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BELL SYSTEM PRACTICES
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PRELIMINARY TRANSMISSION TESTS
TOLL CONNECTING TRUNKS
USING PORTABLE TEST HYBRID SET - DE-90071-01
NO. 4A TOLL SWITCHING SYSTEMS

Contents Page

1. GENERAL

1.01 This section outlines the method of making preliminary transmission and return loss tests. It is issued to outline the use of the portable test hybrid DE-90071-01.

1.02 Return loss requirements for the particular group of trunks to be tested can be obtained from the trunk record, trunk order, or circuit order.

1.03 The portable test hybrid can be used to verify that the trunk facility, network and NBO specified on the trunk data are correct prior to actual cross connection of added or rerouted trunks.

1.04 The test hybrid can be used for trouble investigation and permits quick sectionalization of the trouble.

1.05 An assistant is required for testing incoming trunks and outgoing trunks to operators.

1.06 A block diagram sketch of the portable test hybrid set is shown in Figure 1.

2. APPARATUS

2.01 No. 21A transmission measuring set J94021A (SD-95115-01), or equivalent.

2.02 Portable test hybrid DE-90071-01.

2.03 Decade capacitor box General Radio Co. 219M, or equivalent.

2.04 Two P2AA cords, six feet long, equipped with two 241A plugs (2P13B), or equivalent.

2.05 P3N cord, six feet long, equipped with one 310 plug and one 241A plug (3P17B). Remove the 310 plug and replace with a 309-type plug. This cord is required only when tests are made from the TMB jacks.

2.06 W2BP cord, six feet long, equipped with one 241A plug and No. 35 cord tips (2W15B), or equivalent.

2.07 Two plugs, 328D, or equivalent (600NL).

2.08 Dial hand test set 1011G, equipped with 2W39A cord.

3. PREPARATION

3.01 Calibrate and operate the 21A transmission measuring set as described in Bell System Practices.

3.02 Adjust the oscillator section of the 21A transmission measuring set to 1000 cycles and proceed as follows:

(1) Using a P2AA cord, patch the OSC OUT 600-ohm jack of the 21A transmission measuring set to the 4W IN jack of the DE-90071-01 test set.

(2) Using a P2AA cord, patch the DET IN 600-ohm jack of the 21A transmission measuring set to the 4W OUT jack of the DE-90071-01 test set.

(3) Operate the TALK-TEST key on the DE-90071-01 test set to the TALK position.

(4) Adjust the oscillator output to +7 db (red dial).

(5) Restore the TALK-TEST key on the test set to the TEST position.

4. PROCEDURE

(A) Return Loss Measurements

4.01 Outgoing Toll Connecting Trunks

(a) At the TMB jacks of the MTCT frame, or at the MDF, patch the trunk under test to the HYB IN jacks of the test hybrid set.

NOTE: When the associated toll switching trunk equipment is idle, the two-wire side of the hybrid coil is open at the SL relay and it is, therefore, not necessary to block the relay.

(b) Adjust the NETWORK switch to the proper type net (115-type or comp. net).

(c) When trunks using precision networks are being tested, patch the decade capacitor to the NET BO jacks and adjust as follows:

(1) For tests at the MDF, adjust to the value specified on the preliminary test information sheet.

(2) For tests at the TMB jack, adjust to the capacity value specified for the NBO on the TFO or other trunk data.

NOTE: Trunks using compromise networks do not use NBO capacitors, therefore (c) above is not required.

(d) Patch the dial hand test set to the TALK & DIAL jack.

(e) Adjust the SERIES PAD switch to that shown for the pad value on the trunk data.

(f) Adjust the IMPEDANCE switch as follows:

(1) To 600 ohms when trunk circuit uses 120N coils.

(2) To 900 ohms when trunk circuit uses 120P coils strapped 1.5:1 ratio.

(3) To 1500 ohms when trunk circuit uses 120P coils strapped 2.5:1 ratio.

(g) Adjust LINE & N CAPACITOR switch to 4.28.

(h) Adjust SERIES CAPACITOR switch to 1.08.

(i) Insert 328D plug into the HOLD A-B jacks or connect 600-ohm resistor across associated binding posts.

(j) Operate the TALK-TEST key to TALK and dial the 900-ohm balance and noise test termination in the distant office. A click will be heard indicating seizure of the test termination. In the case of TX trunks, dial the appropriate TX code, and when the operator answers, ask her for the SING TEST termination with her TALK key normal. Restore the TALK-TEST key of the test hybrid to the TEST position.

4.02 For return loss tests on trunks using precision networks (high loss), sweep the oscillator of the 21A transmission measuring set from 300 to 3000 cycles and record the following measurements on Form P-2421-SC, Trunk Order Tests:

(a) The minimum return loss between 300 and 750 cycles.

(b) The minimum return loss between 750 and 2000 cycles.

(c) The return loss at 2000 cycles and each "peak" and "valley" of return loss, and the frequency at which they occur up to and including the return loss at 3000 cycles.

(d) Determine that the minimum return loss between 2000 and 3000 cycles equals or exceeds the minimum specified.

4.03 For return loss tests on trunks using compromise networks (low loss), check the reading at 2000 cycles only and record on form P-2421-SC.

4.04 Incoming Toll Connecting Trunks

(a) Access to the incoming toll connecting trunks may be obtained at the IDF or MDF without removing cross connections. The pair is picked up on a shoe and patched to the HYB IN jack of the test hybrid set. To remove the bridging loss of the trunk equipment associated with the pair, it is necessary to put a plug in the TEST jack of this associated equipment.

(b) Adjust the NETWORK switch to the proper type net (115-type or comp. net).

(c) When trunks using precision networks are being tested, patch the decade capacitor to the NET BO jacks and adjust as follows:

(1) For tests at the MDF, adjust to the value specified on the preliminary test information sheet.

(2) For tests at the IDF, adjust to the capacity value specified for the NBO on the TFO or other trunk data.

NOTE: Trunks using compromise nets do not use NBO capacitors, therefore (c) above is not required.

(d) Adjust the SERIES PAD switch to that shown for the pad value on the trunk data.

(e) Adjust the IMPEDANCE switch as follows:

(1) To 600 ohms when trunk circuit uses 120N coils.

(2) To 900 ohms when trunk circuit uses 120P coils strapped 1.5:1 ratio.

(3) To 1500 ohms when trunk circuit uses 120P coils strapped 2.5:1 ratio.

(f) Adjust LINE & N CAPACITOR switch to 4.28.

(g) Adjust SERIES CAPACITOR switch to 1.08.

(h) Insert 328D plug into the HOLD A-B jacks or connect 600-ohm resistor across associated binding posts.

(i) Call the distant office and request the assistant to terminate the trunk being tested as follows:

(1) Trunks from dial office - 900 ohms.

(2) Trunks from switchboard - SING-TEST jack with TALK KEY normal.

4.05 For return loss tests on trunks using precision networks (high loss), sweep the oscillator of the 21A transmission measuring set from 300 to 3000 cycles and give the assistant at the originating office the following readings:

(a) The minimum return loss between 300 and 750 cycles.

(b) The minimum return loss between 750 and 2000 cycles.

(c) The return loss at 2000 cycles and each "peak" and "valley" of return loss, and the frequency at which they occur up to and including the return loss at 3000 cycles.

(d) Determine that the minimum return loss between 2000 and 3000 cycles equals or exceeds the minimum specified.

4.06 For return loss tests on trunks using compromise networks (low loss), check the reading at 2000 cycles only and give the result to the attendant at the originating office.

(B) 1000-Cycle Net Loss Measurements

(a) Proceed as in Paragraph 4.01 (a) to (i).

(b) Operate the TALK-TEST key to the TALK position and dial the 1-MW outlet in distant office. For switchboard trunks, place a call to the operator and request her to connect the trunk to the 1-MW jack. Since the connection is made through the switchboard cords, caution her not to operate the MONITOR or TALK key while test is being made.

(c) Patch the transmission measuring set to the 4W IN jacks of the portable test hybrid. Insert the 328D plug in the 4W OUT jacks.

(d) Restore the TALK-TEST key to TEST and measure the loss.

5. REPORTS

5.01 Form P-2421-SC, Trunk Order Tests, shall be used for recording the results of these tests.

5.02 The reports shall be reviewed by the supervisor in charge and forwarded immediately to the transmission supervisor.

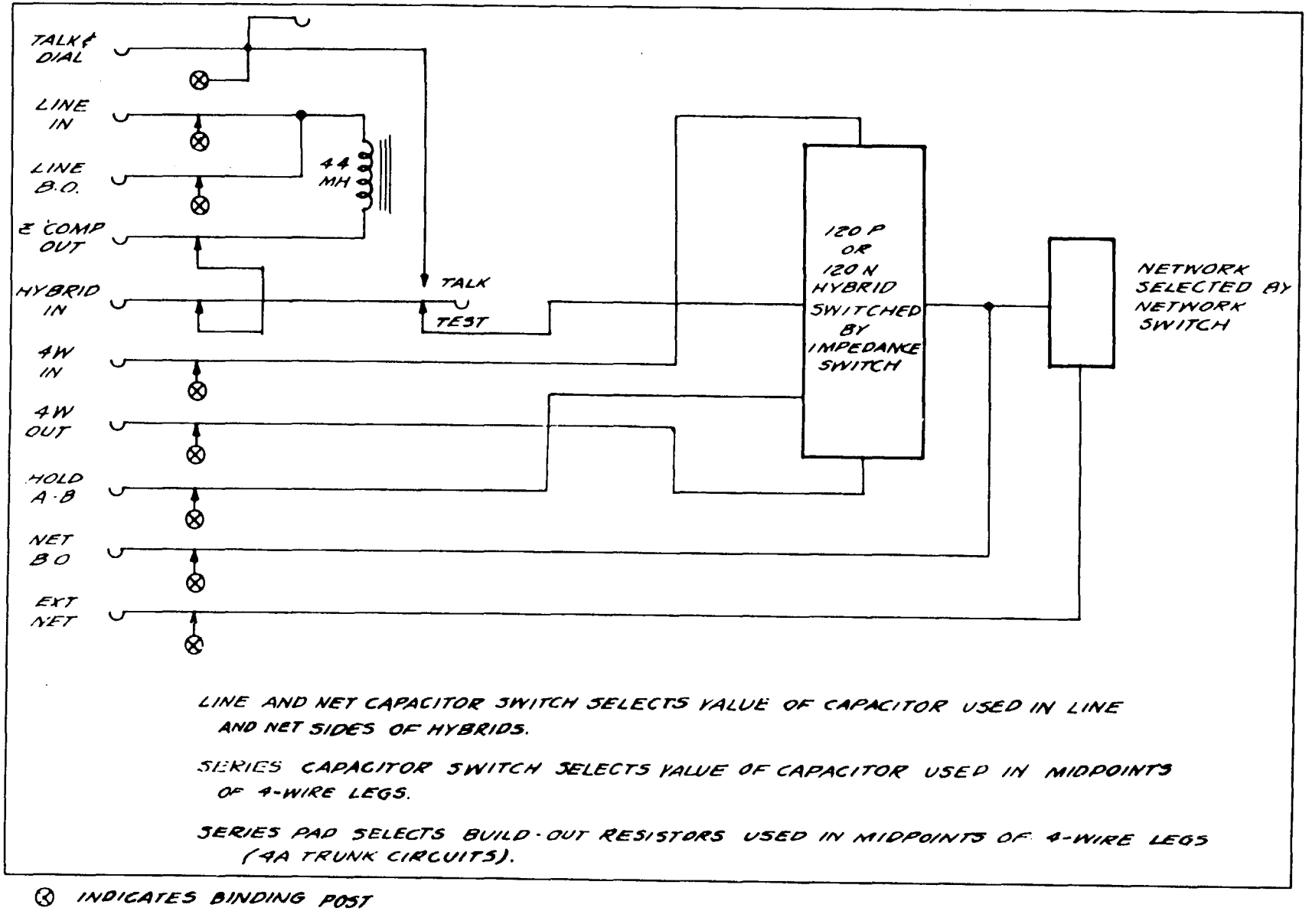

Figure 1 - Block Diagram for Portable Test Hybrid DE-90071-01