

# USING YOUR RADIO WITH A REPEATER

This discussion is about using your radio to communicate using repeaters in the VHF/UHF frequency bands of the Amateur Radio Service. These repeaters are usually supported by individuals or clubs and take a lot of work and \$. Their use should be considered a privilege and not abused. However, DO use them. That is what they are there for..

## DEFINITIONS

**VHF** - the 2M band (144.000 MHz to 148.000 MHz)

**UHF** - the 70cm band (440.000 MHz to 448.000 MHz)

### FM: Frequency modulation

A FM receiver has a feature call the "Capture Effect" which means that it will capture the strongest signal it hears and reject all others. The consequences of this will be discussed later. All communications in the VHF/UHF bands are done using FM.

### AM: Amplitude modulation

Transmitter: (Tx): sends out radio waves

Receiver (Rx): receives radio waves

**Transceiver** (TxRx): -device that transmits and receives.

Your radio is a TxRx and can communicate with other radios using two methods:

#### (1) **Simplex communication:**

This simply means that the radios talk directly to each other transmitting and receiving on the same frequency. These communications are limited to Line-Of-Sight.

#### (2) **Repeater communication:**

Radios talk to each other through a third "radio" called a repeater. A repeater is actually two radios - a Tx and a Rx. Applying the Capture Effect mentioned above, if a repeater transmitted and received on the same frequency what signal would the receiver capture? Obviously, it would capture its own signal thus accomplishing nothing. For this reason, a repeater transmits on one frequency called the output frequency (A) and receives on another frequency (B) obviously called the input frequency. These are usually a standard amount apart. For 2M it is 600 KHz (6 MHz) and for 70CM it is 5 MHz. This offset may be either Plus or Minus.

Your radio is designed so that it is listening on the repeaters output frequency (A) and when you press the PTT (Push-To-Talk) button and start talking, it automatically switches to the repeaters input frequency (B).

The repeater must also be in Line-Of-Sight of the radios it is communicating with but is usually on a high place like a tall building or on a mountain top thus increasing greatly the range of the signal. That is why repeaters are so useful.

This also creates a problem. If you are in the receive range of two repeaters using the same frequency pairs there would be confusion as to which one you were communicating with and possibly reaching both of them. In many areas there are few enough repeaters so each one can have its own frequency, but in a place like S Cal there are more repeaters wanted than there are frequency pairs available. Hence a system was developed called Private Line (PL) which helps this. What this does is put a sub audible tone (one that cannot be heard by the human ear) on the signal and the repeater will not retransmit a signal unless it has the correct sub audible tone present. This feature is called TONE. Likewise, you can set your radio to reject a signal unless it has the proper sub audible present. This feature of your radio is called CTCSS.

## GENERAL PROAMMING

Your radio has two modes – **VFO MODE** and **MEMORY MODE**. (You will need to find these features on your radio).

- (1) Select the VFO MODE
- (2) Enter desired frequency
- (3) Enter the offset direction (most radios do this automatically)
- (4) Enter the PL/CTCSS tones (If you need them)
- (5) Save to an unused MEMORY (see below)

You don't want to have to enter all this information every time you go to a different repeater (early radios required this) - anyway who can remember all those numbers? Hence the memory system which allows you to store this information in a numbered nonvolatile location for future use. Most radios have at least 200 memory locations. Each memory location stores all the above information and can be identified with a name to help you remember which repeater you are using.

To use the memories, you enter the MEMORY MODE and select the location you want to use.

You are now ready to communicate with someone through the repeater.

That's all there is to it. Good luck.