

J98619A SUBSCRIBER LOOP MESSAGE AND SIGNAL REPEATER TESTS AND ADJUSTMENTS

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1. GENERAL

1.01 This section describes methods of making tests and adjustments on the J98619A message and signal repeater. Information is included on the power supply, alarms, repeaters, cabinet heaters, and battery. The tests and adjustment procedures are suitable for installation and periodic maintenance of the system. Intervals for periodic maintenance should be established locally and should take into consideration local environmental conditions.

1.02 This section is reissued to include information for testing the optional remote testing features at the remote cabinet on a local test basis. Since this reissue constitutes a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The power supply tests provide a check of the ac, rectified dc, battery, and ringing supply voltages. The alarm tests check for ac failure, fuse failure, and low battery conditions. Since the J98619A system repeats all normal message and signal information between the central office and subscriber, the repeater tests cover dial pulsing, dc supervisory signals, ringing with superimposed positive and negative dc, and voice transmission. Also included are tests for the cabinet heaters and the battery.

1.04 The remote tests check the dc bypassing of the DLL circuit and the application of a 1000-Hz milliwatt supply plus a simulated dial pulse train at the remote cabinet.

1.05 The remote testing, dc bypassing unit is under control of the local test cabinet or local test desk and establishes a dc bypass connection around the DLL circuit and any associated repeater. The control of the dc bypassing unit is through the use of a positive coin potential applied to the line under test from the central office.

1.06 The use of the remote testing features with local test cabinet No. 3 and the local test desk 12- and 14-type will be covered in the following sections:

| SECTION | TITLE |
|-------------|--------------------------|
| 662-202-500 | Local Test Cabinet No. 3 |
| 662-300-500 | Local Test Desk—12 Type |
| 662-400-500 | Local Test Desk—14 Type |

2. APPARATUS

2.01 Table A provides a list of apparatus required for performing all tests and adjustments in Part 4.

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2.02 The KS-5499, L1307 hydrometer is for use with high specific gravity batteries.

2.03 The 2P4C patching cord consists of one No. P2B cord, 6 feet long, with two No. 310 plugs.

2.04 The 2W35A patching cord consists of one No. W2BY cord, 4-1/2 feet long, with one No. 347A plug and two No. 35 cord tips.

2.05 The W1Y test cord consists of one 8-inch length of single conductor cord with one No. 59 test clip on each end.

2.06 Type D-79650 (red) and D-79651 (black) test cords, 6 feet long, with picks, for use with No. 931 Weston DC VM.

3. PREPARATION

3.01 All tests and adjustments are made at the repeater site unless otherwise specified.

Note: Most tests and adjustments described require out-of-service conditions for only one customer line at a time.

TABLE A

| APPARATUS | TEST OR ADJUSTMENT | | | | | | |
|---|--------------------|---|---|---|---|---|--------------|
| | A | B | C | D | E | F | |
| Weston DC VM, Model 931 with 300/150/75/30V scale | 1 | 1 | - | - | - | - | |
| KS-14510, L5 VOM | 1 | - | 1 | 1 | - | - | |
| KS-14418 Headset with 419A Plug | - | 1 | 1 | - | - | - | |
| 1011D Handset | - | 1 | 1 | - | - | * | |
| 54A (J99254A) TMS | } | - | 1 | - | - | - | |
| 54B (J99254B) Test Stand | | | | | | | } cables and |
| 54C (J99254C) RLMS | | | | | | | |
| 23A (J94023A) TMS | - | - | 1 | - | - | 1 | |
| KS-5499, L1307 Hydrometer (2.02) | - | - | - | - | 1 | - | |
| 2P4C Cord (2.03) | - | 1 | 2 | - | - | 1 | |
| 2W35A Cord (2.04) | - | 1 | - | - | - | - | |
| W1Y Cord (2.05) | - | 1 | - | - | - | - | |
| Test Cords (2.06) | 1 | - | - | - | - | - | |
| 258 Dummy Plug | 1 | 1 | 1 | - | - | 1 | |
| Blocking Tool | 1 | - | - | - | - | 2 | |

* Optional

Note: A D cabinet tent (AT-7953) should be used during inclement weather.

3.02 An assistant will be required at the central office during the alarm tests to observe functioning of the alarm lamps and to operate the LB TST and ACO keys.

3.03 Some tests and adjustments may require access to the innermost regions of the repeater cabinet. To accomplish this:

- (1) Release slotted retaining straps from left end of the front gate
- (2) Swing the front gate forward and to the right
- (3) Remove screws that fasten left end of battery compartment to the rear gate
- (4) Swing left end of battery compartment forward slightly
- (5) Loosen wing nuts at upper and lower right-hand corners of the rear gate.
- (6) Swing rear gate forward and to the left.
- (7) Power supply covers, etc., can now be removed, as required.

3.04 The ac supply and cabinet heater tests may require access to the inner part of the ac power panel. To accomplish this:

- (1) Turn ac power off at external power switch.
- (2) Remove screws that fasten TST jack J9 to panel.
- (3) Remove screw that fastens UTILITY OUTLET receptacle J6 to panel.
- (4) Remove sheet metal screws from upper and lower flanges of panel.
- (5) Slide the panel forward to remove.

3.05 If the rear gate is swung out during any tests or adjustments, ***make sure that no wires on the protector blocks at the rear of the cabinet are near the cabinet heater elements*** before returning this gate to its normal position.

3.06 Since the cabinet heaters are thermostatically controlled, the heater switch S1 may be left on at all times. However, check that the switch is in the ON position prior to cold weather to guard against possible equipment malfunctioning.

3.07 The No. 258 dummy plug must be used to disable alarm transmission in some tests in Parts 4A and 4B. It is used to open the subscriber side of the loop at LINE EQPT jack J3 or J4 during the tests in Part 4C to prevent annoying the customer with ringing and to prevent local customer interference with the tests.

3.08 Make sure that all equipment plugs, switches, and controls are in the normal position, that all test equipment is removed, and that the cabinet door and panel board cover are locked before leaving the repeater site.

Note: Check that the fuse holders on the recommended panel board are not inserted upside down, which is equivalent to the OFF position of a switch.

4. TESTS AND ADJUSTMENTS

A. Power Supply

4.01 The power supply is tested to ensure that the ac, rectified dc, battery, and ringing voltages are within the required limits. Adjustments are to be made only when the specified test requirements are not met.

Warning: *Commercial power can be lethal. Use extreme care where leads and components carrying such power are exposed.*

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| STEP | PROCEDURE |
|--|--|
| <p>1</p> <p>2</p> | <p>AC Supply</p> <p>Set VOM to the 300 VAC scale.</p> <p>Connect the VOM test tools to TS1-1 and 2 and then to TS1-3 and 4. See 3.04.</p> <p>Requirement: VOM indicates 105 to 130 VAC for both lines (1 and 2). Report results if out of limits.</p> |
| STEP | PROCEDURE |
| <p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> | <p>DC Supply</p> <p>Set DC VM to the 30V scale.</p> <p>Insert No. 258 dummy plug in ALM EQPT jack J8 to disable alarm transmission.</p> <p>Connect the DC VM test tools to TSB-4 and 17 (4 is negative).</p> <p>Requirement: DC VM indicates 26 ± 0.5 VDC.</p> <p>If the requirement in Step 3 is not met, remove power supply PS2 cover (see 3.03) and adjust VOLT ADJ control R7. If no voltage is indicated, test fuses F1 and F2 in PS2. If R7 will not increase PS2 voltage to required value, the batteries may be partially discharged. In this case, remove the output lead to terminal TS1-2 on PS2. Connect DC VM to J1 (negative) and J2 on PS2. Adjust PS2 for requirement; then, reconnect the output lead.</p> <p>Set DC VM to the 75V scale.</p> <p>Connect the DC VM test tools to TSB-17 and 19 (19 is negative).</p> <p>Requirement: DC VM indicates 51.5 ± 0.5 VDC.</p> <p>If the requirement in Step 6 is not met, remove power supply PS1 cover (see 3.03) and adjust VOLT ADJ control R7. If indicated potential is about 26 volts, test fuses F1 and F2 in PS1. If R7 will not increase PS1 voltage to required value, the batteries may be partially discharged. In this case, block relay LB operated, if operated, or released, if released. Insulate the LB-10M contact and disconnect terminal TS1-2 on PS1. Connect DC VM to J1 (negative) on PS1 and J2 on PS2. Adjust PS1 for requirement, then reconnect the output lead and restore relay LB to normal. Remove insulation from LB-10M contact.</p> <p>Note 1: This test will interrupt all service during the time the PS1 lead is open and relay LB is blocked in the released state.</p> <p>Note 2: Make sure that PS2 meets the requirement in Step 3 before adjusting PS1.</p> |

| STEP | PROCEDURE |
|------|--|
| 8 | If released, block relay LB operated. If it is operated, proceed to Step 9. |
| 9 | Connect the DC VM test tools to TSB-17 and 22 (22 is negative). <i>Requirement:</i> DC VM indicates 51 ± 1.0 VDC. |
| 10 | If the requirement in Step 9 is not met, F16, CR2, CR5, BT1, or BT2 may be defective or BT1 and/or BT2 may be partially discharged. See Part 4E for battery test. |
| 11 | Remove blocking tool from relay LB, and replace PS1 and PS2 covers. |
| 12 | Remove the 258 dummy plug. |
| STEP | PROCEDURE |
| | <p>Ringing Generator</p> <p>1 Set VOM to the 300 VAC scale.</p> <p>2 Connect VOM test tools to output terminals 4 and 5 on generator G1. Remove dust cover to locate terminals.</p> <p><i>Requirement:</i> VOM indicates 80 to 120 VAC.</p> <p><i>Note:</i> Very heavy ringing current, caused by many lines being rung simultaneously, may temporarily reduce voltage below 80 VAC.</p> <p>3 Set VOM to the 300 VDC scale.</p> <p>4 Connect VOM test tools to TSA-10 and 19 (10 is negative).</p> <p><i>Requirement:</i> VOM indicates approximately 100 to 155 VDC.</p> <p>5 Connect VOM test tools to TSA-19 and 25 (19 is negative).</p> <p><i>Requirement:</i> VOM indicates approximately 100 to 155 VDC.</p> |

B. Alarms

4.02 The following tests are made to ensure that the ac failure, fuse failure, and low-battery alarm circuits meet requirements for proper

operation. Adjustments are to be made only when the specified test requirements are not met.

Note: All power supply requirements described in Part 4A must be met before proceeding with the following alarm tests and adjustments.

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4.03 Since communications between the repeater site and the central office will be required for verification of alarm lamp operation, the 1011D handset should be connected to the ADPT OUT jack, and the ADPT IN jack should be connected to an idle line with the 2P4C cord. The ADPT IN and ADPT OUT jacks are located on the cabinet main jack field.

Note 1: Use of the adapter provides approximately 10-dB loss and will prevent repeater singing.

Note 2: Use the KS-14418 headset to locate an idle line by plugging into the E6 repeater TST 1 or TST 2 jacks.

| STEP | PROCEDURE |
|------|--|
| | <p>Low Battery Alarm</p> |
| 1 | Insert No. 258 dummy plug in ALM EQPT jack J8 to disable alarm transmission. |
| 2 | Insulate 2M contact on relay LB. |
| 3 | Set DC VM to the 75 VDC scale. |
| 4 | Connect DC VM to TEST jack J5 with 2W35A cord (tip is negative). |
| 5 | <p>If relay LVS is operated, carefully rotate the LB TST control counterclockwise to release relay LVS; if it is released, proceed with Step 6.</p> <p>Note: Relay LB is operated by a make contact of relay LVS.</p> |
| 6 | <p>Carefully rotate the LB TST control clockwise to determine the relay LVS operate point. Reset the LB TST control so that relay LVS is released and the TEST jack voltage is less than 1 volt below the relay LVS operate point.</p> |
| 7 | Wait about one minute to permit the component temperature to stabilize. |
| 8 | Carefully rotate the LB TST control clockwise until relay LVS just operates. |
| 9 | <p>Requirement: DC VM indicates 47 to 48 VDC just prior to operation of relay LVS.</p> <p>Carefully rotate the LB TST control counterclockwise to determine the relay LVS release point. Reset the LB TST control so that relay LVS is operated and the TEST jack voltage is less than 1 volt above the relay LVS release point.</p> |
| 10 | Wait about one minute to permit the component temperature to stabilize. |
| 11 | Carefully rotate the LB TST control counterclockwise until relay LVS just releases. |
| 12 | <p>Requirement: DC VM indicates 44 to 45 VDC just prior to release of relay LVS.</p> <p>If the requirements of Steps 8 and 11 are met, proceed with Step 13. If requirements are not met, small corrections in the relay LVS operate and release points can be made with the LB OPR and LB RLS controls, respectively, while controlling the test voltage with the LB TST control. However, if the setting of LB OPR control is changed, LB RLS control will also require readjustment. For all except minor corrections proceed as follows:</p> |

| STEP | PROCEDURE |
|------|--|
| | <p>(a) Set LB RLS and LB TST controls fully counterclockwise and the LB OPR control fully clockwise. Relay LVS should now be released. If not, release it manually.</p> <p>(b) Rotate LB TST control clockwise to obtain a DC VM indication of 48 VDC.</p> <p>(c) Rotate LB OPR control counterclockwise to slightly decrease the indicated voltage; then restore to 48 VDC by clockwise rotation of LB TST control. Repeat until relay LVS just operates when the DC VM indicates 47 to 48 VDC.</p> <p>Note: Make a final check by adjusting the LB TST control so that the TEST jack voltage is less than 1 volt below the relay LVS <i>operate</i> point (with relay LVS released). Wait for one minute in order to obtain thermal stability. Then, carefully rotate the LB TST control clockwise until relay LVS just operates. The DC VM must indicate 47 to 48 VDC just prior to operation of relay LVS.</p> <p>(d) Lock the LB OPR control.</p> <p>(e) Rotate the LB TST control counterclockwise to obtain a DC VM indication of 44 VDC.</p> <p>(f) Rotate the LB RLS control clockwise to slightly increase the indicated voltage; then, restore to 44 VDC by counterclockwise rotation of LB TST control. Repeat until relay LVS just releases when the DC VM indicates 44 to 45 VDC.</p> <p>Note: Make a final check by adjusting the LB TST control so that the TEST jack voltage is less than 1 volt above the relay LVS <i>release</i> point (with relay LVS operated). Wait for one minute in order to obtain thermal stability. Then, carefully rotate the LB TST control counterclockwise until relay LVS just releases. The DC VM must indicate 44 to 45 VDC just prior to release of relay LVS.</p> <p>(g) Lock the LB RLS control.</p> <p>(h) Repeat Steps 6 through 11 to ensure that the operate and release requirements of Steps 8 and 11 are met.</p> |
| 13 | Rotate LB TST control fully counterclockwise and remove dummy plug from ALM EQPT jack. |
| 14 | <p>At the central office:</p> <p>(a) Observe that the LB and ALM lamps light steadily.</p> <p>(b) Operate the LB TST key momentarily.</p> <p>Requirement: The LB and ALM lamps are extinguished momentarily. No other lamps should light.</p> <p>(c) Momentarily operate the ACO key.</p> |

| STEP | PROCEDURE |
|------|---|
| 15 | <p>Requirement: The LB lamp remains lighted, the ACO lamp lights steadily, and the ALM lamp is extinguished.</p> <p>At the repeater site, remove the meter plug from TEST jack J5.</p> |
| 16 | <p>At the central office:</p> <p>(a) Observe that the LB lamp is extinguished, the ACO lamp remains lighted, and the ALM lamp lights steadily.</p> <p>(b) Operate the ACO key momentarily.</p> |
| 17 | <p>Requirement: The ACO and ALM lamps are extinguished.</p> <p>At the repeater site, remove the insulation from 2M contact on relay LB.</p> |
| STEP | PROCEDURE |
| 1 | <p>Fuse Failure Alarm</p> <p>At the repeater site, remove power supply PS1 ac input plug from receptacle J7.</p> |
| 2 | <p>At the central office:</p> <p>(a) Observe that the FA and ALM lamps light steadily.</p> <p>(b) Operate the ACO key momentarily.</p> |
| 3 | <p>Requirement: The FA lamp remains lighted, the ACO lamp lights steadily, and the ALM lamp is extinguished.</p> <p>At the repeater site, replace power supply PS1 ac input plug in receptacle J7.</p> |
| 4 | <p>At the central office:</p> <p>(a) Observe that the FA lamp is extinguished, the ACO lamp remains lighted, and the ALM lamp lights steadily.</p> <p>(b) Momentarily operate the ACO key.</p> |
| 5 | <p>Requirement: The ACO and ALM lamps are extinguished.</p> <p>At the repeater site, remove power supply PS2 ac input plug from receptacle J7.</p> |
| 6 | <p>At the central office, observe that the FA and ALM lamps light steadily.</p> |
| 7 | <p>At the repeater site, replace power supply PS2 ac input plug in receptacle J7.</p> |

| STEP | PROCEDURE |
|------|--|
| 8 | At the central office, observe that the FA and ALM lamps are extinguished. |
| 9 | At the repeater site, connect TSB-22 to the R4- fuse block junction, using the W1Y test cord. |
| 10 | At the central office, observe that the FA and ALM lamps light steadily. |
| 11 | At the repeater site, remove the W1Y cord. |
| 12 | At the central office, observe that the FA and ALM lamps are extinguished. |
| STEP | PROCEDURE |
| | <p data-bbox="298 804 505 832">AC Failure Alarm</p> <p data-bbox="191 863 1438 927">1 At the repeater site, simultaneously remove both power supply (PS1 and PS2) ac input plugs from receptacle J7.</p> <p data-bbox="191 959 558 987">2 At the central office:</p> <p data-bbox="318 1023 1438 1087">(a) After an interval of approximately 6 minutes, observe that the ACF and ALM lamps light steadily.</p> <p data-bbox="318 1119 802 1146">(b) Operate the ACO key momentarily.</p> <p data-bbox="302 1183 1438 1247">Requirement: The ACF lamp remains lighted, the ACO lamp lights steadily, and the ALM lamp is extinguished.</p> <p data-bbox="191 1278 1438 1342">3 At the repeater site, replace both power supply (PS1 and PS2) ac input plugs in receptacle J7.</p> <p data-bbox="191 1374 558 1402">4 At the central office:</p> <p data-bbox="318 1438 1438 1502">(a) Observe that the ACF lamp is extinguished, the ACO lamp remains lighted, and the ALM lamp lights steadily.</p> <p data-bbox="318 1534 802 1561">(b) Momentarily operate the ACO key.</p> <p data-bbox="302 1598 1040 1625">Requirement: The ACO and ALM lamps are extinguished.</p> |

| STEP | PROCEDURE |
|------|---|
| 1 | <p>Simultaneous Fuse and AC Failure Alarm</p> <p>At the repeater site, remove both power supply (PS1 and PS2) ac input plugs from receptacle J7, and connect the W1Y test lead between TSB-22 and the R4- fuse block junction.</p> |
| 2 | <p>At the central office:</p> <p>(a) Observe that the LB and ALM lamps light steadily.</p> <p>(b) Momentarily operate the LB TST key.</p> <p>Requirement: The LB lamp is extinguished momentarily, the FA lamp lights momentarily, and the ALM lamp remains lighted.</p> <p>(c) Momentarily operate the ACO key.</p> <p>Requirement: The LB lamp remains lighted, the ACO lamp lights steadily, and the ALM lamp is extinguished.</p> |
| 3 | <p>At the repeater site, remove the W1Y test lead from TSB-22 and the R4- fuse block junction, and replace both power supply (PS1 and PS2) ac input plugs in receptacle J7.</p> |
| 4 | <p>At the central office:</p> <p>(a) Observe that the LB lamp is extinguished, the ACO lamp remains lighted, and the ALM lamp lights steadily.</p> <p>(b) Momentarily operate the ACO key.</p> <p>Requirement: The ACO and ALM lamps are extinguished.</p> |

C. Repeaters

4.04 The repeaters are tested to ensure proper repeating of dial pulsing, supervisory signals, and voice from the subscriber line to the central office, and of ringing and voice from the central office to the subscriber line. Adjustments are to















be made only when the specified test requirements are not met.

Note: All power supply requirements described in Part 4A must be met before proceeding with the following repeater tests and adjustments.

| STEP | PROCEDURE |
|------|---|
| | <p>Dial Pulse, Supervisory, Ring Repeating, and Voice Amplification</p> <p>1 Using the KS-14418 headset, locate an idle line.</p> <p>2 Insert the 258 dummy plug in the idle line LINE SUB jack (J3 or J4 for odd or even lines, respectively).</p> <p>3 Connect the ADPT IN jack to the LINE EQPT jack (J3 or J4 for odd or even lines, respectively), using a 2P4C cord.</p> <p>4 Set the 23A TMS to 900 ohms.</p> <p>5 Connect the 23A TMS MEAS jack to the ADPT OUT jack, using a 2P4C cord.</p> <p><i>Note:</i> Use of the adapter provides approximately 10-dB loss and will prevent repeater singing.</p> <p>6 Set the 1011D handset to TALK position.</p> <p>7 Connect the 1011D handset to the 23A TMS DIAL jack.</p> <p>8 Set the 23A TMS DIAL-MEAS-SLV key to DIAL position.</p> <p>9 Dial the CO ringback number corresponding to the ringing condition shown in Step A of Table B. Disconnect the 23A TMS to enable ringing.</p> <p>Requirement: Relay conditions for Step A of Table B must be met for correct dial pulse, supervisory signal, and ring repeating. If the requirement is not met, check with VOM set to 60 VAC scale that the potential across the coil of relay T is at least 35 VAC during the ringing interval. If necessary, adjust relay T according to instructions in Section 040-512-701.</p> <p><i>Note:</i> Relay T must not chatter excessively with 20-Hz ringing.</p> <p>10 Reconnect the 23A TMS to ADPT OUT jack, then disconnect to release the line.</p> <p>11 Reconnect the 23A TMS to ADPT OUT jack.</p> <p>12 Repeat Steps 9, 10, and 11 for the conditions indicated in Steps B, C, and D of Table B, watching for correct performance of the designated relays T or R, T1 or R1, P, and D.</p> <p>13 Dial the CO milliwatt supply number and listen for the 1000-Hz tone.</p> <p>14 Set the 23A TMS DIAL-MEAS-SLV key to MEAS position.</p> |
| | <p>Requirement: Received level should be within ± 1 dB of the level measured when the circuit was installed. (This level may be within ± 2 dB of the original value if aerial cable primarily is used.)</p> |

STEP PROCEDURE

TABLE B
RELAY CONDITIONS FOR RINGING TEST


| STEP | RINGING CONDITION | RELAY CONDITION | | | | | |
|------|-------------------|---|---|---|--|---|---|
| | | T | R | TI | RI | P | D |
| A | T±— |  | |  | | |  |
| B* | T±+ |  | |  | |  |  |
| C | R±— | |  | |  | |  |
| D* | R±+ | |  | |  |  |  |

* Does not apply to divided code ringing.

Legend:

RELAY OPERATED 

RELAY RELEASED 

RELAY ALTERNATELY OPERATED and RELEASED 

15 If the requirement of Step 14 is not met, check several other lines for possible discrepancies. Then check CO-to-repeater section records for cable throws, pair changes, etc, before adjusting the E6 repeater as described in Section 332-206-100. The 54A and 54B test sets will be required to set E6 repeater gain, and the 54C test set will be required if line discrepancies are found.

Note: If line loss measures 15 dB greater than normal, the E6 repeater 48 volts may be disabled.

16 Disconnect the 2P4C cord from the LINE EQPT jack of the line under test.

17 Remove the 258 dummy plug.

18 Repeat Steps 1 through 17 for all other lines.

19 Remove all cords when tests are completed.

D. Cabinet Heaters

4.05 The cabinet heaters are tested to ensure that they are in operative condition.

| STEP | PROCEDURE |
|------|---|
| 1 | <p>Operate HTR switch S1 to the ON position.</p> <p>Requirement: HTR lamp lights steadily.</p> |
| 2 | <p>If the internal cabinet temperature is below 35°F, observe HTR 1 to 4 temperatures. (See 3.03).</p> <p>Requirement: The heaters are operating. Gauge by heat emission.</p> |
| 3 | <p>If the internal cabinet temperature is above 35°F, measure cold resistance of the heater string as follows. (See 3.04.)</p> <p>(a) Remove F20 in panel board.</p> <p>(b) Set VOM to the 300 VAC scale.</p> <p>(c) With VOM, test for absence of 117-V, 60-Hz power at receptacle J6.</p> <p>Note: An ac-failure alarm will be generated in the office, unless F20 is replaced within 6 minutes.</p> <p>(d) Set VOM to OHMS x1 scale.</p> <p>(e) Connect VOM test tools between heater side of thermostat S2 and the neutral side of receptacle J6.</p> <p>Requirement: VOM indicates approximately 50 ohms. An indication of approximately twice this value indicates that a heating element may be open.</p> |
| 4 | <p>Replace F20 in panel board.</p> <p>Note: See 3.08.</p> |

E. Battery

4.06 The battery is tested to ensure that it is charged and in good condition, electronically and mechanically. (See 3.03.)

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| STEP | PROCEDURE |
|------|---|
| 1 | <p>Check the battery charge with the built-in indicator.</p> <p>Requirement: The indicator shall be in the upper half of the holder.</p> |
| 2 | <p>If the requirement of Step 1 is not met, check the specific gravity, as described in sections on lead-acid type storage battery maintenance, using the KS-5499, L1307 hydrometer.</p> <p>Requirement: The hydrometer indicates 1.290 to 1.310 specific gravity at 77°F. Make standard correction of this indication if the temperature is not 77°F.</p> |
| 3 | <p>If the requirement in Step 2 is not met, apply corrective maintenance, as described in sections on lead-acid storage batteries.</p> |
| 4 | <p>Observe the electrolyte level and adjust it, as required, with distilled water.</p> |
| 5 | <p>Observe the condition of the battery terminal posts, and take corrective action where necessary. See Section 157-601-702.</p> |
| 6 | <p>Blow through the plastic vent tube to check that it is not obstructed.</p> |

F. Remote Testing Features

4.07 These tests, performed at the remote cabinet, check the operation of the J98619D remote testing, dc bypassing unit and the J98619E remote testing, signal, and timer unit.

| STEP | PROCEDURE |
|------|---|
| | <p>Milliwatt Generator Level Calibration</p> <p>Note: All L relays must be in a nonoperated condition prior to making this calibration.</p> |
| 1 | <p>Block relay C2 operated.</p> |
| 2 | <p>Block relay C3 nonoperated.</p> |
| 3 | <p>Set the 23A TMS to 600 ohms.</p> |
| 4 | <p>Connect the 23A TMS MEAS jack to the milliwatt generator test jack, using a 2P4C cord.</p> |
| 5 | <p>Set the 23A TMS DIAL-MEAS-SLV key to the MEAS position and the ADD DBM switch to 0 position. Read the TMS.</p> <p>Requirement: The reading on the 23A TMS should indicate 0 dBm \pm0.2 dB.</p> |

| STEP | PROCEDURE |
|------|--|
| 6 | If the requirement in Step 5 is met, proceed to Step 8. If the requirement is not met, proceed to Step 7. |
| 7 | If the requirement is not met in Step 5, adjust the milliwatt generator for a 0-dBm output, using the internal control. |
| 8 | Remove the 2P4C cord from the milliwatt generator test jack. |
| 9 | Remove the blocking tools from the C2 and C3 relays. |
| STEP | PROCEDURE |
| | <p data-bbox="312 793 477 821">DC Bypassing</p> <p data-bbox="312 853 1466 917">Note: Subscriber(s) on the line under test will not have outgoing service for the duration of this test.</p> <p data-bbox="204 951 1047 978">1 Turn the TEST SEL switch to the line number to be tested.</p> <p data-bbox="204 1015 1224 1042">2 Operate the TEST INT key (NL) for a period of approximately 5 seconds.</p> <p data-bbox="312 1078 1466 1172">Requirements: SE1 and L relays are operated. The 3-minute timer is activated for testing. TD2 relay is released. TST lamp is lighted. TD1 relay operates approximately 50 seconds after the operation of SE1 relay.</p> <p data-bbox="312 1206 1466 1270">The dc bypassing condition is established around the DLL circuit and E6 repeater under test.</p> <p data-bbox="204 1304 1384 1332">3 Momentarily operate the TEST SP key (NL) to restore the circuit to normal operation.</p> <p data-bbox="312 1366 1443 1393">Note: The circuit will also be restored to normal operation under the following conditions:</p> <p data-bbox="335 1427 720 1455">(a) The line under test is rung</p> <p data-bbox="335 1489 872 1517">(b) The 3-minute timer completes its cycle.</p> <p data-bbox="312 1551 1339 1578">Requirements: L, SE1, and TD1, relays are released. TST lamp is extinguished.</p> <p data-bbox="204 1613 1323 1640">4 If no other tests are to be made, turn the TEST SEL switch to the OFF position.</p> |

| STEP | PROCEDURE |
|------|--|
| | <p>Milliwatt Supply</p> <p><i>Note:</i> Subscriber(s) on the line under test will not have service for the duration of this test.</p> |
| 1 | Turn the TEST SEL switch to the line number to be tested. |
| 2 | Insulate 8M contact on relay C2. |
| 3 | Block C3 relay nonoperated. |
| 4 | Connect the 23A TMS MEAS jack to the LINE EQPT jack (J1 or J2 for odd or even lines respectively) using a 2P4C cord. |
| 5 | Set the 23A TMS to 900 ohms and the DIAL-MEAS-SLV key to the MEAS position. |
| 6 | Set the ADD DBM switch to the -10 position. |
| 7 | Operate the TEST INT key (NL) for a period of 25 seconds. |
| | <p><i>Note:</i> The operation of the C2 relay causes the dc bypassing circuit to open and the output from the milliwatt generator (1000-Hz tone) to be applied through 10-dB insertion loss pad to the E6 repeater and DLL circuit.</p> <p><i>Requirements:</i> During the operation of the TEST INT key, SE1, TD2, and SE2 relays are operated; the 3-minute timer is activated for testing; and the TST lamp is lighted.</p> <p><i>Note:</i> TD1 relay operates approximately 50 seconds after the operation of the SE1 relay. After operation of the TEST INT key, L and C2 relays are operated. TD2 relay is released.</p> |
| 8 | Observe the level indication on the 23A TMS. |
| | <p><i>Note:</i> This is only a 1000-Hz verification test of the milliwatt supply through the E6 repeater and DLL circuit. (See 4.04 for repeater adjustments.)</p> |
| 9 | Repeat Steps 7 and 8 if the circuit times out (3 minutes) before the milliwatt supply test is completed. |
| 10 | If the test is completed before the 3-minute time-out period, momentarily operate the TEST SP key. |
| | <p><i>Requirements:</i> SE1, L, SE2, C2, and TD1 relays are released. TST lamp is extinguished.</p> |
| 11 | Remove the insulation from 8M contact on relay C2. |
| 12 | Remove the blocking tool from the C3 relay. |
| 13 | Remove the 2P4C cord from the LINE EQPT jack. |

| STEP | PROCEDURE |
|------|--|
| 14 | If no other tests are to be made, turn the TEST SEL switch to the OFF position. |
| STEP | PROCEDURE |
| | <p>Dial Pulse Simulator</p> <p><i>Note:</i> Subscriber(s) on the line under test will not have service for the duration of this test.</p> <p>1 Turn the TEST SEL switch to the line number to be tested.</p> <p>2 Insert the 258 dummy plug in the LINE EQPT jack (J1 or J2 for odd or even lines respectively).</p> <p>3 Operate the TEST INT key (NL) for a period of 25 seconds.</p> <p><i>Requirements:</i> During the operation of the TEST INT key, SE1, TD2, and SE2 relays are operated; the 3-minute timer is activated for testing; and the TST lamp is lighted.</p> <p><i>Note:</i> TD1 relay operates approximately 50 seconds after the operation of the SE1 relay. After operation of the TEST INT key, L and C1 relays are operated. TD2 relay releases and reoperates approximately 6 seconds later.</p> <p>4 Approximately 20 seconds after the TEST INT key is released, interrupter INT 1 should be operating and will operate for approximately 20 seconds.</p> <p><i>Requirements:</i> SE3, C3, and DP relays are operated. TD2 relay releases and reoperates approximately 6 seconds later.</p> <p>5 Observe the pulsing movements of the A relay (DLL circuit) during this 20-second dial pulse simulator test.</p> <p><i>Note 1:</i> A visual inspection should be made for faulty operation of the A pulsing relay during this test.</p> <p><i>Note 2:</i> The INT 1 interrupter is generating dial pulses at the rate of 11 pps with an average of 61 percent break. Measurements made at the central office should be relative to the percent break measured at the time of installation.</p> <p><i>Note 3:</i> The circuit should restore to normal at the end of the 20-second dial pulse simulation test.</p> <p>6 Momentarily operate the TEST SP key (NL) to restore the circuit to normal operation, or if the test is to be terminated.</p> <p><i>Note:</i> The circuit will also be restored to normal if the 3-minute testing period has elapsed.</p> |

| STEP | PROCEDURE |
|------|---|
| | Requirements: SE1, L, TD2, DP, SE2, C3, SE3, C3, TD1, and SE4 relays are released. TST lamp is extinguished. |
| 7 | Remove the 258 dummy plug from the LINE EQPT jack. |
| 8 | If no other tests are to be made, turn the TEST SEL switch to the OFF position. |

5. EMERGENCY POWER CONNECTION

5.01 In case of commercial power failure, a portable generator may be connected to the message and signal repeater via the weatherproof receptacle in the panel board. Remove the main fuse holder from the NORM position to disconnect the panel board bus from the normal ac line. Then insert the main fuse holder in the EMERG position to connect the bus to the weatherproof receptacle. (Also, see 3.08.)

5.02 The portable generator should have a minimum capacity of 0.75 KVA at 117V, 60 Hz. If the cabinet heater is to be used, the capacity should be 1.25 KVA minimum. The generator output cable should be equipped with a Hubbell No. 3333 plug with No. 7736 cover for connecting to the panel board receptacle.

5.03 After final use of the portable generator, restore the main fuse holder to the NORM position.