

American Telephone and Telegraph Company

BELL SYSTEM PRACTICES
Teletypewriter and Manual
Telegraph Station and PBX
Installation and Maintenance

SECTION P31.915
Issue A, 8-19-40
Long Lines Department

TELEGRAPH

TELETYPEWRITER APPARATUS

LOCAL TEST CIRCUIT

EXTERNAL TO TELETYPEWRITERS AND SUBSCRIBER SETS

1. GENERAL

1.01 This section describes a local test arrangement for a duplexed teletypewriter arranged for polar receiving where the commercial power supply is 110 volt a-c. This arrangement will normally be required at multi-set stations where 128-B-2 subscriber sets are employed on the two loop polar receiving basis and utilizes spare available jacks in the loop switchboard.

1.02 This arrangement gives the customer a means for practicing on spare teletypewriters and the maintenance man a means for testing a teletypewriter when it is not connected to the subscriber set. This test circuit shall not be used in making orientation or distortion tolerance tests on the teletypewriters.

1.03 The local test equipment shall be mounted on the emergency teletypewriter table wherever practicable. This section gives the details where a 15-N or a 19-A teletypewriter table is involved. Where other types of tables are involved, the mounting of the test equipment will be governed by local conditions.

1.04 The test circuit is of the bridge type, and the reversal of the receiving relay current is effected by unbalancing the bridge. The resistance values required in the bridge to secure approximately equal and opposite mark and space receiving relay currents depends upon the resistance in the receiving circuit. The (B) resistance in the test circuit is made 850 ohms for use with 85 ohm receiving

circuits. The (B) resistance is made 1,000 ohms for use with 170 ohm receiving circuits. The corresponding send and receive currents for the two conditions are as follows:

Receive
Circuit

Resistance (Ohms)	(B) Resistance	Send Amps.		Receive Amps.	
		Mark	Space	Mark	Space
85	850	.000424E	0	.00018E	.00018E
170	1,000	.000437E	0	.000177E	.000177E

E = EMF applied to the test circuit measured under actual load conditions.

Send current tolerance is \pm .001 amp.
Receive current tolerance is \pm .0005 amp.

2. MATERIAL REQUIREMENTS

2.01 Following is a list of the material required per test circuit to provide the proposed test arrangement.

Common Equipment

- 1 J86205J Rectifier (do not substitute)
- 1 151-A-1 Teletypewriter Resistance Unit
- 1 59-C (200 ohm) Resistance
- 1 Circuit Label (Long Lines Drawing 20078-134. In ordering this drawing, specify figure to be reduced to 2-5/8" x 4-1/2")

Additional Material for 15-N Table

- 1 Hubbell 7624 Receptacle
- 1 Hubbell 9764 Plug Cap
- 1 Hubbell 9912 Uniplex Switch
- 1 Hubbell 4825 Flush Plate
- 1 Standard Switch Box (for switch)
- 1 12-F Connecting Block

Additional Material for 19-A Table

- 1 Hubbell 7624 Receptacle
- 1 Hubbell 9764 Plug Cap
- 1 Hubbell 9813 Duplex Switch
- 1 Hubbell 8854 Flush Plate

Additional Material Where Other Than 15-N or 19-A Tables
Are Involved

- 1 Approved Single Pole Single Throw Power Switch
(6 amperes 125 volt)
- 1 Mounting Detail for Rectifier to be Provided Locally
as Required
- 1* Hubbell 7624 Receptacle
- 1** Hubbell 9764 Plug Cap

Note: * Omit if power receptacle is furnished by customer.
** If power receptacle is furnished by customer provide a suitable plug cap for rectifier input.

3. PROCEDURE

Common

- 3.01 Modify the 151-A-1 teletypewriter resistance unit in accordance with Figure 1, and replace the circuit label with Long Lines Drawing 20078-134.
- 3.02 Replace the plug cap on the rectifier with the plug cap applicable for the particular installation involved.

15-N Table

- 3.03 Modify the 15-A control panel by adding the Hubbell 9912 switch in the center of the panel and to the rear; also install the 12-F connecting block on the under surface of the panel convenient to the switch box.
- 3.04 Mount the Hubbell 7624 receptacle inside the table on the rear panel to the right of and in line with the existing connecting blocks.

- 3.05 Wire the switch and the receptacle, installed per Paragraphs 3.03 and 3.04, as shown in Figure 2. This work shall be done in accordance with all national and local rules and regulations.
- 3.06 Mount the modified 151-A-1 teletypewriter resistance unit as shown in Section P90.015.
- 3.07 Make connections between the test jacks in the loop switchboard and the 151-A-1 resistance unit, as covered under Part 4.
- 3.08 Install the rectifier for the test circuit and also the regular rectifier, on end on the shelf in the table.

19-A Table

- 3.09 Remove the existing power switch in the table and replace it with the Hubbell 9813 duplex switch.
- 3.10 Mount the Hubbell 7624 receptacle inside the table on the panel to the left of the left brace (as viewed from the rear) and directly below the existing connecting blocks.
- 3.11 Wire the two units of the new switch and the receptacle, installed per Paragraphs 3.09 and 3.10, as shown in Figure 3. This work should be done in accordance with all national and local rules and regulations.
- 3.12 Mount the modified 151-A-1 resistance unit vertically on the panel between the two braces so that the terminals will be at the top. (See Plan SA 6.28).
- 3.13 Make connections between the test jacks in the loop switchboard and the 151-A-1 resistance unit, as covered in Part 4.
- 3.14 Install the rectifier on end adjacent to the motor-generator.

Other Than Above Installations

- 3.15 Provide a receptacle and power switch applicable for the installation involved for the input of the rectifier,

together with a convenient mounting detail for the rectifier and the 151-A-1 resistance unit as indicated in Figure 4. This work should be done in accordance with all national and local rules and regulations.

3.16 Make connections between the test jacks in the loop switchboard and the 151-A-1 resistance unit as covered in Part 4.

4. CONNECTIONS TO TEST JACKS (Refer to Figure 1, Section P60.101)

Receiving Jacks

4.01 Appearances for the receiving side of the test circuit may be established on miscellaneous jacks, if such are available. In this case connect two or more jacks in series and connect T of the first jack to Terminal 1 of the 151-A-1 resistance unit (see Figure 1). Connect S of the last jack to Terminal 2 of the resistance unit.

Sending Jacks

4.02 Appearances for the receiving side of the test circuit may be established on miscellaneous jacks, if such are available. In this case connect T of one jack (or of the first, if more than one appearance is desired) to Terminal 1 of the 151-A-1 resistance unit (see Figure 1). Connect S of the jack (or of the last jack, if more than one appearance is being provided) to Terminal 3 of the resistance unit.

4.03 A three jack loop circuit may be substituted for either of the miscellaneous jacks discussed above. In this case, strap together Jack Terminals S and T1 and connect Terminal T to Terminal 1 of the resistance unit. Connect Terminal S1 to Terminal 2 of the resistance unit for a "Receiving" appearance or to Terminal 3 for a "Sending" appearance. This arrangement will provide three appearances for either the "Receive" or the "Sending" test loop, depending upon their assignment.

5. ADJUSTMENT OF RECTIFIER

5.01 The rectifier used to supply the current for the test circuit shall be adjusted in accordance with the instructions contained in Section P31.801.

6. OPERATING PROCEDURE

6.01 If it is desired to practice or make tests on a duplexed teletypewriter arranged for polar operation, insert the cord on the "Receive" side of the teletypewriter in one of the "Receive" jacks in the modified loop board and the cord on the "Send" side of the teletypewriter in the "Send" jack of the modified loop board.

6.02 Turn on the power on the set on which it is intended to practice or to make tests, and also turn on the switch which controls the rectifier supplying current to the test jacks.

6.03 In the case of the 15-N and 19-A tables on which the test rectifier is located, the teletypewriter may or may not be operating since the test rectifier power switch on these tables is independent from the rest of the power circuit.

7. REFERENCES

7.01 Long Lines Department Drawing 20078-134, Issue 1, from which Figure 1 is reproduced; Long Lines Department Drawing S-8621-146, Issue 1, from which Figures 2, 3, and 4 are reproduced.

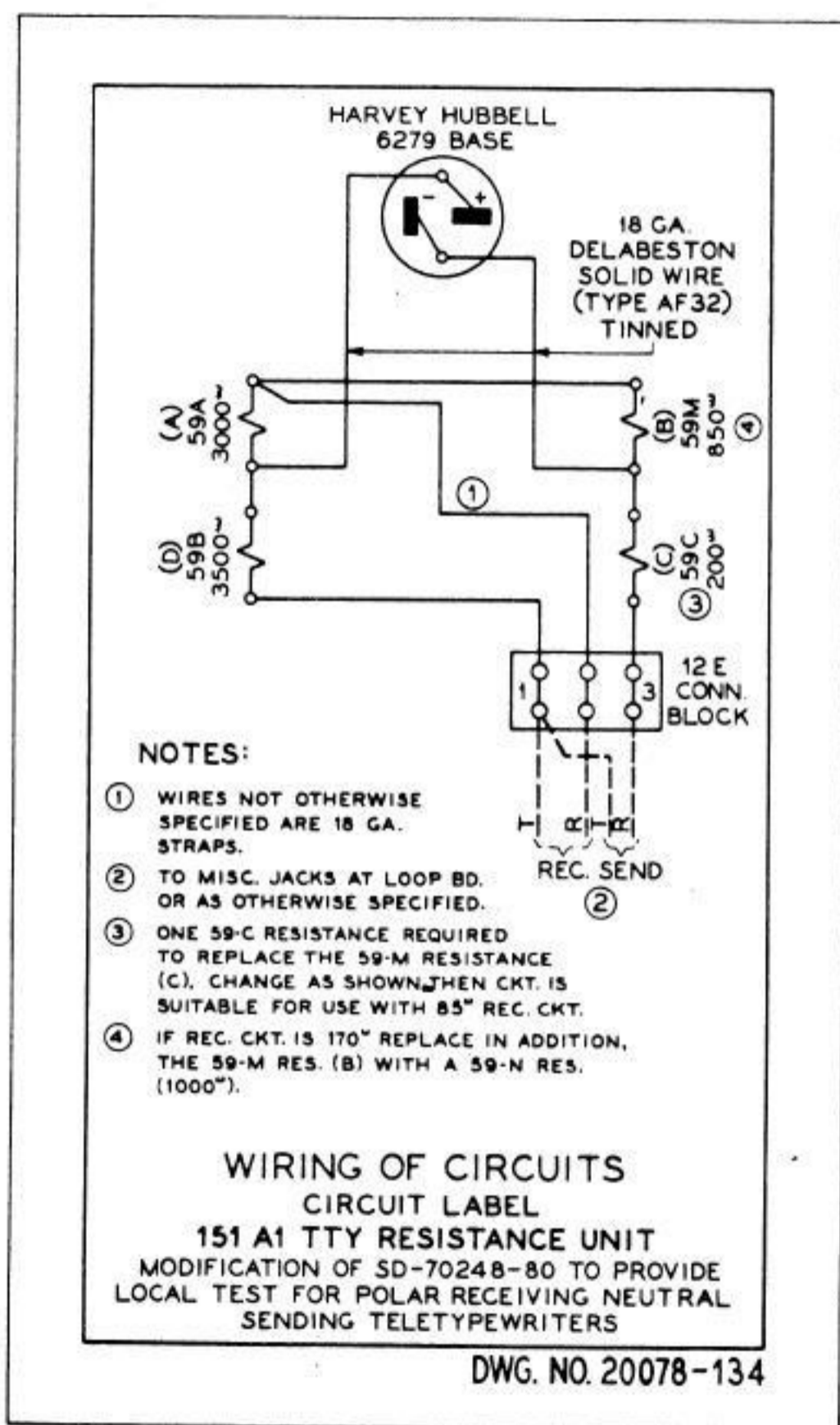


FIG. 1

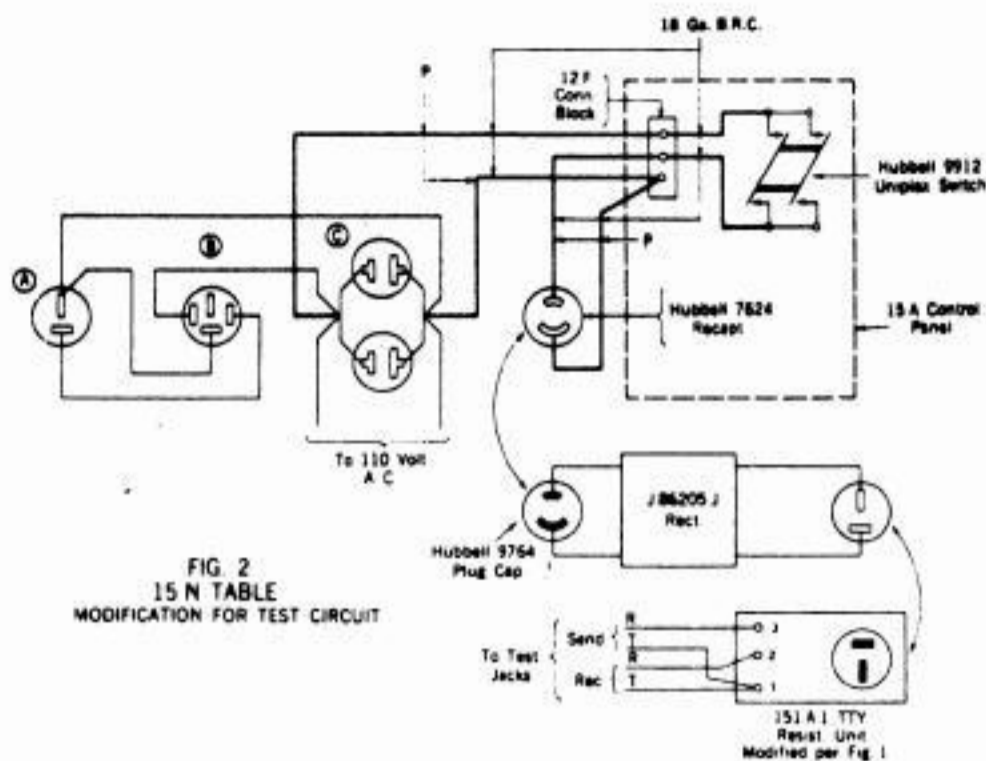


FIG. 2
15 N TABLE
MODIFICATION FOR TEST CIRCUIT

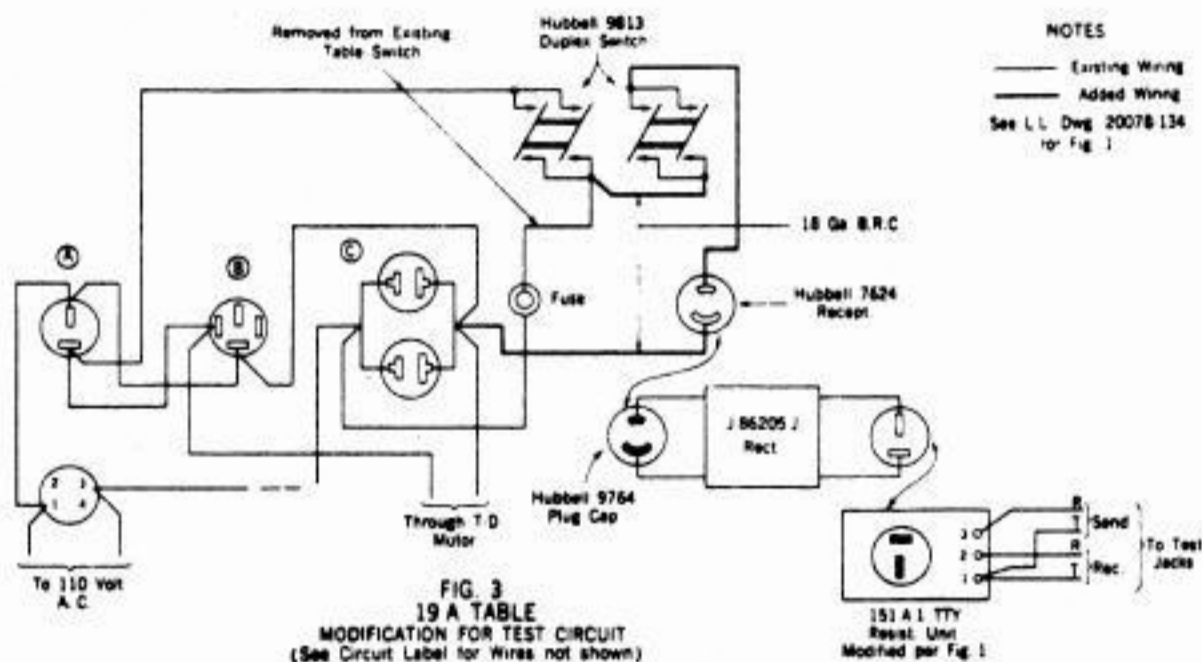


FIG. 3
19 A TABLE
MODIFICATION FOR TEST CIRCUIT
(See Circuit Label for Wires not shown)

NOTES
 — Existing Wiring
 — Added Wiring
 See L.L. Dwg 20078-134
 for Fig. 1

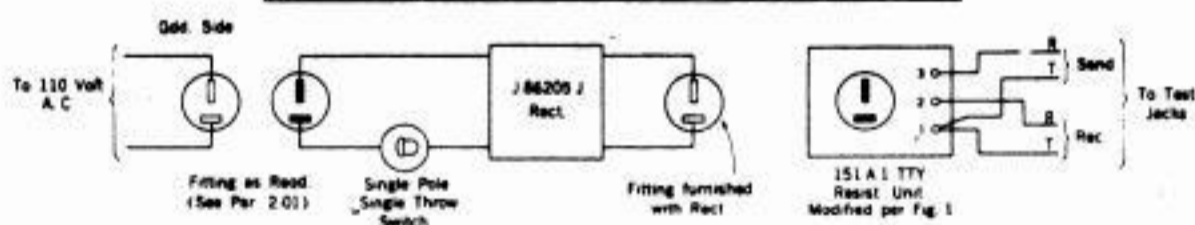


FIG. 4
TEST CIRCUIT
DUPLEXED POLAR RECEIVING TELETYPEWRITERS
(For other than 15 N or 19 A Tables)