines (19 to 69 lines) served by the primary switches mounted in the same horizontal position of the line link frame and associated supplementary units.

Column - The ten 100 point primary switches or ten halves of ten 200 point primary switches mounted one above the other on a line link frame or associated supplementary unit. Where column numbers are specified in this method, the numbers apply to the columns of the line link frame under test.

1.12 Before making tests involving combined home and mate controller operation complete proper strapping of leads.

1.2 Testing Additions

1.21 Before Cross-Connections to D.J.G.F.: Insert make-busy plugs into the SS- jacks on the line link frame under test and perform the tests outlined in Paragraphs 4.1, 4.3 and 4.5 to 4.7 inclusive.

NOTE: On these preliminary tests before DJGF cross-connections are installed dial tone will not be heard and it will not be possible to observe certain lamp indications on the test set.

(a) The tests will cycle under control of the delay register (DL) and therefore the DK and DM register leads to the register rack should be connected and the register circuit checked before making the tests. The test set lamps will not light during these tests therefore check the proper order of selection by observing the HA and HB relays for horizontal group, the LT relays (also LP relay on SD-25553) for line test and the V relays (also VP relays on SD-25553) for column selections.

(b) After the above mentioned tests are completed perform all the tests outlined in Paragraph 5 omitting those tests in Paragraphs 5.13, 5.15, 5.3, 5.4, 5.62 and 5.71.

1.22 After Cross-Connections to D.J.G.F.: After the sender multiple transition has been completed perform the tests outlined in Paragraphs 4.1 to 4.8 inclusive.

1.23 When the mate controller circuit for the line link frame under test is in a working frame, reference to mate frame in any of the following tests (except Paragraph 4.7) should be construed to mean the home frame.

1.24 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 strips 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 on Home Cont. T.S.
123 to 124 on Mate Cont. T.S.
125 to 126 on Home Cont. T.S.
127 to 128 on Mate Cont. T.S.

After the tests in Paragraph 4.1 to 4.8 have been completed perform the tests outlined in Paragraphs 5.13, 5.15, 5.3, 5.4, 5.62, 5.71 and 6.

1.3 Remote Control:

1.31 If it is desired to observe progress of tests from the sender link or sender frames, the ITE-4032 test set may be set up in the following manner to provide remote control of the test set.

1.32 Remove battery cord from A jack. Connect "G" binding post of test set to any spring of the frame "B" jack

using an ITE-9606 cord or equivalent supply the ground to the corresponding spring of the "B" jack at the sender link or sender frame.

1.33 Supply battery to the test set by connecting from the tip of the "A" jack to the test set "B" binding post using an ITE-9606 cord.

1.4 Circuit Test: When making the routine test per Paragraph 6, a circuit test shall consist of a series of tests, as outlined in Paragraphs 6.3 to 6.7 on a line link controller circuit.

1.5 Cross-Connections on New Installations: The test of the M leads to the district junctors (Paragraph 4.9) should be made before the cross-connections to the message registers are installed. All other cross-connections should be installed before proceeding with the tests outlined in this section.

2. RECORDS AND REQUIREMENTS

2.1 Records: Forms ID-1313, ID-2200, ID-2201 and ID-1334 are required for recording the results of these tests. For further information see Section 3 of Handbook 50.

2.2 Requirements: Section 2 lists all tests to be made on line link controller circuits.

3. TESTING EQUIPMENT

3.1 Test Sets

Amt	ITE	Description	Furnished With
1	4032	Line Link Test Set	
1	4106A	Line Relay Test Set-Crossbar	ITE-4023

3.2 Cords

Amt	ITE	Lgth	Cdrs	One End	Other End	Furnished With ITE
5	9548	9"	1	ITE-2455	ITE-2455	⁄4023
1	9598	12'	2	110 Plug	110 Plug	4032
10	9637	12'	3	110 Plug	325A Plug	4032
2	9650	6'	4	137 Plug	Oper. Test Set	⁄4023
1	9690	12'	4	2-110 Plug	325A Plug	⁄4023
1	9708	12'	5	2-110 Plug	325B Plug	⁄4023
★2	9606	6'	3	310 Plug	Spade Tips	

3.3 Accessories

Amt	Code	Description	Furnished With ITE
5	ITE-8507	Alligator Clips	⁄4023
15	298A	Make-Busy Plugs	⁄4023
10	508A	Relay Blocking Tools	⁄4023
1	ITE-4042	Hand Telephone Set	⁄4023
1	D-81762	Hand Telephone Set	⁄4023
1	R-9572	Test Receiver	⁄4023

⁄Crossbar Test Accessory Kit
★Required only for remote control of test set.

4. SUPPLEMENTARY TESTS

NOTE 1: When testing coin lines the lines should be disconnected one at a time to prevent tying up the coin supervisory circuits. This is done by throwing the associated toggle switch to the OFF position instead of releasing G key.

NOTE 2: The calls involved in the tests per Paragraph 4 should be served in the proper sequence as noted, but may not, due to slow 4B-5B of relays HA and HB, or a slow LT relay. Check that the preferred HA and HB relays operate before the GTA and GTB relays operate and lock. The cause of any deviation should be determined.

NOTE 3: On SD-25553, if proper sequence cannot be obtained check that the FA and FB relays meet the proper mechanical and electrical requirements. This applies either on calls within the frame or with home and mate operation.

4.1 Check of Interrupters

4.11 IA Interrupter

(a) Short circuit the 5 and 6 upper contacts of the CA relay. Observe that the TA relay operates on or before 6 seconds have elapsed and that the TA1 relay operates in about 6 seconds (minimum 5 seconds) after operation of the TA relay. If the B and F leads at the interrupter are reversed the TA1 relay will operate almost immediately after operation of the TA relay (.14 seconds). Remove short from upper 5 and 6 contacts of the CA relay.

(b) Insulate 4 and 5T of TA relay. Connect ground to the 10T contact of the TA1 relay. Observe that the TA relay operates and the TA1 relay for at least 7 seconds to insure that for a complete cycle of the interrupter the TA1 relay will not operate. Remove insulation.

4.12 IB Interrupter

(a) Repeat the above tests substituting the CB, TB and TB1 relays for the CA, TA and TA1 relays respectively.

4.2 Originating 10 Simultaneous Calls In Same Horizontal Line Group (See Figure 1)

4.21 Test Set Preparation

4.211 Connect 48V battery and ground to the test set BAT jack using cord ITE-9598.

4.212 Connect the lines to be used for test to the test set by patching ITE-9637 cords between the primary switch verticals and the 0 to 9 jacks of the test set jacks in the sequence in which they are served by the start circuit. (This does not apply in all cases when SD-25553 is used.) For example, if ten lines consisting of one line per horizontal group are to be served, the line in horizontal group 0 will be served first, then group 1, etc., up to group 9. If more than one line is used in a horizontal group in addition to lines in other horizontal groups, the start circuit

will serve one line from each horizontal group before serving a second line in any horizontal group. The order of selection of a number of lines in horizontal group will be a line in column 0, etc., up to column 6. The order of selection of lines in a subgroup is vertical 0 up to vertical 9. Details regarding the lines to be used for test are specified under each test.

4.213 On SD-25553 the order of selection for lines and line subgroups will reverse for each line served.

4.214 When testing coin line link frames block the CC relays of the coin district junctors normal.

4.215 To check dial tone connect a test receiver to the DT terminals and operate the DT key corresponding to the jack to which the line to be checked is connected.

4.22 Connect 10 lines from horizontal group 0 to jacks 0 to 9. Select the lines so as to use each LT relay, associating numerically the 0 to 9 LT positions with the 0 to 9 jacks on the test set. Select lines in each column of the line link frame.

4.23 Operate keys L0 to 9 and G. The lamps on the test set should light in proper sequence as indicated by the following table. The cause of any deviation should be determined. Check that only one lamp lights at a time. More than one lamp lighting at the same time is an indication of trouble. (See Notes 2 and 3, Paragraph 4 and Paragraph 4.13).

(SD-25003)

Test Set No. of Cols.	Jack or Lamp Vertical	0 1	2	3	4	5	6	7	8	9
		1 0	2	3	4	5	6	7	8	9
2	Col. No.	0 1	0	1	0	1	0	1	0	1
3	"	0 1	2	0	1	2	0	1	2	0
4	"	0 1	2	3	0	1	2	3	0	1
5	"	0 1	2	3	4	0	1	2	3	4
6	"	0 1	2	3	4	5	0	1	2	3
7	"	0 1	2	3	4	5	6	0	1	2

(SD-25553)

Test Set No. of Cols.	Jack or Lamp Vertical	0 1	2	3	4	5	6	7	8	9
		1 0	2	3	4	5	6	7	8	9
2	Col. No.	0 1	0	1	0	1	0	1	0	1
3	"	0 2	1	0	2	1	0	2	1	0
4	"	0 3	1	2	0	3	1	2	0	3
5	"	0 4	1	3	2	0	4	1	3	2
6	"	0 5	1	4	2	3	0	5	1	4
7	"	0 6	1	5	2	4	3	0	6	1

NOTE: On even numbered jacks the VP relay should be normal and on odd numbered columns the VP relay should be operated.

4.24 Release the G key and note that the connections are released.

4.25 Repeat the tests per Paragraphs 4.21 to 4.23 from each horizontal group. Test at least one horizontal group on the frame using the mate controller.

4.3 Originating 10 Simultaneous Calls In 10 Different Horizontal Groups and All Columns (See Figure 2)

4.31 Connect 10 lines to jacks 0 to 9 of the test set in accordance with the row of the following table corresponding to the number of columns of the line group on the particular frame under test. For example, if the line link frame has 6 columns cord #5 would be inserted in switch 5 vertical 5 of column 5.

Cord Assoc. with Test Set Jacks	Horizontal Group Number	Number of Columns on Line Link Frame Under Test 2	3	4	5	6	7	Switch Vertical
9	9	1	0	1	4	3	2	9
8	8	0	2	0	3	2	1	8
7	7	1	1	3	2	1	0	7
6	6	0	0	2	1	0	6	6
5	5	1	2	1	0	5	5	5
4	4	0	1	0	4	4	4	4
3	3	1	0	3	3	3	3	3
2	2	0	2	2	2	2	2	2
1	1	1	1	1	1	1	1	0
0	0	0	0	0	0	0	0	1

4.32 On SD-25553 for the first test insulate 1B and 2B of VP relay and 7B of the RP relay. At completion of first test remove insulator from 1B and 2B of VP relay and 7B contact of the RP relay. For the repeat test insulate 2B and 3B of VP relay and cross 7B and 8B contacts of the RP relay. At completion of repeat test remove insulator from 2B and 3B of VP relay and remove cross from 7B and 8B contacts of RP relay. Subsequent repeat tests to be made with the circuit unrestricted. When testing additions before DJGF cross-connections are installed block relays M, TA and TB normal.

4.33 Operate keys L0 to L9 and G. In general the test lamps should light in the sequence 0 to 9. (See Note 2 and 3, Paragraph 4.)

4.34 Release the G key to release the connections. (See Note 1, Paragraph 4.)

4.35 Repeat the test with a 298A plug in the EA jack. Remove 298A plug from EA jack, insert in EB jack and repeat test. Remove 298A plug from EB jack. Make one test with a 298A plug in the MB jack. Remove all relay blocks and 298A plug at completion of test.

4.4 Trouble Lockout

4.41 Omitting Paragraph 4.32 and the next to last sentence of Paragraph 4.35 make this test the same as the test described in Paragraph 4.3 but block relay HM normal in the line in subgroup in which the line used for test in horizontal group 1 is located. Note that a trouble release is given on horizontal group 1

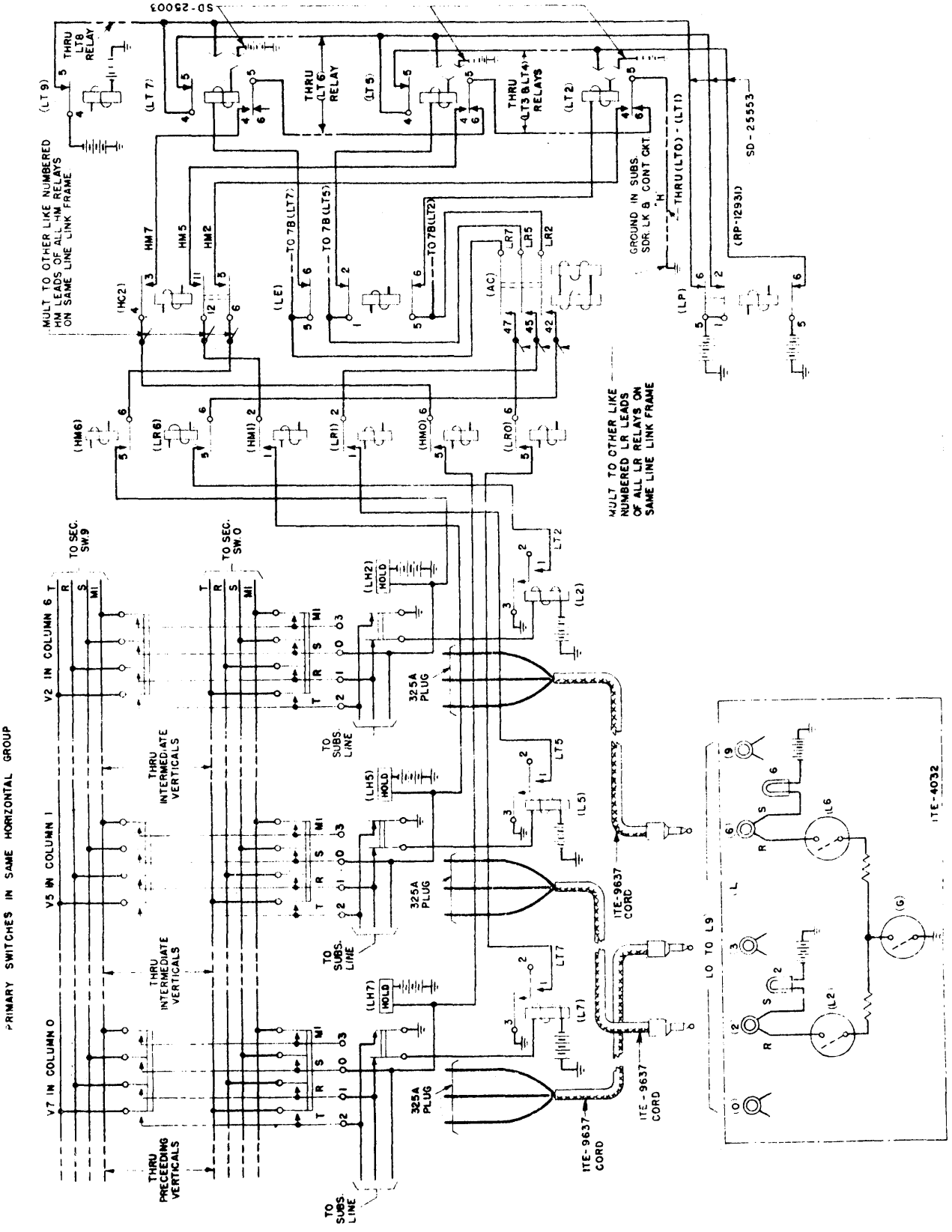

FIG. 1 SETUP FOR ORIGINATING 10 SIMULTANEOUS CALLS IN THE SAME HORIZONTAL LINE GROUP.

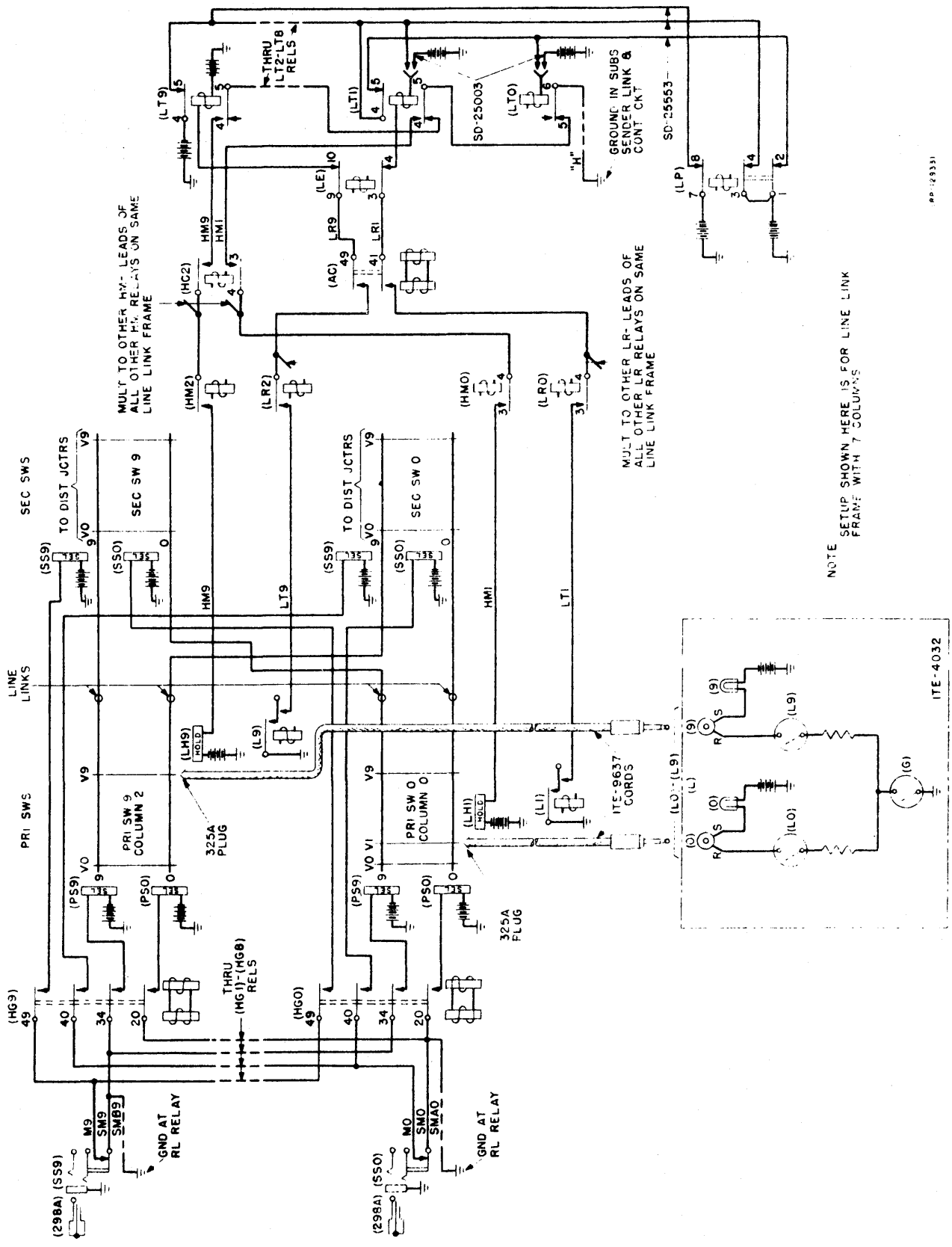

FIG. 2 SETUP FOR ORIGINATING 10 SIMULTANEOUS CALLS IN 10 DIFFERENT HORIZONTAL GROUPS AND ALL COLUMNS.

after which all other horizontal groups in which calls are waiting are served before another attempt is made to serve horizontal group 1. The AL lamp lights. Momentarily operate the TR key to retire the alarm.

4.5 Originating 10 Simultaneous Calls In a Line Subgroup of 10 Lines

4.51 Connect the 10 lines of a line subgroup (any column except 0) to jacks 0 to 9, with the lowest numbered line connected to 0 jack and the highest numbered line to the 9 jack When testing additions before DJGF cross connections are installed block relays M, TA & TB normal.

4.52 Operate keys L-0 to L-9 and G and observe that the lines are served in correct sequence. (See Notes 2 and 3, Paragraph 4 and Paragraph 4.13.)

NOTE: When testing additions before cross connections to D.J.G.F. are installed, lines 0 and 9 will be served, then release keys L0 and L9 after which lines 1 and 8 will be served. Continue in this manner until all lines are checked. Observe the order of operation of the LT relays to check order of serving.

4.53 Release the G key to release the connection. (See Note 1, Paragraph 4.)

4.54 Make this test from one line subgroup of the frame.

4.55 Repeat the test with a 298A plug in the EB jack.

4.56 Release blocked relays and remove the 298A plug from the EB jack.

4.6 Traffic Lockout Feature

4.61 Connect 10 lines of column 0 to jacks 0 to 9 in accordance with the following table and make two tests on the frame. On SD-25553 insulate 7B of RP relay also 1B and 2B of VP relay in home and mate controllers.

	1st Test		2nd Test	
Connect Jack	To a Line of Hor.Grp.	Sw. Vert.	To a Line of Hor.Grp.	Sw. Vert.
0	5	2	0	2
1	6	2	1	2
2	7	2	2	2
3	8	2	3	2
4	9	2	4	2
5	5	3 to 9*	0	3 to 9*
6	6	3 to 9*	1	3 to 9*
7	7	3 to 9*	2	3 to 9*
8	8	3 to 9*	3	3 to 9*
9	9	3 to 9*	4	3 to 9*

* Any one of the 3 to 9 verticals may be used in the specified horizontal group.

4.62 Operate keys L-0 to L-9 and G and observe that the lines are served in correct sequence. (See Notes 2 and 3, Paragraph 4.)

4.63 Release the G key to release the connections. (See Note 1, Paragraph 4.)

4.64 Repeat the test with a 298A plug in the EB jack.

4.65 Remove plug from EB jack.

4.66 Operate keys L(0 to 4) and G, then L(5 to 9) and note lines are served in proper sequence. Make this test for each of the two setups in Paragraph 4.61.

4.67 Repeat the test outlined in Paragraph 4.66 on each column. On SD-25553 remove insulator from 7B of RP relay also 1B and 2B of VP relay at completion of the tests.

4.7 Home and Mate Frame Operation

4.71 Insert a 298A plug into the MB jack of the home control circuit. When testing additions before D.J.G.F. cross-connections are installed block relays M, TA and TB normal.

4.72 Connect one line in horizontal groups 2 to 6 of the home frame to jacks 0 to 4 of ITE-4032 as follows:

Switch Vertical	Cord #	Horiz. Group
0	0	2
1	1	3
2	2	4
3	3	5
4	4	6

Connect one line in horizontal groups 2 to 6 of the mate frame to jacks 5 to 9 as follows:

Switch Vertical	Cord #	Horiz. Group
5	5	2
6	6	3
7	7	4
8	8	5
9	9	6

4.73 Operate keys L-0 to L-9 and G and observe that the lines are served in correct sequence, alternating between the mate and home frames. The test set lamps should light in the sequence 5, 0, 6, 1, 7, 2 etc. (See Notes 2 and 3, Paragraph 4.).

NOTE: When testing additions before cross-connections to D.J.G.F. are installed the test lamps will not light therefore observe that the mate frame LT relays operate in the following sequence 5, 0, 6, 1, 7, 2, 8, 3, 9 and 4.

4.74 Release the G key to release the connections. (See Note 1, Paragraph 4.)

4.75 Remove the 298A plug from the MB jack of the home controller and insert in the MB jack of the mate controller. Repeat the test. The lines should be served in the following sequence: 0, 5, 1, 6, 2, 7, etc.

NOTE: When testing additions before cross-connections to D.J.G.F. are installed the test lamps will not light therefore observe that the home frame LT relays operate in the sequence 0, 5, 1, 6, 2, 7, 3, 8, 4 and 9.

4.76 Remove connections and 298A plug, release blocked relays.

4.77 Make this test once on each pair of line link frames.

4.8 District Group Test and Check of DA, TA, TB, RA and RB Leads

4.81 At the first district junctor frame make 6 of the 10 junctors busy in subgroup 0 and make 7 of the 10 junctors busy in subgroup 1.

4.82 At a line link frame appearance of this district junctor group make busy all secondary switches except the two switches of this appearance. (Plug in SS- jacks.) Connect one line in horizontal groups 0 to 7 to jacks 0 to 7 of ITE-4032 and operate keys LO to L7.

4.83 Block normal the RS and RSA relays. Operate the test set G key and observe that three lines are served by district junctor subgroup 0 and two lines by subgroup 1. Attempts will be made to serve the other lines but since but one junctor is now available in each subgroup and the reserve feature is blocked, the delay register should function at 1.5 to 2.0 second intervals to release the control circuit. If more than the specified number of lines are served by either subgroup, the sender link has failed to open the TA or TB lead with but one district junctor available or there are reverses or crosses in the TA, TB, RA and RB leads. Release the test set G key. (See Note 1, Paragraph 4.)

4.84 Remove the blocks from RS and RSA relays. Operate the G key. Four lines are served by district junctor subgroup 0 and three lines by subgroup 1 after which the control circuit cycles under the control of the delay register. Release the G key. Remove plugs from SS- jacks.

4.85 Repeat the tests outlined in Paragraphs 4.82 to 4.84 at each line link frame appearance of the district junctor group.

4.86 Make the tests outlined in Paragraphs 4.81 to 4.85 with each district junctor group.

4.9 Check of M- Leads to District Junctors

NOTE: This test should be made before cross connections to the message registers are installed. It will probably be advisable to set up talking facilities between the line link frame under test and the district junctor frames.

4.91 M1 Leads

4.911 Connect one end of an ITE-9598 cord to the (BAT) jack of an ITE-4032 test set. Connect the other end to the (A) jack of the line link frame.

4.912 Connect the (H1) plug of an ITE-9708 cord to jack (1) of the ITE-4032 test set.

4.913 Connect the 325B plug of the ITE-9708 cord to secondary switch 0 vertical 0 of the line link frame under test.

4.914 Operate key (TP) on the ITE-4032 test set.

4.915 Lamp (1) will light if ground is present on the M1 lead.

4.916 At the district junctor circuit associated with secondary switch Vertical 0, manually operate the F relay.

4.917 Check that lamp (1) is extinguished. (If 2-party, make test of the associated M2 lead Paragraph 4.92 at this time.) Release the F relay.

4.92 M2 Leads

4.921 Set up tests per Paragraphs 4.911 to 4.914.

4.922 Lamp (2) will light if ground is present on the M2 lead.

4.923 At the district junctor circuit associated with the secondary switch vertical under test, and with the F relay of the district junctor blocked operated, manually operate relay TP.

4.924 Check that lamp (2) is extinguished on the ITE-4032.

4.925 Release TP relay and remove block.

4.93 Repeat tests per Paragraphs 4.91 and 4.92 on each vertical from 1 to 9 in secondary switch 0.

4.94 Repeat tests per Paragraphs 4.91 to 4.93 on each secondary switch from 1 to 9.

5. SUPPLEMENTARY TESTS (MISCELLANEOUS)

5.1 Minor Alarms

5.11 Throw Over

(a) Block relay FA non-operated. Originate a call on any line of the frame under test using handset ITE-4042. When testing coin frames, momentarily apply ground to the ring side of the line by shorting the ring of plug 325A to the plug handle.

(b) Observe that 6 to 13 seconds after the call is originated, the minor intermittent alarm sounds, the white aisle pilot and the frame AL lamp light. Check that the proper LA lamp lights at the make busy frame or CTI frame. If CTI frame is provided, check that at completion of the 6 to 13 seconds time out interval the proper TR (trouble) register scores at the sender make busy frame. If a CTI frame is not provided the TR (trouble) register does not score.

(c) Observe that after the minor alarm sounds the call is served by the mate control circuit. Remove the block from the FA relay and momentarily operate the TR key to restore the alarm. Disconnect the call.

5.12 Throw Back

(a) Block relay FA non-operated. Originate a call on any line of the frame under test using the handset.

(b) After the minor alarm sounds, remove the block from relay FA and block relay FB non-operated. Observe that relay TA-2 is operated.

(c) Disconnect the call and originate again. Observe that 6 to 13 seconds after origination, the call is served by the home control circuit. Check that at completion of the 6 to 13 seconds timeout interval the proper TR (trouble) register scores at the sender make busy frame. This last feature is AJ wiring on SD-25003.

(d) Observe that the TB2 relay is operated and the TA relay is released.

(e) Remove the block from relay FB and momentarily operate key TR to restore the alarm.

5.13 FA and FB Relay Hold Path

(a) Block TA1 relay non-operated and TA relay operated. Originate a call, obtain dial tone and then release. Observe that the FA relay remains operated until the TA relay block is removed. Disconnect the call.

(b) Remove block from TA1 relay. Insert 298A plug into EB jack. Block TB1 relay non-operated and TB relay operated.

(c) Originate a call, obtain dial tone and then release. Observe that the FB relay remains operated until TB relay block is removed. Remove block from TB1 relay and plug from EB jack. Disconnect the call.

5.14 Early Release Feature

(a) Insert 298A plugs into SS0 to SS9 jacks at line link.

(b) Block relay LS normal.

(c) Originate a call on a spare line and disconnect after approximately 1 second. Observe that the control circuit restores to normal immediately.

(d) Remove blocking tool from relay LS.

(e) To check early release feature after relay LE has operated and with relays G0 to G9 normal, repeat test operation 5.14(c) with relay LS permitted to operate normally.

(f) Insert a 298A plug into the EB jack and repeat test operation 5.14(c) with relay LS of the mate controller circuit permitted to operate normally.

(g) Remove the plugs from the EB and the SS jacks.

5.15 Exercise Jacks

(a) Insert a 298A plug into the EA jack, originate a call on a line with a handset and obtain dial tone. Release the connection.

(b) Block relay FA normal and again originate the call. Observe that after 6 to 13 seconds the minor alarm functions and dial tone is obtained. Release the connection and remove the blocking tool from the FA relay and the plug from the EA jack.

(c) Repeat the test using EB jack and the FB relay.

(d) Insert 298A plug into the EA and EB jacks, originate a call and observe that dial tone is obtained immediately. Release the connection.

(e) Block relay CA normal and again originate the call. Observe that dial tone is obtained immediately. Release the connection and remove the blocking tools from relay CA and remove the plugs from the EA and the EB jacks.

5.16 Release Due to Open LT Leads

(a) Block the S relay in the controller circuit under test normal and originate a call on the line link frame using an ITE-4042 handset. When testing additions before cross connections to D.J.G.F. are installed insulate 1T and 2T of TRL relay.

(b) Observe that the minor alarm sounds intermittently and the AL lamp flashes with the alarm. If AE or Q (SD-25003) wiring is furnished at the AP relay in the controller circuit, the AL lamp and the alarm function steadily. When testing additions before cross-connections to D.J.G.F. are installed the AL lamp lights steadily until the controller transfers to the mate frame, then it goes out momentarily and relights steadily until the TR key is momentarily operated to release it.

(c) Release the connection and remove the block from the S relay. The alarm restores to normal. If AE or Q (SD-25003) wiring is furnished, operate the TR key momentarily to restore alarm to normal. When testing additions before cross-connections to D.J.G.F. are installed, momentarily operate the TR key to restore the alarm to normal.

5.17 False Operation HG Relay

(a) (On SD-25553 insulate 3B and 4B of LA relay.) Manually operate the lower half of relay HG-0 and observe that the minor alarm functions after 6 to 13 seconds. Release relay HG-0. Momentarily operate the TR key to retire the alarm. Manually operate and release in turn relays HG-1 to HG-9 and observe that the CA relay operates while each relay is operated. (On SD-25553 remove insulator from 3B and 4B of LA relay.)

5.18 Resetting Alarm Circuit

(a) Block LA relay operated. After TA relay operates and before TA1 relay operates manually operate FA relay, and observe that the TA relay releases.

(b) Remove block from LA relay.

(c) Block LB relay operated. After TB relay operates and before TB1 relay operates manually operate FB relay, and observe that the TB relay releases.

(d) Remove block from LB relay.

5.19 False Ground on DK Lead (SD-25553)

(a) Ground 2T of TRL relay. Check that trouble alarm operates after about 6 seconds (minimum 5 seconds). Remove ground from 2T of TRL relay.

5.2 Major Alarms

5.21 Home Controller

(a) Insert 298A plug into the H jack. Block FA relay non-operated. Originate a call on a spare line.

(b) Observe that 6 to 13 seconds after the call is started, the major alarm sounds, the white aisle pilot and frame MA lamps light. Observe that dial tone is not received.

(c) Disconnect the call, remove block from FA relay, remove plug from H jack and momentarily operate TR key to restore the alarm.

(d) Insert 298A plug into EB jack. Block FB relay non-operated. Insert 298A plug into H jack and repeat 5.21 (a) to (c). Remove block from FB relay and plug from EB jack.

5.22 Mate Controller Busy

(a) Insert 298A plug into MB jack of the mate control circuit. Block FA relay non-operated. Originate a call on a spare line.

(b) Observe that 6 to 13 seconds after call is originated the major alarm sounds, the white aisle pilot and frame MA lamps light.

(c) Remove block from FA relay. Momentarily operate TR key to restore the alarm. Observe that dial tone is received, then disconnect the call and remove 298A plug.

5.23 Home Controller Busy

(a) Insert 298A plug into MB jack of the home control circuit. Block FB relay non-operated. Originate a call on a spare line.

(b) Observe that 6 to 13 seconds after the call is originated the major alarm sounds, the white aisle pilot and frame MA lamps light.

(c) Remove block from FB relay and momentarily operate TR key to restore the alarm. Observe that dial tone is received, then disconnect the call.

5.24 Home & Mate Controllers Busy

(a) Insert a 298A plug into the MB jack of both the home and mate control circuits.

(b) Observe that the major alarm sounds immediately, the white aisle pilot associated with both frames light and the MA lamps on both frames light immediately.

(c) Remove both plugs and operate TR key on both frames momentarily to restore the alarms.

(d) Whenever a plug is inserted in the MB jack of a line link control circuit the LL guard lamp at the floor alarm cabinet should light.

5.25 Blocked Terminating Call

(a) Block TA1 & TB1 relays operated. Observe that the major alarm sounds immediately, the white aisle pilot and frame MA lamps light.

(b) Remove blocks from TA1 & TB1 relays. Operate the TR key momentarily to restore the alarm.

5.3 Lockout - Terminating Call

5.31 Block TA & TB relays non-operated. Block LA relay operated. Then originate a call on a spare line. Observe that dial tone is not received.

5.32 Remove block from LA relay. Observe that dial tone is received then disconnect the call.

5.33 Block LB relay operated and originate a call on a spare line. Observe that dial tone is not received.

5.34 Remove block from LB relay. Observe that dial tone is received then disconnect the call and remove blocks from TA and TB relays.

5.4 Alternate District Junctor Group Selection

5.41 Originate a call on a spare line. Note the group of districts selected by observing the secondary line link hold magnet operated.

5.42 Disconnect the call and originate again. Observe the district group selected.

5.43 The two district groups should agree with the cross-connections of the DA, DB leads at the G0 to G9 relays.

5.5 Line Relay Operate and Non-Operate Test

NOTE: The relay can covers must be in place when making these tests.

5.51 Connect to the line under test by inserting the test set plug into the vertical unit jack on the primary switch.

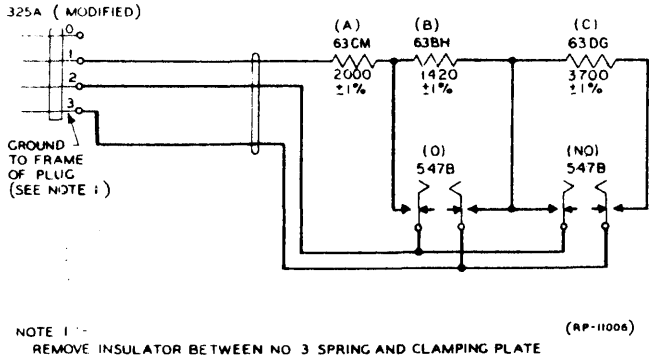

FIG. 3 LINE RELAY TEST SET, ITE-4106A

5.52 Apply the operate test by holding operated the O key. A sender will be seized and the line hold magnet operates. If the L relay operates partially the controller will cycle, the hold magnet will not operate and the AL lamp will flash. Release the O key when the hold magnet operates.

NOTE: If when testing additions this test is made before senders are available the controller will cycle under the control of the delay register on OK tests (see Paragraph 1.21). The AL lamp will not flash except in the case of a partially operated L relay.

5.53 After the operate test has been made, hold the NO key operated to apply the non-operate test. In case of false operation either fully or partially the circuits will react as described under Paragraph 5.52.

5.6 Check of Registers

5.61 Line Link Controller Delay (SD-25317,Figs. 1, 15)

(a) Insert 298A plugs into the SS0 to SS9 jacks.

(b) Originate a call on a spare line. Observe that 1.5 to 2 seconds after the call is originated the RL relay in control circuit operates and call is restarted.

(c) Observe that the associated DL register on traffic register rack scores once.

(d) Disconnect the call.

(e) Block the TRL relay operated and originate a call on a spare line.

(f) Observe that after 1.5 to 2 seconds the DL register scores once but the RL relay does not operate. Disconnect the call and remove block from the TRL relay.

(g) Insert 298A plug into the EB jack and repeat Paragraph 5.61 (a) to (f) except that the RL relay refers to the RL relay in the mate circuit.

(h) Remove the plugs from the SS jacks.

5.62 Peg Count (SD-25317 Figs. 1, 10, 17, 18)

(a) Operate associated battery control key (GRD) at traffic register rack.

(b) Originate a call on a line. Observe that the proper associated PC register at traffic register rack scores once.

5.63 Trouble Release Register

(a) When SD-25003 with AI wiring is specified or SD-25553 without CTI frame is used, make the following test.

(b) Insulate 3T and 4T contacts of TRL relay, operate TRL relay, check that it locks. Remove insulator from 3T and 4T of TRL relay, check that the proper TR (Trouble) register scores once at the sender make busy frame and the TRL relay releases.

5.7 Check of Leads

5.71 Class of Service

(a) This test is made by originating calls in each line link frame and verifying the operation of the proper CS relay in the sender as each LT relay is operated. The CS leads are checked through each line link DF relay and associated sender link G relay by busying all line link secondary switches except the two corresponding to the DF relay path under test.

(b) Insert make busy plugs into jacks SS2 to SS9 of the line link frame to be tested and block the TA and TB relays normal. On SD-25553 block LP relay normal.

(c) At the sender link frame associated with the SSO-1 jacks of the line link frame block the W relay normal and block normal the GB relay associated with the sender subgroup to be used for test. Block operated all other GB relays in this sender link circuit.

(d) At the sender make busy frame insert a make busy plug in the sender subgroup used for test. This will prevent calls from being directed through other sender links to this sender subgroup. Make busy all senders in the subgroup except one by plugging the MB jacks. In the sender left idle block normal the ON-1 relay. Block operated the SC-2, SC-3 relays if provided.

NOTE: When testing additions make busy the secondary switches (SS jacks) at all line link frames having access to the district group through which the CS leads are being checked. Make busy all other district groups at that sender link frame.

(e) Originate a call with a handset from the #9 vertical of any primary switch of the line link frame under test and hold the call. Relay LT9 of the line link control circuit should operate and lock.

(f) Have an assistant observe that the proper CS relays operate in the sender which has been seized. Manually release operated CS relays.

(g) Release LT9 relay by opening its locking path (7T and 8T contacts on SD-25003 and 9T and 10T contacts on SD-25553). Manually operate relay LT8 of the line link control circuit and observe that relay LT8 locks up. If the same class of service is used with relay LT8 (determined by the strapping of the L0 to L9 punchings, punchings 50 to 59 of the miscellaneous T.S.) have the assistant at the sender frame observe that the same CS relay operates. If a different class of service is used with LT8 a different CS relay should operate. Manually release operated CS relays. Repeat for relays LT0 to LT7 inclusive.

(h) To check the L0 to L9 leads between the home and mate controller circuits repeat operations 5.71(e) to (g) (refer to Note following Paragraph 5.71(m)).

(i) Remove the block from TA and TB relays. Remove the handset and manually operate and release RL relay to restore the line link controller to normal. Remove the plugs from the SS jacks. On SD-25553 remove block from LP relay.

(j) Repeat the test at all line link frames having access to this district junctor group, inserting the plugs in the SS jacks as required to direct the call to this junctor group.

(k) Repeat operations 5.71(b)to (m) on all line link frames using all district junctor groups.

(l) Where the assignment of class of service is made by vertical file and individual column, the following test shall be performed. Using a test receiver connected to battery, verify that with ground connected to punching 50 of terminal strip adjacent to the AC relay and CSVO relay operated, L0 terminal on CS AUX TS at the top of bay is grounded. Move ground to punching 51-59 and repeat for leads L1 to L9. Release CSVO relay, operate relays 1 through 6 and repeat test for all L leads.

(m) Where partial Touch Tone dialing service is provided,make contacts 11-12 of HC3 or MC3 relay, operate the HG relay in the assigned group and verify that TD relay operates. Repeat test for RD relay, verify that ground and resistance battery respectively are present at 6B of the DF relay. Restore 11-12 contacts of HC3 or MC3 relay to normal. Manually operating RD and TD respectively,observe with ground applied in sequence at terminals 23, 33, 43, 53, 14, 24, 34, 44, 54 and 15, relays SLA 0-4 operate.

NOTE: The test per Paragraph 5.71 (h) is to be made only once from each line link frame using and district junctor group.

5.72 LO and LE

(a) Block TA and TB relays normal then connect ground through a test receiver to the LO lead at 3B of the FB relay.

(b) Observe that the LA relay operates. Manually operate and hold the FA relay. Observe that the LA relay remains operated. Remove the ground and reapply after LA relay releases. Observe that the LA relay does not reoperate.

(c) Block FB and CB relays operated. Apply ground to 3B of FB relay. Observe that the LA relay does not operate. Release CB relay. Observe that the LA relay operates, then remove the ground.

(d) Block CB relay operated and FB relay nonoperated. Apply ground to 3B of FB relay and observe that the LA relay operates. Remove the ground and remove the block from the CB and FB relays.

(e) Apply ground to the LE lead at 5B of the FA relay.

(f) Observe that the LB relay operates. Manually operate and hold the FB relay. Observe that the LB relay remains operated. Remove the ground and reapply after LB relay releases. Observe that the LB relay does not reoperate. Remove the ground and release the FB relay.

(g) Block FA and CA relays operated, apply ground to 5B of FA relay. Observe that the LB relay does not operate. Release CA relay. Observe that the LB relay operates then remove the ground.

(h) Block CA relay operated, and FA relay nonoperated, apply ground to 5B of FA relay and observe that the LB relay operates. Remove the ground and remove the block from the CA and FA relays then remove block from TA and TB relays.

5.8 Check of Locking & Short Circuit Paths

5.81 TA2 and TB2 Relays

(a) Insert a 298A plug into MB jack of mate control circuit. Block the M relay normal. Block operated relay TA1. Relay TA2 operates and locks.

(b) Remove the block from relay TA1. Observe that relay TA2 releases when relay TA1 releases. Remove the plug from the MB jack.

(c) Insert a 298A plug into MB jack of home control circuit. Block operated relay TB1. Observe that relay TB2 operates and locks.

(d) Remove the block from relay TB1. Observe that relay TB2 releases when TB1 releases. Remove the plug from the MB jack and remove the block from the M relay.

5.82 TA1 and TB1 Relay Contacts

(a) Manually operate relay TA2 and after it is locked, manually operate relay TB1 and observe that it locks. Observe that after relay TB1 operates, that relay TA2 releases and relay TB2 operates and locks within six seconds. Observe that relay TB1 releases.

(b) Manually operate relay TA1 and observe that it locks. Observe that after relay TA1 operates, that relay TB2 releases and relay TA2 operates and locks. Observe that relay TA1 releases when relay TA2 operates. Momentarily operate TR key to restore alarm and release relay TA2.

5.83 TA2 and TB2 Relay Contacts

(a) Manually operate relay TA2, and after it is locked, operate relay TB2 and observe that it locks. Observe that relay TA2 releases.

(b) Operate the TR key momentarily. Observe that relay TB2 releases. Manually operate relay TB2 and after it is locked, operate relay TA2 and observe that it locks.

(c) Observe that relay TB2 releases. Momentarily operate the TR key to release the TA2 relay.

6. ROUTINE TESTS - LINE LINK CONTROLLER

NOTE 1: When testing additions these tests should be performed only on each new line link and controller circuit and the emergency sender link controller should be used at least for one cycle of test with each new sender link frame, or on each sender link frame to which new district junctor groups are added.

NOTE 2: A routine test shall consist of the following series of tests applied to one line link frame.

NOTE 3: On Each Cycle of Routine Test

(a) Use 10 different line links by plugging secondary switches busy (SS Jacks).

(b) Use the emergency sender link controller with a different sender link frame.

(c) Select 10 lines in different test positions.

6.1 Test Set Preparation

6.11 Patch 48V battery and ground to ITE-4032. Connect a test receiver to DT and G terminals of the test set. Operate keys L-0 to L-9.

6.12 Using ITE-9637 cords patch 10 lines of a line link frame to the 0 to 9 jacks of ITE-4032. Select one line in each horizontal group and distribute the lines so that one is in each line test position and at least one in each column. (See Paragraph 4.31 for table of test cord connections for 10 lines to test set jacks 0 to 9).

6.2 Using Link Controller on Home Frame

6.21 Insert a make busy plug in the EA jack. Operate the G key of the test set. Each of the lines will be connected to a sender as indicated by lamps 0 to 9 lighted.