

Portable HF Operating



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Why operate a portable HF station ?

- Physical space restrictions or restrictive covenants (condo) may make it difficult or impossible to erect HF antennas at home.
- High RF noise levels in residential neighbourhoods resulting from power-lines and/or consumer electronics makes operation from home difficult.
- Vacation or work travel (mini DX-pedition)
- For fun (1 QSO in the field is worth 10 in the shack !)

VA3SIE operating FYBO QRP contest



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My Criteria for operating HF Portable

- Short set-up time - on the air in less than 20 min.
- Operate for 2 to 3 hours maximum during daytime.
- Usually I provide my own antenna supports – I don't want to rely on Mother Nature.
- No more than two trips to the car for gear.
- Multi-band operation on 40m / 30m / 20m.
- **Your criteria may be different, it is up to you to decide what is important to you.**

Expectations – What can you hope to achieve ?

- Easy
 - Ragchew QSOs within North America
 - Some DX Contacts (at the mercy of propagation)
 - Casual Contesting
- Hard
 - Competing with the “Big Guns” in contests
 - Serious DXing (i.e. busting pileups)
- **Accept the fact that you won't be the loudest signal on the bands.**

Power out & in ... the implications



Battery Weight vs Capacity

- 32 lbs - 32 Ah sealed lead acid 'wheelchair battery'
- 14.5 lbs - 18 Ah sealed lead acid Booster pack
- 4.5 lbs - 5 Ah sealed lead acid battery
- 2.0 lbs – 2 Ah sealed lead acid battery
- 0.5 lbs – 2.7 Ah (10 X 1.25v NiMH AA cells)
- 1.3 oz – 0.4 Ah 9V Alkaline 'Transistor battery'.

100 watts vs 25 watts vs 5 watts

- Assume that while running 100 watts into a Hamstick you receive a 599 signal report ... all other factors being equal :
 - At 25 watts out your signal report would be 589
 - At 5 watts out your signal report would be 579
- With a better antenna and reduced power output you can reduce your battery weight, achieve similar results and make your station more portable.

Some Practical HF Portable Antenna Ideas



EDZ – Extended Double Zepp

- 44 or 88 foot doublet - fed with twin-lead or ladder-line (Google 'Norcal Doublet')
- 44 ft version will operate on 40m through 10m
- 88 ft version adds 80m operation
- Advantage over a 40m dipole is that major antenna lobes are broadside to antenna on all bands.
- Can easily be matched by a tuner and installed as inverted-vee with a single antenna support.

Clip-Lead Multi-Band Dipole

- Inner dipole is resonant on highest frequency of interest (i.e. 20m).
- By jumpering the dipole end insulators with clip-leads, additional wire lengths are successively added on to make the antenna resonate on the next lowest band (i.e. 30m & 40m).
- This antenna is a resonant dipole on each of the bands of interest.
- May be fed with coax. No tuner needed.

Clip lead Dipole



Clip Lead details



Short Vertical non-resonant Wire

- **Vertical 24 foot to 28 foot long wire**
- **Use 4 to 20 ground radials each 16 feet long (1/8 wavelength at lowest operating frequency).**
- **With a tuner, it will load on 40 m through 10m with ease**
- **No feedline losses incurred as no feedline is needed.**

Long vertical non-resonant wire

- **End-Fed 84 to 87 foot long wire**
- Use 4 to 20 ground radials at least $1/8$ wave on lowest operating frequency
- Will easily match on 80m through 10m with a tuner. (May even be used on 160 m).
- Can be erected as an inverted-L (the taller the vertical section the better, with the leftover bit running horizontal to a tree etc.)
- No feedline losses because there is no feedline

The 'WYE' a three wire Groundplane

- Mono-band, upside-down Y shaped GP vertical
- Vertical Radiator ($234 / F \text{ Mhz} = \text{length in feet}$)
- Two sloping elevated radials ($246 / F \text{ Mhz}$)
- Good match to 50 ohm coax.
- Attach coax centre conductor to vertical wire, braid to Ground plane. Hang from a tree / fiberglass pole etc.
- (Hint for VHF use can be made out of stiff wire with an SO-239 as the center insulator.)

Portable Antenna Mast ideas

- Shakespeare Wonderpole “Crappie” fishing pole – available in 10' , 13' and 20 foot lengths at about \$1 per foot at Le Baron's.
- DK9SQ and MFJ 10 meter long fiberglass masts are heavier duty than fishing poles and can also be used to support small VHF / UHF beam antennas - www.kangausa.com & www.mfj.com
- Other fiberglass masts such as Jackite - www.jackite.com

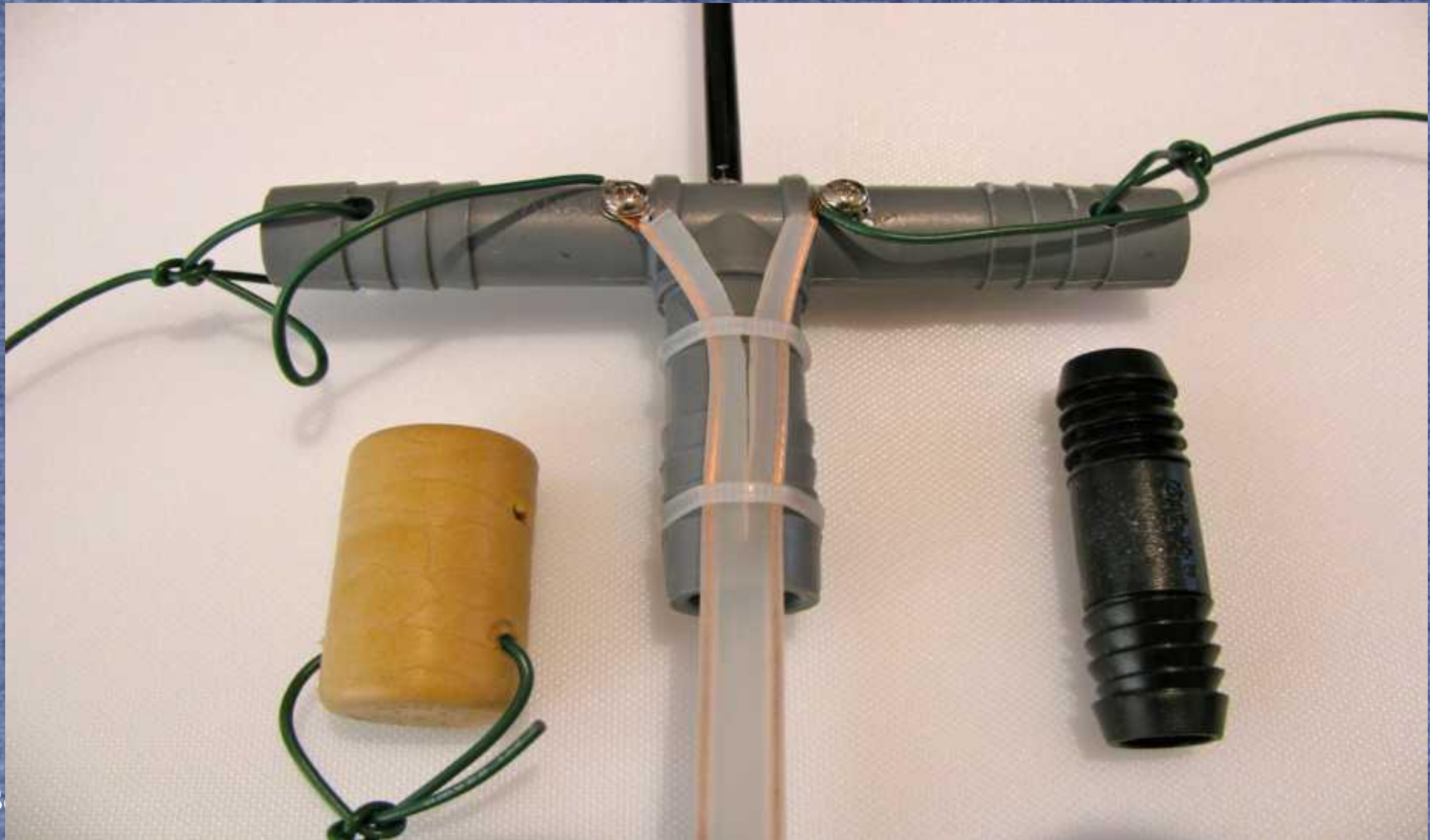
Fiberglass Mast Support Ideas

- Lee Valley Multi-Purpose Anchor Stake – item # ST110 – cost ~ \$13
- Homebrew bases – roll your own with ABS / PVC Pipe, aluminum or steel angle stock, spikes, SS hose clamps etc.
- Other patio umbrella supports

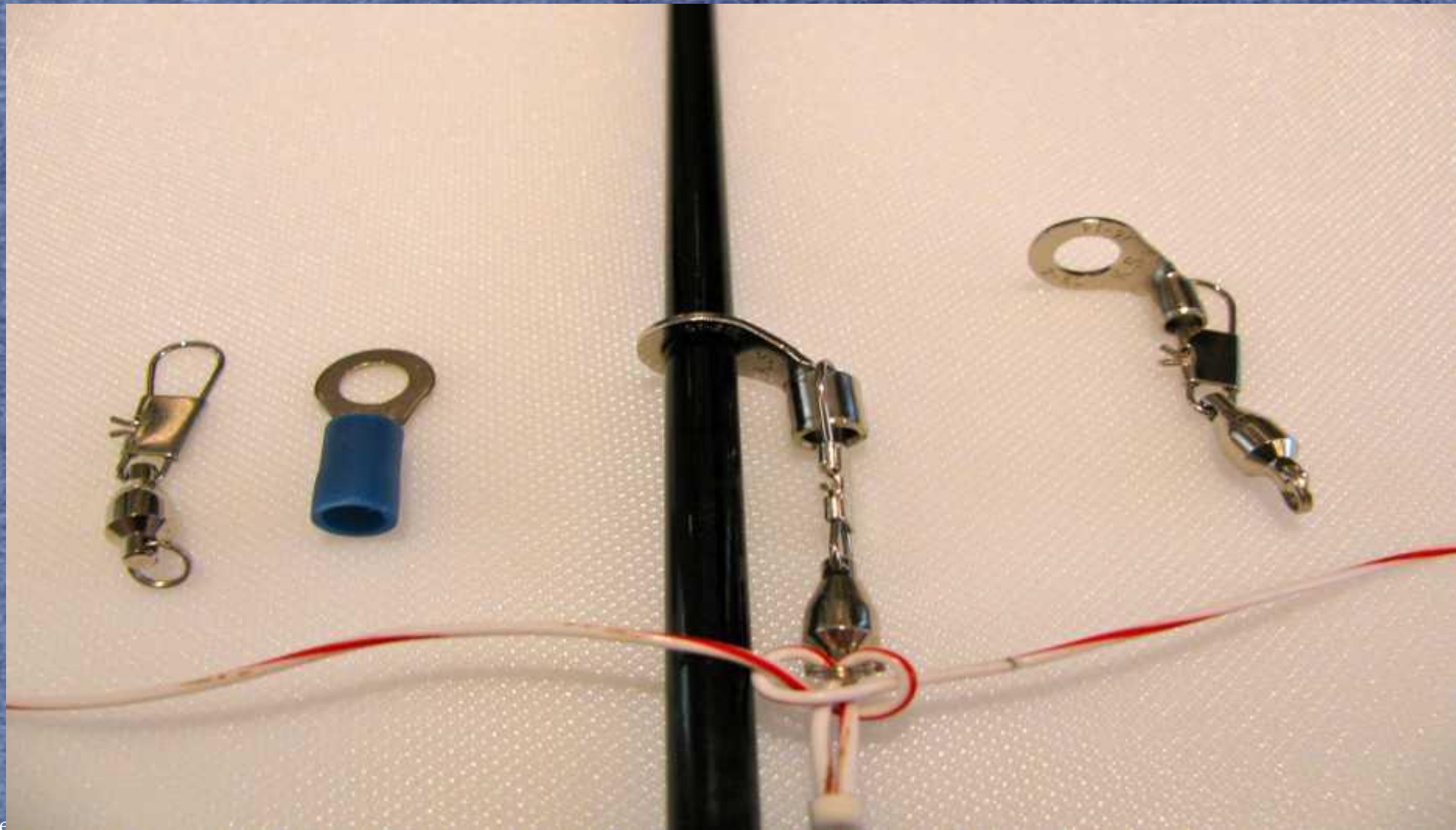
Antenna construction ideas

- PVC Tees can be used as center insulators; PVC joiners or synthetic wine corks can be used as end-insulators.
- Fishing snap-swivels and crimp ring terminals can be utilized create a center support for a lightweight doublet or vertical wires attached to a fiberglass pole.
- Wire - #22 to #24 AWG Teflon coated Silver plated from N2GO or #531- 'Invisible Toughcoat Silky' from the Wireman at www.thewireman.com

Antenna Insulators



Ring Terminal doublet support



Safety

- Consider RF exposure guidelines & implications of low antennas
- 5W of RF has a bite, higher power can cause RF burns. Ends of wire antennas are at high potential
- Ensure that your antennas do not pose a risk to pedestrians, pets & children when operating from a public place.
- RAC members have \$1M in liability insurance

Observations

- 5W CW and 25W SSB are generally the lower limits for consistent reliable communications
- When in doubt go with a horizontal antenna. Even a low doublet or dipole will generally outperform a vertical over average ground.
- Verticals work well near salt water or areas with good soil conductivity (i.e. Farmland).
- Automatic antenna tuners do work well and are extremely useful for matching multi-band antennas

Have fun !

