DESCRIPTION, OPERATION, ADJUSTMENT OF 25-54 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 J111 for the following procedure. The Channel A or single frequency crystal should be inserted between pins 4 and 6 of crystal socket XY101. The Channel B crystal, for two-frequency operation, should be inserted between pins 2 and 8 of the crystal socket.

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

1. Place the TUNE-OPERATE switch in the TUNE position.

2. Rotate the ANT COUPLING control to its extreme counterclockwise position.

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

4. Check for drive of at least 1.5 volts at the PA GRID jack (green-negative). If necessary, repeak Z113 (or Z114) and Z117.

5. Plug the positive meter probe into the CATH PA jack and the negative meter probe into the GND jack on the power supply chassis.

6. Key the transmitter and tune the PA PLATE tuning control for a minimum (dip) meter reading.

7. Place the TUNE-OPERATE switch in the OPERATE position.

8. Key the transmitter and re-dip the PA PLATE control. The neon lamp should be at minimum brightness.

9. Rotate the ANT COUPLING control slightly (approximately 10°) clockwise. Do not over couple or a false setting will be obtained.

10. Key the transmitter and adjust the ANT TUNING control for maximum brightness of the neon lamp.

11. Key the transmitter and adjust the ANT COUPLING control clockwise for a CATH PA meter reading of 1.5 volts or for maximum brightness of the neon lamp, whichever occurs first.*

12. Repeat Steps 10 and 11.

13. The transmitter modulation deviation should be set for a maximum deviation of ±5-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.

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*For FCC purposes, the plate current of the power amplifier stage may be accurately calculated in milliamperes by multiplying the voltage reading (on a 20,000 ohms-per-volt meter) at the CATH PA jack by 100.

c. With the audio oscillator developing a 1.0 volt signal @ 1000-cps, adjust the transmitter MOD control for a 5-KC swing as indicated on the deviation monitor.

d. Turn the MIKE SENS control (R719) counterclockwise until the modulation deviation starts to reduce below 5-KC to 4.5-KC. Lock these controls by tightening the lock nuts.

Receiver Adjustment

The antenna should be connected for the following adjustment.

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

2. While receiving a weak (LIM-1 reading below limiting) unmodulated signal on the system frequency, peak the antenna transformer T312 preselector trimmer C1 (on top of the transformer) and trimmer C3 (on the bottom of the transformer).

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

4. While receiving a strong, unmodulated signal on the system frequency, note the meter reading. If the discriminator meter reads more than ±0.2 volt (EX-1-C meter) or 1.0 volt (VTVM) and the transmitter is known to be on frequency, adjust the OSC-1 trimmer for a zero discriminator reading.

5. Adjust SQUELCH control (R717) fully CCW.

6. While receiving an on-channel signal deviated 3.3-KC with a 1500-cps audio signal, adjust VOLUME control R718 for a reading of 2 volts at AUDIO 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 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 Outline Diagram

RC-833 (Type 2116-G1 Supervisory Signaling Unit) or RC-836 (Type 2117-G1 Supervisory Signaling Unit) for component location.

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 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. This function 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 volumes 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 revertive 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 and call light of the control unit will be energized and remain 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 has been 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 has been completed, the reverting channel will be grounded.