

**P1 CARRIER TELEPHONE SYSTEM**  
**SYSTEM LINE-UP AND MAINTENANCE**  
**GENERAL INFORMATION AND TEST EQUIPMENT**

**1.00 GENERAL**

**1.01** The system line-up and maintenance procedures for the P1 carrier telephone system have been arranged into the following sections:

- 363-103-100 GENERAL INFORMATION AND TEST EQUIPMENT
- 363-103-501 PREPARATION FOR SYSTEM LINE-UP
- 363-103-502 NONREPEATERED SYSTEMS LINE-UP
- 363-103-503 NONREGULATED REPEATER SYSTEMS LINE-UP
- 363-103-504 REGULATED REPEATER SYSTEMS LINE-UP
- 363-103-505 HOW TO LOCATE TROUBLE

**1.02** The line-up consists of a series of tests and adjustments to be made at various points in the system with the terminal and repeater equipment installed at their in-service locations. The purpose of the system line-up is to adjust the equipment to the line by the proper placement of pads and equalizers and the proper adjustment of carrier and voice-frequency power in the system to insure satisfactory operation with weather variation.

**1.03** The general procedure used in the system line-up is:

1. Install and adjust the central office terminals. Connect these terminals to the carrier line.
2. Install and line up the repeater nearest the central office. Connect this repeater to the line and adjust its output (pads, regulator, etc) in the central office to remote terminal direction of transmission.
3. Repeat 2 for all other repeaters in the system.
4. Install and adjust the remote terminal nearest the last repeater. Connect this terminal to the carrier line.
5. Install and adjust the other remote terminals in turn from the last repeater to the most distant remote terminal. Connect these terminals to the carrier line.
6. Return to the last repeater and adjust its output. If the system is pilot regulated, disconnect the line toward the remote terminals and adjust the output of the pilot oscillator.
7. Adjust the output of the other repeaters in the remote terminal to central office direction.
8. Reconnect the carrier line at the last repeater and make end-to-end measurements (received carrier power, net loss, ringing checks, etc) in both directions of transmission.

## SECTION 363-103-100

- 1.04** After the system line-up is completed, place the subscriber lines in service.
- 1.05** The line-up procedure assumes that the high group frequencies (60 to 96 kc) are being transmitted from the central office. If the low group frequencies are transmitted from the central office (reverse direction), the procedure is similar; when different binding posts or values are used, they are indicated by REV.
- 1.06** Terminal and repeater line-up and maintenance are covered in Sections 363-101-100, 363-101-101, 363-101-502 through 363-101-509; and 363-102-100, 363-102-501 through 363-102-506.
- 1.07** When a channel is added to an existing nonrepeated system, make end-to-end measurements on this channel.
- 1.08** When a channel is added to a nonregulated repeated system, no changes are required at the repeaters if the proper output pads are placed in the terminals of the channel being added. End-to-end measurements of this channel should be made.
- 1.09** When a channel is added to a regulated repeated system, the repeater output in the total-power-regulated direction of transmission of each repeater must be readjusted. No adjustments are required at the repeaters in the pilot-regulated direction of transmission. End-to-end measurements of this channel should be made.
- 1.10** The trouble locating information consists of a series of tests to aid in isolating trouble to a particular terminal, repeater, or line section and should be used after it has been determined that the trouble is located in the carrier plant and not in the voice-frequency circuits, station sets, or other plant. See the section entitled Rural Carrier Telephone Systems, Testing Methods.
- 1.11** After locating the defective terminal or repeater, it should be replaced.

## 2.00 APPARATUS

- 2.01** The following apparatus is required when performing the system line-up:
- 24—Clips, Alligator, small (Mueller Electric Company No. 30 or equivalent), to be soldered on resistor leads
    - 1—Cord, IW13B, equipped with two KS-6259 clips or equivalent, used for grounding test set
    - 3—Cords (shorting straps), W1Y
      - 1—Handset, 1011B or equivalent
      - 1—Milliwatt source, 1000 cycle, 600 ohm, such as 19C oscillator, 21A transmission measuring set, central office 1000-cycle milliwatt supply, etc (the oscillator must be a 600-ohm device or built out to be a 600-ohm device)
      - 4—Plugs (dummy plugs), 258C, central office use only
        - 1—Resistor, KS-8512, L5 or equivalent, 3900 ohm, 10 watt, for remote terminal use only
        - 2—Resistors, 145A, 135 ohm
        - 6—Resistors, 145A, 600 ohm
        - 1—Telephone Set, 500 type
        - 1—Test Set, P1 Carrier, J98707F, L1
        - 1—Voltmeter, Vacuum Tube (VTVM), such as Hewlett-Packard 400C or D
        - 1—Volt-ohm Milliammeter, KS-14510, L1 (use same meter for all voltage readings on repeaters)
- 2.02** In addition to the above apparatus, an 800AF network (dummy regulator) is required for system maintenance.