

normal RF output on the other channels, and no received audio on certain channels and normal reception on the other channels.

The trouble can result from only one circuit, the synthesizer. More specifically, it can only result from a defective crystal or a faulty channel selector switch. These are the only parts involved in switching from one channel to another.

Many manufacturers of CB radios use the frequency generation scheme shown in Table 1, or a similar scheme, which permits 10 crystals to generate all 23 channel frequencies. The crystals are connected in a 4 x 6 matrix to permit 24 possible frequency combinations. The channel selector switch is wired to select 23 of the 24 possible combinations. A crystal failure in such a synthesizer usually disables 4 or 6 channels.

A defective crystal is easy to identify from the manufacturer's synthesizer crystal frequency scheme. For a radio that uses the scheme in Table 1, if channels 13, 14, 15 and 16 don't operate, crystal 'H' is defective. If the problem is noted on channels 2, 6, 10, 14, 18 and 22, crystal 'B' is the cause. The frequencies of the crystals are different with nearly every manufacturer. To convert the crystal 'H' or crystal 'B' identification to a specific crystal in a specific radio set requires the manufacturer's synthesizer frequency scheme. This information should be included in the service manual for the CB set.

**TABLE 1
TYPICAL CRYSTAL SCHEME FOR CB SYNTHESIZER**

| Channel | OSC #1 Crystal | OSC #2 Crystal | Channel | OSC #1 Crystal | OSC #2 Crystal |
|---------|-------------------|-------------------|---------|-------------------|-------------------|
| 1 | A | E | 13 | A | H |
| 2 | B | E | 14 | B | H |
| 3 | C | E | 15 | C | H |
| 4 | D | E | 16 | D | H |
| 5 | A | F | 17 | A | I |
| 6 | B | F | 18 | B | I |
| 7 | C | F | 19 | C | I |
| 8 | D | F | 20 | D | I |
| 9 | A | G | 21 | A | J |
| 10 | B | G | 22 | B | J |
| 11 | C | G | — | C | J |
| 12 | D | G | 23 | D | J |

NOTES

TROUBLESHOOTING PROCEDURE FOR "WEAK AUDIO" SYMPTOM

Use this troubleshooting procedure when the receiver audio is below rated power with a strong modulated carrier applied to the receiver. The symptom also may be accompanied by high distortion.

Perform the PA Mode Check.

1. If normal audio power output is possible in the PA mode, the trouble is in the first audio amplifier stage (circuit No. 12). Inject a modulated 455 kHz signal into the detector (circuit No. 6) and measure audio signal levels in circuit No. 12. Use an oscilloscope for the measurement and look for evidence of signal amplitude clipping or below normal levels.
2. If audio power output is also below rated power in the PA mode, the trouble is in the audio amplifier circuits (circuits No. 15 thru 18). Generate a 1 kHz test tone on the speaker of the CB ServiceMaster and use it to drive the microphone in the PA mode. Make audio level checks on an oscilloscope in circuits 15 thru 18. Look for evidence of signal amplitude clipping or below normal levels.

If one of the push-pull audio power amplifiers (circuits No. 17 or 18) is disabled, audio power is about 25% of normal and highly distorted.

TROUBLESHOOTING PROCEDURE FOR "POOR RECEIVER SENSITIVITY" SYMPTOM

Use this troubleshooting procedure when the receiver provides rated audio output, but does not meet the receiver sensitivity specification. This symptom is produced by a malfunction in the RF or IF amplifier section of the receiver (circuits No. 1 thru 5 in Figs. 22 and 23).

1. Set up test equipment as for the Receiver Sensitivity Check, but increase the RF generator output until the 10 dB (S+N)/N level is reached.
2. Check AGC voltage for normal DC values. If convenient, disable AGC and re-check sensitivity. AGC can usually be disabled by shorting the AGC bus to chassis ground, or connecting a bias type power supply to the AGC line and setting it for the normal no-signal AGC DC level. If normal sensitivity is restored when AGC is disabled, troubleshoot the AGC circuit.
3. Measure the RF voltage levels of the synthesizer (circuit No. 11) and 2nd oscillator (circuit No. 8) outputs. Low injection levels can cause this symptom.
4. If the manufacturer's literature includes typical stage gains, make gain measurements and compare them to the specified figures.
 - a. Inject 30% modulated 455 kHz at the detector (circuit No. 6) and adjust the RF generator level for a convenient audio level such as 1/2 watt.
 - b. Note the RF generator output level.
 - c. Move the point of injection toward the antenna,