

## Getting started with 'Citizens Band' (CB) radio

The UHF CB (Ultra High frequency) is the two-way radio service used by road crews, truckers, caravanners, etc. Its range is typically up to a few 10's of Km, less in cities, hills or dense vegetation, more from higher locations and over open country.

UHF CB not ideal as a wide area rural radio service, but it is what we have, so let's make best use of it. The approved sets are limited to 5 watts, which is OK over a good path, but commercial and emergency services use at least 25 watts, to get the message through when conditions are less than optimal. They also benefit from operating through hilltop repeaters, so that all messages are relayed from the high ground, enabling communications in and out of valleys and across greater distances.



Type-approved 80 channel, 5 watt UHF CB sets from well-known brands (GME, Uniden, ICOM) typically cost \$200+ for handhelds and more for in-vehicle (mobile) sets, to which an antenna and installation are added. (1) The mobile sets are also suitable as 'base' stations at home. Other brands can be found for much less and are probably just as good for our purposes, although they may be less rugged. (Oricom, TRX, Crystal) The earlier 40 channel sets are sometimes available secondhand for ~\$50. The lower 40 of the new 80 channels are the same as on these older sets so they work fine together.

More flexible and less expensive 'Chinese' radios are available from local suppliers. These are popular with radio amateurs, and must be programmed to the frequencies required using simple software. (2) They communicate perfectly well with the other CB radios. They are not quite as simple to use as a regular CB radio, but for many, the advantages will outweigh the slight learning curve.

The 'workhorse' of this class of handhelds is the Baofeng UV-5R, costing ~\$50. (3) High-capacity batteries are available to keep them going for days. There are many others, but each may require its own type of programming lead, so better to stick to a common model.

The mobile types are now compact enough to carry in a day pack and use portable if required. (4) These are normally operated at the 5 watt legal limit, and can be switched up to 25 watts when conditions require. These require 12 volts DC to operate. Use a car battery at home, or a battery pack for portability. (5)

A better antenna will always improve comms, longer ones are generally more effective. These can be fitted on top of the house or to the car, and connected to the handheld radio instead of the usual short rubberised antenna via an inexpensive adaptor. The antenna need be no more complex than the correct length of wire, but a good external antenna need cost no more than \$50. (6)

### Repeaters

Much greater range can be had by operating through repeaters, typically mounted on hilltops or tall buildings. These retransmit what they hear, to a much wider area. The 'Duplex' setting on the radio enables this, if you are within range of a repeater. ~100Km is achievable. Several repeaters already exist in the area. If you can hear any activity on a nearby repeater channel, you can probably use it.

Set your radio to 'Duplex' or an 'R' channel. Press the talk switch for a second or so, release and listen for the 'repeater tail', a slightly delayed return signal from the repeater. If you don't hear it, try again with 'Mon' or lowered squelch. Try calling and requesting a signal check. These are set up and maintained by either community groups or interested individuals who obtain the required licence from the ACMA. 'BAL07' on Buckombil Hill, Tregeagle, East of Lismore, 'CAS03' and 'GIB05' at Casino and 'KGL01' at Kyogle. More may need to be established. The actual range of these should be tested, reported, and used regularly to ensure they are still operational. (7)

Local ad-hoc repeaters can also be set up for events or testing. A simple 'Parrot' repeater can be made using the Surecom SR-112 (~\$100) connected to any suitable two-way radio. When placed on a hilltop or other vantage point, this will repeat on the same channel any transmissions received. This way, all users have the advantage of the high ground. The correct cable for the radio is specified at purchase, or can be made (8). It will need weatherproof mounting, plastic plumbing is suitable. These allow people to test their radio without requiring an operator at each end. They can be set to emit a regular message, assuring all that their radios are working.

## Keeping your radio charged and ready

A modest solar panel and battery can keep these radios running permanently. Some extra leads are handy. (9)

## Effective communications

Unlike the phone, or a room full of people, this kind of radio is one-at-a-time, so some protocols are needed to use it effectively. Follow these easy steps to make a call.

1. First listen to ensure the channel is clear for you.
2. Press the PTT (Push-To-Talk) button.
3. After 2 seconds:
4. Say "recipient's call sign"
5. Followed by "THIS IS" and "your call sign"
6. Once the person replies, convey your message.

If you don't hear what you expect to, use the 'Mon' side-key (monitor), or turn down the Squelch control to listen to any weak signals (& a lot of hiss).

1. **Clarity:** Speak a little slower than normal. Speak in a normal tone, do not shout.
2. **Simplicity:** Keep your message simple enough for intended listeners to understand.
3. **Brevity:** Be precise and to the point. (10)

## Which channel to use?

### Legally restricted channels

The following channels are legislated as a part of the ACMA UHF CB Class Licence.

5 and 35: are the designated emergency channels and are not to be used except in an emergency.

11: is the 'call channel' and is only to be used for initiating calls with another person, you should quickly organise another vacant channel to continue your discussion on.

22 and 23: are only to be used for telemetry and telecommand.

61, 62 and 63: are reserved for future allocation.

### Each of the 80 UHF channels has the following accepted use:

1-8 and 41-48: Duplex channels (output).

31-38 and 71-78: Duplex channels (input).

9, 12-17, 19-21 24-28, 30, 39, 49-60, 64-70, 79 and 80: General chat channels.

10: 4WD Clubs or Convoys and National Parks.

11: Call Channel used for locating friends – a general meeting point for when communications are lost or beginning, before moving to another channel.

18: Caravanners and Campers Convoy Channel.

40: Australia Wide road safety channel used primarily by truckies and oversized load pilot vehicles.

But in our use, a community will typically agree on a channel that is not much in use in the area.

## References

1) Type-approved UHF CB radios - Probably the best deal at present You'll need a mounting bracket.

<https://oricom.com.au/product/value-pack-uhf305-uhf-cb-radio-black-6-5dbi-antenna>

2) Chirp programming software <https://chirp.danplanet.com/>

3) Baofeng UV-5R radios <https://www.ebay.com.au/itm/143361962342>

4) Mobile or base radios <https://www.ebay.com.au/itm/165458479589>

5) Battery backup - A typical mobile radio draws ~2.6 watts when receiving, so this 44 watt-hour battery pack should run it for ~16 hours, but they draw up to 4A when transmitting, so you'll need a bigger battery if you're talking much. One of these might be handy keeping your ADSL/NBN going also. <https://www.ebay.com.au/itm/254861313144> or <https://www.ebay.com.au/itm/144028694023>

We're testing these now. Some of the newer auto starter batteries have 12 volts out, so may be suitable, although more expensive. You should have one of these anyway.

6) Antenna - Repco sells quality CB antennae starting from \$50. eBay also. A suitable mounting bracket might be <https://www.ebay.com.au/itm/163145518341> An antenna with magnetic base could be handy <https://www.ebay.com.au/itm/224251929092> The 'patch lead' to connect a handheld to an external antenna (SMA Male to UHF female 1M long) <https://www.ebay.com.au/itm/184143684433> & (SMA female to SMA female adaptor – for Baofengs, etc) <https://www.ebay.com.au/itm/184110178669>

7) Repeaters - link to coverage models, how to report actual (tba)

8) Parrot repeaters - <https://www.ebay.com.au/itm/265151609288>

9) Solar power pamphlet (tba)

10) Radio protocols – These can be quite relaxed when conditions are good, to quite strict when lives are at stake. Each group should agree on and practice a range of techniques.

<https://www.csudh.edu/Assets/csudh-sites/dhpd/emergency-preparedness/two%20way%20radio%20protocol.pdf>

[https://en.wikipedia.org/wiki/Radiotelephony\\_procedure](https://en.wikipedia.org/wiki/Radiotelephony_procedure)

<https://www.caravancampingsw.com/using-a-uhf-cb-radio/>

<https://cdn.revolutionise.com.au/cups/westernportyacht/files/8semxakdrksuqu0x.pdf>

## Community Emergency Radio Network Northern Rivers

<https://www.facebook.com/groups/523818639372392>

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