

Cross-Band Repeating

(Preliminary version)

Amateur radio operators these days generally purchase an HT as their first radio. In most cases they select a 2 meter/440 Mhz dual band HT as the “best bang for the buck.” The next general purchase is a mobile unit and here most select a dual band 2 meter/440 MHz transceiver capable of cross-band operation. Since most special event communications use 2 meters as the principal frequency, those with these two pieces of equipment are ready to “cross-band repeat.” The cross-banding feature allows the user to cross over from one band to the other. This feature enhances the use of an HT for special event operations. The HT provides the user with mobility and convenience and the link to a mobile transceiver with a more powerful signal and better antenna. The mobile transceiver receives the weaker HT signal on one band and “crosses” it to the other band with more signal strength. Enabling the cross-band feature generally requires pressing several buttons since it is a “secondary function.”

This nifty feature, although a real help in a number of communications situations, is not entirely without it's problems. Listed below are some points to consider when setting-up and using the cross-band feature.

- Choose your frequencies with care. Refer to the band plan for each frequency. This can be found in the front of the ARRL Repeater Directory. The choice of the 2 meter frequency is usually made by the event coordinator.
- When choosing the secondary frequency, usually a 440 Mhz frequency, refer to the 70 cm. band plan. The 433 to 435 MHz frequency range is set aside for auxiliary and repeater links. Some units will not tune this low, so check your unit. A PL tone should be used to ensure that you don't interfere with other users of this frequency and they don't interfere with you. Set the cross-banding unit in the full decode mode and the transmitting unit for PL encode, both using the same PL frequency. Most units come with PL encode as standard. Few come with PD decode although it is available as an add-on option.
- In a simplex net condition the cross-band feature can be fully utilized. In this case the cross-banding transceiver is set for full transmit and receive on both sides. In this mode you transmit on 440 Mhz between your HT and the cross-banding transceiver and it translates or crosses your signal to 2 meters. Use of a PL tone on the 440 Mhz side is a must.
- When the net control is using a repeater, a slightly different method of cross-banding is used. In this case the cross-banding transceiver 2 meter band is set in the simplex mode on the repeaters 2 meter input frequency. It's 440 Mhz band is set to receive on the HT's transmit frequency. The HT, in this case, a dual band unit, is set to receive the 2 meter repeaters output signal and transmit on it's 440 Mhz side to the cross-banding transceiver. Again the use of a PL tone on the 440 Mhz is encouraged. This set-up overcomes a latch-up problem that can occur with repeaters with long squelch tails.

- The time out timer on the cross-banding transceiver should be set to on with a three minute time out. Also remember the IDing requirements and the rules governing radio control below 220 Mhz. You can refer to sections 97.119 (a) and 97.201 of the FCC's amateur radio rules for detail. The tough issue here is meeting the ID requirements of section 97.119 (a). Generally an HT is not used as a cross-banding unit. The heatsinking and transmit components are not built for this type of operation.
- Most importantly is to test your cross-banding set-up before hand and be aware of its salient features. Testing it out at the "event" is not the proper time.

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