

# CB to 10

## — part XXX: the Midland 13-866

The basic applications of this conversion will apply to most CB chassis using the 23-MHz series of crystals. The chief difficulty with this radio, which uses no crystal trimmers, is to figure the pF load for the crystals needed. The load of the circuit is about 58-60 pF, but since the crystals are third-overtone cut, the

load to request is about 22 pF cut for third overtone operation. There are two methods of approaching this chassis, but changing the 23-MHz crystals is recommended. The formula is simple: Just add 2 MHz to the existing crystals.

The crystals required are: 25.290, 25.340, 25.390,

25.440, 25.490, 25.540.

Changing these crystals is simpler on an initial conversion because their fundamental range is only 8 MHz, and they are far easier to work with than fundamental 16 MHz crystals. In addition, it is possible to add 24 more channels to the synthesizer circuit by use of a 4PDT switch and four more crystals. Frequencies needed are: 15.220, 15.230, 15.240, and 15.250 MHz, which are stock items at most crystal houses, and range in price from \$3.50 to \$6.00 each (so shop around).

Activating the channel 24 position can be accomplished by locating the white wire coming from the selector switch and going to TR6. Using a piece of hookup wire, as diagramed, or a spare wiper from an old rotary switch, solder it to this terminal in such a way that it makes contact with the switch when the defeat cut in the switch meets the normal wiper. (Refer to Fig. 1.)

Install the new 25-MHz crystals in place of the ones removed from the circuit board. Apply power to the set, and with a frequency counter check for oscillation at the collector of TR6. If the oscillator is not func-

tioning, back out the slug on T6 until the circuit fires. With TR6 oscillating, you now can proceed with the tune-up procedure.

Connect a signal generator through a .01-uF capacitor to the base of TR17. Ground the generator to chassis ground, not the case. With the set on channel 13, (23 if you are installing the 15-MHz crystals as well), inject a 29.115-MHz signal with 1000 Hz, 30% modulation (29.255 MHz for channel 23). Adjust T12, T13, T14, and T15 for maximum receiver output.

Key the transmitter into a dummy load with a wattmeter connected and tune T1 through T9 for maximum rf output. The relative output function of the S-meter may be used for this initial tune-up. Then peak C24 and L5 for maximum power output. At this point, you should have about 2- to 2.5-Watts output. The value of the tank coils in these sets varies greatly, and it may be found that maximum power output occurs when the L5 slug is all the way out. If this is the case, replace C22 (150-pF capacitor) with a 100-pF ceramic disc. This will allow the coil to tune over its mid-range and increase power output to about 5 to 6 Watts. Modula-

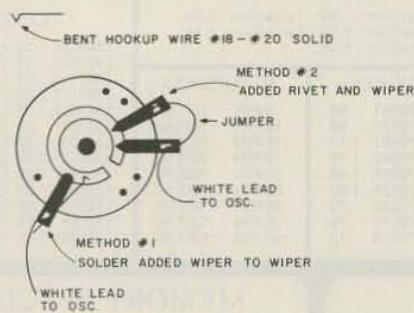


Fig. 1. Two methods of activating position 24 on the channel selector.

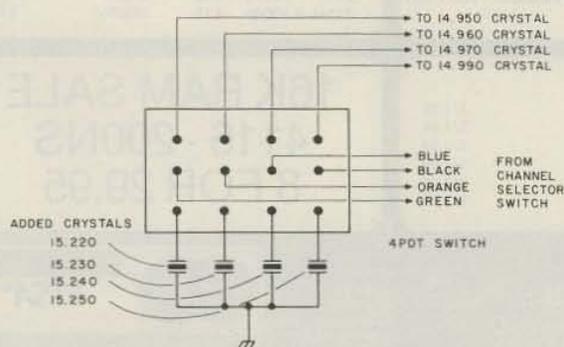


Fig. 2. Adding 24 extra channels to the Midland 13-866.

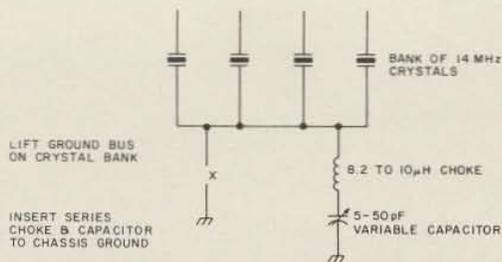


Fig. 3. VXO operation with the Midland 13-866.

tion can be increased by removing TR8 from the circuit.

Adding additional channels by using a 4PDT switch is accomplished by removing the green, orange, blue, and black leads going from the selector switch to the 14-MHz crystals on the chassis. Connect these wires as diagramed in Fig. 2. With the switch down, the 24 low channels will be obtained. With the switch in the up position, the upper range can be used.

For frequencies other than, or in addition to, the

normal 73 band plan, the basic conversion has a usable range of about 800 kHz without retuning.

VXO operation with this radio can be obtained by lifting the ground bus of the 14-MHz crystals and inserting a 10- $\mu$ H choke and a 5-50-pF variable capacitor in series with the crystal bus to chassis ground, as in Fig. 3. This trick will work with any fundamental crystals up to about 16 MHz. Do not attempt to use it on crystals operating in the overtone mode because severe instability will result. ■

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