

one stage at a time, and readjust the RF generator level for the same audio reference level.

- d. Again note the RF generator output level.
- e. The difference in the RF generator output levels between step "b" and "e" (in dB) is the gain (or loss) between injection points.
- f. Troubleshoot any stage with low gain, or any passive device with high attenuation.
- g. Change from 455 kHz to 7.8 MHz to the RF carrier frequency as the point of injection moves from the 455 kHz IF section to the 7.8 MHz IF section to the RF section.

This is a good troubleshooting technique even when the manufacturer's literature does not give typical stage gains. Sometimes the defective stage is obvious. Also, with experience, the typical stage gains will become memorized and a low stage gain will be easy to spot.

5. Realign the receiver.

TROUBLESHOOTING PROCEDURE FOR "RADIO DOES NOT TRANSMIT" SYMPTOM

Use this troubleshooting procedure when there is no transmitter RF power output, but receive operation is normal. It includes the symptom in which the transmitter cannot be keyed.

Does the red transmit indicator light up when the push-to-talk switch is closed?

1. If it does not light up, jumper across the push-to-talk pins of the microphone jack, or equivalent point in the radio set.
 - a. If the transmit indicator light goes on, the problem is in the microphone or microphone cord.
 - b. If the transmit indicator light does not turn on, the transmit-receive relay is probably the cause. In radios without a transmit-receive relay, look for the trouble in the solid-state switching circuit that replaces the relay.
2. If it does light up, the problem could lie in almost any of the transmitter RF circuits (circuits No. 21 thru 25 in Figs. 22 and 23). Use an RF voltmeter or high frequency oscilloscope to measure RF voltages. Starting with circuit No. 21 and working toward No. 25, measure each accessible point in the signal path until absence of RF voltage is noted. This is the defective area.

In some transceivers, circuits No. 21 and 22 may be part of the synthesizer, and the synthesizer output in the transmit mode is a low level RF carrier frequency. If the transceiver uses this design, check RF voltage at the synthesizer output and, if present, check circuits No. 23 thru 25.

In some other transceivers, circuit No. 21 may operate at a different frequency. The transmit oscillator usually operates at the same frequency as the receiver IF, and 7.8 MHz is used only if the receiver IF is 7.8 MHz.

TROUBLESHOOTING PROCEDURE FOR "LOW TRANSMITTER POWER" SYMPTOM

Use this troubleshooting procedure if the transmitter RF output power is below normal, and receiver operation is normal. The symptom is caused by low gain or low voltage in the transmitter RF amplifiers (circuits No. 23 thru 25). Measure RF voltages and DC voltages at each of these amplifiers. Troubleshoot the stage with low readings. Touching up transmitter alignment adjustments may also restore maximum power.

TROUBLESHOOTING PROCEDURE FOR "RADIO OFF-FREQUENCY" SYMPTOM

Use this troubleshooting procedure if the transmitter frequency is not within specification on any channel(s). The receiver may also operate off-frequency but detection of the symptom is more difficult. An off-frequency receiver displays symptoms of poor sensitivity and, possibly, distortion during operation. Normal results may be obtained during testing because the RF generator is usually tuned for maximum receiver output, not necessarily to the channel frequency.

If the radio is off-frequency, the problem is usually one of the crystal oscillators. If the trouble appears on all channels, the transmit oscillator (circuit No. 21) is operating off-frequency. If the trouble appears on only certain channels, refer to Troubleshooting Procedure for "Radio Does Not Transmit or Receive on Some Channels" Symptom for method of isolating the defective crystal; but instead of certain channels being inoperative, there will be certain channels that are off-frequency. Replace the crystal or reactive components (capacitors/coils) that may detune the crystal operating frequency. Slight off-frequency conditions may be improved by realignment.

TROUBLESHOOTING PROCEDURE FOR "ABNORMAL TRANSMITTER MODULATION" SYMPTOM

Use this troubleshooting procedure if there is no transmitter modulation and receiver audio power is normal. Also use it if the transmitter appears undermodulated, or if the transmitter is easily overmodulated.

If there is no modulation, the microphone, microphone amplifier (circuit No. 14) or modulation input to the transmitter RF power amplifier (circuit No. 25) is defective.

1. Perform the PA Mode Check.
2. If PA mode operation is normal, troubleshoot the audio output transformer and audio input to circuit No. 25.
3. If PA mode does not produce audio output, inject a 1 kHz test signal into the audio pins of the microphone jack or equivalent points in the radio and key the transmitter.
4. If modulation is achieved, the microphone or microphone cord is faulty.
5. If no modulation is produced, troubleshoot microphone amplifier (circuit No. 14).