

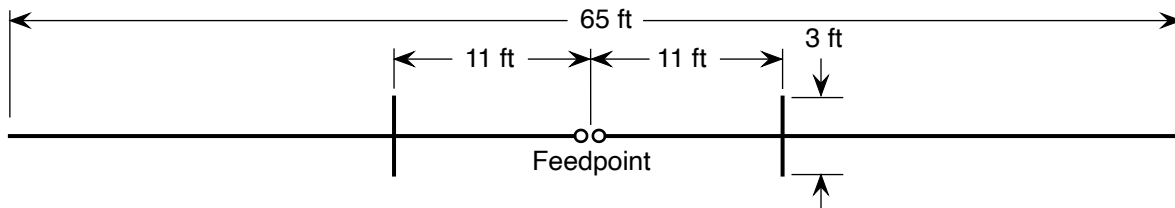
Using a 40 m Dipole on 15 m With a Better Match

Gary, NA6O

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It's possible to use any dipole on its third harmonic while obtaining a usable match on both bands. This is very convenient, giving you two bands for the price of one, and is attempted most commonly with 40 and 15 m bands (7 and 21 MHz). However, the desired match does not occur exactly at the third harmonic, but rather at a somewhat higher frequency. For instance, a 40 m dipole resonant at 7.0 MHz will also be resonant at 21.8 MHz, which is 0.5 MHz above the top of the 15 m band. You'll find that the SWR is near 10:1 within the band, and it's quite possible that your antenna tuner can't match it very well, if at all.

Here is a simple solution that I've been using for many years. All you have to do is add small capacity hats about 1/3 of the way out on each side of the dipole, which is about 1/4 wavelength on 21 MHz. The diagram shows a typical setup. The hats are 3-foot pieces of wire soldered at their midpoints to the main conductor. I use 0.063 inch bronze brazing rod which is available at welding supply stores, but any kind of stiff wire will do. Bend it a little so it forms a bit of an inverted vee, then it won't spin around all the time.



The exact location of the capacity hats isn't too critical. I put them at 11 ft out from the center. Trim the overall dipole for resonance on 40 m, then check it out on 15. If you want to further refine the resonance on 15 m, you can trim the length of the hats. The tuning rate is about 85 kHz per inch. Changing the hats will also slightly affect the 40 m resonance at about 12 kHz per inch. In the end, you will easily cover the whole 15 m band with a reasonable SWR. It will be far better than without this trick!

I should also mention that the radiation pattern on 15 m is quite complex since it's no longer a simple 1/2-wave dipole (the hats have nothing to do with that fact). Peak gain is actually greater than a dipole but there are also many nulls.

The photo below shows my original installation on a low-observable 4-band fan dipole (40, 30, 20, 15 m). I used 18 AWG solid wire for the hats in this case and actually spliced some on because it was a first experiment.

Has this been published elsewhere? Yes, in the June 1991 QST it was mentioned in a general article about dipoles by NJ2L. Sadly, it's never made it into the ARRL Antenna Handbook... If you want to try simulation with EZNEC or some other tool, this makes a great exercise. Speaking of simulation, I wondered if this method would work on an 80 m dipole, making it usable on 30 m. It will, however the hats are about 9 feet long. Perhaps this could be

implemented with wires pulled out via insulators and string. Further simulation and experimentation is in order here.

