

# Quick-Install-Uninstall VHF/UHF Mobile Radio

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## Introduction

Installing a radio transceiver can be time consuming and often one encounters a number of problems such as vehicle navigation, RF sensitive equipment, and antenna mounting. The system in this project can be quickly installed and a quickly uninstalled.

## Possible Vehicle Damage

There are some new vehicles that are so sensitive to RF, a mobile radio cannot be installed in any manner whatsoever. The navigation system on some vehicles can be damaged if the radio transceiver is not installed correctly. To install a radio transceiver correctly, there must be a good antenna ground, such as the trunk lip mount, where the screws are set directly into the car metal, and the radio power must be connected directly to the battery.

## Power

The first problem to overcome is connecting the radio directly to the battery, which involves passing the cable directly through the firewall. There are air bag sensors and other sensitive electronics that run through the firewall. Care must be taken to avoid them. The problem is overcome by adding a 7 ah gel cell battery to the radio box. The battery can be charged from the cigarette lighter through a cable, a 1N5404 diode for isolation, and a fuse for protection. The 0.55 volt loss from the diode is negligible. The charger should be unplugged when the radio is in use in order to have complete isolation from the vehicles electrical system. Furthermore, the battery makes the system quick to install and uninstall. The radio used for this project is the Yaesu FT-8900R. Power consumption and estimated battery life is as follows:

<u>Mode</u>	<u>Measured Current Draw</u>	<u>Estimated Battery Life (7 ah battery)</u>
Receive	0.27 amps	25.9 hours
5 Watts Output	2.15 amps	3.26 hours
10 Watts Output	2.86 amps	2.45 hours
20 Watts Output	4.01 amps	1.75 hours
50 Watts Output	7.42 amps	0.94 hours (56 minutes)

The formula for calculating battery life is: Battery life (hours) = Battery Amp Hour / Current

## Antenna and Mount

The second problem to overcome is the antenna. Placement of the antenna can be a problem. Do not place the antenna close to a satellite receiver antenna or a remote start antenna or a navigation GPS antenna, otherwise the output of the transceiver can overload these systems. If a trunk lip mount can be installed easily, there will be little problems with ground coupling. However, if the only other choice is between drilling a hole in the roof or use a magnet mount, use the magnet mount. A

glass mount antenna may also work well. There will be an efficiency loss because of the capacitive ground coupling when using magnet mount or glass mount.

The magnet mount antenna system chosen for this project was the Diamond Antenna MR77. First, two pieces of two inch wide clear adhesive tape was fixed to the bottom of the magnet mount to prevent scratching of the vehicle. One of the problems with using a magnet mount for this project is that the RG58C cable is too thick to fit through the door opening. So, a "C" series Teflon cable was needed. The RG58C cable was cut from the magnet mount. The ends of the remaining 2 inches of RG58C cable were stripped as was the end of a 6.5 foot "C" series Teflon cable, which terminated in an MSA/UHF female connector. The center conductors were soldered together. Then, it was covered with heat shrink tubing. The braids were stretched over the heat shrink tubing. Additional braid was taken from the left over RG58C cable and wrapped around the heat shrink tubing and braids from each end of the cables to completely cover the center insulation. A small amount of solder was made to connect all braids. A 4" length of heat shrink tubing was placed over the entire assembly. After mounting the antenna on a mini van, the SWR was measured as 1.2:1 at 146 MHz. and 1.1:1 at 149 MHz.



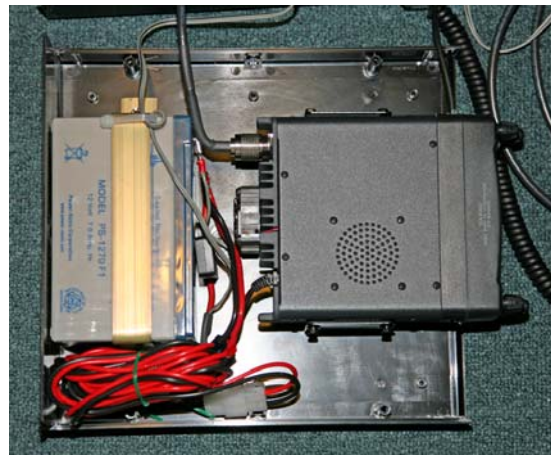
MR77



"C" Series cable spliced

## Cabinet and Construction

In the middle of winter, it was doubtful that a power saw outdoors would function well enough to make this a woodworking project. Instead, an off the self plastic case was selected. The battery, radio, mike holder, and components were mounted in the plastic case. The front was cut out leaving extra space for adequate ventilation. Velcro hook strips were added to the bottom. See photos below.





## Parts List

Yaesu FT-8800R, 2m / 70cm, 5-50 watt radio

Diamond MR77 Dual band magnet mount 19.5" antenna (1/4 wave-2m, 1/2 wave-70cm)

Power Sonic PS-1270F1, 12 volt, 7.0 AH, sealed gel cell battery

DM-4-039-K, Plastic Enclosure, 4.38"H x 10.40" W x 11.46" L

1 inline fuse holder

Cigarette light plug

1N5404, 3A Diode

1 set of Anderson power pole connectors

2 female disconnects 0.25"

6-32 x 1/2" screws, lock washers, and nuts as needed

## Second Configuration

The second configuration uses a Kenwood D710 transceiver and a GPS receiver for APRS. The radio is mounted in a plastic case. The radio head, speaker, microphone clip, and GPS receiver are mounted on a wooden board, which is mounted to a cup holder mount.

