BETTER UHF CB CAR RADIO PERFORMANCE

Revision 9

Graeme Dennes

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C'mon, Baldrick. Let it out. What is all the fuss about then, eh?
The purpose of installing a car-mounted UHF CB radio system is to provide efficient and effective communications with other vehicles. It doesn't rely on the mobile service, yet it provides communications over distances of several kilometres, depending on the terrain. Your radio system needs to provide a long transmission range and a clear signal. To achieve this *to the maximum extent possible,* the radio and antenna need to perform *to the maximum extent possible*. This article advises *how* to achieve that, and it applies to *all* vehicles. It advises how and why problems occur with vehicle UHF CB radio installations. It also explains why a *hand-held* UHF CB radio is a poor substitute for a car-mounted system by exposing its weaknesses when used in that role.

UHF CB radios are licensed by the Australian Communications and Media Authority (ACMA) for personal communications. The Citizen Band Radio Service (CBRS) is a two-way, short distance, "line of sight" communications service which operates in the 477 MHz radio frequency band, meaning it (theoretically) only works when the transmitting and receiving antennas have a clear, unobstructed "view" of each other. If a hill or building is between the sender and receiver, the signal won't get through. If your antenna can "see" a location or point, be it close-by or at a distance, your radio can potentially transmit to that point. A correctly installed system offers great convenience and enables communications with other vehicles in a group, other road users and possibly someone who can come to your aid, especially in remote regions. Antenna type and mounting location have a huge influence on the performance of your UHF CB car radio. If your reception is somewhat sporadic and perhaps unreliable, it almost invariably points to a problem with the mounting location of the antenna. Much more follows.

Baldrick, who said there were signal quality issues? Remember, you're battling the master now!!

Well, I'll do m'best, m'lord. Go easy on me, though. I'm only a Baldrick.
Have you experienced problems with the radio transmissions from other cars? Some issues are caused by the quality of their radios, some are caused by weak transmitted signals resulting from their poor antenna locations, and some can be caused by their radio's 12V wiring connection point in their vehicles. As we normally don't hear our own transmissions, we can be oblivious to the problems being experienced by others who are listening to our transmissions, such as:

1. Distorted or heavily distorted voice.
2. Lack of clarity or intelligibility (difficulty in discerning some words or syllables).
3. The voice bears little resemblance to the voice of the person on the microphone (if you know them).
4. Squeals, whistles etc accompany the voice.
5. Background noise and interference almost smother the voice.

Have you experienced the following issues caused by another vehicle's antenna setup?

1. You can't receive *their* signal, but you can receive signals from other cars which may be further away. (Their antenna is being shielded by their car, ie, their car's body is between their antenna and you, causing a signal reduction in your direction.)
2. Their signal sounds like they are 10 Km away when they are only 100 m away! (Again, this is caused by shielding of their antenna by their car causing reduced signal in your direction.)

What are the issues with UHF CB radios, Baldrick?
Most UHF CB radios today are generally reliable devices, and the better-quality radios usually have voice quality not too dissimilar to mobile phones, at least up to moderate ranges. Even so, not all radios have good voice quality. This is one of the trade-offs with the lower priced radios - voice quality is often sacrificed. The prices of UHF CB radios have fallen over the last several years, and often, by paying just a little more, you can buy a much higher quality car radio than ever before.

If you experience shortfalls in your operating range, it is most likely caused by a poor mounting location of your antenna, although it could also be due to selecting the incorrect antenna for the task at hand. More follows. If you are advised of problems with *your transmitted voice quality*, such as those noted earlier, it can be caused by your radio, but again, it can also be caused by poor antenna location. These issues will need to be properly investigated and diagnosed. To do nothing about such issues with your radio system really means "well, you'll just have to put up with it", which is not helpful to others in the group who listen to your transmissions.

For 2CV owners, the voice quality and clarity of the radio signal generally needs to be better than average because of the typical wind noise, road noise and engine noise we dearly love to experience when we drive our 2CVs. Ah, bliss!

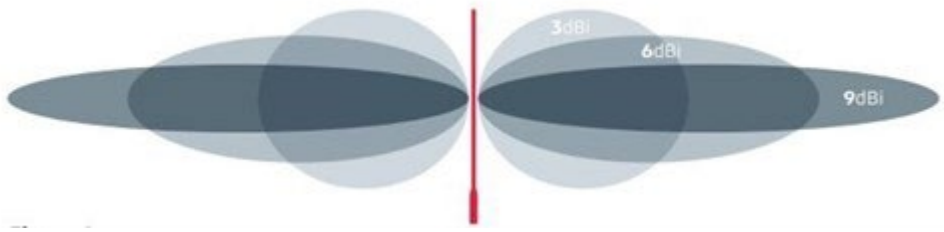
Bliss, m'lord?

Look, you wouldn't understand.

Alright Balders, now tell me, how do we select the correct antenna for our vehicle?

Well, m'lord, it goes like this.
Vehicle-mounted antennas are available in a variety of gains and types. Depending on the application, there are various, sometimes conflicting, requirements to be met by an antenna to maximise the success of the radio installation for the intended use. This section aims to assist in understanding how an antenna's gain figure affects the performance of a car-mounted radio system. Gain refers to an antenna's ability to boost the transmitted and received signals. A common measurement of gain is the decibel (dB), and antenna gain is often expressed in decibels in comparison to an isotropic antenna, stated in units of dBi. (There are several different methods in use to specify antenna gain, so if comparing antenna performance figures, be satisfied that you're comparing apples with apples.)

Let us look at some antenna radiation patterns and gain figures. Consider the diagram below with the car's vertical antenna located in the centre of the diagram, and you are viewing the antenna from the side of the car. It shows three representative antenna radiation patterns which wrap around the antenna like a doughnut (3dBi pattern) to a flatter doughnut (6dBi pattern) to a very flat doughnut (9dBi pattern).



3dBi gain antenna: low gain, doughnut-shaped pattern. This antenna has a radiation pattern which extends *well above and below the horizontal.* It is less likely to be obstructed by hilly terrain, bushland and buildings. This is the *best type for suburban and rugged hilly areas*. Its performance in the *countryside or wide, open spaces is quite poor due* to the *short* communication range of this antenna.

6dBi gain antenna: medium gain, flatter doughnut-shaped pattern. This antenna has a radiation pattern which extends s*omewhat above and below the horizontal*. This means it is also less likely to be obstructed by hills, trees or buildings, and is ideal in suburban and the countryside for *medium* communication range. *This is the ideal all-round UHF CB antenna for your car,* and is the antenna recommended by the writer to suit the majority of general activities.

9dBi gain antenna: high gain, very flat doughnut-shaped pattern. This antenna has a radiation pattern which is *essentially horizontal*. This means it provides the *longest communication range in wide, open spaces.* This makes it ideal for use in outback areas where the terrain is quite flat and where there are few obstacles present to interfere with the signal path. Radiation above and below the horizontal is minimal, so *its performance in suburban and hilly country is quite poor.*

Is that all there is to it then, Baldrick?

Oh no, m'lord.
Firstly, the fundamental, text book, key to maximising communications range is to mount the antenna as high as possible above the ground. The greater the height above ground level, the greater the range. In theory, the range is the slant range to the horizon so the higher the antenna, the greater is the slant range.

Secondly, to achieve maximum range and signal quality from your UHF radio, select an antenna which is *ground-independent.* These antennas do not require a ground reference such as a metal roof or metal bonnet, so may be elevated on a base, frame or tube to further raise the antenna's height above ground.

Well then, Baldrick, where should we mount the antenna?

Well, here goes, m'lord. The secret will be out now!

1. Always locate the antenna mount at the *highest* point on the vehicle to prevent radio frequency (RF) shielding of the antenna by the vehicle's metal body. This will ensure 360 degrees of clear, unimpeded coverage is achieved, giving *equal maximum range in all directions*. Yes, utopia!

2. Mount the antenna so it is truly vertical, providing equal maximum range in all directions.

3. *Is that all then Baldrick?*
   No, not yet, m'lord:
   Generally, the best mounting location to maximise range and signal quality is in the middle of a metal roof, being that it is usually the highest point on a vehicle, but short of that, gutter mounting or 2CV roof-edge mounting is next best, per photos at the end of this article. If you have a roof rack, mount the antenna at the highest point on the roof rack such that the antenna's *base* is elevated *above the maximum load height in the roof rack* so that RF shielding from the roof rack and the load does not occur.

4. *There are some bad locations too, m'lord.*
   What? What are you dribbling about? There can't be?
   The worst mounting locations for car antennas are locations where the antenna *is being shielded horizontally (to the side) by the body of the vehicle*, resulting in range and signal quality problems. Locations such as bull bars, bumper bars, bonnets, boots, mudguards, side panels, side mirrors and towing hitches are the *worst possible* antenna locations because of RF shielding by the vehicle body. *Vehicles using such mounting positions for their antennas are guaranteed to experience range and signal quality shortfalls, whether the owner knows it or not*, in comparison to optimally-mounted systems in a side-by-side contest with all other things being equal!

   And why might this be? Because point 1 above is not being met. The *biggest single cause* of range and signal quality problems in vehicle UHF CB radio communications is *poor mounting location of the antenna*. Full stop. Period. Over and out!

Antenna mounting location is a trade-off between the *best* vehicle location for maximising range and signal quality and the *available* vehicle locations. The best location is in the middle of the roof (well, maybe not for a 2CV!), but most owners won't want to drill a hole in their roof. Ironically, poor antenna location means that only a small percentage of owners are able to realise their radio's full potential, even with the most expensive equipment! The second best location is on a side gutter in the roof area.

Your signal can also be shielded by vehicles travelling in front of or behind you, cutting down on your range when communicating with a vehicle at the front or rear of the group. This is a very real shielding issue, so mount your antenna at the highest possible point to minimise this issue.

The antenna whip should be easily removable for storage, entering car parks, garages, etc. Use a mounting bracket to suit the antenna and the chosen mounting location on your car. Some brackets also allow the antenna to be folded down for entering garages, carparks, etc so it doesn't have to be removed or disassembled. Check out all the mounting options available. There is a wide variety.

In summary, use a *ground-independent antenna* and mount it high. *Way up high*. Position the mounting base *above the highest point of the vehicle* to prevent RF shielding by the vehicle's body or roof rack. Using a lower mounting point *will* guarantee problems in the radio's performance, yet we see vehicle antennas mounted where, perhaps, their owners think they "look cool", but which will be forever compromised!

Don't forget the PL-259 antenna cable connecting plug, Baldrick.

No, I won't, m'lord.
After the antenna's coaxial cable has been cut to the required length for your car installation, ensure the PL-259 connecting plug is *correctly* fitted to the end of the coaxial cable for screwing into the antenna socket on the back of the radio. Incorrectly fitted plugs can play havoc with the operation, performance and reliability of your UHF CB radio *and can damage the radio*. Always fit the plug by following the instructions provided by the antenna manufacturer. If in doubt, arrange for your antenna supplier to fit the plug to the cable. A correctly *crimped* PL-259 connector is the perfect solution.

What, we have two UHF CB standards Baldrick?

We certainly do, m'lord. The old 40-channel standard and the new 80-channel standard.

Ah, he still thinks he can dazzle me…
The technical standards for Australia's UHF CB radio service are set by ACMA. The 80-channel standard came into being after it was put into the regulations by the Federal Government in 2011 for the purpose of replacing the 40-channel standard. The regulations also specified that 40-channel radios could not be used after 30 June 2017. Only 80-channel radios could be used after that date. After some fierce lobbying by groups, fleet managers, etc, the government revoked the 2017 deadline, giving the green light for radios of both standards to continue to be legally used within Australia.

Our standards are unique to Australia and New Zealand. A UHF CB radio approved for use in Australia can be legally taken to and used in New Zealand, as was done during the RAID New Zealand 2018 event. However, radios designed to the standards set by other countries are not compatible with the Australian standards and cannot be legally used in Australia.

Balders, is there a problem in having both the 40-channel and 80-channel UHF radio standards?

Yes indeed, m'lord. An annoying problem. Australia's UHF CB radios (old and new standard) use frequency modulation. The old 40-channel standard uses 5KHz ("wide-band") frequency deviation and the new 80-channel standard uses 2.5KHz ("narrow-band") frequency deviation, and this difference results in an annoying, on-going operational incompatibility between the two radio standards. (BTW, this has nothing to do with fitting the 80 channels into the old 40-channel frequency band.)

Alright Baldrick. What is the problem?
Well, m'lord, we'll take a couple of examples. Consider you are using an old-standard 40-channel (5KHz deviation) radio, and you are listening to the transmissions sent by a new-standard 80-channel (2.5KHz deviation) radio. The volume level as received on your 40-channel radio will be quite soft, as though the sender is speaking very quietly or too far from the microphone. You may say to the sender, "Can you speak up. Your voice is very weak". Even if the sender speaks louder, it will not fix the low-volume problem on your 40-channel radio, so you may need to increase the volume level so you can adequately hear the 80-channel caller.

Now we'll reverse the situation. Consider you are using a new-standard 80-channel (2.5KHz deviation) radio, and you're listening to a signal sent from a 40-channel unit (5KHz deviation). The volume level as received by your 80-channel radio may be very loud and very heavily distorted, as though the sender is shouting into the microphone. You may say to the sender, "Can you speak softer. Your voice is heavily distorted". The sender may speak quieter and that may assist the 80-channel listeners, but it doesn't fix the problem for other 40-channel listeners, who may then need to increase their volumes to hear the 40-channel radio!

Then, when two 40-channel radios communicate with each other, both will need to turn down their volumes! It is a no-win situation whenever both 40-channel and 80-channel radios are being used in a group. It becomes a pain in the proverbial when you have to constantly adjust the volume to compensate when the two different radio standards are being used in a conversation. The people affected by this incompatibility issue are *all* the members of a group in which *both* 40-channel and 80-channel radios are being used, such as car clubs. Hand-held and car-mounted radios are equally affected by this issue.

However, there is another issue resulting whenever 40-channel radios, which operate on UHF CB channels 1 - 40, are being used in a group, and that is the increase in channel congestion. That is when you're unable to find an unused, authorised channel within the channel range (1 - 40) in which to conduct your communications. Channel congestion is going to worsen over time for all users, so moving from a 40-channel radio to an 80-channel radio (channels 1 - 80) increases the available, authorised channels. This gives your group a better chance of finding an unused channel in the upper 40 channel range (channels 41 - 80) for communications.

However, there is an answer to this, m'lord.

Ah, he still thinks he knows everything…

Replace your old 40-channel radio with a modern 80-channel unit. If all UHF CB radios in the group were the 80-channel type, then (1) the channel congestion problem discussed above would be greatly eased because more channels will be available, (2) the loud, heavily distorted voices wouldn't occur and (3) the ongoing volume adjustments wouldn't be necessary. Further, 40-channel radios never had the development impetus that occurred for the 80-channel units. The 40-channel units were scheduled to meet their demise in 2017, so their development ceased *before* 2011, i.e., *before* the details of the new 80-channel standard were formally announced.

Much smarter technology was put into the 80-channel radios, being that this was *the* new standard for Australia and being that manufacturers sought to maximise their commercial opportunities through good technical innovation. The manufacturers, by and large, were very successful, and we now have the benefits of their endeavours in that our 80-channel radios are equal best in the world.

There are some basic microphone and etiquette rules too, m'lord.

Look, you can't know everything… Oh alright then, go on.

To ensure *your* radio transmissions provide the best possible quality for your listeners, follow these simple rules:

1. Before speaking, think about what you are going to say, then bring the microphone right up to your lips, i.e., *touching your lips*, then press the microphone button and speak your message. UHF CB radios are designed for the microphone to *touch* the lips. *Don't hold it away from the lips.*
2. Speak clearly and with purpose. *Don't* speak quickly, and definitely ***don't speak loudly!***
3. Hold down the microphone button for one second (not less!) *before speaking* to ensure the start of your message is not lost.
4. Always listen for several seconds before transmitting to ensure the channel is not already in use by others. This helps avoid people talking over each other and breaking up all the messages.

12V Vehicle Power Connection for the Radio:
Run a dedicated 12V fused power lead pair *directly* from the radio's power connector to the *car battery posts*, so the radio obtains its power *directly* from the battery. Do not share this 12V wiring with other equipment in the car. Use a cable with a copper conductor diameter of 1.5 mm per wire.

Using hand-held radios in cars? Come on Baldrick, why can't we? Surely we can?
Whilst a small hand-held UHF CB radio might be convenient, don't be fooled into thinking it is all you need. When compared to car-mounted radios, hand-held radios normally have at least one fundamental limitation. Firstly, they usually have a physically smaller antenna (for ease of portability, handling and use), and because of this, the antenna gain will be less than that provided by a vehicle-mounted antenna. This directly translates to a reduction in range when compared to the vehicle-mounted radio, all other things being equal.

The smallest hand-held units generally only cover a range of maybe a kilometre at the very best, and that greatly depends on the terrain and the conditions. Having said that, in recent years, hand-held models have improved and you can now usually buy radios with transmission powers from 0.5W to 5W. Five watts is the maximum legal power for UHF CB radios (vehicle type or hand-held type), and a 5-watt hand-held radio does provide better range than lower power units. Even so, they are still heavily constrained by the short antenna. If the power level is less than 5W, hand-held radios are even *further* handicapped in range. Hand-held radios can never provide the performance (range and signal quality) of optimally-mounted vehicle radios. What is more, *they were never designed to!* It's horses for courses!

Another issue. If you use a hand-held radio from inside your car while travelling with a group which is using car-mounted radios, the signal from your hand-held radio will usually be the first signal in the group to drop out from the airwaves as the distance opens up. This is because of the RF shielding of your signal by the metal body of your car – even if you have a 5W hand-held radio. Your car's metal body is "killing" the signal. The rest of the group may stop hearing your transmissions and you'll stop hearing theirs. You could even be travelling in the centre of the group, yet this "cone of silence" may follow you! Yep, you'll be incommunicado! Meanwhile the rest of the group may still have communications between themselves, discussing where the next coffee stop is and where the lunch stop will be! You may be surprised at just how quickly this happens to you and just how long the silence continues, and it can happen to you even when you have clear line-of-sight to other vehicles! For example, I've lost contact with the signal from a hand-held radio in a car which was three hundred metres in front of me in clear line of sight, yet we couldn't talk or listen to each other, such was the reduction in signal from the hand-held radio used inside a vehicle.

Then there is the issue of battery life. Hand-held radios need to have their batteries recharged. The 5W units take a fair amount of battery power to operate and their batteries will need to be recharged more often. At lower transmission powers, the batteries will last a little longer between recharges, but still only for a certain amount of use. Also, the range is automatically reduced because of the lower transmission power.

There is just a little light at the end of the tunnel, m'lord.
There can be a small reprieve. Some hand-held radios have the option of using an external antenna, so if your car has a car-mounted antenna fitted per the guidelines in this article, you may achieve *some* of the benefits of a car-mounted radio by connecting the hand-held radio to the car's antenna, but keeping the following two points very much in mind:

1. The hand-held radio, with its purpose-designed smaller antenna, is designed for shorter range communications. Because of this, the receiver's sensitivity specification may not be as good as that provided by the car-mounted counterpart which has been designed for longer range communications. The reduced sensitivity of the hand-held radio automatically translates to a reduction in the operating range compared to the car-mounted radio, all other things being equal.
2. For the external antenna option to have any chance of success with the other car-mounted radios in the group, the hand-held unit would need to be a 5W unit to match the transmitted power of the standard UHF CB car radio. If its power is less than 5W, the chance of successful communication is small, as already discussed.

To conclude, hand-held radios are the *perfect* tool for communications for on-foot activities such as bushwalking, camping, building sites, etc, for when you need short-range communications for an outdoor group. They also generally work well in the marine environment for boat-to-boat and boat-to-shore communications. However, as discussed above, so much goes against hand-held radios when they're used in a car, making them an inefficient and ineffective communication device in comparison to an optimally installed car system. What we may *require* of them and what we actually *achieve* with them are two very different things! Further, don't put too much store in planning for a hand-held radio used in your car to be suitable for communications in emergencies.

Its range will *always* be less than the car-mounted system, *so it may not do the job in the situation*. Added to this is that 5W hand-held radios are typically 50% higher in cost than car-mounted radios, so in comparison, you pay a lot more for them and you get a lot less performance. In a nutshell? Hand-held radios are good for on-foot or on-water activities. For on-road activities, use a car-mounted system as described here. You'll never be disappointed!

You've had some Raid experience m'lord?
Yes Baldrick. Let me give you an example. The writer participated in Raid Arnhem 2016, comprised of 75 2CVs. The writer estimates that approximately two-thirds of the vehicles were fitted with poor quality UHF radio systems – regardless of the cost of those systems! The key shortfall was the poor quality and clarity of the transmitted voice signals, as received by the other participants! This would have been due to either poor quality radios, poor quality antennas and/or poor quality antenna installations, or non-optimum 12V supply connection points, or a combination of all of these. A proportion of those also suffered from reduced range operation, which would have been caused by antenna placement.

The converse? Only around one-third of the radio systems in the group provided very good or better voice quality, clarity and range.

Finally, the quality of the equipment and the quality of the installation is vital to maximise the success of your UHF radio system for the intended purpose – car to car communications. We need maximum clarity at maximum range to ensure the message can get through, especially emergency messages. Don't let anything interfere with that goal.

A final summary, m'lord:

Doesn't he know it is my turn now? Alright, go ahead?
The purpose of this article is to inform car owners about the pathway to achieve maximum range and maximum signal quality and clarity from a car-mounted UHF CB radio installation. The article has also discussed some of the pitfalls involved with the installation of car-mounted radios and why it's possible for even the most sophisticated and expensive car radio system to have its operational performance severely curtailed by installation deficiencies. By following the information and guidelines herein, you'll always transmit the strongest-possible and clearest-possible signal for others to receive, and you'll always have the longest-possible communication range. You will enjoy the very best of vehicle-mounted UHF CB radio systems! Utopia! Yes, indeed.

Let me suggest a couple of equipment options, m'lord.

Well, alright, but hurry. We have to finish off.
The following two products are suggested, as they provide excellent solutions. The writer has no association with the manufacturers or retailers mentioned. However, the writer can confidently recommend these products, being they are the exact products installed in the writer's 2CVs. Installation photos follow. These are modern, high-performance, state-of-the-art products from long-standing manufacturers. If the writer was buying another UHF CB radio and antenna today, the items below would be purchased again.

Recommended Vehicle-Mounted UHF CB Radio:

Figure 2

Uniden UH8060S radio.

This is a compact, extremely reliable, exceptionally well-engineered and manufactured radio with many practical and useful functions and features. The audio quality of the transmitted voice is excellent. A key feature is that it has its display panel and all controls positioned on the microphone for very easy access.

From this electronics engineer, you cannot buy better because there is no better UHF CB radio on the planet! This is the "gold" standard.

The dimensions of the radio are 100 x 95 x 24 mm (a.k.a. Mini Compact Size).

The radio comes with a five-year warranty.

Manufacturer's details: https://uniden.com.au/product/uh8060s-au

An example of a supplier of this radio is:

https://www.gadgetcity.com.au/uniden-uh8060s-80-channel-5w-uhf-lcd-speaker-radio-5-yr-wty-p-3178.html?zenid=63c966298fa94c49bae0b3b262bb2689

Recommended Vehicle-Mounted UHF CB Radio Antenna:

Figure 3

RFI Technology Solutions CD63-71-53 antenna.

This is a modern, state-of-the-art, ground-independent, very well engineered vehicle antenna. Again, you cannot buy better because there is no better all-round 6dB-gain UHF CB antenna available. It is the ideal vehicle-mounted antenna. It uses the MBC mounting style for attachment to a mounting bracket as shown in the photos on the following pages. It uses a flexible stainless-steel whip which may be easily unscrewed from its mounting base for stowage. Hand-tighten only.

This antenna is fitted with 5 metres of coaxial cable but no connector. It requires a PL259 plug connector fitted to the end of the cable *after the cable is cut to length* to suit your installation.

To obtain maximum reliability, signal quality and long life, use a *professional*-quality *crimped* PL-259 connector, not a soldered connector. These can be supplied and fitted by a professional UHF CB radio supplier who provides vehicle installation services.

Manufacturer's details for the CD63-71-53 antenna:

https://www.rfi.com.au/CD63-71-53

An example of a supplier of this antenna is:

https://buya2wayradio.com.au/RFI-CD63-71-55-UHF-CB-ANTENNA (yes, that's -55, not -53).

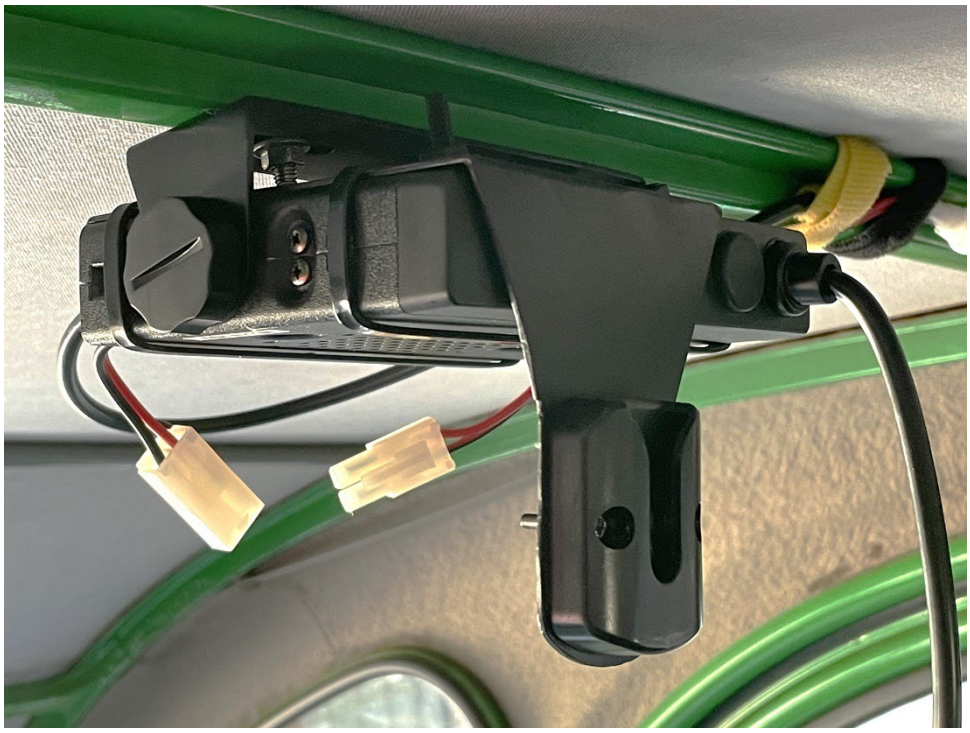
Order antenna **CD63-71-53** which is supplied with a removable MBC mount.

To repeat, if placing an order for this antenna, ensure the part number ordered is **RFI Technology Solutions model CD63-71-53.**

An item of interest in the above photograph: Because of the antenna's mounting location (on the bulbar), the owner *will* experience rearward range and clarity problems because of shielding by the vehicle's body, whether the owner knows about it or not!

A set of photos of the writer's vehicle installations follow.

The photo above shows the radio's supplied mounting bracket secured centrally to the roof cross-member. The bracket remains permanently in the 2CV. Also visible are the radio's power connector and antenna coaxial cable, all allowing the radio to be easily and quickly removed from or refitted to the vehicle.



The photo above shows the radio fitted in its mounting bracket and held by its two thumb screws. At the front is the metal bracket made by the writer to hold the microphone holder. The bracket is fixed to the radio case with the two cable ties shown, one on each side of the thumb screw. When the radio is removed, the bracket comes with it. When the vehicle is not being used, the writer disconnects the 12V line to the radio (the two white nylon connectors).

The photo above shows the radio fitted in its mounting bracket, the microphone placed in its holder, and the antenna connected to the radio via the coax cable and PL-259 plug. The nylon power connectors are shown disconnected. Because the radio draws a very small standby current from the battery when it is turned off (like most vehicle electronic devices), the writer disconnects the power connector while the vehicle is garaged. (A better option would be to mount a toggle switch somewhere around the dashboard area to turn the radio power on-off, saving the need to disconnect-reconnect the nylon connector. Visible on the microphone are the push-to-talk switch, the control buttons and the LCD display. (All controls are conveniently on the microphone. There are no controls on the radio unit itself.) Also showing at upper right is the inline fuse holder supplying the 12V power to the radio. Ensure the radio has its own (dedicated) fuse and is wired *directly* to the battery posts. No other point.

The radio is mounted with its speaker facing *downwards* so the speaker is **close** to the ears of **both** front seat occupants, aiding the clarity of the received signals for those travelling in the silent(!) space of a 2CV without having to strain the ears.

Removing the radio: Removing the radio from the vehicle, such as for security reasons, takes a short 20 seconds. Disconnect the power connector and the antenna connector, and unscrew the two thumb screws on the sides of the mounting bracket. Yes, it's that easy. Reverse the steps to refit it.

The photo above shows the writer's antenna mounting bracket fitted to his orange 2CV, positioned forward on the inside edge of the metal roof structure on the passenger's side. It locates the base of the antenna in line with the *highest point* on the vehicle. Ensure the mounting face of the antenna bracket is **dead horizontal** so the antenna is positioned at true vertical to maximise communication range. Yes, check with the spirit level as it's vitally important. The bracket shown here is the writer's experimental one! The second bracket, in the photos which follow, has less holes drilled in it!

Photo 3: Antenna mounting base fitted to the mounting bracket with the antenna whip removed. Ensure the coaxial cable is not kinked, jammed in, deformed, caught, folded in a tight radius or damaged in any way to ensure it operates at its maximum performance with maximum reliability and longest life. The antenna base's chromed mounting fixture, shown above, is a well-engineered fitting.

A small plastic dust cap (not shown in these photos) is supplied with the antenna for screwing onto the threaded mounting base to protect it from damage from dust, stones, water etc whenever the antenna is removed for stowage.

Photo 4: Close-up of antenna MBC mounting base, minus the plastic dust cap.

Photo 5: Another view.

Photo 6: Antenna screwed onto its mounting base. Hand-tighten only.

Photo 7: And another.

Photo 8: One more, just to be sure!

LIST OF ARTICLES BY THE WRITER

The articles written by the writer, listed below, may be freely downloaded from either of the following club websites by clicking on the adjacent links and locating the articles. Both websites maintain the latest revisions of the articles. Before using the articles, please ensure the latest revisions are being used, as the articles are updated on an as-required basis by the writer and given new revision numbers.

Citroen Classic Owners' Club of Australia: Technical Articles

Citroen Car Club of Victoria: Tech Tips

1. 2CV 40-Litre Fuel Tank
2. 2CV API GL-4 Gearbox Oil
3. 2CV Battery Charging Circuit
4. 2CV Battery Problems Solved
5. 2CV Brake Saga
6. 2CV Buyer's Questions
7. 2CV Carburettor Cover Screws
8. 2CV Carburettor Jets and Adjustments
9. 2CV Engine Problems
10. 2CV Fuel Filter
11. 2CV Fuel Gauge and Battery Meter
12. 2CV Gearbox Output Hubs
13. 2CV Gearbox Unwinding Debacle
14. 2CV Hard Luck Stories
15. 2CV Headlights Improvement
16. 2CV Ignition Coil
17. 2CV Knife Edges Replacement
18. 2CV Low Oil Pressure Beeper and Lights On Beeper
19. 2CV Maintenance - Part 1 of 2
20. 2CV Maintenance - Part 2 of 2
21. 2CV Oil Breather
22. 2CV Oils and Maintenance Advice From Burton
23. 2CV Points Ignition Reinstallation
24. 2CV Roof Rack
25. 2CV Secondary Choke Butterfly Adjustment
26. 2CV Spare Parts to Carry
27. 2CV Valve Clearance Adjustment
28. 2CV Workshop
29. Better Fuel Hose Clamps – **applies to all vehicles**
30. Better UHF CB Car Radio Performance – **applies to all vehicles**
31. Ignition Coil Ballast Resistors – **applies to all vehicles**

FINAL STATEMENT

My acknowledgement and grateful appreciation is given to the web sites
from which photos/drawings/diagrams have been sourced.

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Before using the information in this article, ensure the latest revision is being used.

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