Your First HF Station

Decisions, decisions, decisions

- Kit or Fully Assembled
- New or Used
- CW, Phone, or Digital
- QRP (low power) or Full Power
- Single or multi-band

New or Used

Used Kit – why is it even on the market? Does it work?

Used Prebuilt – Setup and Tuned

Make or Buy?

- Kits are not always the cheapest – required tools:
  - Soldering iron and Solder
  - Hand tools (clippers, desoldering device, long-nose)
  - Water saturated sponge or pad
  - Test equipment for tuning (signal generator, signal analyzer)
  - Practice and patience
  - Work area
  - Time

Mode:

CW, Phone, or Digital

Continuous Wave (CW): Morris Code requires a key and code skill

Low power transmitter and sensitive receiver can reach long distances

Phone requires a microphone and transmit key

Requires most transmit power and receiver sensitivity for long distances.

Digital requires an interface and a PC with sound card or laptop.

Allows for receiving very weak signals and a low power transmitter

Mode is your choice, depending on your interest and skill

Make or Buy

- Pre-built – More expensive?
- Plug and play
- Support
- Setup and tuned

Minimum Station Options

- Single-band CW Transceiver
- Single-band Phone Transceiver
- Digital Transceiver
- Multi-band Phone Transceiver

Transmitter Power Considerations

QRP: 10 Watts or less.

- Low-cost components
- Limited range depending upon band conditions

High Power: 1500 Watts legal maximum depending upon band and mode.

- High-cost components
- Power amplifier required
- RF safety considerations
- Serious DX operators

Typical QRP Frequencies

BAND	Frequency	
40m	*7090 kHz* 7285 kHz	**Technician: CW Only**
30m		
20m	14285 kHz	
17m	18130 kHz	
15m	*21285 kHz* 21385 kHz	**Technician: CW Only**
12m	24950 kHz	
10m	*28365 kHz* 28385 kHz	**Technician: CW, RTTY, Data, and Phone**
6m	50185 kHz	

Minimum Single-band CW Station Components

- Single-band CW Transceiver
- Key
- Speaker
- Power supply
- Antenna
- Feedline
- License
- Logbook
- Code lessons

Minimum Digital HF Station Components

- Digital Transceiver
- Laptop or PC
- Cables and Software
- Speaker
- Power supply
- Antenna
- Feedline
- License
- Logbook

Minimum Single-band Phone HF Station

- Single-band Phone (Single Side Band –SSB) Transceiver
- Microphone
- Speaker
- Power supply
- Antenna
- Feedline
- License
- Logbook

Minimum Multi-band HF Station Components

- Single Sideband Transceiver
- Microphone
- Speaker
- Power supply
- Antenna
- Feedline
- License
- Logbook

Low-Cost Antenna

Long wire between trees

Sloping wire antenna from one tree

Lowest Cost Multi-band Phone Station

- Kit Low Power (QRP) Transceiver
- Kit Antenna tuner
- Untuned long wire antenna
- 9:1 Balun
- 12-volt Brick Power Supply
- Earphone, mic and Push To Talk (PTT) switch

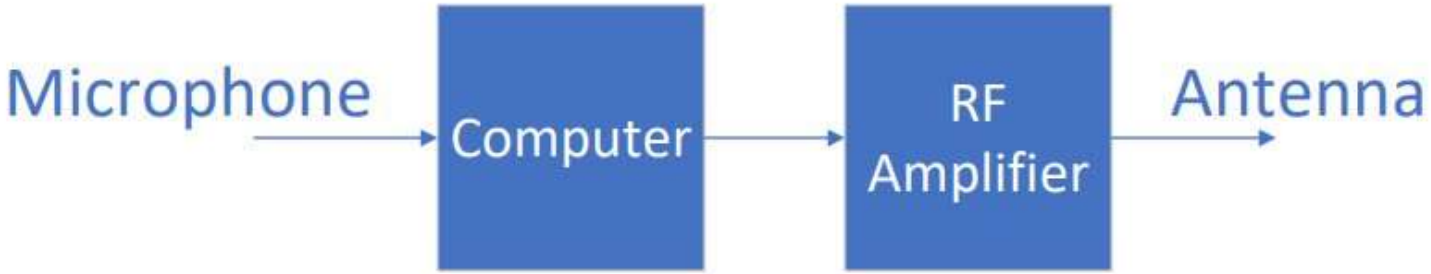
Example of a possible transceiver: QMX-5

$172 - to - $200

Software Defined Radio

- Based on today's fast processors
- Inexpensive due to Arduino and Raspberry Pie micro processor
- Feature rich due to bigger, multi-core processors and memory
- Updates and refinements are possible due to NVRAM technology
- Implementation due to Digital Signal Processing technology
- Software modulation, demodulation and decoding

Simplified Receiver Block Diagram



Simplified Transmitter Block Diagram

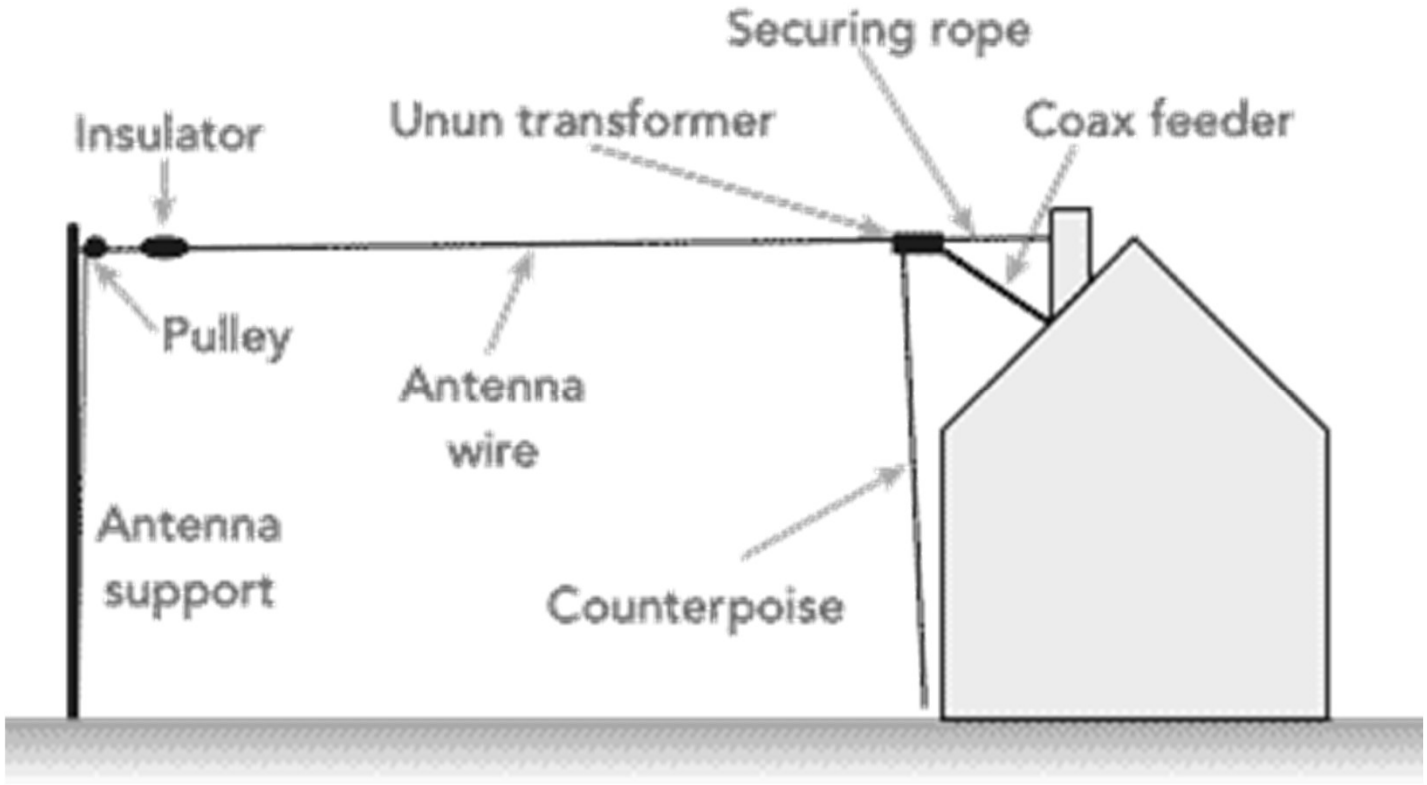
Example: Long Wire Antenna

- Insulated wire strung between two tall objects on your property
  - Keep away from power lines over property and to house
  - Hang between two insulators connected to rope, fixed at one end and run thru pully at other end to weight hanging above ground
  - Feed wire at fixed end with a 9:1 Balun
  - Best if ¼ wavelength of lowest band
    - i.e., 65.6 feet for 80 meter band

Example: Long Wire Antenna

- Provide lightning protection – best is to disconnect antenna and ground when not in use. Don't use during thunderstorm.
- Use 50-ohm feed line between Balun and transmitter, the shorter lowest lost the better.
- SAFETY FIRST during installation and use. Keep as high as possible and above 15 feet minimum. Use lowest transmit power that gets contacts.

Example: Simple Long-Wire Antenna



Example: 9:1 150 watt Balum $20

Tuning a long-wire antenna

Random length antenna no likely to have resonance in ham bands

For maximum signal radiation, transmitter must be matched to antenna

If not matched, RF power will be reflected back into transceiver and not fed into antenna. Transceiver damage could occur.

QRP antenna tuners are available in kit and pre-built form

Example: ATU Automatic Antenna Tuner $55

Example:

150 Watt,
QRP “friendly”
Linear Amplifier

$356 Assembled

Alternative to low-cost transceiver

Yaesu FT-818ND
6W HF/VHF/UHF
All Mode Mobile
Transceiver $730

Disclaimer

Beware of product quality. Some Chinese models are junk!

Do your research before buying, lots of information on Web

Keep an eye open for FCC certifications and warning.

Conclusion

All the examples are cheap, foreign-made kits with DYI assembly.

QRP means less than 5 watts of transmitter power.

A properly tuned antenna as high as possible, a low loss feed line and patience is essential.

QRP and DYI means challenges and new skills.

For approximately $350 you can have a complete HF station.

Fini