

A photograph of a woman with blonde hair sitting in the driver's seat of a dark-colored car. She is smiling and holding a black handheld radio to her mouth. A young girl with brown hair in a ponytail, wearing a white soccer jersey with black stripes on the sleeves and black shorts, stands outside the car. She is leaning her arm on the car door and holding a green and yellow soccer ball. The background shows some trees with yellowing leaves, suggesting an autumn setting.

# Installing a Mobile Radio in Your Vehicle

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Having ham radio in your car is another way to stay in touch with friends, or to call for assistance during an emergency. Because modern radio equipment is compact and lightweight, you might think installing it a vehicle would be straightforward. However, modern vehicles are compact, use lots of plastic, and are loaded with their own technology, which presents a unique set of challenges for the mobile ham radio operator. Here are some things to consider when planning your mobile setup.



Gooseneck mounts allow you to reposition gear quickly and easily. [Image courtesy of Lido Radio]



Cup holder mounts offer easy installation. [Image courtesy of Lido Radio]

## Safety First

I cannot emphasize enough the importance of having a safe, solid installation that provides minimal distraction to the driver. Loose or weak mounting systems can turn a transceiver into a projectile should you be involved in an accident, must stop short, or are forced to make an evasive maneuver. A poorly located radio can distract you while driving, or severely affect your ability to safely control your vehicle. Safety should also be a concern when considering antennas for your vehicle. They should be mounted in a way where they cannot fly off the vehicle and potentially injure or kill someone. Antennas should also be mounted so as not to strike objects or people as you drive past them.

## Location is Everything

Where you locate your transceiver is important. It should not interfere with normal driving, yet it should be in easy reach, and not draw your eyes away from the road. Sit in the driver's seat and look around the cockpit for an area that could be a good location. You may want to recruit a friend to hold the radio in place while you sit in the driver's seat and get a feel for how the radio will affect your ability to drive, or the comfort of your passengers. Some transceivers allow you to mount the radio in an out-of-the-way location, such as under a seat, and you place a control unit near the dashboard.

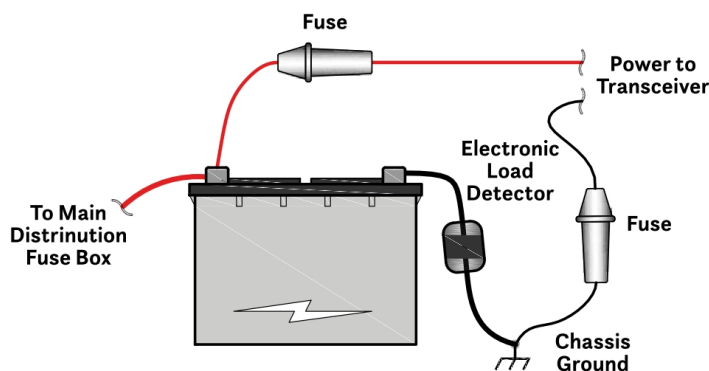
Most transceivers have speakers mounted inside the bottom portion of the cabinet, which directs the sound toward the floor of the vehicle and not the driver. Depending on the interior noise level of your vehicle, you may find an external speaker useful. Some are amplified, giving more volume to the audio output of the radio. Again, these devices should be securely mounted and positioned to direct sound to the driver without being a driving distraction.

There are many types of mounting hardware that can provide a solid physical mount for your equipment, while providing access to the controls with minimal distraction. Some of these are flexible gooseneck devices, mounting hardware designed to work within a cup holder, and floor brackets. Depending on your needs, fabricating skills, and budget, you could employ custom mounting designs for your specific installation. Again, safety must be your primary focus when designing a custom installation.

## Making Connections

Electrical connections are important. These need to be solid, so they don't fail or short circuit. Be sure to use the proper gauge wire to meet the current demands of your equipment. A short circuit or lightweight wire is a potential fire hazard. DO NOT use existing vehicle wiring.

Direct to battery or tapping a fuse block are the most common methods for powering your radio. Connecting directly to the vehicle's battery aids in reducing interference from other circuits, but requires getting the cable through the vehicle's firewall, which can be challenging in newer vehicles because more "stuff" has been built into the engine and passenger compartments on either side of the firewall. Connection to the battery should be fused as close to the battery as possible, as shown in the drawing, so power to the circuit is cut at the source in the event that the current draw is higher than the value of the fuse.



When powering your mobile radio by connecting it directly to the vehicle's battery, place the fuses as close to the battery as possible. In the event that the current draw is higher than the value of the fuse, the fuse will do its job and break the circuit.

Soldering your connections is a time-honored ham skill, but don't overlook crimping, which is used throughout the automotive industry as well as in military, aerospace, and medical applications. When you use quality connectors with the right tools and properly prepared wires, crimping will produce a solid, long-lasting connection.

In addition to the electrical connections, the RF connections must be solid to minimize interference to other electronic devices, prevent shock, and get the signal from the transceiver to the antenna. Having a good solid connection from the coax braid to the metal of the vehicle at the antenna will ensure maximum performance from your antenna. Poor connections are almost always at fault when troubleshooting a mobile radio installation that is not working properly.

## Antenna Choices

Antenna mounting offers choices as well as challenges. Drilling a hole in the vehicle's body is a personal choice with many factors to weigh. You certainly don't want to drill a hole in a leased vehicle, because it could cost you when you return it to the dealer. If you intend to mount an antenna on a family vehicle, you may want to consult the other drivers in the family. Your choice of mounting hardware depends on the antenna as well as the location on the vehicle where it will be installed. When routing the coaxial cable from the antenna to the radio, be sure it won't get crimped when closing doors or tailgates. It should also be routed in a way that does not allow water to enter the inside of the vehicle.

Magnetic mounts (mag mounts) are a good alternative for mounting VHF and UHF antennas and, in most cases, don't require a physical ground connection at the antenna. The space between the magnet and the actual metal of the vehicle acts as a capacitor, coupling the antenna to the vehicle's body. This is critical to the performance of the antenna. In a mobile application, the entire body of the vehicle acts as the "other side" of the antenna (like a dipole). In cars with plastic or composite bodies, this can be an issue that may require a separate wire from the ground side of the antenna to the nearest bit of metal. And even then, the metal must be electrically connected to the ground (-) side of the car battery.



Mag mounts are a popular choice for mounting VHF and UHF antennas.

HF antennas are generally large and heavy, with a lot of wind resistance, so you should avoid using a mag mount in these types of installations. As a rule, for best performance and safety, HF antennas should use a solid physical mount with a good ground connection.

## Finishing Touches

Paying attention to details can dress up your installation. Using cable ties or wraps keeps "electrical spaghetti" neat and out of the way. Screw covers add a custom finish to exposed hardware. Microphone holders keep your microphone secure and out of the way, but accessible when needed.

### When In Doubt, Pull Over

Always put safety first. Mobile operating does not always mean operating while in motion. If traffic or road conditions present a hazard to driving, then pull over to a safe location to make your contact.