VHF 101
A First Look at Weak Signal VHF and Up

CSVHFS: VHF 101

Loosely speaking, Amateur Radio is divided into two large pieces.

- The High Frequencies
- The VHF Frequencies and above. We often just call this VHF. Or sometimes we use VHF+ to make certain that the reader understands that we are talking about the VHF frequencies and everything above

The High Frequencies(HF)

- Strictly speaking, HF is from 3 MHz to 30 MHz. However, we normally include our 160M band, which is actually a Medium Frequency (MF) band
- In General, the HF bands tend to be long range bands

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The Bands used for Contesting

- 160M - 1.8 MHz to 2.0 MHz
- 80M - 3.5 MHz to 4.0 MHz
- 40M - 7.0 MHz to 7.3 MHz
- 20M - 14.0 MHz to 14.35 MHz
- 15M - 21.0 MHz to 21.450 MHz
- 10M - 28.0 MHz to 29.7 MHz
- Novice/Technician CW Sub-Band 28.0 to 28.3
- Novice/Technician SSB Sub-Band 28.3 to 28.5

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The Bands not used for Contesting

- 60M - Our only channelized band--5 channels, USB Only, 100 watts ERP, very specialized band
- 30M - 10.100 MHz to 10.150 MHz--200W MAX Power--CW ONLY
- 17M - 18.068 MHz to 18.168 MHz--CW Sub-band 18.068-18.110
- 12M - 24.890 MHz to 24.990 MHz--CW Sub-band 24.890-24.930 MHz

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WHY VHF???

1. VHF is FUN
2. ALL the VHF spectrum is available to the Technician Licensees
3. VHF is challenging—anyone can work Austin to Baton Rouge on 40M(day) or 75M(night). It is a bit harder to do that on 2M or 432.
4. Antennas are smaller, lighter, and cheaper than what you see on HF
5. When the VHF bands open, you can work DX with a small to medium station.

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The VHF Frequencies(and UP)

In General, the VHF+ bands tend to be short range bands

THE BIG THREE:

- Six Meters (6M) – 50 MHz to 54 MHz (The Magic Band)
- Two Meters (2M) – 144 MHz to 148 MHz
- The 70cm Band – 420 MHz to 450 MHz (also just called 432)

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The VHF Frequencies (and UP)

Six Meters (6M) – 50 MHz to 54 MHz (The Magic Band)

- The Weak Signal part of the band is 50.0 MHz to about 50.5 MHz
- CW ONLY from 50.0 MHz to 50.1 MHz
- DX Window from 50.1 to 50.125 MHz--DX ONLY here
- SSB Calling Frequency is 50.125 MHz
- RANGE--This band can be very long range, sometimes thousands of miles. This band is called the Magic Band because it exhibits all the propagation modes that are seen on the HF bands AND all the modes seen on the VHF bands.

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The VHF Frequencies(and UP)

Two Meters (2M) – 144 MHz to 148 MHz

- The Weak Signal part of the band is 144.0 MHz to about 144.5 MHz
- CW ONLY from 144.0 MHz to 144.1 MHz
- SSB Calling Frequency is 144.200 MHz
- RANGE– Modest station 150 – 200 miles. Specialized station 400 + miles on a daily basis

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The VHF Frequencies(and UP)

The last VHF band

The 222 MHz band – 222 MHz to 225 MHz

- 222 is a great band. It is a quiet band and normally, you can work about as far on 222 as you can on 2M
- Calling Frequency is 222.100 MHz, both CW and SSB

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The VHF Frequencies (and UP)

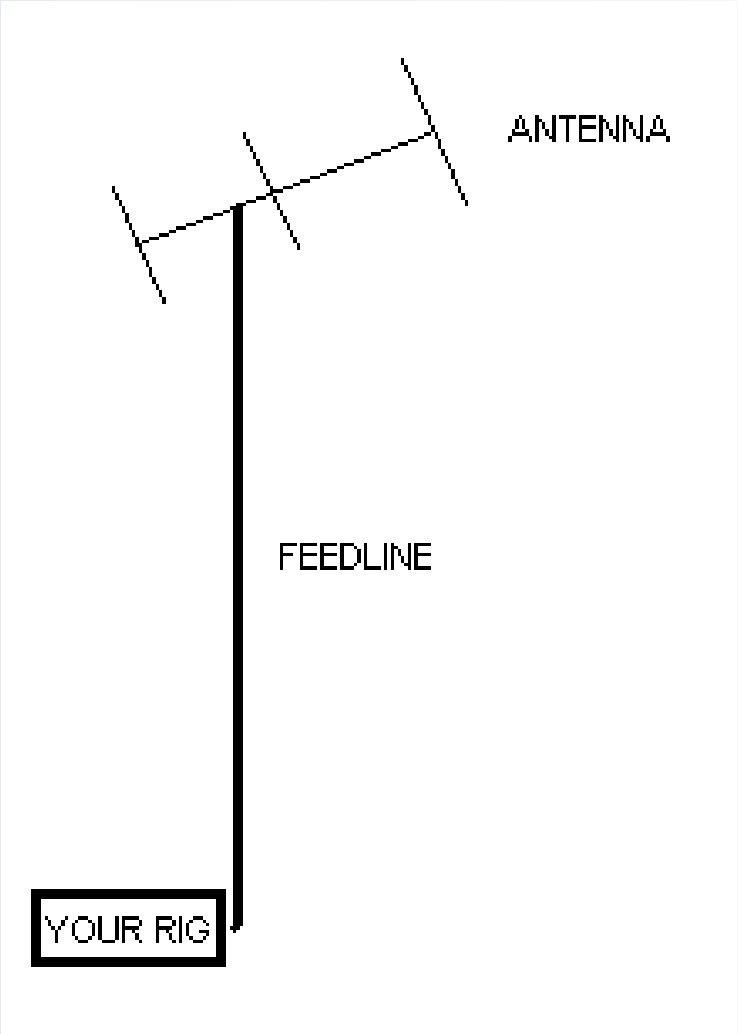
The 70cm Band – 420 MHz to 450 MHz (also just called 432)

- Most weak signal @ 432.000 – 432.200 MHz
- Call Frequency 432.100 both CW and SSB
- Range slightly less than 2M band with equal equipment

The Microwave bands

- The 902 MHz band
- The 1296 MHz band -- The most popular Microwave band
- The 2304 MHz band
- The 3456 MHz band
- The 5760 MHz band
- The 10 GHZ band
- Even Higher Bands

A Simple VHF Station v1.0



A Simple VHF Station v1.0

LMR-400 Coax



VHF Transceiver



VHF Horizontal Loop

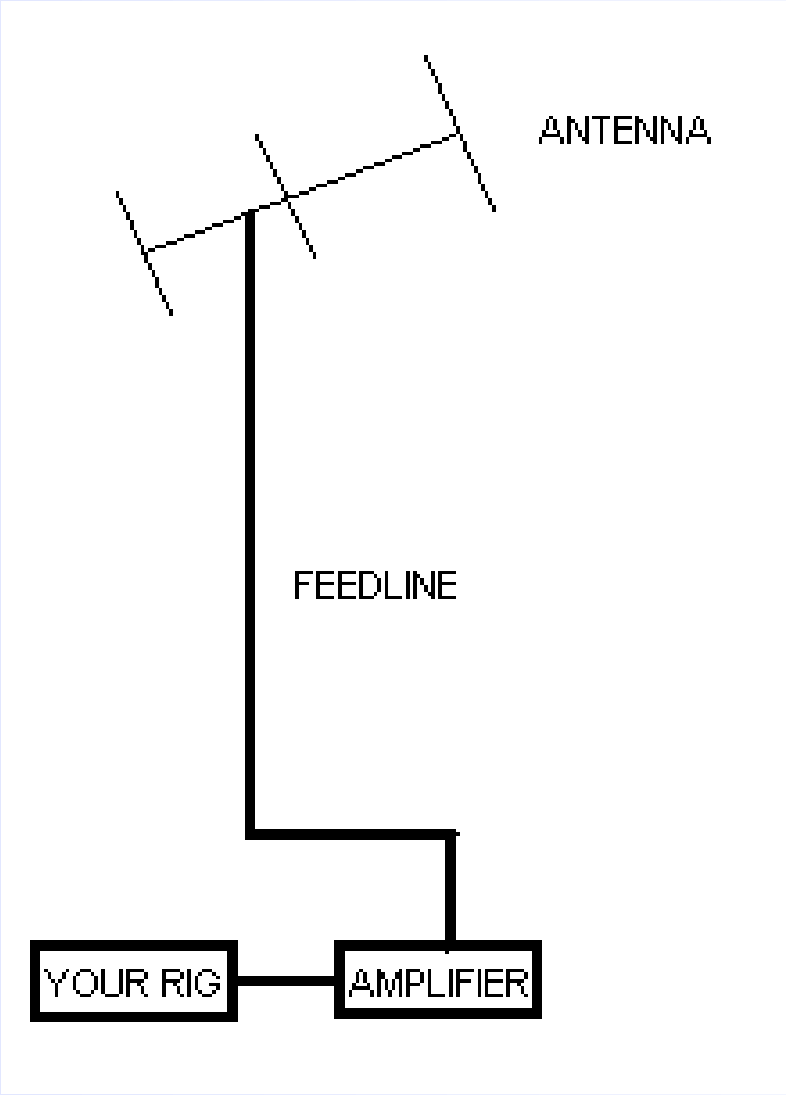


or

VHF Yagi Antenna



A Simple VHF Station 1.1



A Simple VHF Station 1.1

VHF Yagi Antenna



LMR-400 Coax



VHF SWR Meter



Coax Jumper



VHF Transceiver



Coax Jumper



Power Amplifier



A Simple VHF Station

The Rig:

- Single Band Rigs
  - Icom 551 and 551D -- 6M only rigs(not currently made)
  - Icom 251 and 251H -- 2M only rigs(not currently made)
  - Icom 471 and 471H -- 432 only rigs(not currently made)
  - Others
- Multi-band Rigs:
  - Icom IC706MK2G -- HF + 6M + 2M + 432(Semi-Obsolete)
  - Icom IC7000 -- HF + 6M + 2M + 432
  - Yaesu FT100D -- HF + 6M + 2M + 432(Obsolete hard to find)
  - Yaesu FT736R -- 2M + 432 + two options (6M, 222, 1296)
  - Yaesu FT857D -- HF + 6M + 2M + 432
  - Yaesu FT897D -- HF + 6M + 2M + 432
  - Kenwood TS2000 -- HF + 6M + 2M + 432 + 1296(Optional)
  - Icom 746 & 746Pro -- HF + 6M + 2M(not currently made)

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The Antenna:

ALL Weak Signal work uses Horizontal Antennas

- The Dipole: Just two lengths of wire, OK for 6M, especially portable type use
- The Loop antenna: Basically a dipole bent into a circular shape, OK for 6M, 2M, and 432. A good mobile antenna
- Beam Antennas? Normally a Yagi, but could be a Quad. Beams are the norm for fixed station operations.

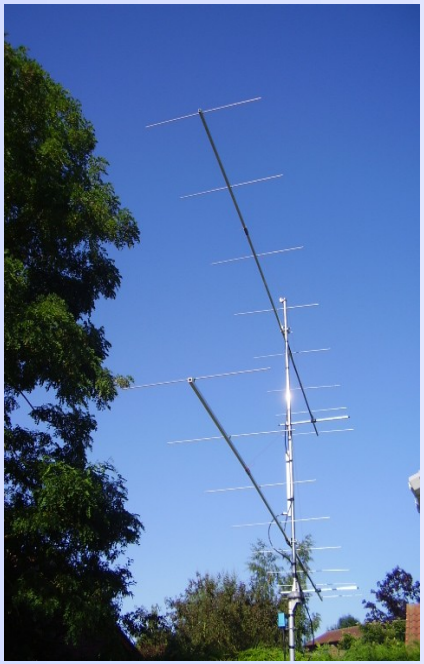
A Simple VHF Station

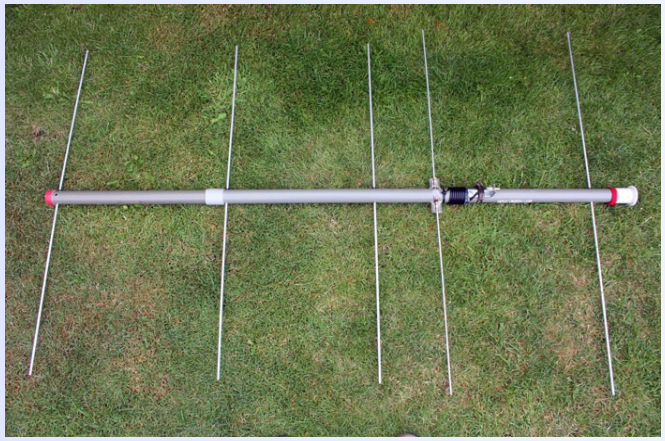
The Feedline:

- Carries the signal from the antenna to the receiver on RX
  Carries the RF from the transmitter to the antenna on TX
- Feedline LOSS is your enemy. The less LOSS the better
- In General, the smaller diameter the coax, the more loss. Larger diameter coax is better
- RG-58 -- Small coax, very lossy, can be used for short jumpers
- RG-8X -- A bit larger, still fairly lossy, good for jumpers
- RG-8 -- Approximately 1/2", now obsolete
- LMR-400 -- Approximately 1/2", lowest loss of that size
- Heliax -- Lowest loss of all coaxial cables. Common sizes are
- 1/2", 7/8", and 1 5/8". Requires special connectors

The biggest mistake that I see from VHF Rookies is using crappy feedline

VHF Fixed or Mountaintop Station:









CENTRAL STATES VHF SOCIETY

Rovers--Put Your Station in Your Vehicle

1. A VHF Rover is a vehicle with VHF gear installed.
2. Rovers are not usually seen in HF, but they are an important part of VHF.
3. You can take your rover station to a rare grid and pass out contacts to others.
4. You can rove in the contests. Every time you enter a new grid, you get to contact everyone again.
5. A rover does not have to be a complicated setup. KISS

Rovers-Put Your Station in Your Vehicle

The Simple Rover

Simple Rovers rigs cover 6M, 2M, and 432. Others optional.

Antennas: are normally whips, loops, or small yagi's

6M Whip antenna -- 5/8th wave 2M FM antenna is perfect for 6M

2M Loop antennas -- There are several different choices here

M2 HO loop -- www.m2inc.com

KU4AB loop -- www.ku4ab.com

KB6KQ loop -- www.loopsnmore.com

Delbert loop -- www.delbertloops.com

432 Loop antennas -- Same manufacturers as above

Dual 2M + 432 loop: E-Factor loop by WT4E www.efactorantennas.com

Cheap Yagi's by WA5VJB: www.wa5vjb.com/yagi-pdf/cheapyagi.pdf

These are superb small yagi's for rover operations. You will get a chance to build one of these after lunch.

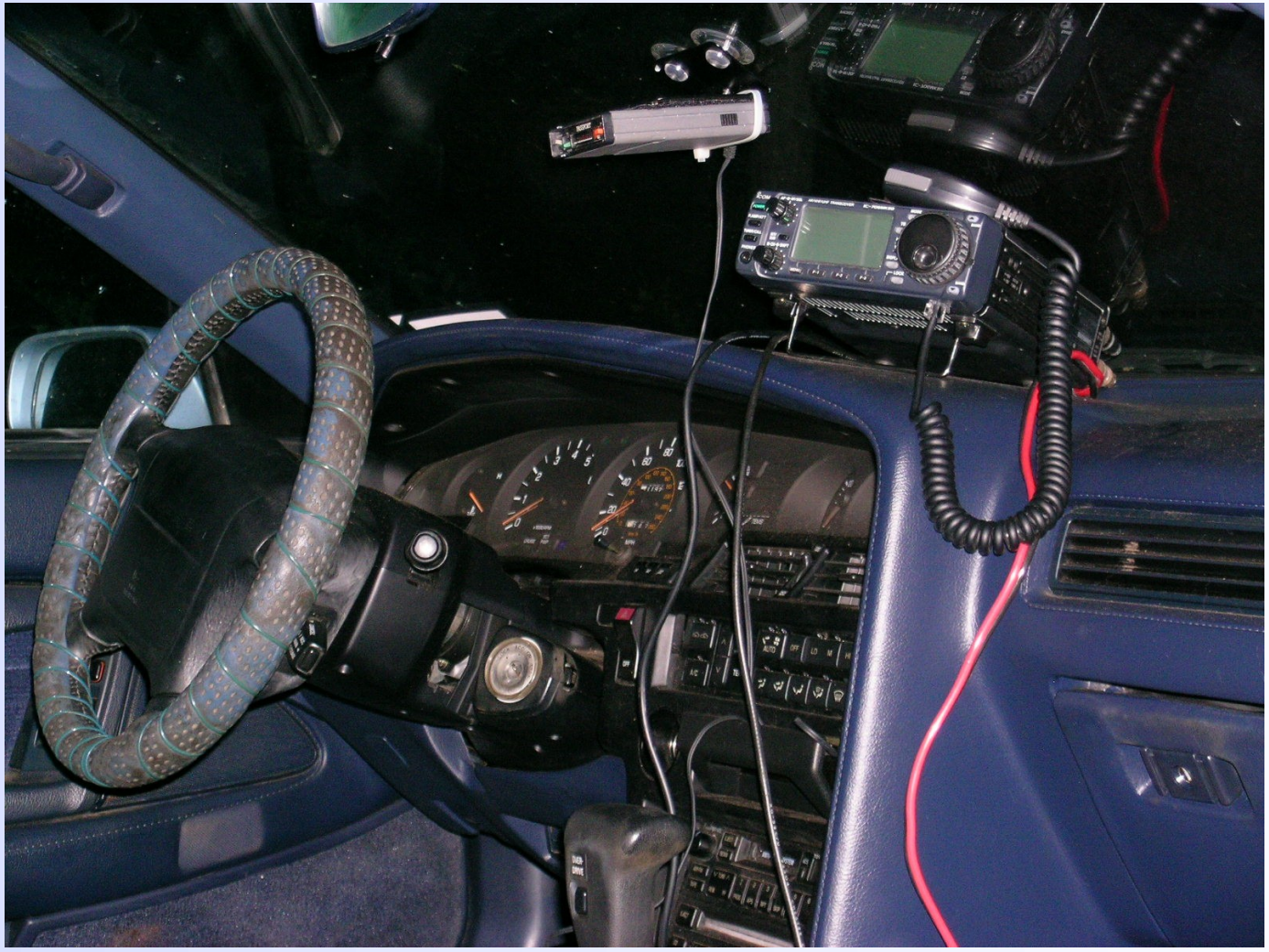
Mag Mount 6, 2 and 432 on Simple Rover #1



Mag Mounts on Simple Rover #2



Inside Simple Rover #1



Rovers-Put Your Station in Your Vehicle

Simple Rovers:

- As stated, these rovers are “quick and easy” to set up.
- They are a good way to introduce roving fun to those that have never done roving.
- This is a quick way to add some points and maybe a multiplier or two to your score or your club score.
- Roving is really a blast. You should try it.

Questions?

Thank You!