

# Hints & Hacks

Share your hints (or hacks) with fellow hams by sending them to [ota@arrl.org](mailto:ota@arrl.org) or *On the Air*, ARRL, 225 Main St., Newington, CT 06111.

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*A typical NMO antenna mount. This one already has the coaxial cable and connector attached.*



## HACK

### Mounting an Antenna to the Body of your Car

For many hams, drilling a hole in a vehicle for a mobile antenna is an unthinkable task. It's not uncommon for hams to wait until the vehicle is either paid off, beyond factory warranty, or appears to have little resale value.

However, there's no denying the superior performance of a through-chassis antenna. At VHF frequencies and above, the metal body of the vehicle helps to create a reasonably uniform radiation pattern in all directions, which is exactly what you want when operating on the road.

Perhaps the most popular through-chassis antenna mount is the *NMO*, a Motorola design. Many ham and

commercial antennas are offered in the *NMO* style (see below left). The *NMO* connector is robust enough to support almost any size VHF/UHF mobile antenna, and it offers a waterproof feedthrough for the coaxial cable to your radio.

Many *NMO* base options exist. You can purchase a preassembled unit, or you can assemble your own. I opted to make my own, so I can select the type of coax, length, and connector. With sensitive and RF-noisy circuits in today's modern vehicles, I always opt for double-shielded, braid-over-100%-foil coax such as LMR-240.

If you're going to attach an *NMO* mount to your car, you need the right tool. Enter the *NMO hole saw*, which attaches to any electric drill (see above right). This ingenious little device is a far cry from a standard hole saw. The center bit provides a pilot hole for the larger  $\frac{3}{4}$ -inch diameter cutter. The cutter is designed for shallow metal, as many vehicles only have 20-gauge body panels. Additionally, this tool has a "shoulder," so that the saw cannot plunge into the vehicle and cause damage to



*An NMO hole saw.*

the interior. Quality saws of this type can cost as much as \$65, so consider splitting the purchase among your friends who may also want to install *NMO* antenna mounts.

Since all work is performed from outside the vehicle, it is imperative that all inspections be performed before you drill. You must stay clear of all vehicle reinforcement structures, cables/wiring/raceways, and take care not to interfere with retractable sun/moon roofs.

Once you've marked and cut the hole, use a swab to apply some rustproof paint to the exposed metal edges. Install the *NMO* mount and make sure the rubber O-ring is facing down. This makes




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a watertight seal. Tighten firmly, but do not over-tighten. I typically tidy up with some car wax, but only on the paint, not on the connector. Then I install the antenna and perform any necessary tuning. The result is a clean, high-performance installation you'll be proud of (see above). When installed atop an SUV or van, it is nearly invisible.

When the time comes to sell or trade your car, simply unscrew the NMO mount and cut the coax. A low-profile rubber plug may be inserted and painted to match the color of the vehicle.

**Al Rabassa, NW2M**

**HINT**  
**Keeping Parts Together**

I use this convenient solution for small parts (nuts, bolts, etc.) in my toolbox and go-kit. Obtain a few prescription bottles. Drill a small hole in the center of each cap and screw the caps together with a screw and nut (near right). Now you can keep the screws in one bottle and the matching nuts in the other — always together whenever you need them! As shown at far right, I keep my spare PowerPole housings in one bottle, and their matching pins in the other.

**Tony Yamin, KF6JS**

*Drill a small hole in the center of each cap and screw the caps together with a screw and nut.*



*Put the bottles together and your parts — and their matching components — will always be at hand!*