

Your Low-Cost 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 and Time
 - Time

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 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
30m	
20m	14285 kHz
17m	18130 kHz
15m	21285 kHz
	21385 kHz
12m	24950 kHz
10m	28365 kHz
	28385 kHz
6m	50185 kHz

Minimum Single-band CW Station Components

Кеу
Speaker
Power supply
Antenna
Feedline
License
Logbook
Code lessons

Single hand CW Transceiver

Minimum Digital HF Station Components

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

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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

Some Low-Cost Antenna

Long wire between trees

Sloping wire antenna from one tree

Lowest Cost Multiband 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 1: (tr)uSDX Transceiver Kit: \$96.00 Assembled: \$148.00



(tr)uSDX Kit

- Two PC boards
- IC chips installed
- DIY Tasks
 - Wind Toroids
 - Install "lead-ed" components
 - Encase
 - Tune and test



(tr)uSDX Transceiver disclaimer

You usually get what you pay for

- Reliability
- Quality

Mixed reviews

Chinese version has bad reputation

Production quantities are low – extended delivery

Example 2: uSDX+ v2 8 BAND ALL MODE HF TRANSCEIVER

\$144.00



Example: Speaker, mic w/ Push to Talk (PTT)



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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



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: Simple Long-Wire Antenna



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.
- <u>SAFETY FIRST</u> during installation and use. Keep as high as possible and above 15 feet minimum. Use lowest transmit power that gets contacts.

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



Alternative to lowcost 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.

This presentation the result of Web research, not experience.

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.

