3. If the transceiver is equipped with an S meter, apply a 1000μV on-frequency carrier signal from the RF signal generator and note the S meter reading.

   a. If a strong S meter reading is obtained, the RF and IF sections are operating (circuits No. 1 thru 5). The trouble is isolated to the detector (circuit No. 6) or first audio amplifier (circuit No. 12). Inject a modulated 455 kHz signal into the detector and troubleshoot as instructed in step 2b.

   b. If no S meter reading is obtained, the signal is not passing through the RF and IF sections. Proceed to step 4.

4. Inject a modulated 455 kHz signal at the output of the 2nd mixer (circuit No. 3). [In a single-conversion receiver, the point of injection is the output of the first mixer, and the frequency may not be 455 kHz.]

   a. If audio output is obtained, the 455 kHz IF section is operating. Proceed to step 5.

   b. If no audio output is obtained, the signal is not being passed through the 455 kHz IF section (circuit No. 4 or 5). Starting at the point of signal injection and working toward the detector, measure 455 kHz signal on the oscilloscope until loss of signal is noted. This is the defective area.

5. Inject a modulated 7.8 MHz signal at the output of the first mixer (not all transceivers use 7.8 MHz first IF frequency, use appropriate first IF frequency).

   a. If audio output is obtained, the 2nd oscillator (circuit No. 8) and 2nd mixer (circuit No. 3) are good. Proceed to step 6.

   b. If no audio output is obtained, either the 2nd oscillator (circuit No. 8) or the 2nd mixer (circuit No. 3) are defective. Measure output of the 2nd oscillator on an RF voltmeter. If no RF is measured, this is the defective stage. If RF is present, the 2nd mixer is the defective stage. A defective AGC circuit (circuit No. 9) could bias the 2nd mixer to cutoff. Measure AGC voltage with no RF signal applied.

6. Inject a modulated carrier frequency directly into the first mixer (bypass the RF amplifier).

   a. If normal audio output is obtained, the trouble is in the RF amplifier circuit (circuit No. 1) or AGC circuit (circuit No. 9).

   b. If no audio output is obtained, the first mixer (circuit No. 2) or AGC circuit (circuit No. 9) is indicated as defective.

TROUBLESHOOTING PROCEDURE FOR "RADIO DOES NOT TRANSMIT OR RECEIVE" SYMPTOM

This procedure is used when there is no transmitter RF output and no receiver audio on any channel. The symptom can be verified by making transmitter RF power checks on several channels and receiver audio power checks on several channels. No output will be measured in any check.

The only circuit that is common to the receiver and the RF portion of the transmitter is the synthesizer (circuit No. 11 in Figs. 22 and 23). If the synthesizer fails, there is usually low receiver noise present. About the only other trouble possibility is the loss of power on a main power distribution bus. A remote trouble possibility that should not be entirely overlooked is two separate, simultaneous failures, one in the receiver and one in the transmitter. The following steps will help isolate the trouble.

1. Is there any receiver noise? If so, the trouble is probably in the synthesizer; go to step 2. If no noise is heard, go to step 5.

2. Check the output of the synthesizer with an RF voltmeter or high frequency oscilloscope. If no RF is measured, or it is of the wrong frequency, the synthesizer is defective. Remember that the RF voltmeter is not frequency sensitive. If one of the mixer inputs is missing, there will still be an RF output, but of the wrong frequency. However, if a mixer input is missing, the RF level will probably be low. See step 4 for an alternate checkout method.

3. A synthesizer typically contains at least two oscillators and a mixer. If any of these stages is defective, the correct output will not be generated. Measure RF output voltages at each stage until the defective stage is located, then make DC voltage and resistance measurements to isolate the bad part.

4. An alternate to steps 2 and 3 is to use an RF signal generator and inject the correct frequency signals into the synthesizer. If the injected signal restores operation, the normal signal is missing from that point. Move the point of injection from the output of the synthesizer toward the input, one stage at a time. Each point may require a different frequency; refer to the manufacturer's literature. When the point of injection is moved beyond the defect, signal injection will no longer restore normal operation and the defective area has been isolated. A high impedance injection probe is required to prevent circuit loading, which could detune or disable the circuit and render the check useless.

5. If no receiver noise was heard in step 1, check the channel selector illumination and meter illumination. If they are lit, input power is getting into the radio set. Check some of the major power distribution voltages. If the indicators are not lit, check input power.

6. If no problem was found in step 5, perform steps 2, 3 and 4.

7. If no other problem can be found, treat the "Radio does not transmit" and "Radio does not receive" symptoms as separate symptoms. Refer to the associated troubleshooting procedure for each of these symptoms.

TROUBLESHOOTING PROCEDURE FOR "RADIO DOES NOT TRANSMIT OR RECEIVE ON SOME CHANNELS" SYMPTOM

This procedure is used to isolate a trouble when there is no transmitter RF power output on certain channels and