

Ham Radio on a Budget

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Agenda

- Introduction
- Budget: high/ medium /low ranges
- Radio Selection
- Accessories
- Antenna System
- Conclusion

Introduction

Goal of presentation: Affordable starter station guidelines for new hams

In this presentation we will look at the following:

- 1) Stations possible with different budgets
- 2) Radios
- 3) Antenna system: Antenna, rotor, ground, feedline and antenna tuner
- 4) Accessories:, microphone, code key and cabling

HF Radios

Scenario #1 (I just won the lottery)

Transceiver: \$5000-\$18000

- Dual receiver (good for Dx pileups)
- Better performance: noise/sensitivity /selectivity
- More knobs, buttons, connectors in back

Accessories: \$1000 Microphone, keyer, etc.

Digital Setup: \$2000 Computer, screens, networking



\$18000 Cdn



\$12150 Cdn



\$5250 Cdn



\$6750 Cdn

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\$6200 Cdn

HF Radios

Scenario #1

Antenna: High performance antennas (\$5000-\$10000)

Tower + Install: 50ft (\$10000-\$15000)

Rotator: (\$3000-\$5000)

Antenna Tuner: (\$2000-\$5000)

Amplifier: Solid State unit (\$5000-\$10000)

Ant setup + transceiver → \$40000 to \$80000



\$15000 Cdn + \$2 x 10000 Cdn



\$8750 Cdn



\$6400 Cdn

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\$4850 Cdn

HF Radios

Scenario #2 (Modest or Average Station)

Transceiver: \$1400-\$2100

- Single SDR receiver
- Waterfall display
- Built in Antenna Tuner
- 100 watts
- 160- 6 meters

Accessories: \$200 Microphone, keyer, etc.

Digital Setup: \$300 Computer, screens, etc.



\$1400 Cdn



\$1600 Cdn



\$2100 Cdn

HF Radios

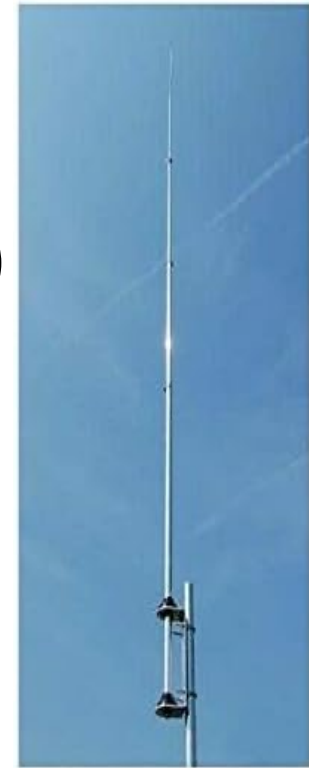
Scenario #2

- Good antennas: Dipole, 6TBV, DX Commander (\$200-\$500)
- Homebrew well performing antennas at fraction of cost

Optional: Antenna Tuner: (\$200-\$500)

- Most transceiver have built in antenna tuners
- Tuners can be bought second hand for a fraction or retail

Power Supply: 12 volts 35 amps



\$500 Cdn



\$500 Cdn



\$200 Cdn



\$280 Cdn



\$200 Cdn

HF Radios

Scenario #3 (limited Budget \$200-\$300)

Few radios are available new for this price range

→ other than kits or QRP radios

Check out fleamarkets in Quebec, Ontario and nearby USA.

Interesting deals appear on Kijiji and Facebook marketplace

HF Radios

What type of radio to buy?

Used radio is recommended

- Fully solid state
- Functional radio → have buyer show you radio working on all bands
- Buying in person is preferred to buying online from an unknown buyer

If buyer wants 75-100% of retail price → say no !

- Better to buy new radio, pay taxes + shipping → get 2-3 yr warranty

Post 1995 radios are best choices → SDR, waterfall display, built tuner

1975-1995 radios are OK as well → Digital display, WARC bands, filters

HF Radios

Radios that require more effort to operate than modern radios

- 1) Tube radios → I love tube radios; I do not recommend them as a first radio
 - Using a tube radios is like driving a car with a manual transmission
- 2) 1970-80's radios: hybrid mostly solid state with tube output stages
 - Final tubes are expensive and wear out quickly, if not handled properly.

Radios to avoid

- 3) Many overpriced radios from the 1980-90s (pre-SDR radios)
 - Often seller think because radios cost \$1500 new and they should get \$750-1000
 - Exceptions in footnote (*) below
- 4) Radios that look abused, missing knobs and are heavily scratched or rusted

* High performance radios such as Elecraft and Flex

* High end radios from top three manufacturers: Icom, Kenwood, Yaesu

All Radios

*Make sure radio has the following items (if it is used):

- Hand microphone (or desk microphone)
- Power cord (120 volts or 12 volts)
- Manual is nice to have (but if missing can easily be found online)

*These items can cost over \$50 each if you have to buy them separately.

Accessories

Some radios operate off of 120 volts and need no external power supply.

Many operate off of 12 volts and require a 12 volt (@ 23 amps) power supply

Almost all radios have a CW jack code keys & can be used with

- Straight key
- Keyer (i.e. Vibroplex bug)

Cabling in shack

- Power cords and power bar
- Coaxial cables to tuner and antenna switch
- Ground bar

Computer + Sound card for FT8, RTTY, N1MM+

HF Radios

Example #3a (\$100 used)

Kenwood TS-520 (1975 vintage)

- 100 watts, hybrid solid state
- SSB, CW, FT8 (with sound card)
- All bands (no WARC)
- Analog dial
- Large footprint



HF Radios

Example #3b (\$100 used)

Icom 730 (1985 vintage)

- 100 watts, solid state
- SSB, CW, FT8 (with sound card)
- All bands (including WARC)
- Small footprint



HF Radios

Example #3c(\$160 new, \$40-\$100 used)

Ubitx (2015 vintage)

- QRP radio (15 watts)
- SSB, CW, FT8
- All bands (including WARC)
- Kit or factory built
- Great for portable operation



Antennas

Cost Effective Antennas

1) Horizontal antenna (i.e. dipole or Hertz)

Pros:

- Simple, cheap, no ground needed
- Efficient, good gain

Cons:

- Requires real estate (66 ft for 40 meters)

→ Tip: Inverted 'V' configuration can improve real estate footprint

Dipoles can be homebrew very easily or purchased for around \$50

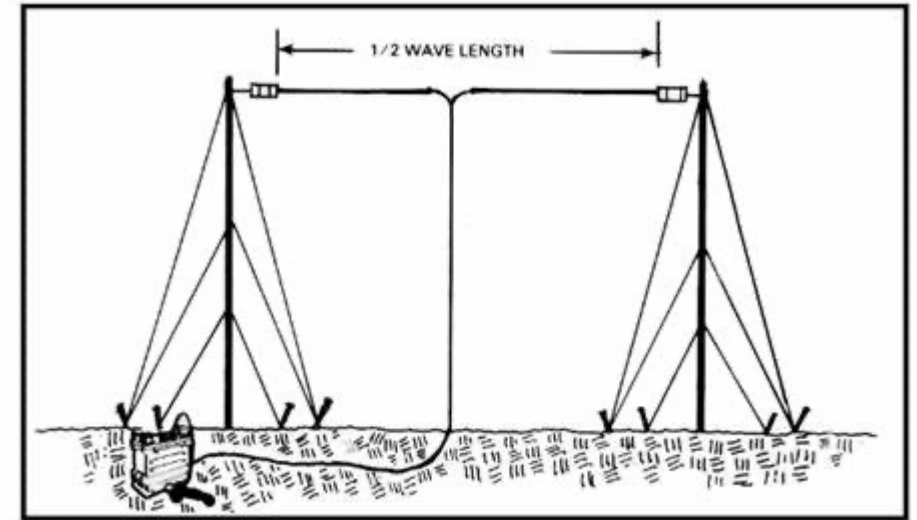


Figure 3-12. Center-fed Hertz antenna with two upright supports.

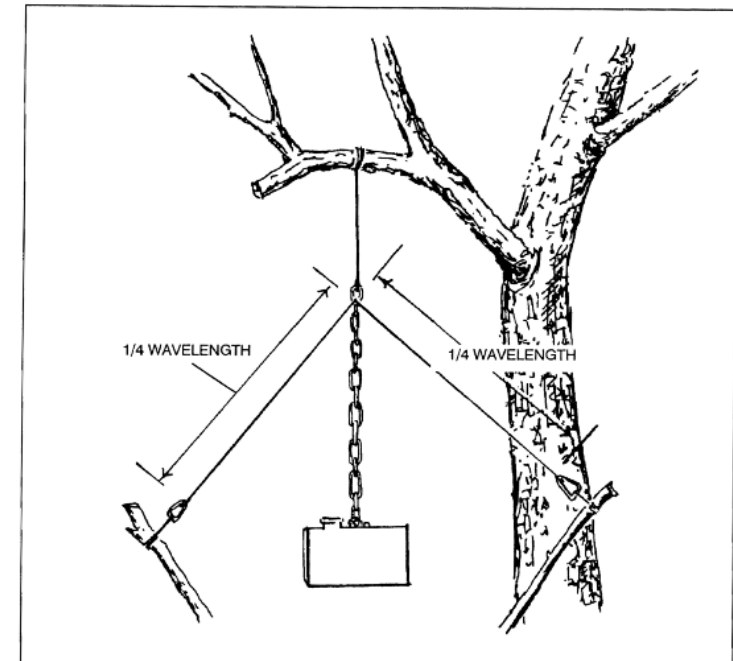


Figure D-10. Inverted Vee antenna.

Antennas

2) Vertical antenna (i.e. Marconi)

Pros:

- Real estate efficient
- Can be used for mobile and portable operation

Cons:

- Not as efficient as dipole, ground rod is not perfect counterpoise, several dB of RX/TX loss

→ Secret to better performance, use $\frac{1}{4}$ wavelength counterpoise radials instead of ground rod

→ Self standing antenna can be made with fiberglass rod (i.e. fishing pole)

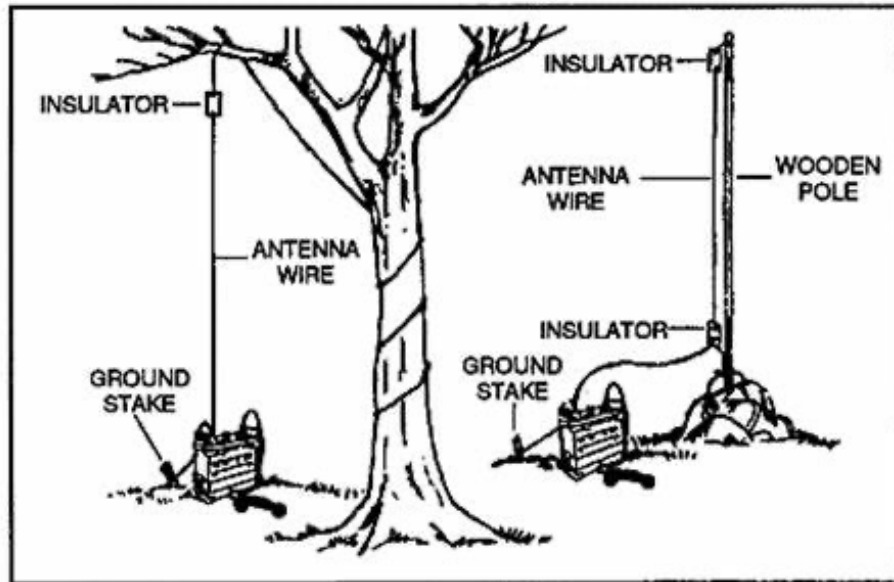
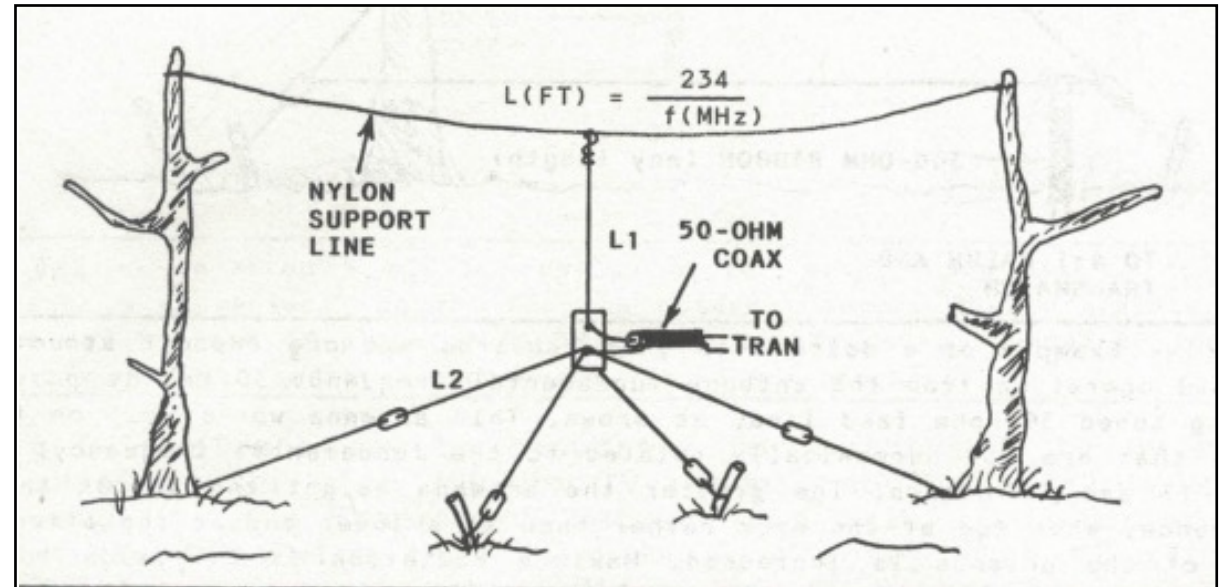


Figure 7-3. Field substitutes for support of vertical wire antennas.



Conclusion

Budgets for a Radio Station

Cost of station: \$200 to \$80000+

1) Money is no object (\$30,000-\$60000)

Buying the best possible

2) Budget with value (\$2000-\$2500)

Current technology for best value

3) Minimalist Station (\$200-\$300)

Through bargain hunting and homebrewing a good workable station can be had

Conclusion

General Guidelines

Buy a used radio with due diligence

- Buying from someone you know: best option

Make accessories are present:

- Mike, power cable, manual (optional)

Buy power supply and antenna tuner

- Second hand good option

Homebrew versus buy antenna

- Best investment of time vs money is decision factor here

Questions ?



"No Greg went to the ham auction this afternoon, to get rid of a couple old radios that were cluttering up the place...Oh I think I hear him pulling in now!"