Installation Engineering Handbook 62
Western Electric Company, Incorporated
Columbus Works

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TERMINATING MARKER AND TERMINATING MARKER APPLIQUE TEST TERMINAL HUNTING

CONTENTS

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1. GENERAL INFORMATION

1.1 Refer to Terminating Marker and Terminating Marker Applique Tests per Section 225 for General Information, Test Procedure, Records and Requirements, Test Equipment, and Test Set Up.

2. LINE GROUP LOCKOUT

NOTE: Line Choice 0 is specified for this test but any line choice may be used if preferable.

2.1 These test calls are made to a line on the A, B, C and D Line Link Frames of Line Choice 0.

2.11 Contacts on relays LLG (A-D) are insulated so that the operating paths of the lockout relays LOG (A-D) will be checked over primary windings on one-half of the calls and over secondary windings on the other one-half of the calls.

2.12 On these calls, check that ground is momentarily applied to punching 47, T.S. between secondary switches 7 and 8 or at contacts 1 and 2 top of relays TRL at the line link frame to which the call is completed.

2.13 This checks the ability of the marker, in completing a call, to take preference over an originating call that is delayed by connecting ground over lead LR.

2.14 Make test calls and observe that lamps light as indicated in the following chart. After each test call, remove the contact insulation. Other lamps will light as indicated in Section 225 for a successfully completed test call.

Called Line	Contacts Insulate	Lamps Lighted
L.L. Frame A	7T & 8T (LLGA)	LLGA,LOG
" " A	4B & 5B (LLGA)	LLGA,LOG
" " B	7T & 8T (LLGB)	LLGB,LOG
" " B	4B & 5B (LLGB)	LLGB,LOG
" " C	7T & 8T (LLGC)	LLGC,LOG
" " C	4B & 5B (LLGC)	LLGC,LOG
" " D	7T & 8T (LLGD)	LLGD,LOG
" " D	4B & 5B (LLGD)	LLGD,LOG

3. OPERATING I.L. SS MAGNETS AND MATE FRAME CHECK

NOTE 1: The test per Paragraph 3.2 is required only when Fig. R of the marker is provided.

NOTE 2: The tests per Paragraphs 3.3 and 3.4 are required only when Incoming Link Extension Frames are provided.

NOTE 3: The test per Paragraph 3.5 is required only when Incoming Link Extension Frames are not provided.

3.1 Make a test call. Observe that the call is completed and the incoming link circuit relay RS of the incoming frame used for test operates.

3.2 Operate key ESM on any incoming link frame, operate key F corresponding to the incoming frame selected and make a test call.

3.21 Observe that the test call is completed and the emergency incoming secondary select magnet lockout chain circuit is used.

3.22 This may be checked by observing that the incoming link circuit relay ES operates. Restore key ESM.

3.23 Operate key TR2 and make a test call. Observe that the test call is completed and relay ES on the incoming link frame operates. Restore key TR2.

3.3 Connect ground to lead MK1, punching 46, terminal strip (IMC). Make a test call and observe that the marker times out and no CH lamp is lighted. Lamp MK1 should be lighted. Remove the ground from lead MK1.

3.31 Repeat Paragraph 3.3 for lead MK0, punching 44, Terminal Strip (IMC). Lamp MK0 lights.

3.4 Connect ground to lead MK3, punching 47, terminal strip (IMC) relays. Operate key TR2 and make a test call. Observe that the marker times out and no CH lamp is lighted. Lamp MK1 is lighted. Remove the ground from lead MK3.

3.41 Repeat Paragraph 3.4 for lead MK2, punching 45, Terminal Strip (IMC). Lamp MK0 lights.

3.5 Block normal relay RS of the incoming link frame used for test. Make a test call and observe that the marker times out and no CH lamp is lighted. Remove the block from relay RS.

4. SLEEVE GUARD TEST

NOTE: Block normal relays TMW and TM8 to prevent interference from time measure features.

4.1 LBK1 Relay: Manually operate and release relay SGA. Check that relay LBK1 operates while relay SGA is operated.

4.2 LBK & OF1 Relays: Block operated relay TBK. Manually operate relay LBK. Check that relay LBK locks operated and verify relay OF1 operated.

4.21 Remove block from relay TBK and check that relays LBK and OF1 released.

4.3 NK and HF (2-5) Relays

4.31 NK and RT Relays: Block operated relay NK and check that relay NK1 operated.

4.32 HF (2-5) Relays: Block normal relay HF -3. Manually operate relay HF-2. Check that relay HF -2 locks operated and verify that relay HF -5 operated.

4.321 Block operated relay TK. Check for ground at contact 7M of relay HF -3 and contact 3 top of relay TK.

4.322 Remove block from relay HF -3. Check that relay HF-3 operated, relay HF-5 released, and ground is removed from contact 7M of relay HF-3 and contact 3 top of relay TK.

4.323 Manually operate relay HF-4. Check that relay HF-4 locks operated.

4.33 Remove block from relay NK. Check that relays NK1 and HF(2-4) released. Remove block from relay TK.

4.4 CH- Relay

4.41 Block operated relay NK and then manually operate relay CH-9. Check that relay locks operated and relay NK1 operates.

4.411 Manually operate and release relay SGA. Verify that relay CH-9 released.

4.42 Block operated relay CH-4. Check that relay CH-4 locks operated.

4.421 Manually operate and release relay PGT. Check that relay CH-4 released.

4.43 Block operated relay CH-0. Check that relay CH-0 locks operated.

4.431 Momentarily operate relay HF-2. Check that relay HF (2 & 3) lock operated and relay CH-0 remains operated.

4.432 Remove block from relay NK. Check that relays HF (2 & 3), CH0, and NK1 release.

4.5 LK and IK1 Relays

4.51 Block operated relay LK. Manually operate relay HF-5. Check that relay HF-5 locks operated.

4.52 Block operated IK1 relay. Check for ground at contact 6 top of relay R0.

4.521 Remove blocks from relays LK & IK1. Check that relay HF-5 released and that ground is removed from contact 6 top of relay RO.

4.6 SGA and INA Relays

4.61 Block operated relay GLH1. Manually operate and release relay SG and verify that relays SGA and INA operated.

4.611 Remove block from GLH1 relay and check that relays SGA & INA released.

4.62 Block operated relays CK6, CK8 and NK. Manually operate relay L-19. Check that relay L-19 locks operated.

4.621 Block normal relay INA. Manually operate and release relay SG. Verify that relay SGA operated and relay L19 remained operated.

4.622 Remove block from relay INA. Check that relay INA momentarily operated and verify that relays L-19 and SGA released.

4.63 Remove blocks from relays CK6, CK8 and NK.

4.7 GLH Relay

4.71 Without Marker Speed-Up

4.711 Block normal relay HTR. Block operated relays NK 1 and LK and relay HMT. Manually operate relay GLH. Check that relay GLH locks operated.

4.712 Remove block from relay HMT. Check that relay GLH released. Remove blocks from NK1 and LK relays.

4.72 With Marker Speed-Up

4.721 Block normal relays HTR and HMT1, then block operated relays NK1 and LK. Verify relays RT and LK1 operate.

4.722 Remove block from relay HTR. Verify relay HTR operates.

4.723 Remove block from relay HMT1. Verify relays HMT1 and GLH operate.

4.724 Manually release relay HMT1. Verify relay GLH remains operated.

4.725 Remove blocks from relays NK1 and LK. Verify relays GLH, HTR, RT and LK1 release.

4.8 INC- and TIN Relays

4.81 Without Marker Speed-Up

4.811 Block normal relay SIN. Block operated relays SGA, INB, GLH1, CK4, and CK6. Check that relays LIN and TIN are normal.

4.812 Remove block from SGA relay and observe that relay TIN and INC operated.

4.813 Block operated relay SGA. Check that relays INC and TIN remained operated.

4.814 Remove block from relay GLH1. Check that relay INC released and relay TIN remained operated.

4.815 Remove block from relays SGA, INB, CK4, and CK6. Check that relay TIN released.

4.82 With Marker Speed-Up

4.821 Block operated relays CK6, CK4 and INB. Verify relay INC operates.

4.822 Block relay INA normal, then momentarily operate relay SGA. Verify relay INC releases while relay SGA is operated.

4.823 If equipped with option IE, block relay CK5 operated.

4.824 Momentarily operate relay OIN. Verify relay OIN locks operated and relay TIN operates.

4.825 Release relay INA. Then momentarily operate relay SGA. Verify relay INC releases while relay SGA is operated.

4.826 Block relay INA normal, then block relay SGA operated. Verify relay INC remains operated.

4.827 Release relay CK6. Relay TIN and INC release.

4.828 Release relay CK4, INA, INB, SGA and CK5, if equipped with IE option.

4.9 EO and EQ Wiring

4.91 NC (2-5) Relays (EO Wiring)

4.911 Block operated relay NTT. Check that relays NC- (2-5) LFA, LFB operate. Check for ground on NT lead PCHG. 154 T.S. (NC).

4.912 Manually operate and release relay JB. Check that ground is removed from NT lead while relay JB is operated.

4.913 Manually release and block normal relay LFB. Check that ground is removed from NT lead.

4.914 Remove blocks from NTT and LFB relays.

4.92 SL Relay (EQ Wiring)

4.921 Block operated relays RLT and CHO. Check for ground on LLO lead PCHG. OOC T.S. (NC).

4.922 Momentarily apply ground to lead SL at multicontact relay (TIB) contact 14. Check that relay SL operates while lead is grounded.

4.923 Block operated relay HF4. Check that ground is: (1) removed from LLO lead PCHG. OOC T.S. (NC), (2) relay SL is normal, (3) ground is present on SL lead contact 14 (TIB) relay, and (4) relay GT operated.

4.924 Remove blocks from relays TMW, TM8, RLT, CHO & HF4.

5. TERMINAL HUNTING

NOTE 1: These tests require:

(a) An allotted PBX group and a PBX group which covers the entire range of the terminal hunting progress (81-100) lines in the group on one 100 block or, (b) Two or more groups which overlap to cover all operating features of the terminal hunting progress circuit.

NOTE 2:

(a) If PBX groups are not available for making these tests, build up groups for use during the test period by temporarily installing F and C cross-connections at a block relay frame.

(b) Temporary cross-connections are also necessary in each marker if an allotted PBX is not available and has to be simulated.

(c) The S cross-connections at the LDF for the build-up lines need not be installed.

(d) The build-up lines should be distributed over line link frames. If it is necessary to build up a large group, only the first line of the second, third, fourth and fifth twenty blocks require C cross-connections.

(e) F cross-connections are required for all lines in all twenty blocks. If PBX groups are built up, leave them for use in making special tests on markers 0 and 1 as described in the method covering special calls (Section 225.6).

(f) The allotted PBX group should also be used for the test of subscriber line overflow register circuit using number group cross-connections as described in a separate section (225.8).

5.1 Terminal Hunting Thru a 20 Block

5.11 Make a call to a PBX group having 20 or more lines whose directory number ends with 00, 20, etc., and therefore, will cause relay LO to operate. Observe that the test call is completed and that lamps LO and HF light.

5.12 Make busy the first line number in the PBX group by inserting a 322A-MB plug into jack (NS) 0 and repeat the test call. Observe that the test call is completed and that lamps LI and HF light. Do not remove the make busy plug.

5.13 Insert a MB plug into jack NS1 and repeat the test call. Observe that the call is completed and that lamps L2 and HF light.

5.14 Continuing as described above, insert MB plugs into the next NS jack and repeat the test call until jacks NS 0-19 and lamps (L) 0-19 have been used.

5.141 Make a test call with MB plugs in jacks NS 0-19. Observe that the test call is completed, lamps BB, RV, and TC light and that none of lamps LO-L19 light. Remove the MB plugs.

5.2 Terminal Hunting Progress (End of Block Hunting)

NOTE: In the following description a PBX group of 81 to 100 lines on one 100 block is assumed. Two or more PBX groups may be used provided they overlap on the terminal hunting progress circuit to check all advance paths.

5.21 Make busy the twenty line numbers associated with the twenty block under test by inserting 322A MB plugs into jacks NS 1-19 for lines 1-19.

5.211 Connect ground to the associated NS-0 lead at the BR, LDF or LL frames and cross contacts 1B-2B of marker relay MT5 for lines LO, L20 etc.

5.212 Start a test call to the first line number of the PBX groups used for test. Observe that lamps LO, HPO, HP1, HP2 and RL followed by TRL light indicating completion of the test call to line 20 or the first line in the second twenty block.

5.22 As previously described for line 0, make busy line 20. Repeat the test call to the first line number in the PBX group. Observe that the test call is completed, and that lamps LO, HPO, HP1, HP2, HP3 and HP4 light.

5.23 Make busy line 40 and repeat the test call. Observe that the test call is completed and that lamps LO and HPO to HP6 light.

5.24 Make busy line 60 and repeat the test call. Observe that the test call is completed and that lamps LO and HPO to HP8 light.

5.241 Remove the cross from relay MT5, the test ground connections from the NS leads and the MB plugs from the NS jacks.

NOTE:

(a) A non-allotted PBX group of 24 or more line numbers associated with positions 0-19 on the first twenty block and positions 0-3 on a second twenty block as follows is required for these tests.

Pos.of Line Number in Grp.	Pos.on First Twenty Block	Pos.of Line Number in Grp.	Pos.on First Twenty Block	Pos.of Line Number in Grp.	Pos.on First Twenty Block
1	0	11	10	21	0
2	1	12	11	22	1
3	2	13	12	23	2
4	3	14	13	24	3
5	4	15	14		
6	5	16	15		
7	6	17	16		
8	7	18	17		
9	8	19	18		
10	9	10	19		

(b) In building up or selecting an available PBX group to be used for test observe that the associated line numbers (2 & 21), (1 & 22), (23), and (24) are located on line link frames other than those associated with the following sets of line numbers, respectively, (1, 5, 9, 13, 17 & 22), (2, 6, 10, 14, 18 & 21), (3, 7, 11, 15, & 19) and (4, 8, 12, 16 & 20). The lines used for test may be located on a minimum of four line link frames.

Line Link Frames	0	1	2	3
	1	2	3	4
Pos. of the	5	6	7	8
Line Numbers	9	10	11	12
In the Grp.	13	14	15	16
	17	18	19	20
	22	21	24	23

(c) NF cross-connections at the block relay frame are required for all the line numbers in the group.

(d) NC cross-connections are required for the first 24 line numbers only.

(e) LDF cross-connections may be omitted.

(f) The sleeve guard feature of the marker, in addition to the PBX busy re-test, is checked on the following tests.

5.301 Insert 322A MB plugs into all NS jacks excepting 0, 4, 8, 12 and 16 which leaves line numbers 1, 5, 9, 13 and 17 available for test.

5.302 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 0.

5.303 Make test calls to 1, 5, 9, 13, and 17 line numbers located on line link frame 0.

5.304 Observe the following test results for each of the test calls.

(1) Lamps LO, HPO, HP1, HP2 and RL followed by TRL light. This indicates that the test calls were completed to the first line (Position 0) in the second twenty block which is line number 21 of the PBX group.

5.305 Remove the MB plugs from the SS jacks on the line links and the NS jacks on the trouble indicator.

5.306 Insert 322A MB plugs into all NS jacks excepting 1, 5, 9, 13 and 17 which leaves line numbers 2, 6, 10, 14 and 18 available for test. Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 1.

5.307 Make test calls to 2, 6, 10, 14 and 18 line numbers, located on Line Link Frame 1.

5.308 Observe the following test results for each of the test calls: Lamps L1, HPO, HP1, HP2 and RL followed by TRL light. Remove the make busy plugs.

5.309 Insert 322A MB plugs into all NS jacks excepting 2, 6, 10, 14 and 18 which leaves line numbers 3, 7, 11, 15 and 19 available for test.

5.310 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 2.

5.311 Make test calls to 3, 7, 11, 15 and 19 line numbers located on Line Link Frame 2.

5.312 Observe the following test results for each of the test calls: Lamps L2, HP0, HP1, HP2 and RL followed by TRL light. Remove the make busy plugs.

5.313 Insert 322A MB plugs into all NS jacks excepting 3, 7, 11, 15 and 19 which leaves line numbers 4, 8, 12, 16 and 20 available for test.

5.314 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 3.

5.315 Make test calls 4, 8, 12, 16 and 20 line numbers located on line link frame 3.

5.316 Observe the following test results for each of the test calls: Lamps L3, HP0, HP1, HP2, and RL followed by TRL light. Remove the make busy plugs.

5.32 Busy all channels to the first line of the PBX group used for test, by inserting 349A MB plugs into jacks SS (0-9) of Line Link Frame 0 on which the first line is located.

5.321 Make a test call to the first line number of the PBX group, (directory number).

5.322 Observe that the test call is completed to the second line number of the PBX group; lamp L1 lighted. Do not remove the make busy plugs.

5.323 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame (1) associated with the second line number of the PBX group.

5.324 Again make a test call to the first line number and observe that lamps OF, TC, RV, RC, CON, GT2, and RL followed by TRL light, indicating overflow.

5.325 Remove the make busy plugs from the line frames 0 and 1 associated with 1 and 2 line numbers of the PBX group.

5.33 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 0 associated with the 5 line number of the PBX group.

5.331 Make busy all lines in the PBX group, except those associated with positions 0 to 4 in each twenty block, by inserting 322A MB plugs into jacks NS 5 to 19.

5.332 Make a test call to the fifth line number (first twenty block position 4) in the PBX group and observe that lamps LO, HP0, HP1, HP2, and RL followed by TRL light. This indicates that the test call was completed to the first line number (position 0) on the second twenty block.

5.333 Remove the MB plugs from the line link frame (0) associated with 5 line number in the PBX group.

5.334 Remove the MB plug from jack NS 5 and insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 1 associated with 6 and 21 line numbers in the PBX group.

5.335 Make a test call to the sixth line number in the PBX group and observe that lamps L1, HP0, HP1, HP2 and RL followed by TRL light. This indicates that the test call was completed to the second line number (position 1) on the second twenty block.

5.336 Do not remove the MB plugs from line link frame 1 associated with 6 and 21 line numbers in the PBX group.

5.337 Remove the MB plug from jack NS 6 and insert 349A MB plugs into jacks SS (0-9) of Line Link Frame 2 associated with 7 and 24 line numbers in the PBX group.

5.338 Make a test call to the seventh line number and observe that lamps L1, HP0, HP1, HP2 and RL followed by TRL light. This indicates that the test call was completed to the second line (22) in the second twenty block.

5.339 Remove the MB plugs from NS jacks 7 to 19 and from the line link frames (1 and 2) associated with 6, 21, 7 and 24 line numbers as required.

5.34 Insert 349A MB plugs into jacks SS (0-9) of Line Link Frame associated with twenty block positions 0, 10, 40, 60 and 80, as required for the PBX groups used for test.

5.341 Insert 322A MB plugs into jacks NS 1 to 19 inclusive and make a test call to the first line number of the PBX group.

5.342 Observe that lamps, BB, TC, RV, RC and RL followed by TRL light. This indicates that the marker found only busy lines after encountering an all channels busy condition.

5.343 Remove the make busy plugs and restore the operated keys.

5.35 Insulate contacts 1 - 2T of relays LE and TBW. Manually operate and release relays LLG - (A-D) one at a time. As each one is operated observe that the LLGE relay is operated.

5.351 On one test, check with a receiver connected to battery that ground is connected to 1T contact of the LE relay. Remove insulators from 1-2T of relays LE and TBW.

5.4 PBX Off-Normal Retest

5.41 Operate key PBX and make a test call to a line number which is cross-connected for terminal hunting at the block relay frame, (NF-HF).

5.411 Observe that the marker immediately connects to the trouble indicator, and that lamps HF, TBK, FC, TK, BC, GJ, SL, GC, GLH, CON, GT2 and TRL light. CN and RL do not light.

5.42 With key PBX operated, cancel continuity test for PBX lines by inserting 322A make busy plugs into jacks CCT and PBX. Make a test call to the first line number of a PBX group.

5.421 Observe that lamps TBK, BC, GJ, GC, GLH, CON, GT2 and RL followed by TRL light, also observe that one of lamps L-0 to L-19 lights to agree with the second line number in the PBX group.

5.43 Block YBA relay normal. With continuity test for PBX lines cancelled and with key PBX operated, operate key GT and make a test call to the first line number of a PBX group.

5.431 Observe that lamp L- associated with the second line number lights, also that lamps FC, OF, TC, RC, GLH, CON, GT2 and RL followed by TRL light, indicating overflow. Remove the make busy plugs.

5.432 With keys PBX and GT operated, operate key TR2. Repeat the test call described in Paragraph 5.43 and 5.431. Observe the same test results except that lamp TR2 also lights.

5.44 With keys PBX, GT and TR2 operated, insert 322A MB plugs into all NS jacks excepting 3, 7, 11, 15 and 19. Make a test call to the first line number of a PBX group consisting of line numbers on two successive twenty blocks.

5.441 Observe that lamps TR2, HP0, HP1, HP2, OF, TC, RC, CON, GT2 and RL followed by TRL light.

5.442 Restore keys PBX, GT, TR2 and remove the MB plugs from the NS jacks. Remove block from YBA relay.

5.45 Operate key PU and make a test call to an intermediate PBX line number. Observe that the marker immediately connects to the trouble indicator and that lamps HF, TBK, FC, TK, BC, GJ, GC, GLH, CON, GT2, and RL followed by TRL light. Remove the make busy plugs.

5.452 Operate key TR2 and repeat the test call described in Paragraph 4.451. Observe the same test results except that lamp TR2 also lights. Restore key TR2.

5.46 With key PU operated, operate key FS, cancel continuity test for PBX lines and block normal TTI relay PU.

5.461 Make a test call to the first or an intermediate PBX line number. Restore keys PU when the NG lamp associated with the first number group connector seized by the marker has been observed to light momentarily.

5.462 Observe that lamps HF, LTI, FS, TBK, BC, GC, GJ, GLH, CON, GT2, and RL followed by TRL light indicating that the test call was rerouted to trouble intercept. Release key FS.

5.463 Operate key MAN and repeat the test call described in Paragraphs (5.46 - 5.462). Observe the same test results except that lamp MAN lights instead of lamp FS. Release key MAN.

5.464 Operate key TOL and again repeat the test call. Observe test results as described in Paragraphs (4.46 - 4.462) except that lamps TOL and IT light instead of FS and LTI respectively.

5.465 Remove the make busy plugs restore the operated keys and remove the block from relay PU.

5.5 Allotted PBX

NOTE: If an allotted PBX group of lines is not available in the particular office under test, use any two non-allotted PBX groups associated with

different number group connectors and make cross-connections as indicated below to simulate an allotted PBX group. Disconnect punchings ST and HB (Figure 3) for the hundred block containing the directory number of the simulated allotted PBX group from NG-ST and NG-HB respectively (Figure 7).

Connect:

ST to SH	(one of 0 to 19 Split Hundred Relay)
SH-ST to ALC-ST	(One of 0 to 19 contacts on AL1 and AL2 relays)
SH-HB to ALC-HB	(one of 0 to 19 contacts on AL1 and AL2 relays)
SH-TB to ALC-TB	(one of 0 to 19 contacts on AL1 and AL2 relays)
AL (Fig. 9) to AL (Fig. 11)	
AL1-ST to NG-ST	(one of 0-24 Number Group)
AL1-HB to NG-HB	(one of 0-24 Hundred Block)
AL1-TB to TB	(one of 0-4 Twenty Block)
AL2-ST to NG-ST	(one of 0-24 Number Group)
AL2-HB to NG-HB	(one of 0-24 Hundred Block)
AL2-TB to TB	(one of 0-4 Twenty Block)

5.51 PBX Alternate Number Group Allotter

5.511 Make three test calls to the directory number of an allotted PBX.

5.512 Observe from lamps NGC - and AL (1 & 2) that the even numbered test calls terminate in one number group connector and the odd numbered test calls terminate in the other number group connector.

5.513 Make three test calls to numbers in the same twenty block as the directory number but not to the directory number itself.

5.514 Observe that in each case the call is completed to the first line (lamp LO) of the twenty block seized regardless of which number in the twenty block is called. (On these calls the two number group connectors will be seized alternately as described in the preceding paragraph.)

5.515 Busy all lines of the PBX used for test in one of the number group connectors and make three test calls to the directory number.

5.516 Observe that, in each case the call is completed to the first line in the first twenty block of the PBX group in the other number group connector.

NOTE: When the NG lamp associated with the first number group connector seized by the marker has been observed to light momentarily, make busy all lines in one number group by inserting 322A MB plugs into jacks NS (0-19) before starting the test calls and removing the MB plugs from jacks NS 0 to 19 as required.

5.517 Make busy all lines in the PBX group in both number groups by inserting 322A MB plugs into jacks NS 0 to 19. Make three test calls to the group. In each case, observe that the test calls are completed and that lamps BB, RV and TC light.

5.518 This test is required only when the PBX groups are arranged with all lines have directory number appearances in allotment AL1 and bridged terminals reaching the same lines in allotment AL2.

5.519 Make three test calls to the directory number of a PBX group using this arrangement. Observe that the call completes satisfactorily and that lamps AL (1 or 2), NAL, and proper NGC- light. This indicates that line location is the same for both allotments AL1 and AL2.

5.6 PBX Block Allotter

5.601 This test is required only when the PBX Block Allotter circuit is provided.

5.602 Operate TH, H, T, and U switches for the directory number of a PBX group arranged for Block Allotter operation and momentarily operate key ST.

5.603 Observe that the proper lamps NGC-, HB-, TB-, and L- light. This indicates the position of the line in the allotted block preferred first by the marker under test.

5.604 Momentarily operate key RL. All lamps extinguished.

5.605 At the associated block allotter circuit, block operated relays BSA and BSB which are preferred first by the marker under test.

5.606 Momentarily operate key ST. Observe that lamps NGC-, HB-, TB-, and L- light. This indicates the position of the line in the allotted block preferred next by the marker under test.

5.607 Momentarily operate key RL. All lamps extinguished.

5.608 Repeat this procedure for each remaining block allotters of the selected PBX group except the block allotter preferred last by the marker under test.

5.609 At the block allotter preferred last by the marker under test, block operated relays BSA and BSB.

5.610 Momentarily operate key ST. Observe that lamps BB and GBL light. Remove blocking tools from all relays BSA and BSB.

5.611 Momentarily operate key RL. All lamps extinguished.

5.612 At the associated Auxiliary Line Circuit, block operated all relays SL- associated with the block allotter preferred first by the marker under test. Observe that relays BSA and BSB operate at the associated block allotter circuit.

5.613 At the associated Auxiliary Line Circuit, remove blocking tools from the SL- relays. Observe that relays BSA and BSB release.

5.614 Repeat Paragraphs 5.612 and 5.613 for each remaining block allotter, of the selected PBX group, in the order preferred by the marker under test.

5.615 At the associated PBX Block Register Circuit, block relay BKT normal and insulate contacts 7B and 8B of relay ALG- preferred first by the marker under test.

5.616 Momentarily operate key ST. Observe that lamp XALG lights.

5.617 Release relay BKT and remove insulator from contacts 7B and 8B of relay ALG-. Momentarily operate key RL. All lamps extinguished.

5.618 At the associated PBX Block Register Circuit, insulate contacts 1B and 2B of relay NK2.

5.619 Momentarily operate key ST. Observe that lamp NGC- does not light.

5.620 Remove insulator from contacts 1B and 2B of relay NK2. Momentarily operate key RL. All lamps extinguished.

6. JUMP HUNTING

6.1 Jump hunting groups probably will not be equipped originally and it will be necessary to run temporary cross-connections at a block relay frame. If so, use a spare 20 block relay frame and use a spare 20 block relay from which to jump hunt. Use relay HB 24 and five associated 20 block relays to which to jump hunt for checking this feature of the marker. After tests of Paragraph 6 are complete, the temporary cross connections, if installed, should be removed.

6.11 Use a temporary set-up of ten jump hunting groups referring to them as groups 0 to 9 for convenience.

6.12 Install temporary cross-connections from the NC and NF punchings of the spare 20 block relay jump hunted from as follows: NS punchings need not be cross-connected.

J.H. Group	Cross-Connect	Cross-Connect
0	NC0 to JC0	NF0 to JF0
1	NC1 to JC2	NF1 to JF0
2	NC2 to JC4	NF2 to JF1
3	NC3 to JC6	NF3 to JF1
4	NC4 to JC8	NF4 to JF2
5	NC5 to JC10	NF5 to JF2
6	NC6 to JC12	NF6 to JF3
7	NC7 to JC14	NF7 to JF3
8	NC8 to JC16	NF8 to JF4
9	NC9 to JC18	NF9 to JF4

6.13 These cross-connections will cause a call to J.H. Group 0 to be terminated on HB24, TB0, line 0; to J.H. Group 1 to be terminated on HB24, TB0, line 2; to J.H. Group 2 to be terminated on HB24, TB1, line 4; to J.H. Group 3 to be terminated on HB24, TB1, line 6; to J.H. Group 4 to be terminated on HB24, TB2, line 8; etc. The NF and NC punchings of these ten lines jump hunted to, should be cross-connected temporarily as regular ring party lines. The NS punchings need not be cross-connected.

6.2 Make a call to each jump hunt group and observe that the following lamps light.

Group	0 - lamps	HB24,	JF0,	JC0,	L0
"	1 - "	HB24,	JF0,	JC2,	L2
"	2 - "	HB24,	JF1,	JC4,	L4
"	3 - "	HB24,	JF1,	JC6,	L6
"	4 - "	HB24,	JF2,	JC8,	L8
"	5 - "	HB24,	JF2,	JC10,	L10
"	6 - "	HB24,	JF3,	JC12,	L12
"	7 - "	HB24,	JF3,	JC14,	L14
"	8 - "	HB24,	JF4,	JC16,	L16
"	9 - "	HB24,	JF4,	JC18,	L18

NOTE: On following tests it is necessary to end of block hunt over only one twenty block. Refer to Paragraph 5.2.

6.3 Temporarily setup a jump hunting group following a group having end of block hunting. Also temporarily setup an end of block hunting group following a jump hunting group. Busy lines as required and check that the marker will jump hunt after end of block hunting and that it will end of block hunt after jump hunting.

7. SECOND TRIAL

NOTE: Additional second trial features are tested in connection with other tests covered elsewhere in these methods.

7.1 Make a test call and observe that the CH lamp lights that corresponds to the first channel in the order of selection. Operate key TR2 and repeat the same call. Observe that the CH lamp lights that corresponds to the sixth channel in the order of selection.

8. REORDER

8.1 Operate key RO and make a test call to any line number below 500 in any block of 1000 line numbers. Observe that lamps CKG, K1, K2, K3, LE, FC, TE, CON, GT2, RL, RO, OF, TC, RV, RC and IF- light and lamps NGC- and LCF- do not light.

8.2 Repeat the test call to any line number above 500 in any block of 1000 numbers. Observe test results as described in Paragraph 8.1.

8.3 Make the tests described in Paragraphs 8.1 and 8.2 to line numbers associated with each office served by the marker.

9. FREE LINES

9.1 With key FS operated, make a test call to a free line and observe that the call is completed and that lamps FS, TC and FL light. Release key FS.

9.2 Operate key MAN and make a test call to a free line. Observe that the call is completed, lamps MAN and FL light and that lamp TC does not light. Release key MAN.

9.3 Operate key TOL and make a test call to a free line. Observe that the call is completed, lamps TOL and FL light and that lamp TC does not light.

10. UNNUMBERED TERMINALS

NOTE: This test is required only when Figure A of the marker and Figure C of the trouble indicator are specified.

10.1 Make five test calls to a number group connector to check the ability of the marker to select unnumbered terminals in hundred block 24.

10.11 If five unnumbered terminals are not cross-connected in hundred block 24, one in each twenty block, temporarily install the NC and NF cross-connections for five lines at the block relay frame.

10.12 Key a number associated with the number group and the position on the twenty block of the unnumbered extra line terminals to be called for test.

10.13 Make busy all twenty block positions except the one which corresponds in number with the twenty block position of the called number by inserting 322A MB plugs into jacks NS 0-19, as required.

10.14 Operate key HB24 on all five calls and operate one of keys TB (0-4) on each call until all keys TB (0-4) have been used.

10.15 Observe, on these calls, that lamps HB-, HP-, LLG- and CA or CB light to agree with the line number as determined by the operated HB24, (TB) 0-4 keys and the vacant NS jack and not by the number keyed.

11. FOUR PARTY RINGING

NOTE 1: This test is required only when four party ringing is specified for any or all of the offices served by the marker; namely; 10,000 number series A, physical office, 10,000 number series A, theoretical office, 10,000 number series B, physical offices, and 10,000 number series B, theoretical office.

NOTE 2: The marker cancels four party ringing check for those offices which do not require four party ringing. It is therefore particularly important to make careful observations of the lamp signals and relay operations in addition to the completion of the test calls as indicated in the several tests.

11.1 Make a test call to any RING party line number below 500 in any block of 1000 numbers. Observe that marker relays RP and RP1 do not operate and that lamps RF RC, GT2, CON and RL followed by TRL light. H5 and RP do not light.

11.11 Make a test call to any TIP party line number below 500 in any block of 1000 numbers. Observe that relays RP and RP1 do not operate and that lamps TF, RC, RV, GT2, CON, RL and TRL light. H5 and RP do not light.

11.12 Repeat the test described in Paragraphs 11.1 and 11.11 for each office served by the marker.

11.2 Make a test call to any RING party line number, above 500 in any block of 1000 numbers, for each office which does not require four party ringing. Observe that relays RP and RP1 do not operate, lamps H5, RF, RC, GT2, CON, RL followed by TRL light and RP does not light.

11.21 Make a test call to any TIP party line number, above 500 in any block of 1000 numbers, for each office which does not require four party ringing. Observe that relays RP and RP1 do not operate, lamps H5, TF, RC, RV, GT2, CON, RL followed by TRL light and RP does not light.

11.3 Make a test call to any RING party line number above 500 in any block of 1000 numbers, for each office which requires four party ringing. Observe that relays RP and RP1 operate, and that lamps H5, RF, RC, RP, GT2, CON and RL followed by TRL light.

11.31 Make a test call to any TIP party line number above 500 in any block of 1000 numbers, for each office which requires four party ringing. Observe that relays RP and RP1 operate and that lamps H5, TF, RC, RV, RP, GT2, CON and RL followed by TRL light.

11.4 Block relay RP1 non-operated and repeat the test calls described in Paragraphs 11.3 and 11.31. Observe that the marker times out in each case and that lamp GT2 does not light.

11.41 Cross contacts 5B-6B of relay YB and repeat one of the test calls described in Paragraph 11.4. Observe that lamps GT2, CON and RL followed by TRL light. Remove the block from relay RP1 and the cross from relay YB.

12. TRAFFIC REGISTERS

12.1 Line Link Per Cent Load: Using the cross-connection arrangement at punchings REG1, REG2, R5, R6 and R7, specified for the job make test calls as follows: (1) calls to a line on a line link frame with just the required number of line links busy to cause the marker REG relay to operate and (2) calls to the same line with one less line link busy than required to operate the REG relay.

12.11 Have key LK on the traffic register rack operated to the LINE LINK FRAME position and check that the proper load (LD) register operates on the calls described under (1) but does not operate on the calls described under (2).

12.12 Line links may be made busy by blocking operated marker LL relays. A sufficient number of calls should be made to verify all BL resistances and all LL relays on their break and make contacts.

12.2 Marker Peg Count: Operate key PC and check that the peg count register (PC) associated with the marker under test scores once on each call. Check the register on several calls. This test may be combined with other tests as desired.

12.3 Line Choice Overflow

NOTE: At the traffic register rack, one overflow (OFL) register is provided for each line link half choice. A half choice consists of a pair of line link frames; 0 and 1, 2 and 3, etc.

12.31 Insert 349A MB plugs into jacks SS (0-9) of any line link frame and make a test call to any individual line number associated with the selected line link frame. Observe that lamps OF, TC, RV, RC, GT2, CON, RL and TRL light and that the overflow register associated with the line link frame used for test scores once.

12.32 Insulate contacts 1B-2B of relay RO. Repeat the test call described in Paragraph 12.31 and observe the same test results except that the overflow register does not score. Remove the insulator from relay RO.

12.33 Make tests and observe test results as described in Paragraph 12.32 for each of the following pairs of relay contacts: IT-2T-CNL2, 1B-2B-TRO, 2T-3T-TMBL, 2T-3T-TMBN, and 5T-6T-OFT. Remove the insulator at the completion of the test.

12.4 Incoming Link and Number Group Peg Count: Operate key BAT on the traffic register rack. make three test calls. Observe that the peg count (PC) register associated with the incoming link frame used for test and the peg count register (PC) associated with the number group connector used for test operate on each call.

NOTE: The test of the subscriber line overflow registers and the marker functions on these tests are covered in a separate section.

12.5 Matching Loss Measurements for Peg Count of Incoming First Failures to Match (Option KB and Fig. 31)

12.51 If arranged for X wiring (See Note 117, SD-25283-01-D7), momentarily operate relay PGT. Verify traffic register PCF scores once.

12.52 Block operated relay LBK1. Momentarily operate relay PGT. Verify register PCF does not score.

12.53 Release relay LBK1.

12.54 If equipped with Fig. BM, repeat Paragraphs 12.52 and 12.53 for relay MT4A instead of LBK1. If equipped with Fig. BN, repeat Paragraphs 12.52 and 12.53 for relay MT4 instead of LBK1.

12.55 If arranged for Y wiring, connect a temporary ground on 2T, relay OF1. Perform tests of Paragraphs 12.51 to 12.54.

12.56 Remove temporary ground connection.

12.6 Matching Loss Measurements for Peg Count of Incoming Calls to Terminal Hunting Lines (Option KD)

12.61 Cross 1 and 2B, relay CK8, then momentarily operate relay LO. Verify relay LO locks operated.

12.62 Block operated relay HTO (if equipped with Fig. BE) or block relay LE1 and LE2 operated and cross 3 and 5B, relay LO to operate HTO and HTO1 (if equipped with Figs. BF and CC). Verify traffic register PTH scores.

12.63 Remove block from relay HTO or cross from 3 and 5B relay LO and manually release relay LO.

12.64 Repeat Paragraphs 12.62 to 12.64 for relays L2-19 and HT2-19. During one of the repititions of Paragraphs 12.62 to 12.64 block operated relay MT4 (if equipped with Fig. BN) or MT4A (if equipped with Fig. BM). While this relay blocked operated, traffic register PTH fails to score. Release relay MT4 or MT4A.

12.65 Cross 1 and 2B, relay CK10. Verify ground is not present on terminal 378, Terminal Strip (MISC).

12.66 Repeat Paragraph 12.62. Momentarily operate relay HTO (if equipped with Fig. BE) or cross 3 and 5B, relay LO (if equipped with Figs. BF and CC). Verify traffic register PTH scores and ground is present on terminal 378, Terminal Strip (MISC).

12.67 Remove cross from relays CK10 and CK8 and release relays LE1 and LE2. Verify marker returns to normal.

12.7 Matching Loss Measurements for Peg Count on Terminating Attempts to Busy Lines (Options KA and KE)

12.71 Insulate 1 and 2B, relay LKO, then ground 1B, relay LKO. Verify relay BBA operates and traffic register PCB scores.

12.72 If marker is equipped with GX option, insulate 2M, relay RC in Terminating Marker Applique. Then block relay RC operated. Verify relay BBA releases.

12.721 Remove insulation from RC relay. Verify relay BBA operates and traffic register PCB scores.

12.722 Release relay RC. Relay BBA remains operated.

12.73 Remove ground from 1B, relay LKO. All relays release.

12.74 If marker is equipped with ZE option, block relay LOF operated in T.M. Applique.

12.741 Ground 1B, relay LKO. Verify relay BBA does not operate, relay PEG in T.M. Applique operates, and traffic register PCB scores.

12.75 Remove ground and insulation from relay LKO and release relay LOF in T.M. Applique. Verify marker returns to normal.

12.76 Block relay MT4 (if equipped with Fig. BN) or MT4A (if equipped with Fig. BM). Repeat Paragraph 12.71 and verify traffic register PCB fails to score.

12.77 Release relay MT4 or MT4A and remove cross and ground from relay LKO.

13. INTERCEPTING TRUNKS

NOTE: On additions, these tests are made during a light load period with Telephone Company approval.

13.1 Make each of the following tests on each terminating marker installed. Use ITE-4010 Terminating Equipment Test Set at the Incoming Trunk Frame or the O.G.T. Test Frame to originate the calls. Do not use the terminating trouble indicator to originate the calls.

13.11 Make all of the terminating markers busy except the one under test by inserting 322A MB plugs into associated DB jacks. Move the make busy plugs as required to proceed with tests and restore all terminating markers to normal at completion of tests.

13.2 Originate an incoming local call to an unequipped 500 block. Check that LIN relay operated in terminating marker and call terminated over a local intercept trunk.

13.3 Originate an incoming local call to a plugged up line. Check relay LT1 operated in terminating marker and call terminated over a local trouble intercept trunk. (When panel and X-Bay offices use the plugging up line circuit in common, do not make this test.)

13.4 Originate an incoming toll call to an unassigned line. Check relay TIN operated in terminating marker and call terminated over a toll intercept trunk.

13.5 Originate an incoming toll call to a plugged up line. Check relay TTI operated in terminating marker and call terminated over a toll trouble intercept trunk. (When panel and X-Bay offices use the plugging up line circuit in common, do not make this test.)

Lines presented in Script indicate new or changed information.

Manager, Product Engineering
Control Center

Reason for Reissue:
To update Paragraph 12.5.