

do's - and a few don'ts

**HAM RADIO VHF/UHF
MOBILE INSTALLATION**



by

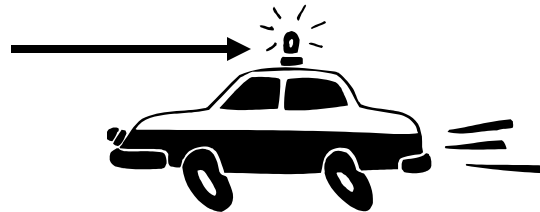
Mike Baker, W8CM

Three categories:

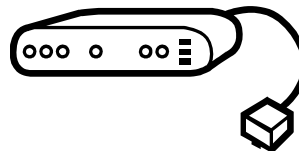
1. DC power



2. Antenna



3. Radio



INSTALLING THE DC POWER IS LOTS OF FUN –



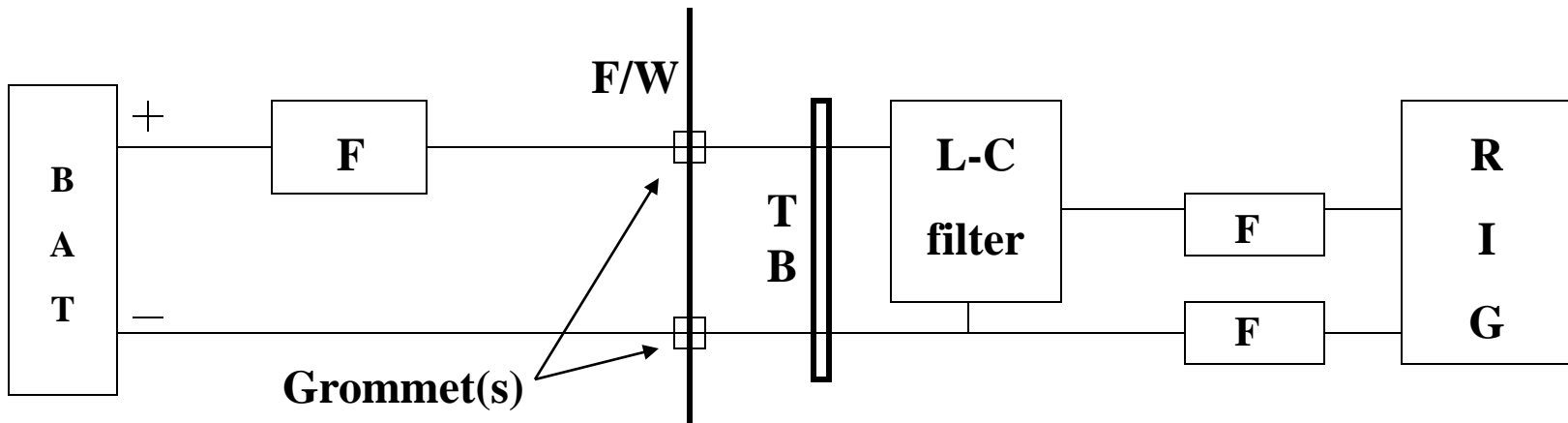
**INSTALLING THE DC POWER IS LOTS OF FUN –
REALLY !**



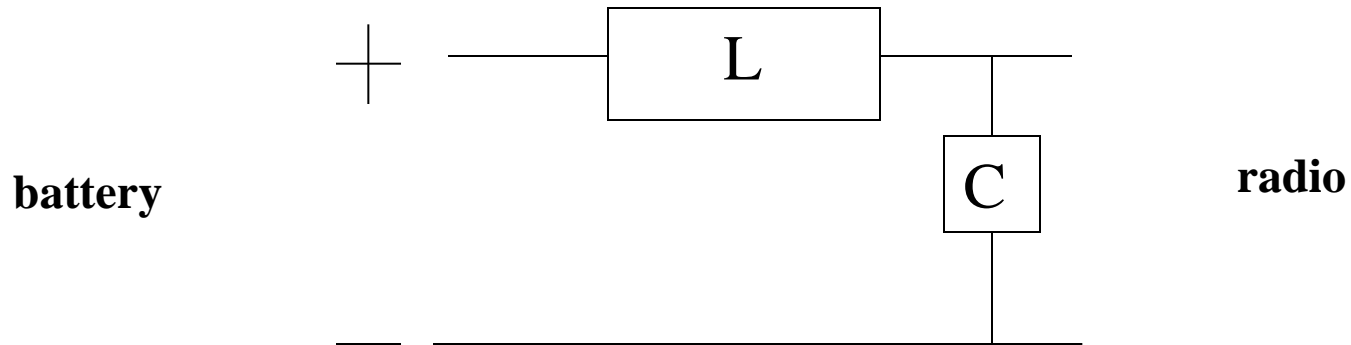
DC POWER



1. Safety precaution – remove all jewelry !!!
2. Connect directly to battery, use ring terminals
3. Use heavy gauge stranded copper wire; crimp connections
4. Fuse(s) close to the battery
5. Alternator noise filter



L-C ALTERNATOR NOISE FILTER

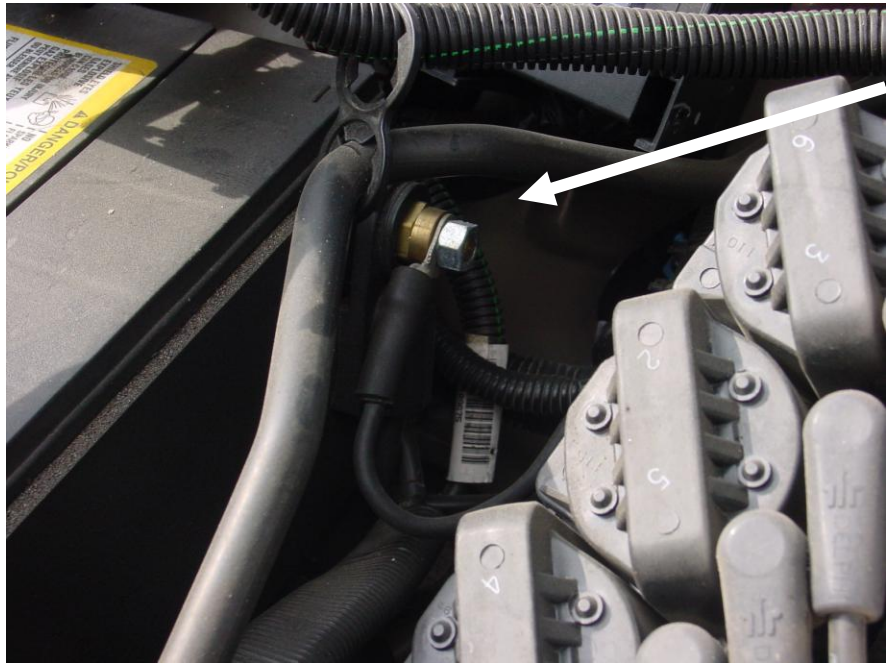


STOPS YOUR RADIO FROM “WHINING” AT LOW ENGINE RPMs
(THE WHINING IS VERY ANNOYING TO THOSE LISTENING TO
YOUR TRANSMISSIONS, AND COULD GET YOU UNWANTED
ATTENTION FROM THE REPEATER TRUSTEE)

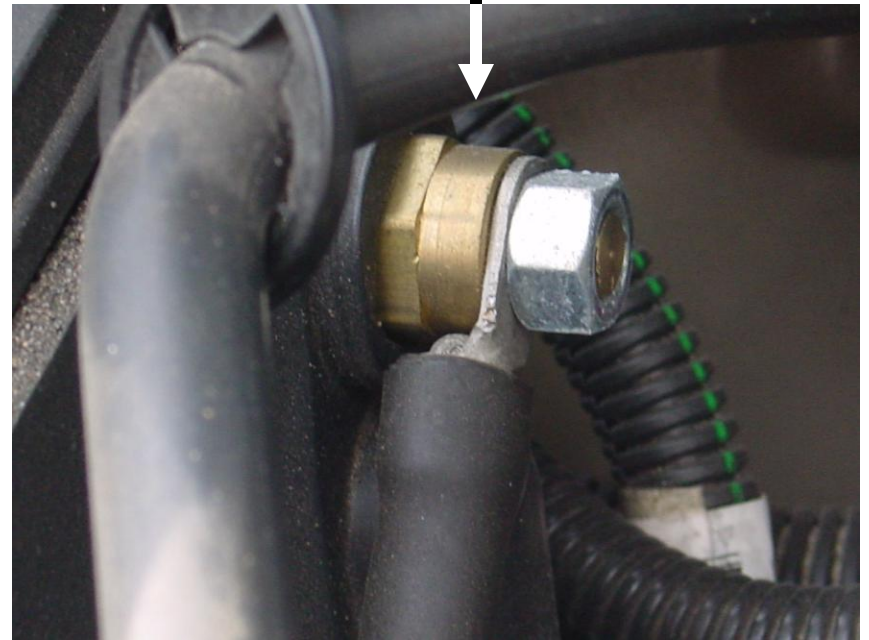


**Conveniently
located positive
tap, with fuse**

2005 Chevrolet
Impala



**Negative connection,
using adapter bolt**



2005 Chevrolet
Impala



positive tap with fuse,
plus negative tap

2003 Dodge
Grand Caravan

ANTENNA



1. Common antenna types
2. How much gain is enough?
3. Is it possible to have too much gain?
4. “Standard” antenna mount
5. Installation

INSTALLING THE ANTENNA IS LOTS OF FUN



**INSTALLING THE ANTENNA IS LOTS OF FUN –
REALLY !**



COMMON ANTENNA TYPES

1. NO GAIN
2. GAIN

NO GAIN = “SHORT”

QUARTER WAVE (19” on 2m)

GAIN = “LONGER”

MOST POPULAR: 5/8 WAVE (43” on 2M)

FUNDAMENTAL PHYSICS

VERTICAL MOBILE ANTENNAS
REQUIRE A 'GROUND PLANE' FOR
PROPER PERFORMANCE

This affects the mounting location, and
hence the selection of the antenna gain

WHERE BEST TO MOUNT THE ANTENNA?

CENTER OF ROOF TOP 😊

ANY WHERE ELSE 😞

ROOF TOP:

1. HIGHEST LOCATION
2. OMNIDIRECTIONAL PATTERN

OTHER:

1. LOWER LOCATION
2. DISTORTED RADIATION PATTERN

*Then again, there is the “real world”:
in other words, the “garage door clang-clang factor”*

Oh, by the way:

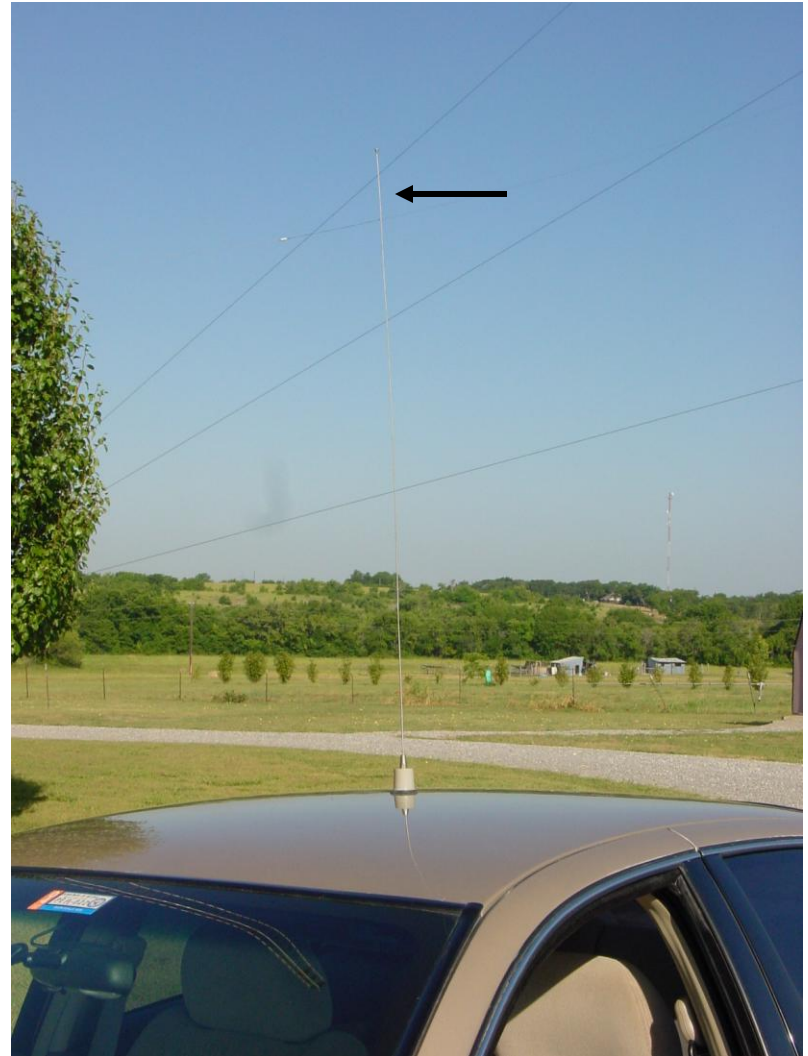
mag mounts, clip-on's, etc. are poorer choices
than a “real” mount

2M TOP 1/4 WAVE



CLANG !

2M TOP 5/8 WAVE



CLANG – CLANG !

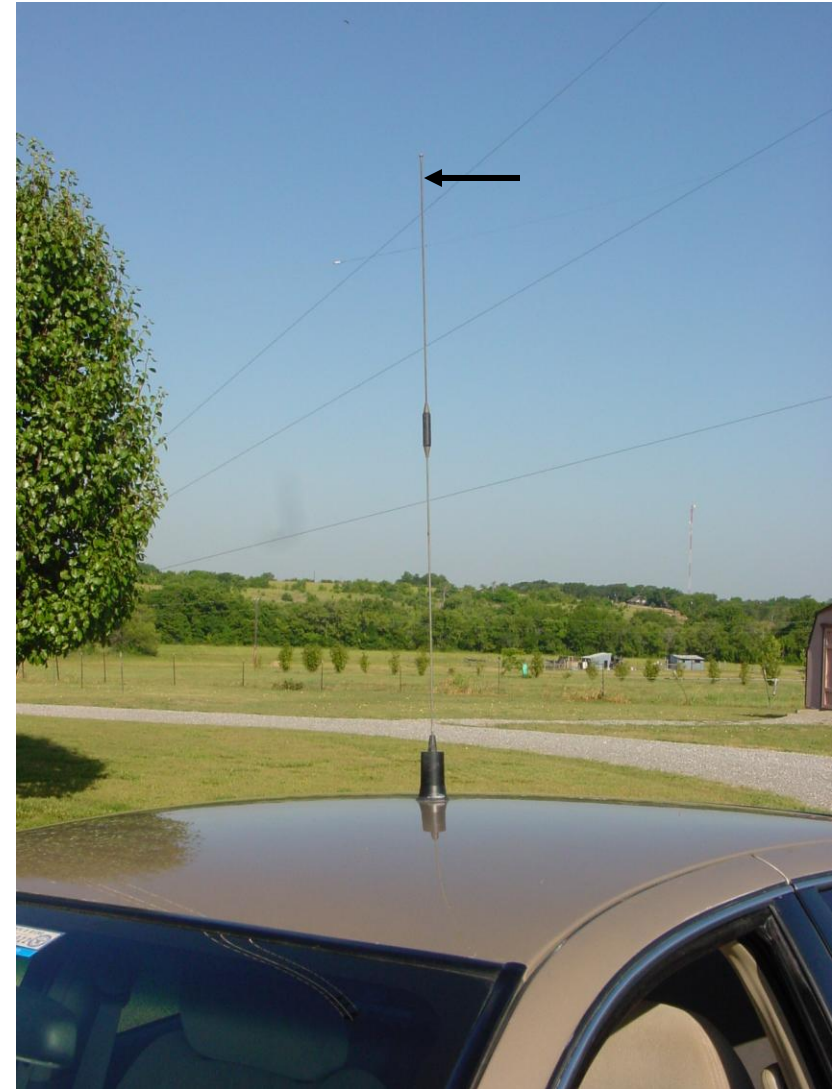
DUAL BAND 'SHORT'

19" – 2M UNITY, UHF GAIN



DUAL BAND 'LONG'

37" – 2M GAIN, UHF GAIN

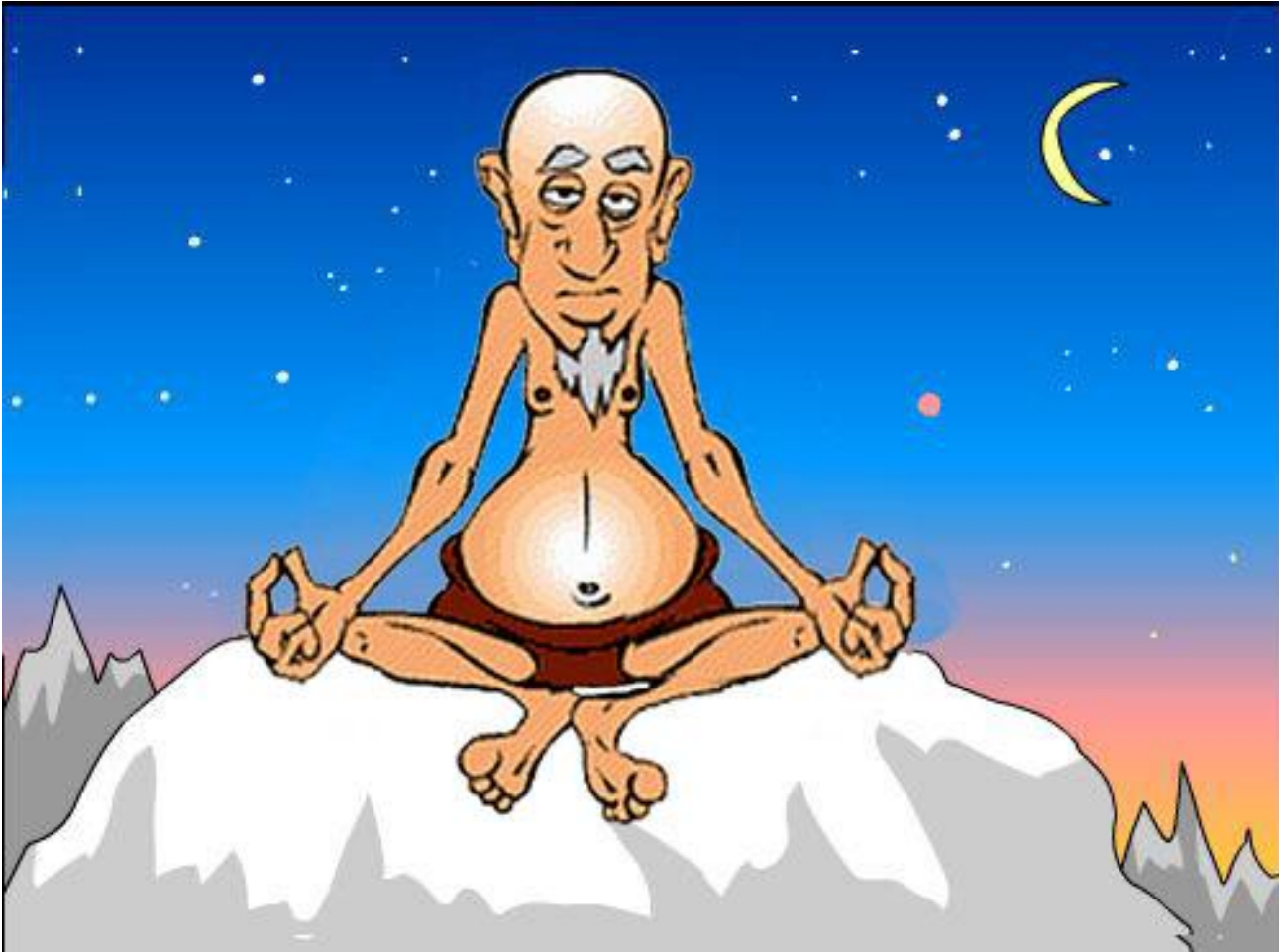


SO, WHAT IS THE GAIN OF A MOBILE ANTENNA?

How many dB?

THE ANSWER:

IT DEPENDS !



remember me? (the rf guru)

Mobile Antenna “Gain” – this is tricky

“Unity Gain” = defined as a $\frac{1}{4}$ wave, not a $\frac{1}{2}$ wave

so..... 0 dBq

The $\frac{5}{8}$ wave antenna is advertised as having 3 dB gain;

this is in reference to a $\frac{1}{4}$ wave, not to a $\frac{1}{2}$ wave!

So.... 3 dBq, NOT 3 dBd

What the heck, the bigger antenna has more gain, in any event.....
but is more gain a good thing?.....

IT DEPENDS !

YOU CAN HAVE “TOO MUCH” GAIN

“gain” is actually achieved by lowering, or “flattening” the radiation pattern

There are situations where a $1/4$ wave antenna will outperform a $5/8$ wave antenna, etc, depending on:

- Terrain
- Distance between mobile and base/repeater
- Height of base/repeater antenna

Antenna Installation

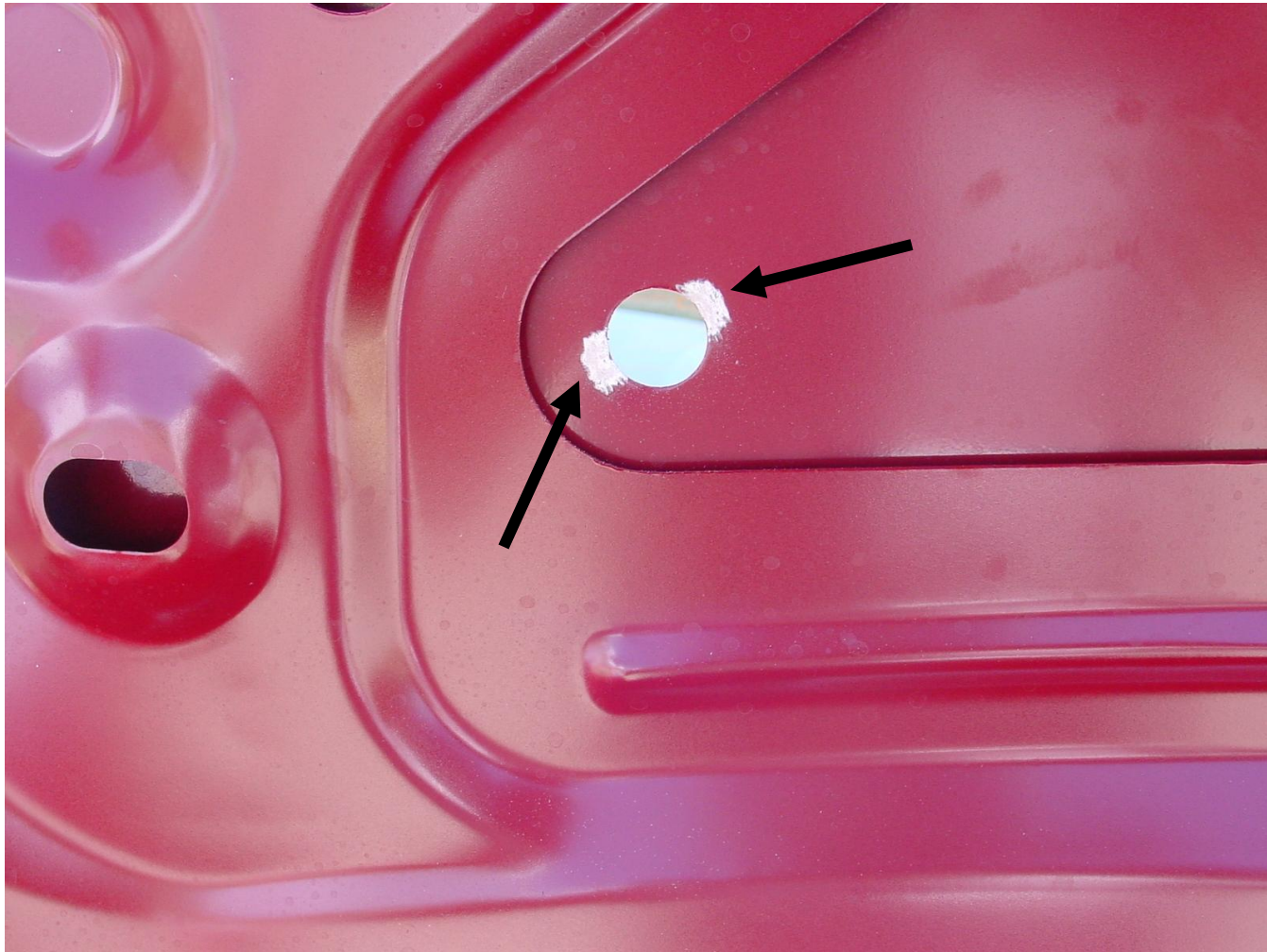
The standard – NMO mount – one “universal” mount that accepts many different antennas, fits in a $\frac{3}{4}$ ” hole

Anyone know what the NMO stands for?



“ New MOtorola ”

After punching* a nice $\frac{3}{4}$ " diameter hole in the car metal, clean the paint away on opposite sides underneath: this assures a good ground connection for the antenna and coax cable

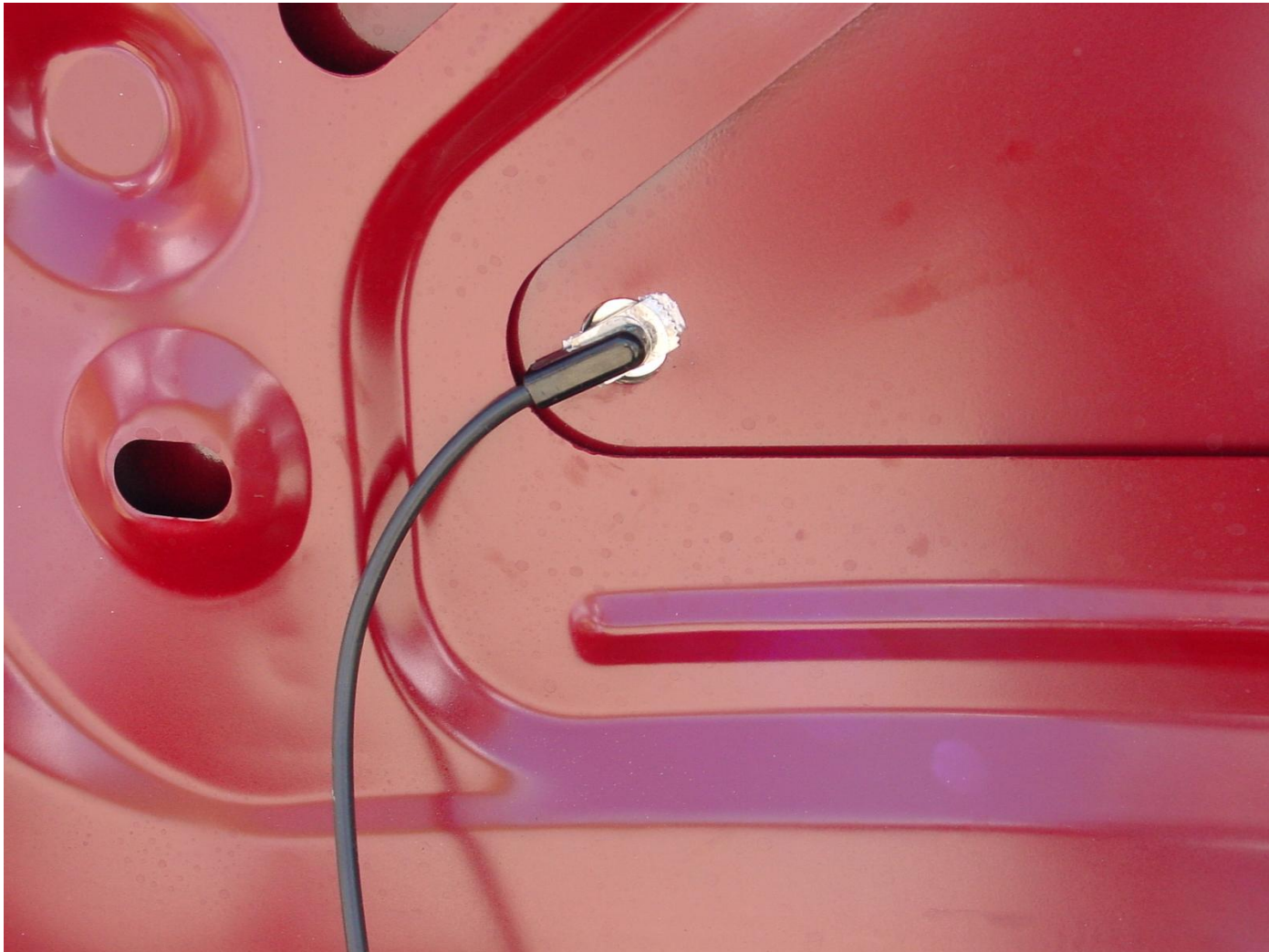


Insert the coax from the top

**** do NOT put the coax connector on first ! ****



The mount will “snug up” into the $\frac{3}{4}$ ” hole when the top nut is tightened. Be sure to align the inside clamp teeth on the bare metal. Seal the area with silicone goo.



“ How do I get the coax from the antenna to the radio? “

Step – by – step procedure:

Disassemble the car

- weatherstripping around doors
- Trim pieces along door, center column

(take heart: this is easy once you've already put that $\frac{3}{4}$ " hole in your shiny new car)

Run the coax in nooks & crannies

Reassemble the car

RADIO INSTALLATION

EVERY ONE IS DIFFERENT !

So, there are no “rules”- only tips

➤ SINGLE UNIT (rare these days)

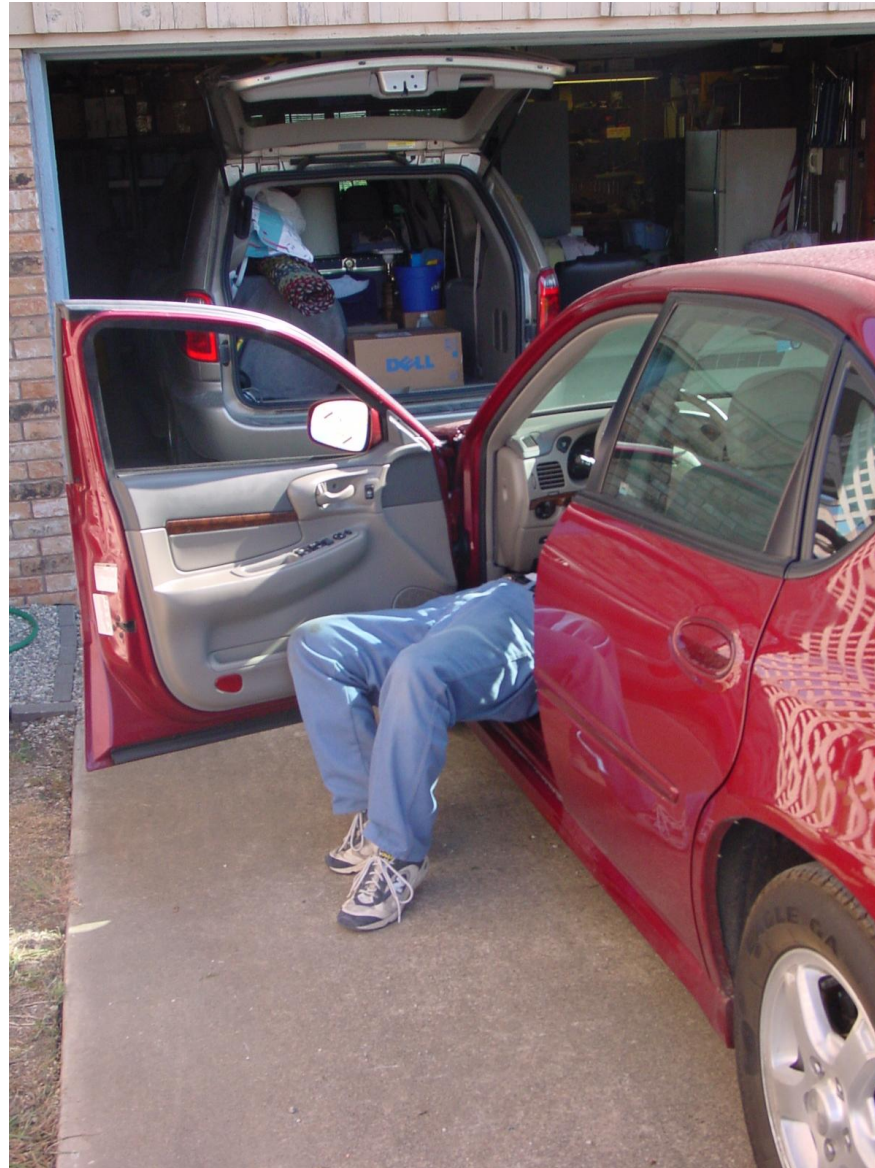
➤ SEPARATED UNIT

common now: control head and radio unit

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REALLY !**



MAIN CONSIDERATIONS

- EASY TO REACH CONTROLS
- HEAT DISSIPATION FOR RADIO
- CONTROL UNIT OUT OF DIRECT SUN
- EXTERNAL SPEAKER
 - Highly recommended
 - Place it where you can see it

**W5VAL mobile
Radio, control head, mic.**



W5VAL mobile - speaker



KB8TJ mobile Radio, control head, speaker, mic.



KB8TJ mobile Radio, control head, speaker, mic.



W8CM mobile control head, mic.



W5VAL mobile Radio, mic.



OK, NOW IT IS YOUR TURN !



tnx es 73 de W8CM