DESCRIPTION, OPERATION, ADJUSTMENT OF 450-470 MC SIMPLEX MOBILE TELEPHONE COMBINATIONS

The General Electric Simplex Mobile Combinations are designed for operation in conjunction with an MTS base station and a central office terminal to provide telephone service to mobile subscribers. Combinations are available for providing manual, dial or identified dial operation. The Model 4KC14A10 Simplex Adaptor, included in these combinations, permits the use of General Electric Progress Line transmitters and receivers with the MTS Duplex power supply and control unit. The Adaptor is an interconnection unit, providing a carbon microphone network and keying relay for the Progress Line Transmitter and VOLUME and SQUELCH controls for the Progress Line Receiver.

After the mobile combination has been installed, as described in the INSTALLATION INSTRUCTIONS, a few checks and system adjustments are required before placing the combination in service.

ADJUSTMENT

Equipment Required

1. A tuning tool and screwdriver.
2. A 20,000 ohms-per-volt meter which covers the 0-3 volt range, such as the G-E Test Set Type EX-1-C.
3. Access to a transmitter signal on the system frequency for receiver adjustments.
4. Equipment required for adjustment of Type 2116 and Type 2117 Supervisory Signaling Units.
   a. Frequency deviation monitor.
   b. An absorption wattmeter.
   c. Several insulated clip leads.
   d. An audio oscillator.
   e. An AC vacuum tube voltmeter.

Transmitter Adjustment

The antenna or some other suitable 50-ohm load should be connected to the Antenna Jack J1 for the following adjustments. The Channel A or single frequency crystal should be inserted between pins 4 and 8 of the crystal oven socket. The Channel B crystal, for two-frequency operation, should be inserted between pins 2 and 6 of the crystal oven socket.

(In three-frequency or four-frequency combinations, the crystals, except for Channel A, are located in the Multi-Frequency Panel.)

1. Rotate the LOADING control (R135 on the PA housing) to the extreme counterclockwise position.

2. Turn power on and allow 30 seconds for warm-up.

3. Place the positive meter probe in the PA CATH jack and the negative meter probe in the GND jack on the power supply chassis.

4. Key the transmitter and tune the PA PLATE tuning control for a maximum meter indication.

5. Place the positive meter probe in the RF OUTPUT jack.

6. Adjust the FILTER 1 and FILTER 2 controls for a maximum meter indication.

7. Adjust the PA PLATE control for a maximum meter indication.

8. Place the positive meter probe in the PA CATH jack and adjust the LOADING control for a reading of 1.3 volt.*

9. Repeat Steps 5 and 6. Repeat Step 8.

10. Unkey the transmitter for 5 minutes. Key the transmitter and quickly tune the PA PLATE control for a maximum meter indication at the RF OUTPUT jack.

11. Repeat Step 8.

12. The transmitter modulation deviation should be set for a maximum deviation of ±10-KC. When this adjustment is made, the carbon microphone SENSITIVITY control (R719) on the 4KC14A10 Simplex Adaptor should be in its maximum clockwise position.

    a. Remove the carbon microphone button from the handset and connect a 50-ohm resistor across the microphone terminals.

    b. Connect an audio oscillator across the microphone terminals of the handset.

    c. With the audio oscillator developing a 1.0 volt signal @1000-cps, adjust the transmitter MOD control for a 10-KC swing as indicated on the deviation monitor.

* For FCC purposes, the cathode current of the power amplifier stage may be accurately calculated in milliamperes by multiplying the reading at the PA CATH jack by 100. To calculate plate current, subtract 10 milliamperes from the cathode current.

d. Turn the MIKE SENS control (R719) counterclockwise until the modulation deviation starts to reduce below 10-KC to 9-KC. Lock these controls by tightening the lock nuts.

Receiver Adjustment

1. Plug the negative meter probe in the LIM-1 jack and the positive probe in the GND jack on the power supply.

2. While receiving a weak unmodulated signal (LIM-1 reading below saturation) on the system frequency, peak the Z301-C1 (Cavity), C302 (RF Plate), MULT-4 PLATE (C307), and MULT-3 PLATE (C312). Once peaked, these adjustments should be tuned for maximum quieting. Maximum LIM-1 current and maximum quieting may not occur together. Always tune for maximum quieting.

3. Remove the negative meter probe from the LIM-1 jack and insert it into the DISC jack.

4. While receiving a strong, unmodulated signal on the system frequency, note the meter reading. If the discriminator meter reading is more than ±0.2 volts, and the transmitter is known to be on frequency, adjust the OSC-1 trimmer (FA) for zero discriminator reading.

5. Adjust the SQUELCH control (R717 on the Simplex Adaptor) fully CCW.

6. While receiving an on-channel signal deviated 3.3-KC with a 1500-cps audio signal, adjust the VOLUME control (R718 on the Simplex Adaptor) for a reading of 2 volts at the Audio Test jack J710.

7. Under no carrier conditions, rotate the SQUELCH control clockwise until noise is heard in the handset. Then adjust the SQUELCH control counterclockwise until the noise just disappears.

Multi-Frequency Panel Operation

When a multi-frequency panel is employed in the combination, S710 on the Simplex Adaptor should be locked in the multi-frequency position. When single-frequency operation is employed, place S710 in the single-frequency position and lock.

Tone Level Adjustment

1. Terminate the antenna jack with an absorption wattmeter.

2. With the handset off-hook, depress the initiate button to initiate a call.

3. Connect the base of Q55 to positive battery with a clip lead to prevent operation of the 3-mode oscillator. Refer to the Outline Diagram RC-833 (Type 2116-G1 Supervisory Signaling Unit) or RC-836 (Type 2117-G1 Supervisory Signaling Unit) for component locations.

4. Connect TB1-5 to TB1-13 with a clip lead (or block the dial off normal) to key the transmitter and operate the 1700-cps oscillator.

5. Adjust R72 for 2.2-KC deviation as indicated on the frequency modulation monitor.

6. Remove the clip lead from the base of Q55 and connect to the base of Q54. This will put positive battery on the base of Q54 and prevent the 1700-cps oscillator from operating.

7. Connect a clip lead between TB1-13 and TB1-14. Connect a clip lead between TB1-5 and TB1-13. These connections key the transmitter and connect the tone output to the modulator input. These functions may also be accomplished by blocking the dial off normal.

8. Adjust R68 for a 1.5-KC deviation as read on the frequency modulation monitor.

OPERATION

Power is applied to the combination by turning the ON-OFF-STBY switch on the control unit to the ON or STBY position. Calls will be received when the control switch is in the STBY position; however, the switch must be in the ON position to answer or place a call.

The earpiece level control (upper) and the sounder level control (if present) on the back of the control unit allow the operator to adjust the earpiece and sounder volume respectively.

In two-frequency or multi-frequency combinations the transmitter and receiver should normally operate on the primary frequency (CHAN A). The alternate channels may be selected by removing the handset from the holder and depressing the desired channel selector push button. The equipment will automatically revert to the primary channel when the handset is replaced in the holder. On dial control units, the reverting switch at the rear of the control unit must be in the ON position for reverting action. If this switch is in the OFF position, the channel which has its selector push button depressed will be selected regardless of the hookswitch position.

In manual combinations, the supervisory signaling unit will faithfully follow a correctly coded signal developing 1.0 volt at 600- and 1500-cps. When this signal has been received, the sounder (if present) and call light on the control unit will be energized until the supervisory unit is reset by dialing an additional "1" at the land terminal. At that time, the selector wheel in the unit will reset and the sounder will cease operating. Remove the handset from the hookswitch and the call light will be de-energized.

In dial combinations, when the supervisory signaling unit has received a properly coded signal, and the handset is removed from the hookswitch within 8 seconds after the receipt of the signal, the channel selector switches will have no effect and CHAN A will remain

operative. When the handset is returned to the hookswitch, causing a disconnect signal to be transmitted to the land terminal, the reverting channel will remain grounded until the disconnect signal is completed. If a call is initiated on a channel other than "A", and the handset returned to the hookswitch (causing the disconnect signal to be transmitted), the disconnect signal will be transmitted on the selected channel. When the disconnect signal is completed, the reverting channel will be grounded.