



# Chapter 5

## HF Station Installation

Mobile Installations

RF Grounding

RF Interference



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# Mobile Station Installation

## Power Connections

- 100 Watts  $\Leftrightarrow$  20 Amps  $\Leftrightarrow$  AWG 12 wire (or larger)
- Low voltage while transmitting causes instability
- Cigarette lighter – 5 Amps or less
- Positive and Negative connections directly to battery

## Antenna Connections

- HF mobile antennas are a small part of a wavelength
- Low antenna Z means high currents
- Antenna current flows in vehicle body
- Low efficiency due to high losses



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# Mobile Interference

Vehicles are full of RF noise sources

- Spark plugs and ignition wiring
  - Alternators
  - Computers
  - Accessories, Fuel Pumps, Window Actuators
  - Poor connections between metal body parts
  - Static discharges
  - Other vehicles
- Bypass capacitors and line filters can reduce most noise



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# Station RF Grounding

The safety ground in house wiring is not a very good RF ground

- Grounding of equipment is used to keep all equipment cases at same potential
- Ground wires should connect to a common point – Star Grounding – to avoid a *Ground Loop*
- Long ground wires are ineffective for RF
- An outside earth ground helps in lightning protection.



# RF Interference caused by Stations

- Fundamental Overload – nearby devices blocked or disrupted by strong RF currents
- Common Mode – RF conducted into devices over wiring and rectified in circuits
- Harmonics – Interference to TV and FM
- Rectification – Frequencies produced when RF conducts through bad connections (diodes)
- Arcing – Causes broadband interference to amateurs and consumers – buzzing sound



# What does RFI sound (or look) like?

- CW – clicks and thumps
- FM Phone – Buzzing in telephones, voices in FM receiver
- AM Phone – Overload quieting or voices in AM receiver or TV, Hum bars in analog TV
- SSB Phone – garbled or distorted voices in telephones, radios, and TV
- All – Motion controlled lights flash on or off; Garage doors open; Automobile computers freeze



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# Station RFI Suppression

Keep RF from entering the device

- Low-pass filters on telephones
- High-Pass filters or Band-Reject filters on TV
- Common-Mode chokes on power wiring
- Clamp-on Ferrite sleeves
- Capacitors across speaker wires or to ground at the amplifier

