2€

Wire Antennas that WORK!

A collection of details and descriptions of antennas
based on Spiderbeam fiberglass poles,
as described in greater detail on DJ0IP's Web Page:
WWW.DJ0IP.DE

The antennas described in this booklet were designed to be efficient, yet simple enough for the average ham to build, using common hand tools. Several of these antennas are used regularly by DX-peditions to all corners of the world. All of these antennas have been built and tested by at least one of the Spiderbeam Team members: DF4SA / DF9GR / DJ0IP / DL9USA / DO5PNS / W4PA.

spiderbeam
high performance lightweight antennas

First Edition, June 2016

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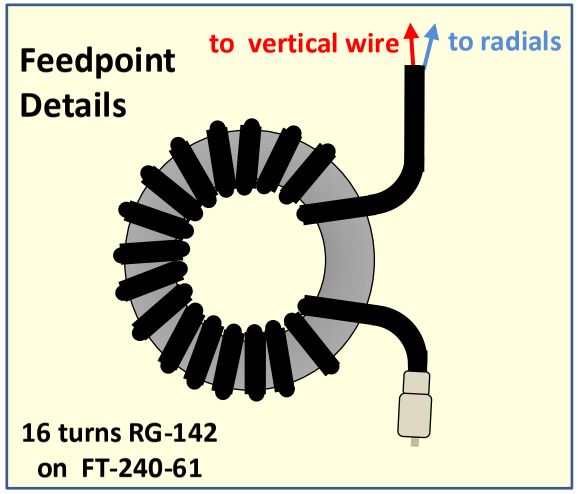
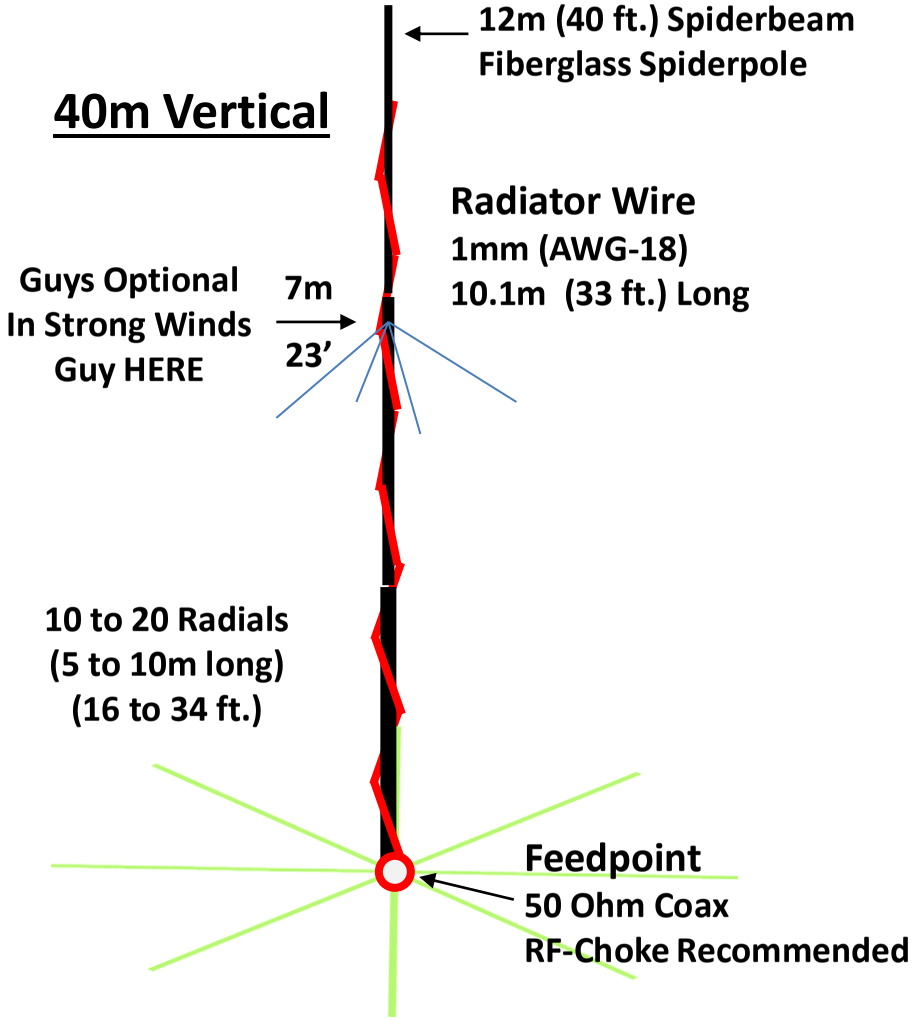
40m Vertical on 12m Pole
(Ground Radials)

Notes:

- Radials should be 6 to 10m long.
- It works great with just 8 radials.
- 16 or more radials is a little better.
- Space radials symmetrically around the pole.

Optional RF-Choke

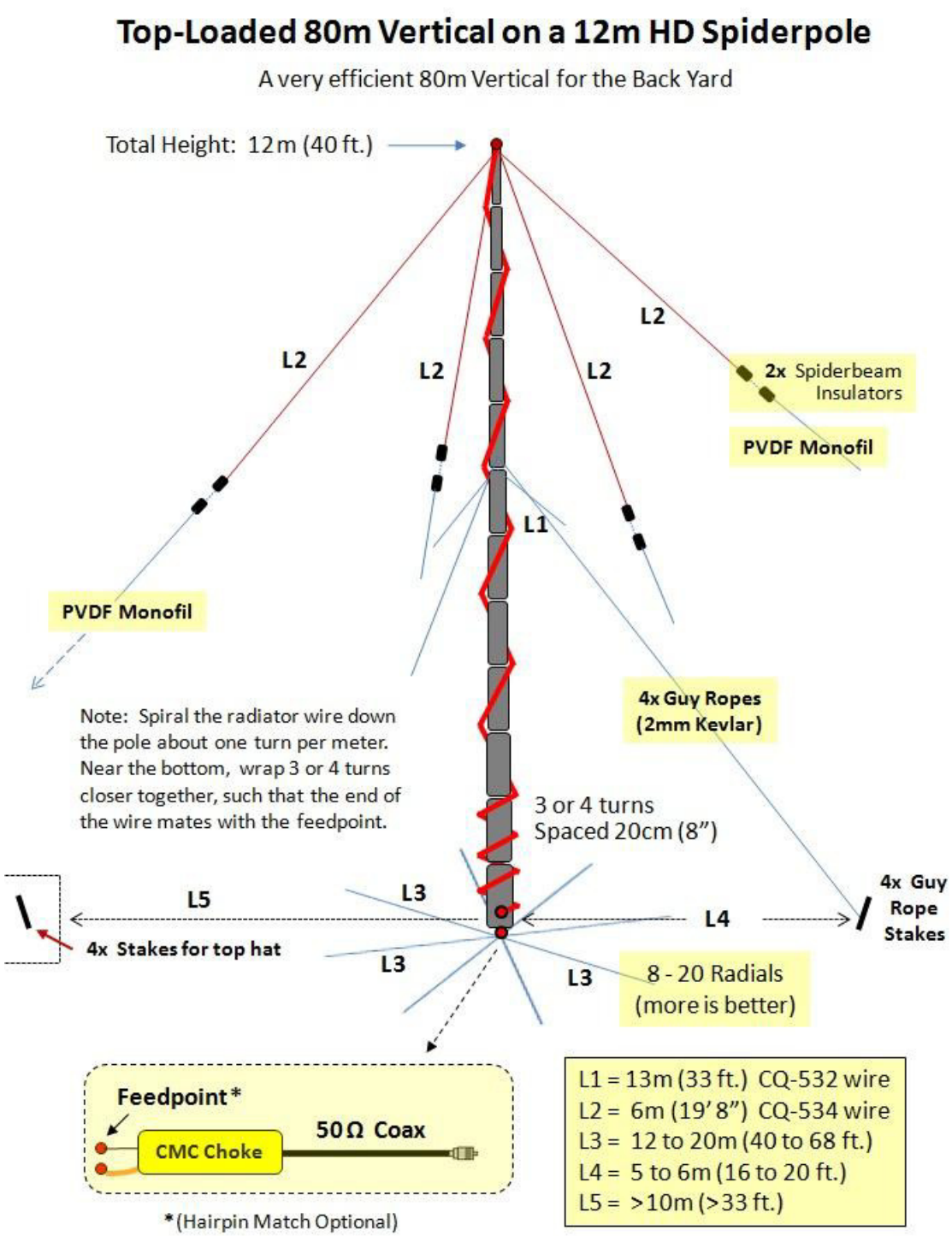




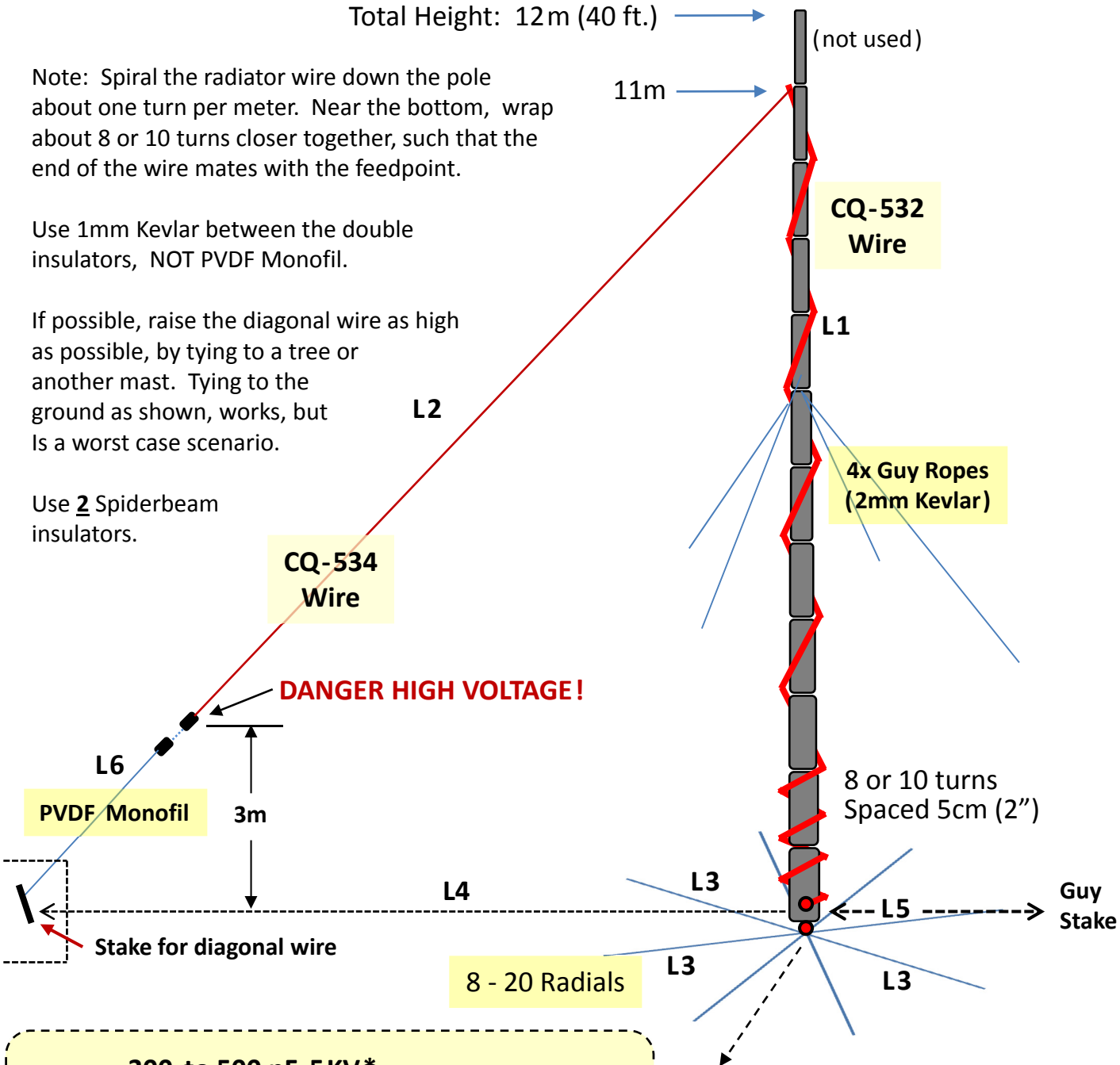
http://www.DJ0IP.de/vertical-antennas/

80m Vertical Antenna

On a Spiderbeam 12m HD Fiberglass Spiderpole



160m Inv-L on 12m Spiderpole



Note: Spiral the radiator wire down the pole about one turn per meter. Near the bottom, wrap about 8 or 10 turns closer together, such that the end of the wire mates with the feedpoint.

Use 1mm Kevlar between the double insulators, NOT PVDF Monofil.

If possible, raise the diagonal wire as high as possible, by tying to a tree or another mast. Tying to the ground as shown, works, but Is a worst case scenario.

Use **2** Spiderbeam insulators.

L1 = 13m (43 ft.) CQ-532 wire
L2 = 35m (115') CQ-534 wire[1]
L3 = 12 to 20m (40 to 66 ft.)
L4 = 35 to 50m (115 to 165 ft.)[2]
L5 = >10m (>33 ft.)
L6 = depends on stake[3]

*Not critical. Wire length will be adjusted for resonance.

[1] Adjust length for resonance.
[2] Adjust such that end of L2 is at least 3m high.
[3] Adjust as necessary.

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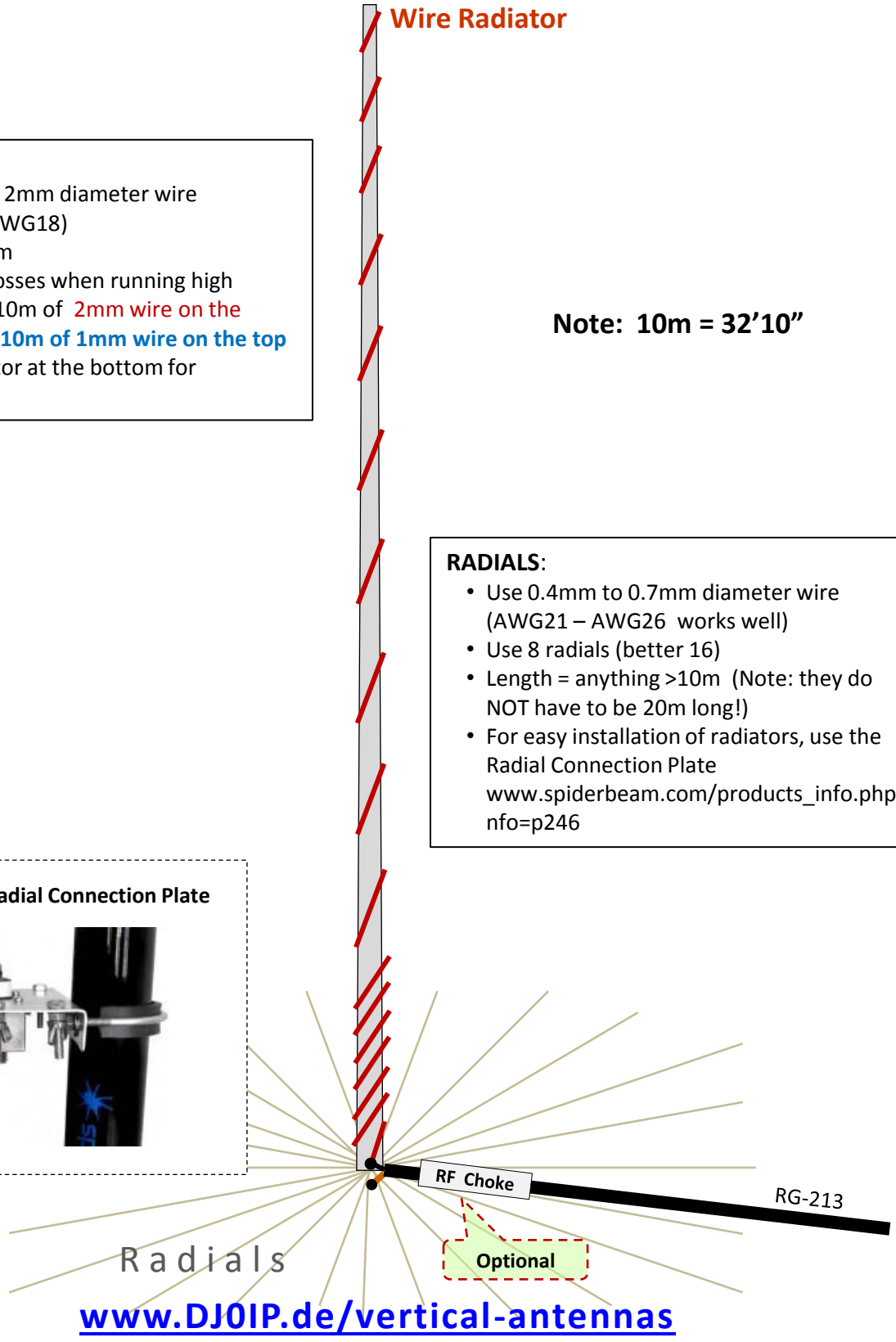
80m Vertical

using the **18m** Fiberglass Pole

RADIATOR:

- Use 1mm to 2mm diameter wire (AWG12 – AWG18)
- Length = 20m
- For lowest losses when running high power, use 10m of 2mm wire on the bottom and **10m of 1mm wire on the top**
- Prune radiator at the bottom for resonance



Note: 10m = 32'10"

RADIALS:

- Use 0.4mm to 0.7mm diameter wire (AWG21 – AWG26 works well)
- Use 8 radials (better 16)
- Length = anything >10m (Note: they do NOT have to be 20m long!)
- For easy installation of radiators, use the Radial Connection Plate www.spiderbeam.com/products_info.php?info=p246

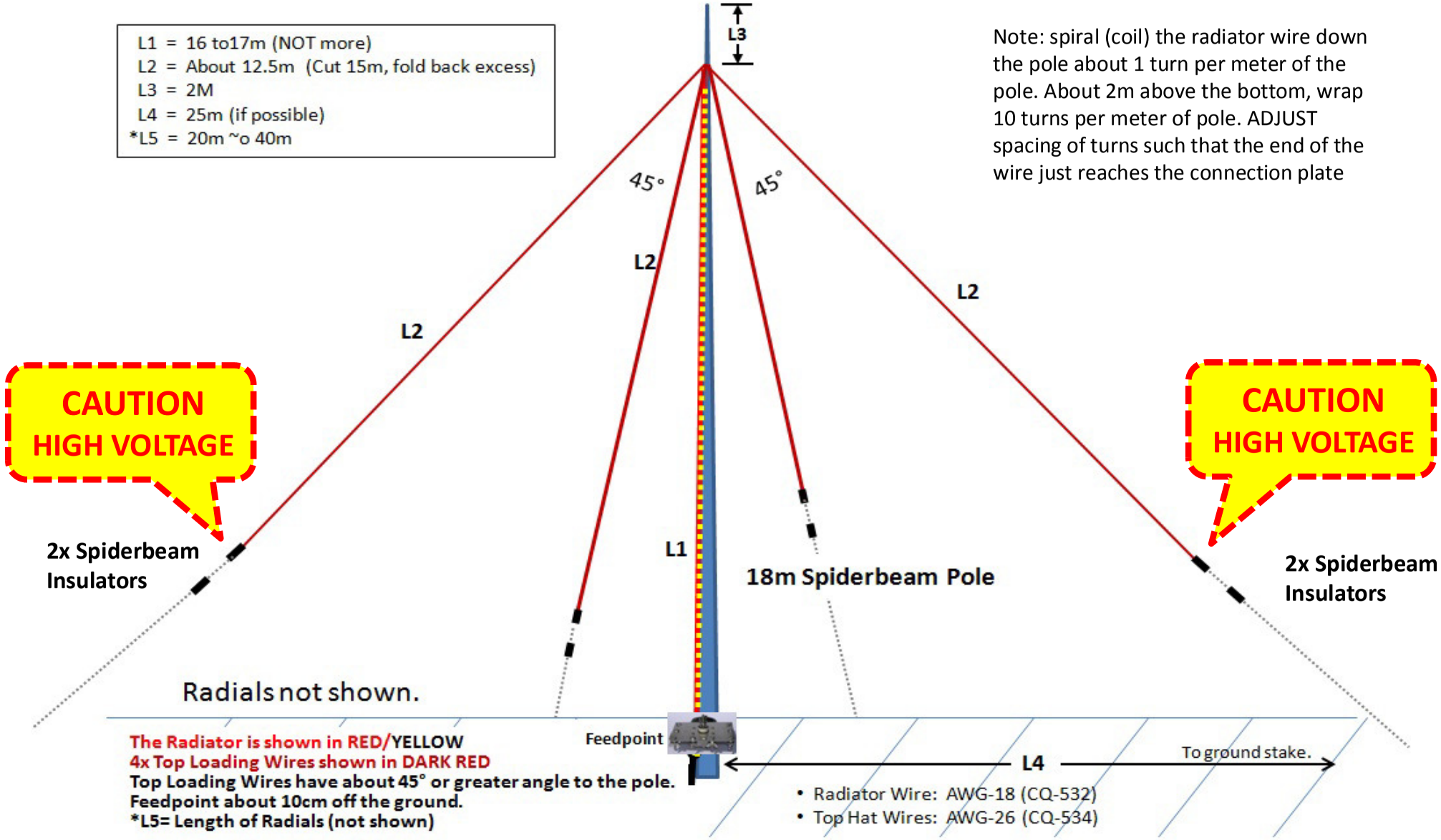
Optional Radial Connection Plate

www.DJ0IP.de/vertical-antennas

160 M Top-Loaded Spiderbeam Vertical on 18m Spiderbeam Pole

L1 = 16 to17m (NOT more)
L2 = About 12.5m (Cut 15m, fold back excess)
L3 = 2M
L4 = 25m (if possible)
*L5 = 20m ~o 40m

Note: spiral (coil) the radiator wire down the pole about 1 turn per meter of the pole. About 2m above the bottom, wrap 10 turns per meter of pole. ADJUST spacing of turns such that the end of the wire just reaches the connection plate



Start with L1 = 18m and trim to adjust frequency.

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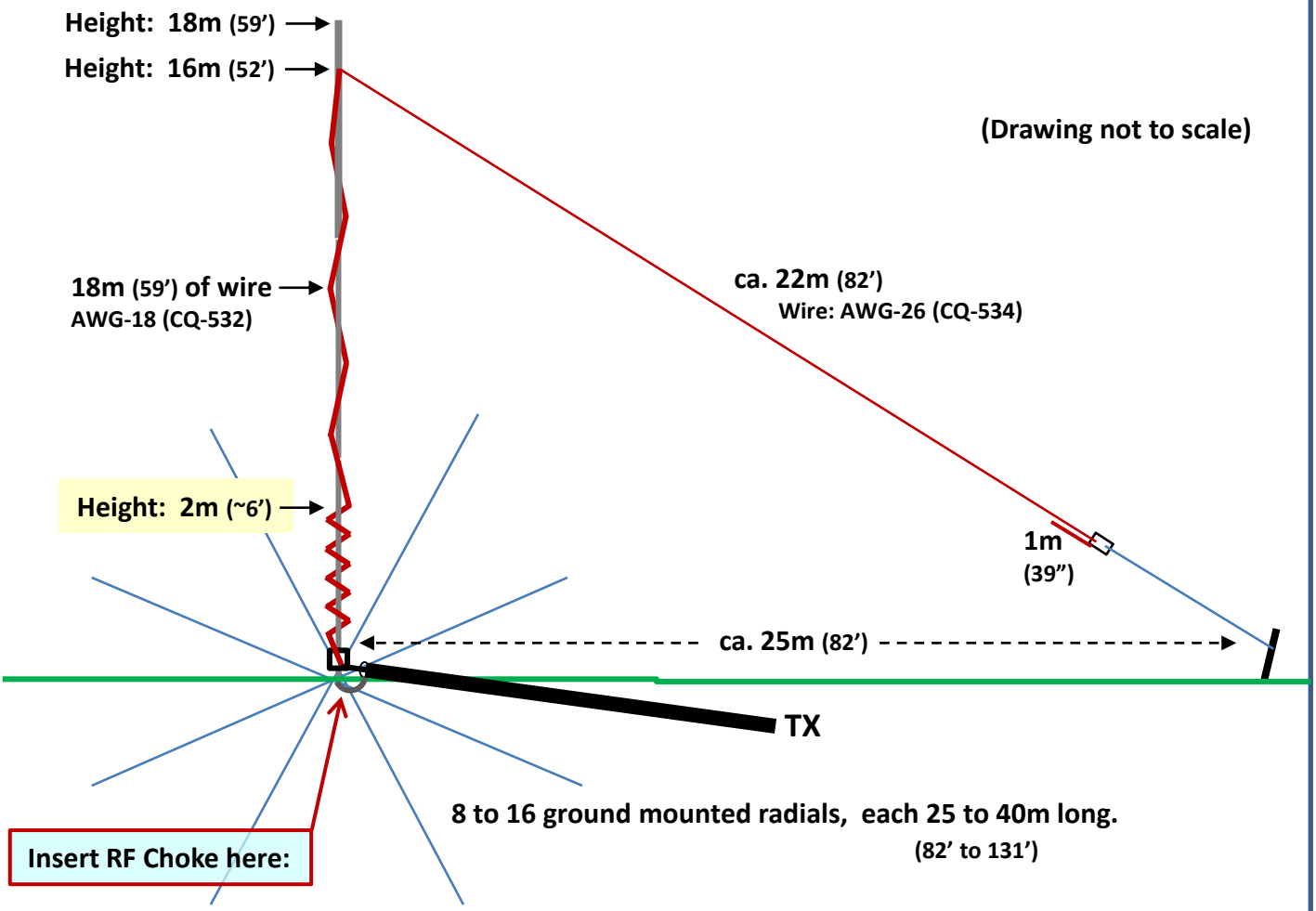
Simple 160m Inverted-L Antenna

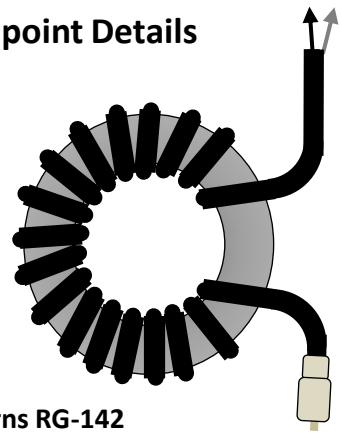
on an 18m Spiderbeam Fiberglass Pole



Antenna Details: http://www.dj0ip.de/vertical-antennas/

Choke Details: http://www.dj0ip.de/vertical-antennas/rf-cmc-choke/

Feedpoint Details



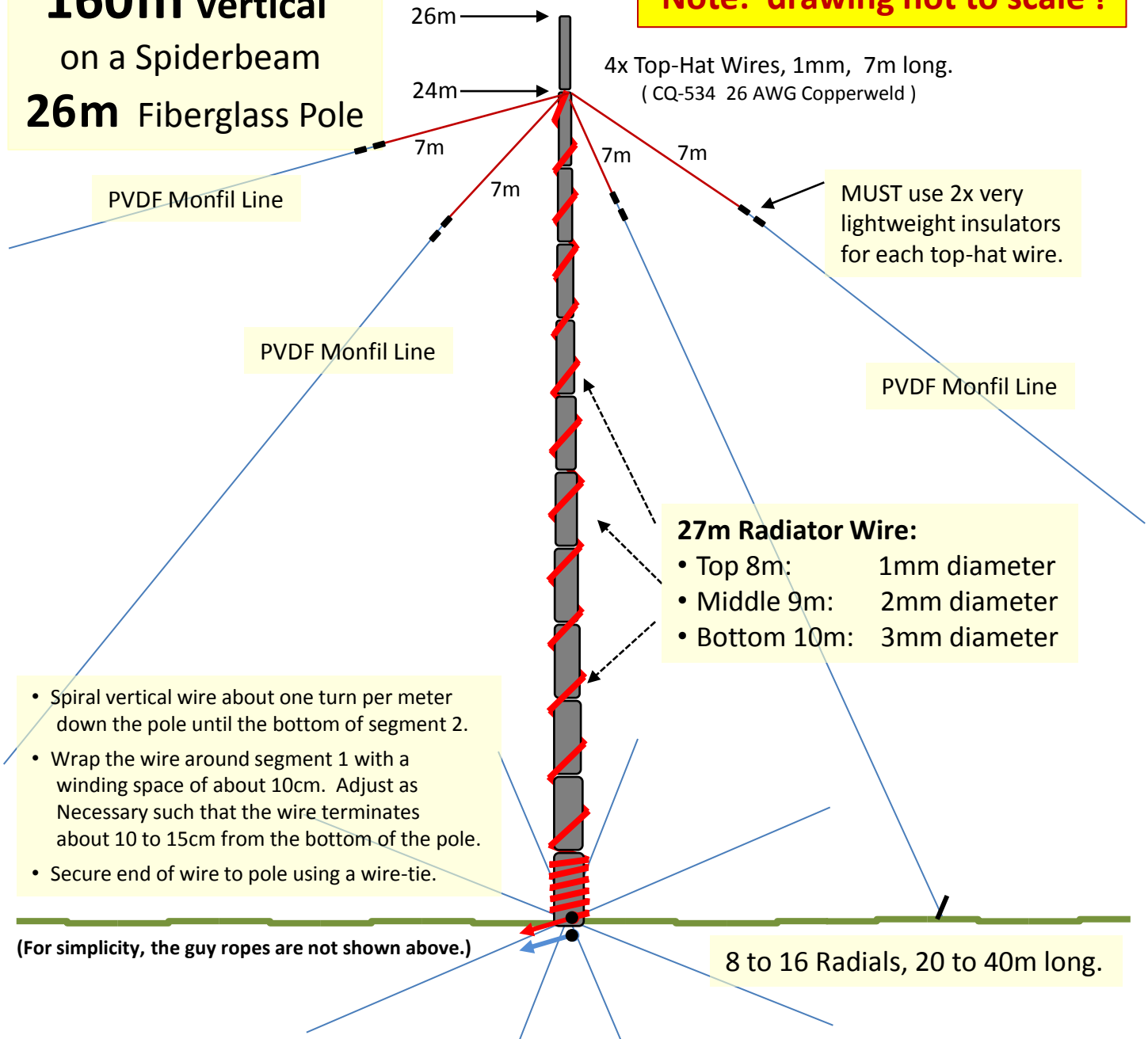
17 turns RG-142
on FT-240-43 (2x Cores for 1KW)

www.DJ0IP.de → and click on:

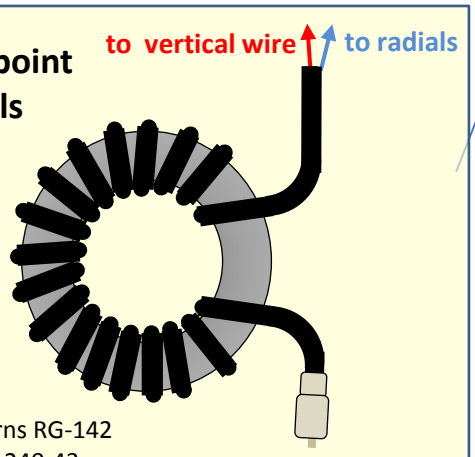
- Antennas
- Vertical-Antennas
  - "Inverted-L-Ant"
  (or)
  - "RF (CMC) Choke"

160m Vertical
on a Spiderbeam
26m Fiberglass Pole

Note: drawing not to scale !



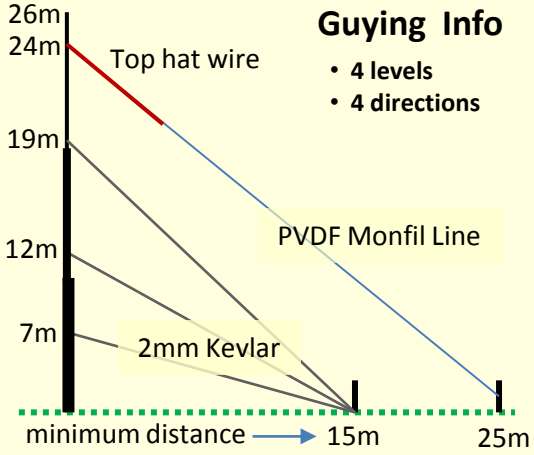
Feedpoint Details



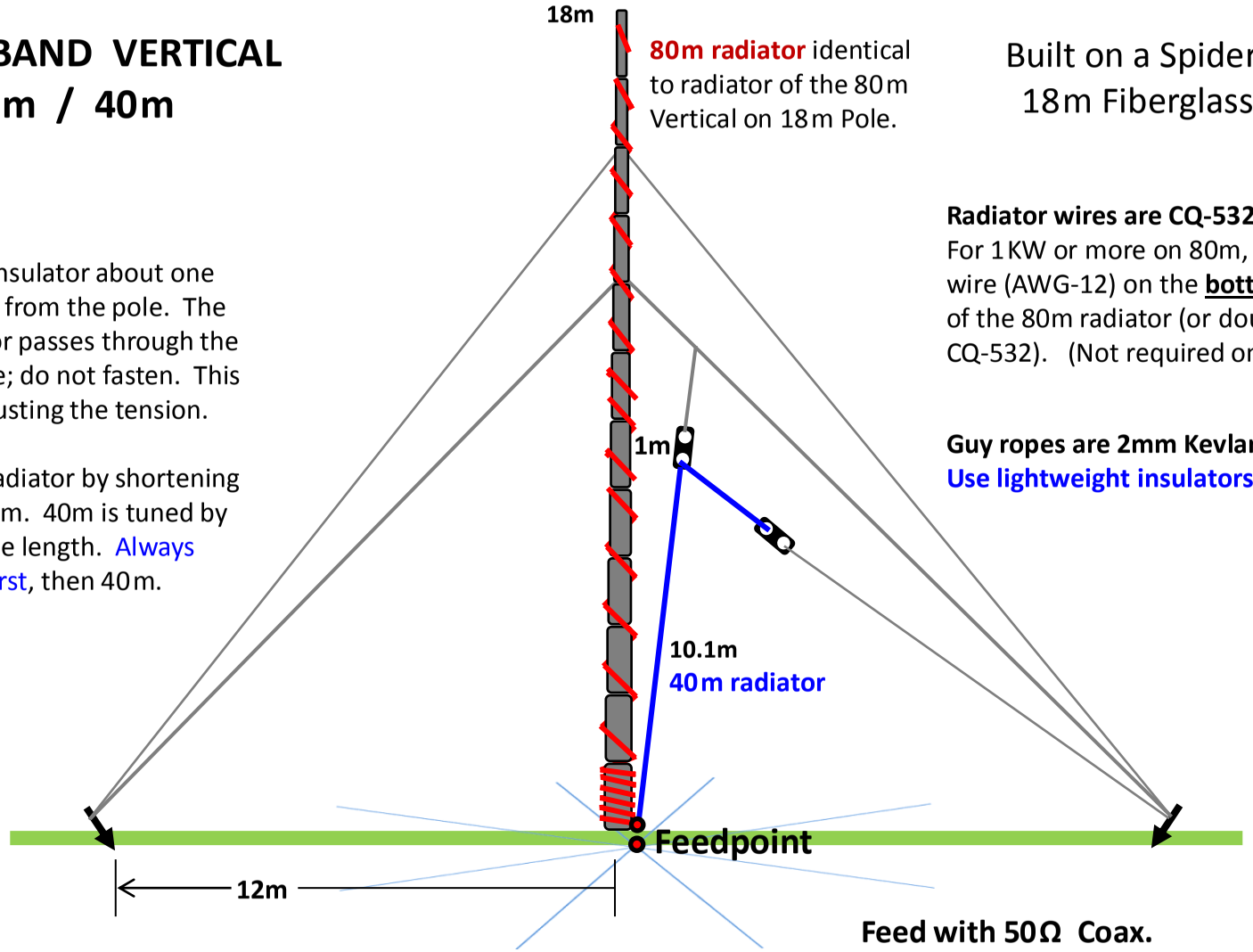
17 turns RG-142
on FT-240-43

Guying Info

- **4 levels**
- **4 directions**



DUAL – BAND VERTICAL
80m / 40m



80m radiator identical to radiator of the 80m Vertical on 18m Pole.

Built on a Spiderbeam 18m Fiberglass Pole

Space first insulator about one meter away from the pole. The 40m radiator passes through the Bottom hole; do not fasten. This enables adjusting the tension.

Tune 80m radiator by shortening at the bottom. 40m is tuned by Adjusting the length. Always tune 80m first, then 40m.

Radiator wires are CQ-532 (AWG-18).
For 1KW or more on 80m, use 2mm wire (AWG-12) on the **bottom half** of the 80m radiator (or double the CQ-532). (Not required on 40m).

Guy ropes are 2mm Kevlar.
Use lightweight insulators!

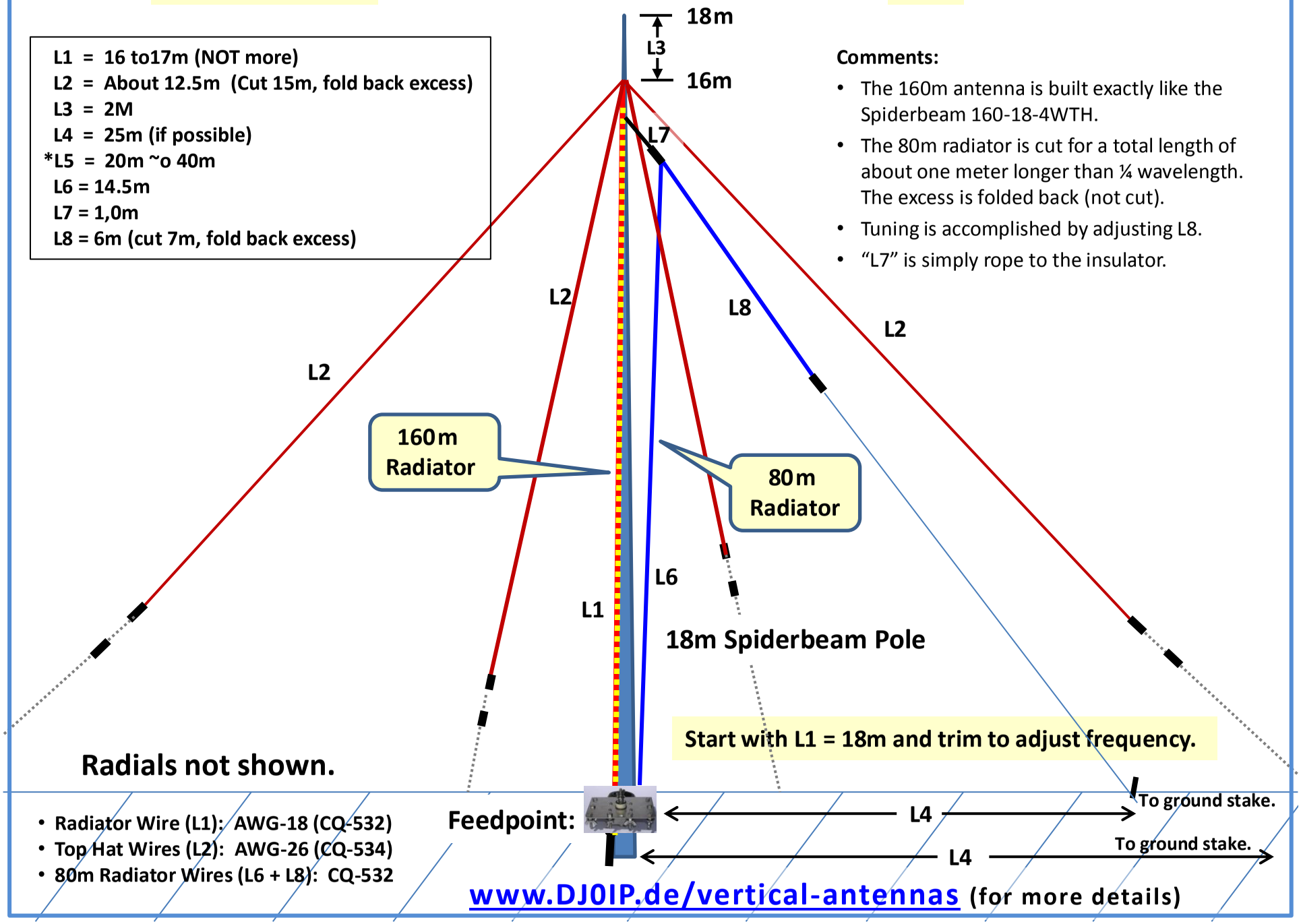
Ground radials are required.

Use 8 to 16 ground radials (or more), 12 to 20m long. Space radials symmetrically around the pole.

Feed with 50Ω Coax.
Use optional CMC Choke (preferred).
Feedpoint ~5-10cm above ground.

info@spiderbeam.com

160m / 80m Dual-Band Vertical on Spiderbeam 18m Pole



Comments:

- The 160m antenna is built exactly like the Spiderbeam 160-18-4WTH.
- The 80m radiator is cut for a total length of about one meter longer than ¼ wavelength. The excess is folded back (not cut).
- Tuning is accomplished by adjusting L8.
- "L7" is simply rope to the insulator.

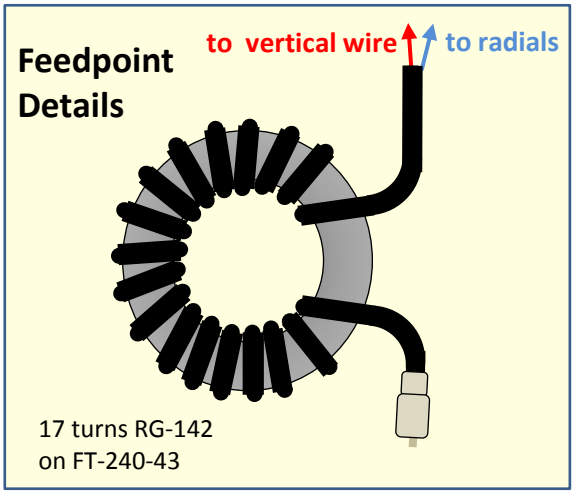
- Radiator Wire (L1): AWG-18 (CQ-532)
- Top Hat Wires (L2): AWG-26 (CQ-534)
- 80m Radiator Wires (L6 + L8): CQ-532

www.DJ0IP.de/vertical-antennas (for more details)

Feeding Low Band Verticals

(Especially 160m)

Common Mode Current Choke



The choke is placed at the feedpoint of the Vertical. The drawing above shows how you can simply wrap coax on the toroid. Use RG-58 for a few hundred watts. For 1 KW use RG-142 (Teflon Coax). For 1.5 KW use 2x Toroids glued together. On the right you see a choke/balun usable for 40m and above. My choke looks similar to this, but has more windings in order to cover 160m. It is not necessary to cross-wind the coax, but sometimes it is more convenient.

A Hairpin Match (Shunt Match)

I've used the shunt match for nearly 50 years. It is a cheap and simple means of raising the feedpoint impedance from a low value (i.e. ~10Ω) to something closer to 50Ω. This is a great way to improve a low band vertical's match. Use thick soft-drawn copper wire or thin copper tubing. I wound about 10 turns onto a wine bottle. Tune by pushing the turns closer together or pulling them farther apart. My choke and Hairpin Match are shown on the right. (DJØIP)

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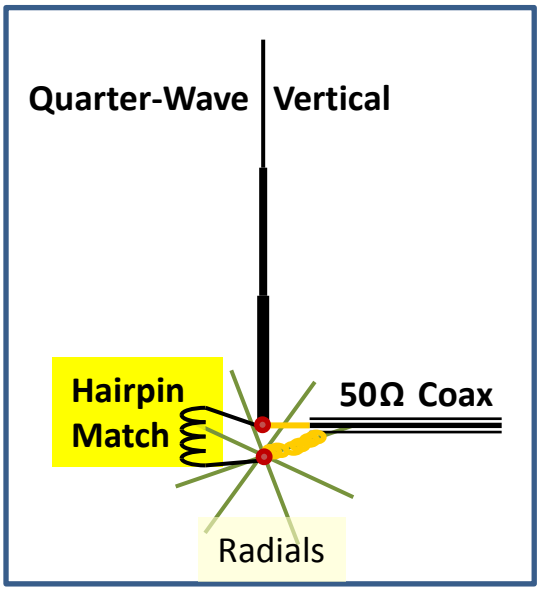
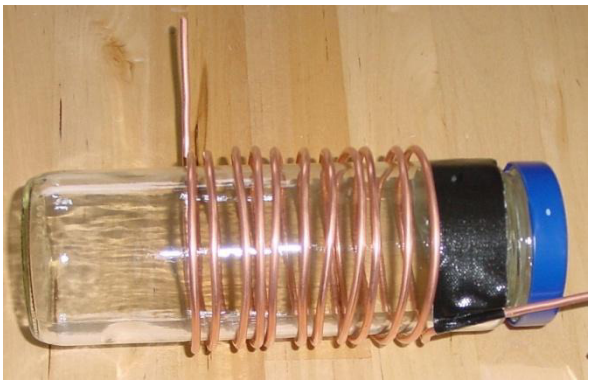
HAIRPIN MATCH

(Shunt Match)

A quick and easy way to obtain a better SWR for short low-band Vertical Antennas.



Wind thick wire or thin copper tubing
On a round object, such as a glass jar:



The Coil:

TUNING:

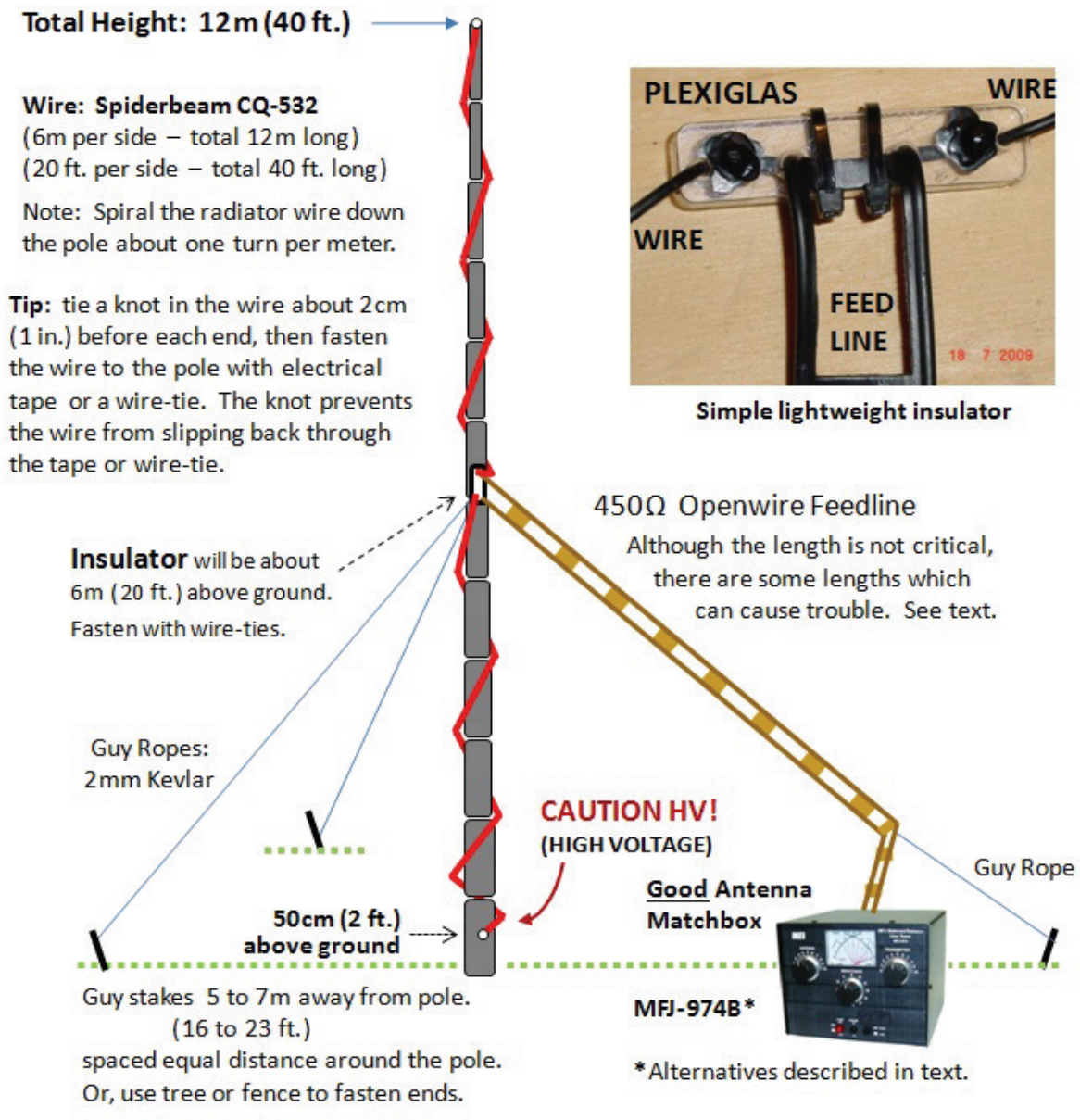
- Measure and record the SWR.
- Push the turns of the coil closer together and see if the SWR improves or gets worse.
- Pull the turns farther apart and check if the SWR gets worse or improves.
- Adjust for best SWR.
- Note: if spread too far apart and still not perfect, remove 1 or 2 windings from the coil.
- Note: if squeezed tightly together and still not perfect, add 1 or 2 windings to the coil.

http://www.DJ0IP.de/vertical-antennas/hairpin-match/

Multi-Band HF Vertical Dipole

On a Spiderbeam 12m HD Telescoping Fiberglass Pole

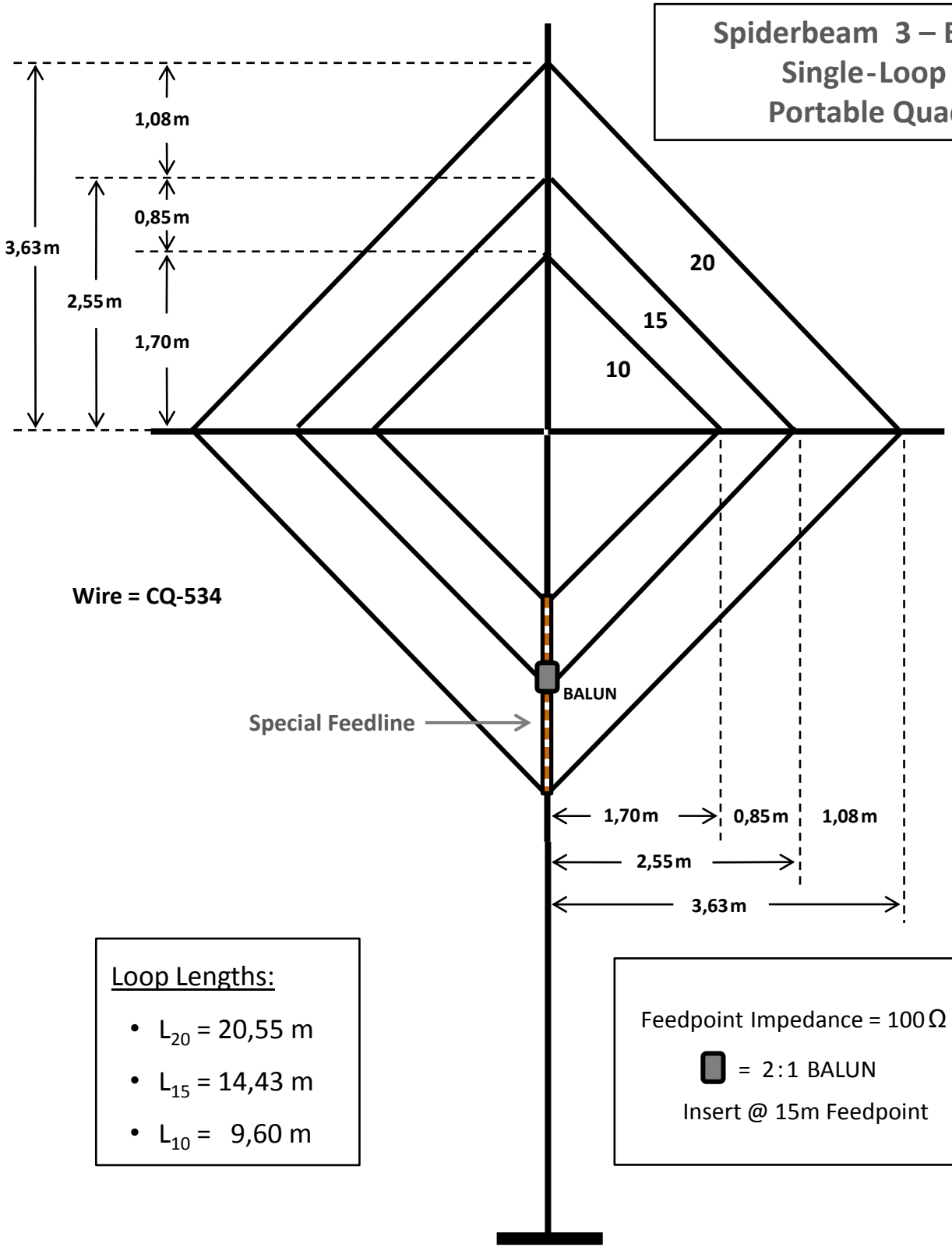
for: 80/40/30/20/17/15/12/10m



Spiraling the wire down the pole distributes its weight evenly around the pole and prevents it from flopping in the wind. Since the lower half of the pole is thicker (wider) than the upper half, the wire will end about 50cm above the ground.

IT IS IMPORTANT TO KEEP THE WIRE THIS DISTANCE FROM THE GROUND!

Spiderbeam 3 – Band Single-Loop Portable Quad



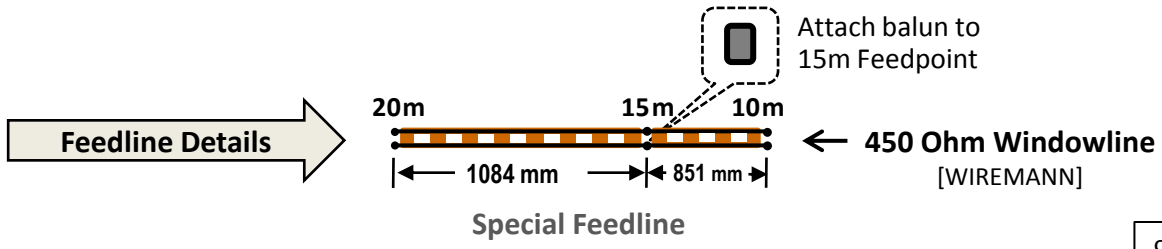
Loop Lengths:

- L_{20} = 20,55 m
- L_{15} = 14,43 m
- L_{10} = 9,60 m

Feedpoint Impedance = 100 Ω

= 2:1 BALUN

Insert @ 15m Feedpoint



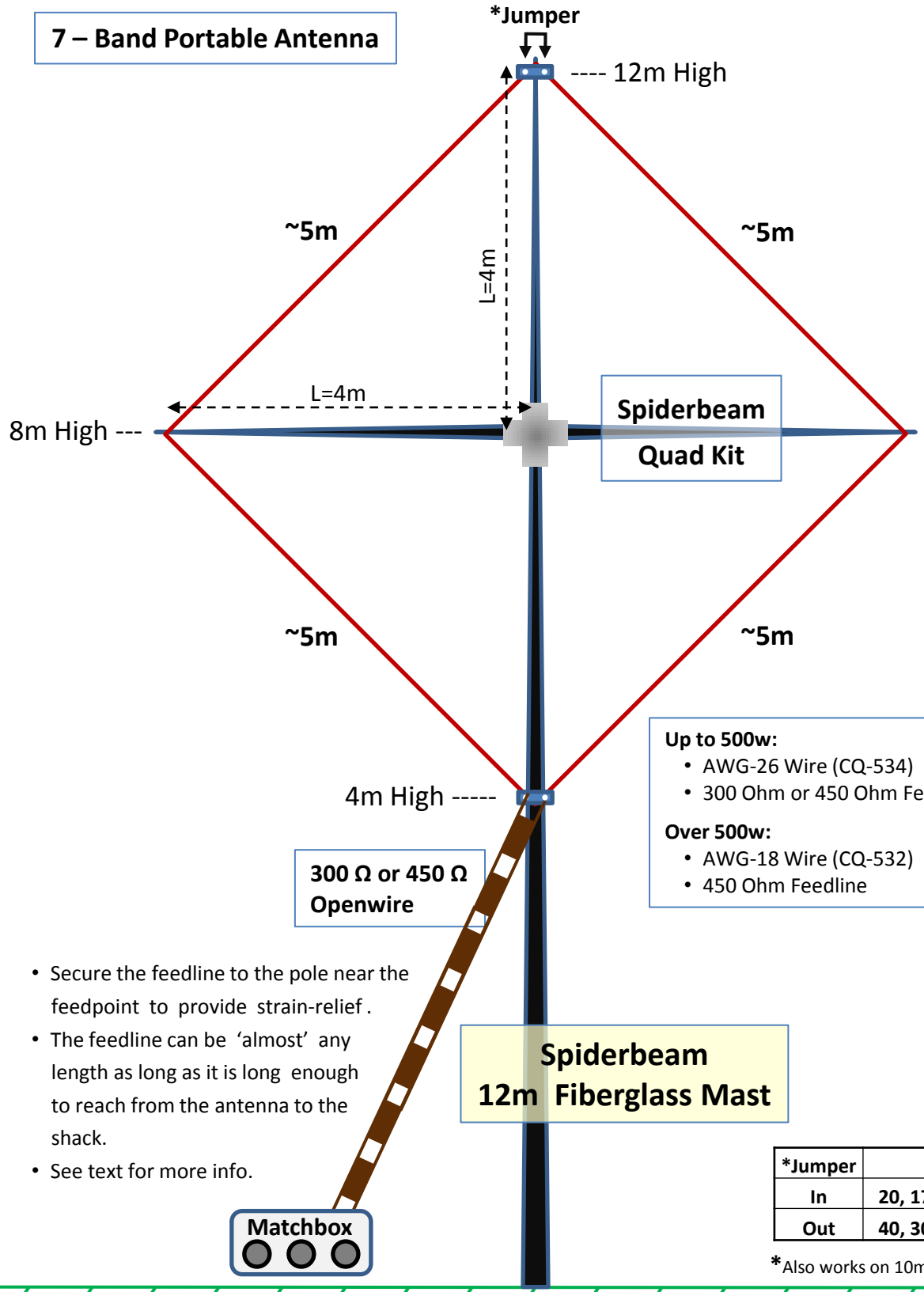
Special Feedline

9/07/2012

Mono – Loop Quad

A Vertically Oriented, Horizontally Polarized Loop

7 – Band Portable Antenna



Up to 500w:

- AWG-26 Wire (CQ-534)
- 300 Ohm or 450 Ohm Feedline

Over 500w:

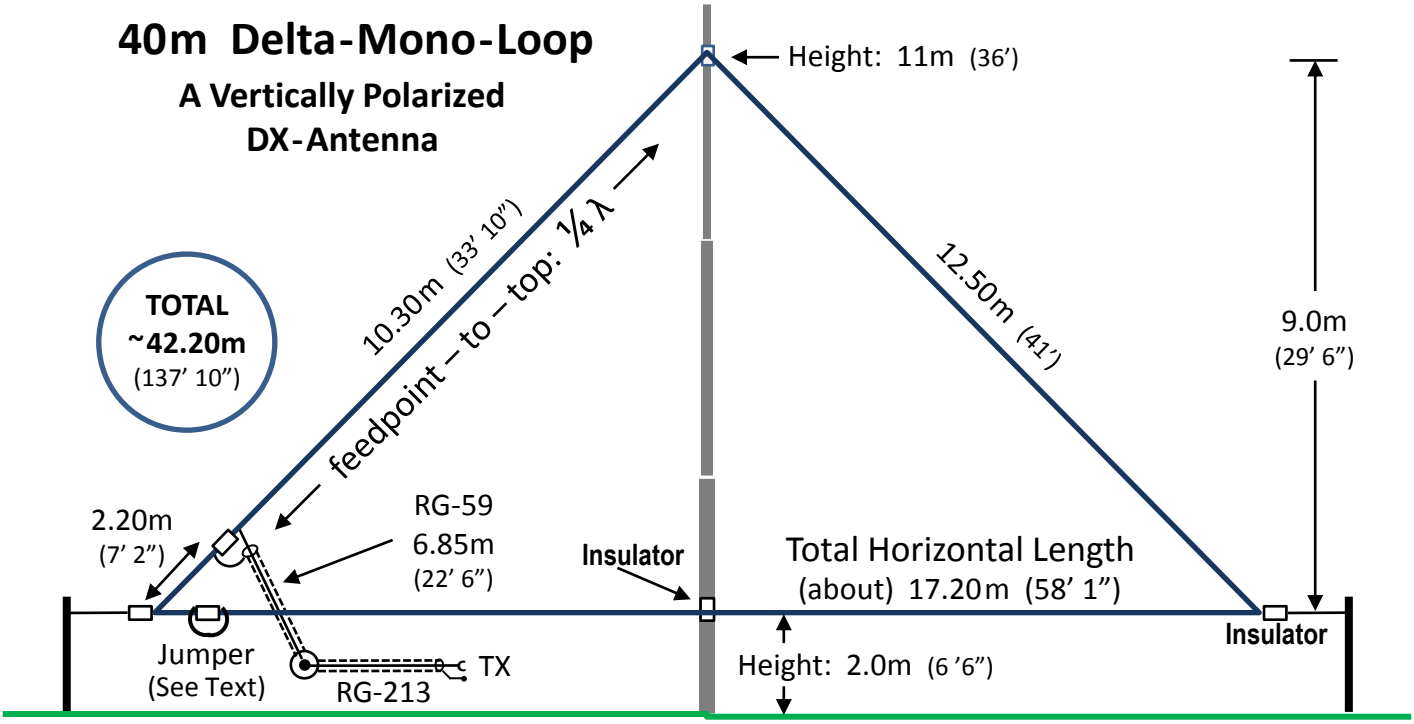
- AWG-18 Wire (CQ-532)
- 450 Ohm Feedline

- Secure the feedline to the pole near the feedpoint to provide strain-relief.
- The feedline can be 'almost' any length as long as it is long enough to reach from the antenna to the shack.
- See text for more info.

*Jumper	Band
In	20, 17, 15, 12m
Out	40, 30, 10*m

*Also works on 10m with jumper "in"

NOTE: Use Symmetrical Matchbox or Asymmetrical Matchbox with 1:1 or 4:1 Current Balun.



DESCRIPTION:

A **vertically polarized** full wavelength loop, with more or less **Omni-directional** radiation (due to the low height, requiring **NO RADIALS**. NOTE: though good for DX, stations within 500 miles may be stronger on a simple dipole.

CONSTRUCTION DETAILS:

- The pole should be about 12m high (minimum 11m). (39'4" to 36'). Higher is better, but then you will have to re-adjust the total length for resonance.
- The feedpoint is located in either diagonal side near one corner of the antenna, enabling vertical polarization. This makes the antenna an excellent DX antenna.
- The length of the diagonal is not very critical and may be adjusted to help find a better fit in the space available, but the distance from the feedpoint to the top should be **one quarter wavelength**.
- The exact total length will vary depending on ground conditions at your QTH. Begin with 42.7m (137' 10") and then shorten the horizontal leg to bring the resonance up to the desired frequency.
- Adjust total length by adjusting the length of the horizontal wire. (Easiest way).
- The horizontal leg of the antenna on the bottom should be 2 to 3m high (6'6" to 9'10") high enough for humans and animals to walk under. Changes to the height will require adjusting overall length.
- The insulator shown directly on the pole at the 2m level is for mechanical reasons. Secure the insulator to the pole, and then pass the horizontal leg through the insulator, reducing sag in the horizontal leg.
- The insulator in the horizontal leg near the left is an option for convenience. It enables easy adjustment for resonance by removing or adding wire. For disassembly, disconnect one side from the insulator and then roll the antenna as a single wire. Each time I changed my QTH, I had to re-adjust the length of the jumper. I just let the jumper wire hang down. For permanent use, you may leave this out.
- The antenna will have an impedance between 90Ω and 100Ω. A quarter wavelength matching stub of 75 Ohm coax will provide a good match to 50Ω. RG-59 is good enough for about 500w. If you want to run more power, use RG-11.

DJ0IP; Original source: CQDL article by DL1BU, April, 1979, page 154.