

TYPE N AND ON CARRIER REPEATERS — REPEATERED HIGH-FREQUENCY LINE
PRELIMINARY TESTS — TRANSISTORIZED REPEATER POINTS
CHECK OF VOLTAGE POLARITY, CURRENT, AND SEALING CURRENT PROVISIONS

The purpose of this test is to check repeater operating voltage and current and to check that sealing current is provided when necessary. This section applies to N1A repeaters and to N2 repeaters connected by an adapter into an N1A repeater mounting.

This section is reissued to add information for the N2-to-N1A repeater adapter. Since this is a general revision, marginal arrows usually used to denote changes have been omitted.

It is important that the voltages at the repeater are of the correct polarity, the current is of the correct magnitude, and the correct provisions have been made for sealing current. Therefore, the installation procedure as outlined in this section must be followed in order to avoid damage to the repeater by reversed voltages. The steps must be followed in proper sequence starting at the power point and proceeding to the end of the power loop.

A simplified dc schematic of the N1A repeater is shown in Fig. 1. The repeater is powered by providing a positive voltage at PA9 with respect to PA11. Figure 2 shows a typical dc circuit for feeding power to two remotely powered repeaters and sealing current to a third. The current is sent over the cable in simplex fashion powering as many as three repeaters in series.

APPARATUS:

1 — KS-14510 Volt-Ohm-Milliammeter (VOM) or Equivalent (20,000 Ohms/Volt)

STEP	PROCEDURE
	A. General Procedures
1	Check that all mounting brackets have been correctly strapped, installed, and wired to the cable terminals and power supplies.
2	Reference to a repeater hereafter will signify an N1A repeater or an N2 repeater/adapter combination applied to an N1A repeater mounting bracket.
3	Before inserting a repeater: <ul style="list-style-type: none"> (a) Check that the incoming voltage polarity at the repeater mounting is correct. (b) If the repeater is locally powered or is the last repeater in a remotely powered string, check that the sealing current, if specified, has been correctly provided.

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4	<p>After inserting a repeater:</p> <p>(a) If the repeater is locally powered or is the last repeater in a remotely powered string, check the dc current.</p> <p>(b) If the repeater is an intermediate repeater in a remotely powered string, check that the outgoing voltage polarity to the next repeater is correct at the cable terminals.</p>												
5	<p>To set up a string of remotely powered repeaters:</p> <p>(a) Begin at the power supply location. Check that the outgoing voltage polarity to the first repeater is correct at the cable terminals.</p> <p>(b) Proceed along the string, inserting repeaters and making the above precautionary checks.</p> <p>(c) When the last repeater is inserted, the dc loop will be closed and current will flow. Measure the current. Record this measurement for the circuit engineer. If the current is too high, remove the repeater.</p> <p style="text-align: center;">B. Check of Incoming Voltage Polarity at a Repeater</p>												
6	Set the VOM to the 300-volt scale.												
7	Measure the voltage between the pins of repeater jack J1 on the repeater mounting bracket as specified in Table A. A diagram of the repeater jack is shown in Fig. 3.												
8	<p>Check that the polarity of the voltage is correct.</p> <p>Requirement: The polarity should be as specified in Table A. The voltage should be 48, 130, 178, or 260 volts depending on the particular situation.</p> <p style="text-align: center;">TABLE A</p> <table border="1" data-bbox="311 1333 1295 1554"> <thead> <tr> <th data-bbox="311 1333 795 1390">POWERED CONDITION</th> <th data-bbox="795 1333 1039 1390">PIN NUMBERS</th> <th data-bbox="1039 1333 1295 1390">POSITIVE PIN</th> </tr> </thead> <tbody> <tr> <td data-bbox="311 1390 795 1444">Locally powered</td> <td data-bbox="795 1390 1039 1444">9 and 11</td> <td data-bbox="1039 1390 1295 1444">9</td> </tr> <tr> <td data-bbox="311 1444 795 1499">Remotely powered from East*</td> <td data-bbox="795 1444 1039 1499">19 and 16</td> <td data-bbox="1039 1444 1295 1499">19</td> </tr> <tr> <td data-bbox="311 1499 795 1554">Remotely powered from West*</td> <td data-bbox="795 1499 1039 1554">1 and 4</td> <td data-bbox="1039 1499 1295 1554">1</td> </tr> </tbody> </table> <p>* East and West refer to carrier designations East and West. <i>Do not confuse with physical directions.</i></p> <p style="text-align: center;">C. Check of Sealing Current Wiring</p> <p>Caution: Before attempting to measure resistance, check to see that voltages are not present which could damage the meter.</p>	POWERED CONDITION	PIN NUMBERS	POSITIVE PIN	Locally powered	9 and 11	9	Remotely powered from East*	19 and 16	19	Remotely powered from West*	1 and 4	1
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9	Set the VOM to the ohms × 10 scale. Short the leads and adjust the zero setting.												

STEP	PROCEDURE																																									
10	<p>Measure the resistance between the pins of repeater jack J1 on the repeater mounting bracket as specified in Table B or C. Table B is applicable where no 240-type flat gain amplifiers are involved. Table C applies where sealing current is fed beyond a 240-type flat gain amplifier installation. A diagram of the repeater jack is shown in Fig. 3.</p> <p style="text-align: center;">TABLE B</p> <table border="1" data-bbox="451 516 1438 690"> <thead> <tr> <th>SEALING CURRENT</th> <th>PIN NUMBERS</th> <th>RESISTANCE MEASURED</th> </tr> </thead> <tbody> <tr> <td>Sent to East*</td> <td>12 and 17</td> <td>100 ohms</td> </tr> <tr> <td>Sent to West*</td> <td>2 and 8</td> <td>100 ohms</td> </tr> </tbody> </table> <p>* East and West refer to carrier designations East and West. <i>Do not confuse with physical directions.</i></p> <p style="text-align: center;">TABLE C</p> <table border="1" data-bbox="428 852 1463 1438"> <thead> <tr> <th colspan="4">SEALING CURRENT SUPPLIED BEYOND 240-TYPE AMPLIFIER</th> </tr> <tr> <th>SEALING CURRENT</th> <th>PIN NUMBERS</th> <th>LOCATION</th> <th>RESISTANCE MEASURED</th> </tr> </thead> <tbody> <tr> <td>Received from East*</td> <td>12 and 17</td> <td>N1 or N1A repeater (pole type cabinet)</td> <td>442 ohms</td> </tr> <tr> <td>Received from East*</td> <td>12 and 17</td> <td>N1 or N1A repeater (all other)</td> <td>440 ohms</td> </tr> <tr> <td>Received from East*</td> <td>12 and 17</td> <td>A11 N2 repeaters</td> <td>620 ohms</td> </tr> <tr> <td>Received from West*</td> <td>2 and 8</td> <td>N1 or N1A repeater (pole type cabinet)</td> <td>442 ohms</td> </tr> <tr> <td>Received from West*</td> <td>2 and 8</td> <td>N1 or N1A repeater (all other)</td> <td>440 ohms</td> </tr> <tr> <td>Received from West*</td> <td>2 and 8</td> <td>A11 N2 repeaters</td> <td>620 ohms</td> </tr> </tbody> </table> <p>* East and West refer to carrier designations East and West. <i>Do not confuse with physical directions.</i></p> <p style="text-align: center;">D. Check of Outgoing Voltage Polarity at Cable Terminal Mounting</p> <p>11 Locate the two cable pairs sending dc power to the next repeater.</p> <p>12 Set the VOM to the 300-volt scale.</p> <p>13 Measure the voltage between the tip of the transmitting cable pair and the tip of the receiving cable pair.</p> <p>Requirement: The tip of the transmitting cable must be positive. The magnitude of the voltage will be 130, 178, or 260 volts, depending on the particular situation.</p>	SEALING CURRENT	PIN NUMBERS	RESISTANCE MEASURED	Sent to East*	12 and 17	100 ohms	Sent to West*	2 and 8	100 ohms	SEALING CURRENT SUPPLIED BEYOND 240-TYPE AMPLIFIER				SEALING CURRENT	PIN NUMBERS	LOCATION	RESISTANCE MEASURED	Received from East*	12 and 17	N1 or N1A repeater (pole type cabinet)	442 ohms	Received from East*	12 and 17	N1 or N1A repeater (all other)	440 ohms	Received from East*	12 and 17	A11 N2 repeaters	620 ohms	Received from West*	2 and 8	N1 or N1A repeater (pole type cabinet)	442 ohms	Received from West*	2 and 8	N1 or N1A repeater (all other)	440 ohms	Received from West*	2 and 8	A11 N2 repeaters	620 ohms
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STEP	PROCEDURE
	<p style="text-align: center;">E. Check of Repeater Current (Locally or Remotely)</p> <p>14 At the repeater, verify that there is a plug in jack J2 and then remove the plug from J3 (color coded yellow).</p> <p>15 Set the VOM to the 12-volt scale.</p> <p>16 Measure the voltage between pin 10 of jack J3 and test point JC4 on the N1A repeater or between test points TP1 and TP2 on the adapter for the N2 repeater. Pin 10 of J3 or test point TP1 must be positive. A diagram of J3 and the test jack is shown in Fig. 4. Figure 5 shows test points TP1 and TP2.</p> <p>17 The same requirements apply as in Section 362-410-515 for the N1A repeater or Section 362-460-501 for the N2 repeater adapter.</p> <p><i>Caution: If this reading exceeds 4 volts for N1A repeaters or 5 volts for N2 repeaters or if it is of the wrong polarity, remove the repeater. This measurement indicates voltage across a 2-percent 24-ohm resistor in series with repeater power diodes.</i></p>

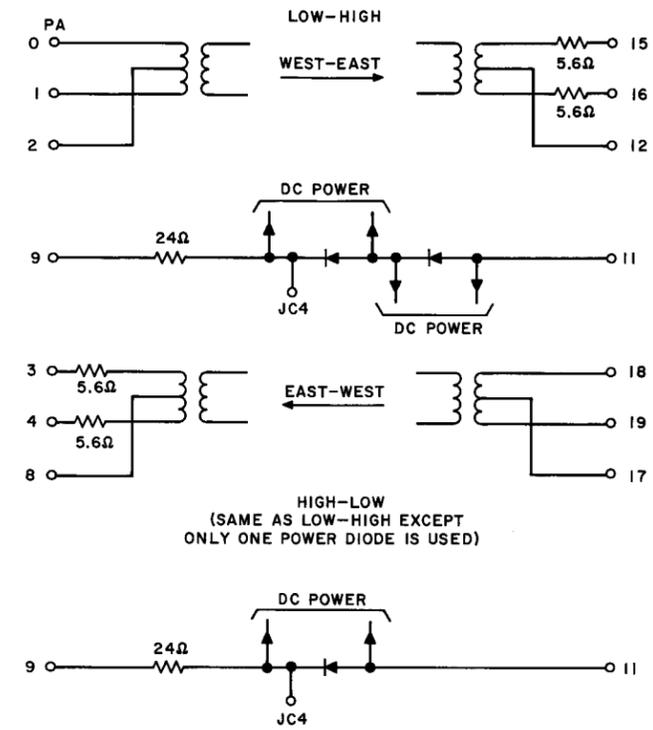


Fig. 1 — Simplified DC Schematic of N1A Repeaters

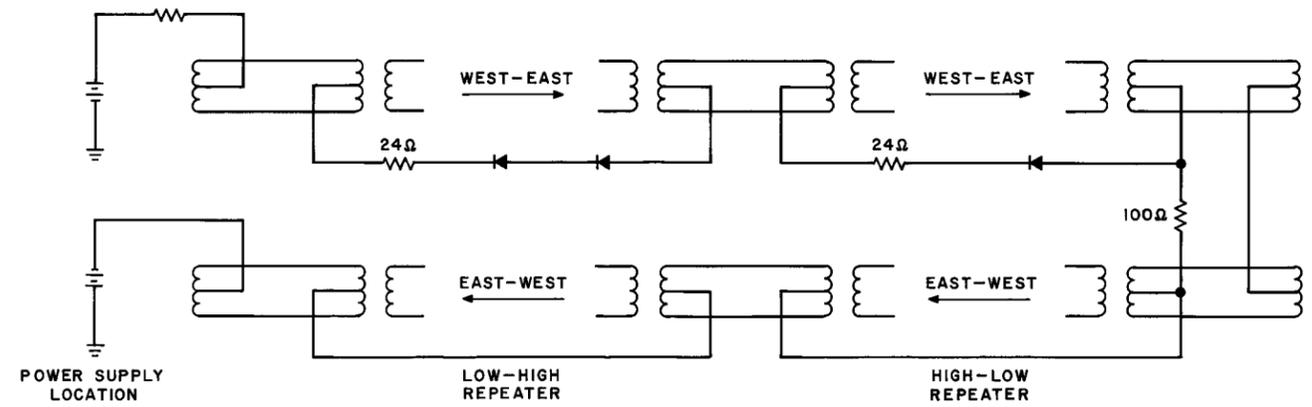


Fig. 2 — Diagram of Typical DC Circuit for Remotely Powered Repeaters

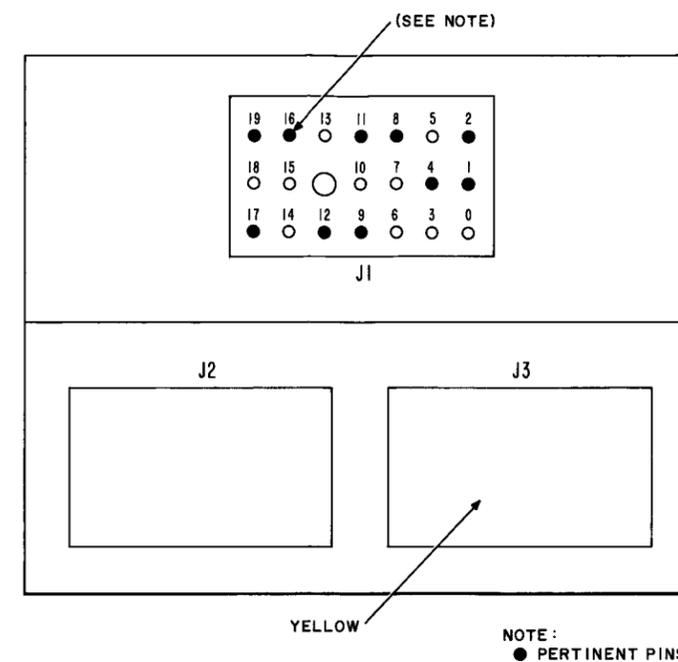


Fig. 3 — Repeater Mounting Bracket with Repeater Removed

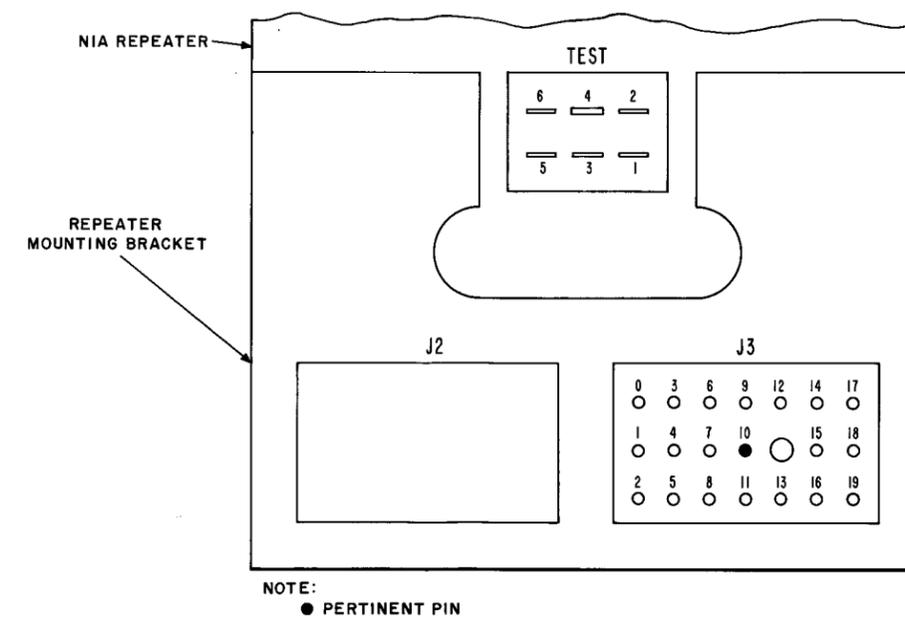


Fig. 4 — Repeater Mounting Bracket with NIA Repeater Inserted

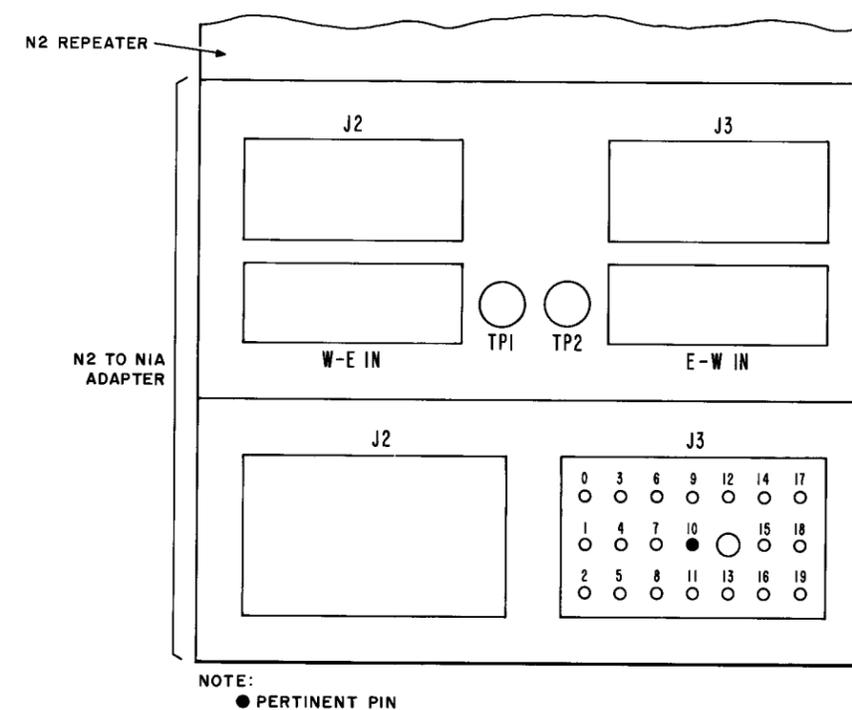


Fig. 5 — Repeater Mounting Bracket with Adapter and N2 Repeater Inserted