Repeaters and Range Extenders

The UHF CB band is a short-range communications band. Typically UHF signals only travel "line of sight," which means if your antenna can "see" the other antenna, you can talk to them. UHF signals are very easily blocked by obstacles, including mountains, buildings and even trees. This makes the UHF band very unreliable for anything but local communications up to a few kilometres (certain atmospheric conditions can extend that significantly.)

Repeaters or "Range Extenders"

To overcome this problem the UHF CB band uses devices known as "repeaters" or "range extenders." These devices are set up on top of very high mountains or buildings, so their antenna can "see" much farther than an antenna on the ground. This is how a repeater can extend the range of your radio, and not because it uses higher power (a UHF CB repeater is limited to the same output power as a normal UHF CB!)

Two Channels

Repeaters operate using two channels. This is often referred to as "duplex," whereas operation on a single channel is called "simplex." Duplex operation is achieved by pressing the button marked "Duplex," "Dup," "Repeater," or similar, and tuning to the output channel of a repeater.

On the new 80 channel band there are two repeater segments designated. Repeater channels are always 30 channels apart, and it is usual for the repeater to be referred to using only its output channel (e.g. channel 5 repeater.) The repeater always receives a signal on its upper or "input" channel and automatically re-transmits the signal on its lower or "output" channel. When you turn the duplex function on it makes your radio automatically change channels every time you press and release the push-to-talk button.

The repeater channels in Australia are:

Repeater Segment 1		***Repeater Segment 2***	
Output Channel	***Input Channel***	***Output Channel***	***Input Channel***
1	31	41	71
2	32	42	72
3	33	43	73
4	34	44	74
5	**35**	45	75
6	36	46	76
7	37	47	77
8	38	48	78

Timers

Most repeaters incorporate a timer function that limits the amount of time the repeater can transmit without a break. This is used to stop the repeater from transmitting non-stop in the event of a fault, but it also helps stop people from making very long transmissions!

Once the time limit set by the timer has been exceeded the repeater will stop transmitting. Usually this will automatically correct itself once the signal on the input has stopped, but if the signal continues without interruption the repeater timer will keep it disabled. Sometimes the repeater will emit a long "beep" sound every minute or so while ever it is disabled by the timer, but this is not always the case.

Repeater Tail

A repeater "tail" is the short period of transmission between the time you stop transmitting and the time the repeater stops transmitting. It is usually only a second or two in length.

When using a repeater it is vital that you allow this tail to stop before you reply to the person you are talking to. Most repeater timers do not reset until the repeater stops transmitting fully, so if you don't allow the tail to stop before you reply, you may not get the full amount of time before the repeater cuts you off!

For example, if a repeater has a time limit of 60 seconds, and your mate talks for 50 seconds, if you don't allow the repeater to stop transmitting before you reply, you may only get 10 seconds before the repeater cuts you off!

Using a Repeater

Repeaters are free to use, and you can use any repeater to communicate with people you normally wouldn't be able to talk to, with the exception of channel 5 repeaters which are legally reserved for emergencies only. To use a repeater simply set your radio onto the output channel of a local repeater (e.g. channel 6) and then turn the repeater function of your radio on.

When transmitting through a repeater it is important to allow a second before you start to speak. This is because repeaters take 1 or 2 seconds before they activate their transmitters, so if you start talking as soon as you press the push-to-talk button you will cut off the first couple of words. Push the PTT button in and then allow 2 seconds before you start to talk.

Also remember when talking to someone through a repeater you are not reaching them directly. It is common to hear people on a repeater discuss how well they are receiving their signal from so far away, but in reality, it is the repeater signal you are hearing so clearly and not the signal direct from the other person!

Using Repeater Input Channels

When you use a repeater input channel (31 to 38 or 71 to 78) for normal conversations you risk blocking any repeater within range that uses that channel for its input. For example, if there was a channel 6 repeater operating in the area and you chose to talk on channel 36, your signal would be retransmitted by the channel 6 repeater and would basically "block" it so that others could not use the repeater to talk. As you would be using the repeater *input* channel you would not hear the repeater and so remain totally unaware that your transmissions were being broadcast over the repeater, but the effects could be devastating, especially if you were using channel 35 to chat and therefore blocking an emergency channel repeater.

Although the Class Licence allows you to use the repeater input and output channels when not within range of a repeater on that channel (except for channels 5 and 35,) it is recommended that you avoid using any of the repeater input channels whether or not you are within range of a repeater as under certain conditions UHF signals can travel a considerable distance and potentially block a repeater 100km *or more* from your location! If you simply avoid channels 31 to 38 and 71 to 78 you avoid the risk of blocking a repeater!

Finding a Repeater

To find a local repeater you need only listen on the output channels, channels 1 to 8 and, in the near future 41 to 48. You will soon hear if a repeater is in operation. You can also try and "trigger" a repeater and listen for the tail. With the repeater function on, select each repeater channel and push the PTT button for a couple of seconds. When you let go, if a repeater is in range, you will normally hear the tail of the repeater before it cuts off. You can also find repeater lists online (see More Information).

Repeater ID

Every repeater must transmit its callsign by either Morse Code or voice. Repeater callsigns will typically consist of three letters and two numbers (e.g. RRS05 is the Radio Rescue transportable 5/35 repeater in SA.) If Morse Code is used the speed is usually slow so you can note down the characters and look it up in the ACMA licence database.

More Information

More information on repeaters and the legally designated channels can be found at:

- RREC Website: **http://www.radiorescue.org.au/**
- Tropinet Repeater Lists: **http://www.tropinet.com/uhf-repeaters/**
- ACMA Website: **http://www.acma.gov.au**
- RREC Phone: **0448 402 359**
- ACMA Phone: **1300 850 115**