

- a. Inject a modulated 455 kHz signal at the output of the second mixer. Tune the RF generator 10 kHz above and below the 455 kHz center frequency. Measure the output of the 455 kHz bandpass filter (circuit No. 4) as the RF generator is tuned across the band. The bandpass should be symmetrical. A defective part usually causes a non-symmetrical condition.
- b. Measure the bandpass at each accessible point in the signal path through the 455 kHz IF amplifier (circuit No. 5).
- c. If the 455 kHz circuits show symmetrical bandpass, check the bandpass of the 7.8 MHz IF circuits (circuits No. 1 and 3).

If the receiver meets specifications, little can be done to further improve adjacent channel rejection.

THEORY OF OPERATION

The Model 1040 CB ServiceMaster can be divided into three separate sections. RF SECTION, AUDIO SECTION, and AUDIO TONE SECTION. Refer to block Diagram, Fig. 27.

RF SECTION

The RF sensing circuit consists of a printed circuit strip-line with a characteristic impedance of 50 ohms. Transmitter RF output flows thru the line to the load. LOAD switch S1 selects either the internal 50-ohm, 50-watt load or an external load. A voltage is induced in each of two pickup lines located opposite the strip-line on the PCB. On one line the induced voltage is proportional to forward power while the voltage on the other line is proportional to reflected power. The voltages are rectified by diodes D1 and D2 and filtered by capacitors C2 and C3. The detected voltages are routed thru RF FUNCTION switch S7 to the input to meter amplifier IC2a.

The detected voltage passes thru a divider consisting of resistors R17-R20. RANGE switch S3 selects the range to be displayed. Meter amplifier IC2a drives RF WATT-METER M2 in proportion to the input voltage from S3. Trimpot R12 sets the calibration for the meter circuit. Average power is indicated on the meter unless RF Power switch S2 is placed in the PEAK POSITION. In the PEAK position additional filtering is added to capture and hold modulation peaks for PEAK power indication.

When reading SWR, RF FUNCTION switch S7 is placed in the SET REF position. In this position forward power is applied to IC2a and pot R11 adjusts amplifier gain for full scale indication. Reverse power is applied to IC2a and the meter deflection is read as a percentage of forward power. SWR is read directly for the SWR scale on the meter.

RF generator input protection is accomplished by RLY 1 which automatically disconnects the RF generator when the transceiver is keyed. One set of contacts of RLY 1 controls what is connected to the transceiver RF output jack. Normally RLY 1 is pulled in which connects the RF GENERATOR jack to the transceiver RF jack. This enables receiver checkout by RF GENERATOR signal injection. As

soon as the transceiver transmit button is keyed IC2b senses the RF signal and turns RLY 1 off through transistor Q2. In the off state, RLY 1 connects the internal 50-ohm load to the transceiver RF jack for RF output measurements.

When in the transmit mode IC2B also applies power to the 26 MHz internal oscillator consisting of Q1 and associated components. The 26 MHz oscillator and a portion of the RF carrier are mixed by D6. The resulting 1 MHz signal is routed through another set of contacts of RLY 1 for display on a scope. A low frequency representation of the RF carrier can then be seen on any low-frequency oscilloscope when in the transmit mode. When in the receive mode, a portion of the transceiver audio output (from the EXT SPEAKER) is displayed on the scope.

AUDIO SECTION

LOAD switch S8 connects either a 4Ω, 8Ω, or 16Ω internal load resistor to the transceiver EXT speaker jack. The audio output signal is also connected to a divider network consisting of resistors R69 thru R72. AUDIO FUNCTION switch S9 selects the signal level for .1W, 1W, or 10W full scale indication. The audio signal is then applied to buffer/notch filter IC1a. When S9 is in the WATTS position, IC1a acts as a unity gain amplifier. The output of IC1a goes to peak detector D10, C40. This DC level is then applied to meter amplifier IC1b and displayed on AUDIO WATTMETER M1. Three trimpots, R73, 74, and 75, set the calibration for the 4Ω, 8Ω, and 16Ω positions, while R76 adjusts meter zero.

The SET FULL SCALE control R68 adjusts the input to the amplifier for full scale, while resistors R66 and R67 set the scale factor for 30% distortion full scale. In the distortion position, IC1a is connected as a tunable notch filter at approximately 1 kHz. NULL control R79 adjusts the frequency of the notch ±100 Hz around 1 kHz.

The 1000 Hz signal is eliminated from the audio output and all remaining harmonics are then passed on to the peak detector for display on the meter.

AUDIO TONE SECTION

Three internal audio oscillators are contained in ServiceMaster. Q3 and Q4 comprise a 1000 Hz oscillator; Q5 and Q6 a 500 Hz, and Q7 and Q8 a 2400 Hz oscillator.

MAINTENANCE

The 1040 has been precisely calibrated at the factory for optimum performance and should not require readjustment. If the unit malfunctions, use conventional troubleshooting techniques, such as voltage and resistance checks, to isolate the defective component.

CALIBRATION

To gain access to the calibration adjustments, remove two screws on back panel and one screw on bottom to remove bottom cover. Refer to Fig. 28 for location of calibration adjustments.