TROUBLESHOOTING WITH THE "CB SERVICEMASTER"

INTRODUCTION

This section of the manual gives some practical tips on using the CB ServiceMaster and its associated test equipment to isolate troubles in Citizen's Band transceivers. Of course, the most valuable troubleshooting tool is a strong knowledge of circuit fundamentals and functional operation. The CB ServiceMaster can convert that knowledge into faster servicing for technicians of all experience levels. The troubleshooting technique presented in this section of the manual demonstrates the guideline for developing a logical, systematic approach to troubleshooting. The checks are presented in a logical sequence based upon an analysis of the transceiver's operation.

Although each manufacturer, and in fact each model, incorporates its own design variations, there is a basic similarity between most CB transceivers. Fig. 22 depicts a block diagram of a typical AM only transceiver and Fig. 23 depicts a block diagram of a typical AM/SSB transceiver. These transceivers use a dual conversion receiver with 7.8 MHz and 455 kHz IF frequencies, synthesizer type transmit/receive oscillator, and an audio circuit that is common to transmit, receive and PA modes of operation. The SSB receiver IF circuits and transmitter RF circuits are independent of the AM circuits, but several SSB circuits are common to transmit and receive operation. These are the most common basic designs found in today's CB transceivers. The troubleshooting procedure in this manual is tailored to the circuit designs of Figs. 22 and 23 in order to more clearly demonstrate the analyzing technique. However, using the technique which is demonstrated, the procedure can then be modified to troubleshoot transceivers with design variations. As technicians become more experienced and proficient, they are encouraged to develop their own technique and shortcuts which could further reduce servicing time and improve profitability. By carefully observing the symptoms, it is often possible to go directly to a specific checkout procedure and bypass unrelated checks.

Virtually all CB transceivers built in recent years have been fully solid state units that operate directly from a 12-volt vehicle battery (120-volt AC for most base stations). Therefore, no effort was made to include specific troubleshooting data for vacuum tube circuits or DC-to-DC power supplies. However, many of the checkout procedures are applicable to vacuum tube equipment as well as solid state circuits, if you should happen to service such equipment.

The troubleshooting procedures isolate the defect to a small area consisting of only a few parts. Conventional voltage and resistance measurements should then be made within the suspected circuit to locate the defective part. Refer to the service manual for the transceiver being serviced for data such as a schematic diagram, normal RF and DC voltages, and test specifications. A detailed block diagram of the transceiver is a valuable tool for rapid trouble isolation.

MOBILE TRANSCEIVER INITIAL CHECKS

When troubleshooting mobile transceivers, it is advisable to perform a few checks to eliminate all items external to the radio set before removing it from the vehicle for bench servicing. External items such as the power cable, antenna, antenna cable, microphone and external speaker are often more subject to physical damage than the radio set and must always be considered as a likely source of trouble. The following checks will quickly verify if external items are good or bad.

If the transceiver was already removed from the vehicle and brought to the service shop for checkout, proceed with the bench check of the radio. However, if the transceiver checkout indicates normal operation, these in-vehicle checks may be necessary when the radio is returned to the vehicle.

For AM/SSB transceivers, perform all these checks in the AM mode of operation.

Power Cable Check

1. Turn on the transceiver. Be sure the ignition switch is also on if required for radio operation.

2. On most transceivers there is some type of lighted indicator when power is applied, such as channel selector illumination or meter illumination. Note whether or not the illumination is lit.

   a. If the indicator is lit, the power cable is probably okay.

   b. If the indicator does not light, check the fuse.

      (1) If the fuse is good, power apparently is not getting through the power cable to the radio set. Make voltage and continuity checks on the power cable and its connectors to isolate the cause of the malfunction. If power is available to the radio set power connector, the problem is within the radio set.

      (2) If the fuse is open, replace it with a new fuse of the proper rating. If the new fuse blows, there is an apparent overload or short circuit in the receiver.

      (3) If the new fuse does not blow, key the transmitter. If this causes the fuse to blow, there is an apparent overload or short circuit in the transmitter.

      (4) If the new fuse does not blow when the transmitter is keyed, normal operation is restored, at least temporarily. Operate the transceiver in both the receive and transmit condition while driving over a rough street. If the fuse does not blow, the likelihood of future fuse failure is greatly reduced. If the new fuse blows during the test drive, there is an apparent intermittent short within the radio.

External Speaker Check

If the installation does not include an external speaker, skip to the "Antenna Check."