2m 145 MHz Rectangular Loop

Andrew VK1AD / 29/09/2019

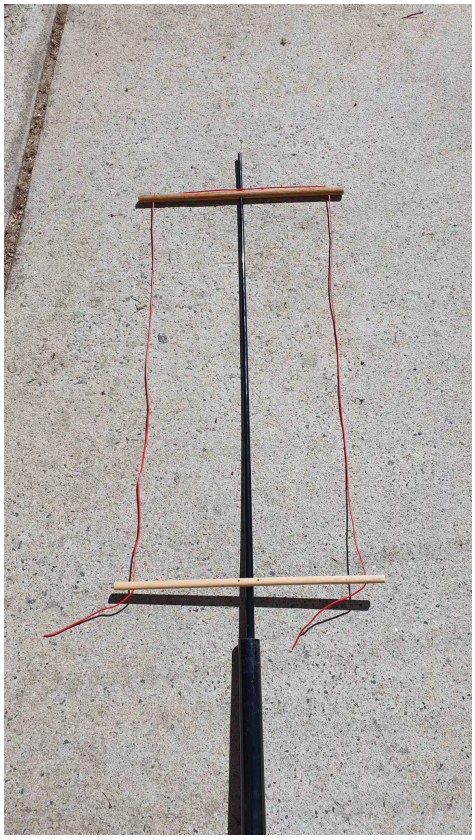
Peter VK3YE recently published a 2m rectangular loop antenna article in Amateur Radio Magazine edition 5 (Sep-Oct 19). The feedpoint impedance of the 2m rectangular loop is 50 ohms thus avoiding the need for a 1/4 wave impedance transformer.
I have constructed the lightweight 150 gram (5.2 ounces) antenna and plan to use it for portable SOTA operations in the lower narrow band segment of the VK 2m band, SSB, CW and digital modes. I chose a center frequency of 145 MHz which permits operation on 144.2 MHz SSB or 146.5 FM simplex. In this configuration polarisation is horizontal.
2m antenna dimensions: Rectangle 360 mm wide x 690 mm high. The ratios are approximately 1/6th and 1/3rd of the full wave loop length or 1/3rd across and 2/3rds high.
My finished antenna wire length is 2.130 metres, which includes an extra 15 mm on each side for feed point strain relief. The finished length will depend on the wire diameter used. Start with a longer length and trim for a low VSWR.
Full wave loop formula: 306.3/frequency (metres) or 1005/frequency (feet)

Materials

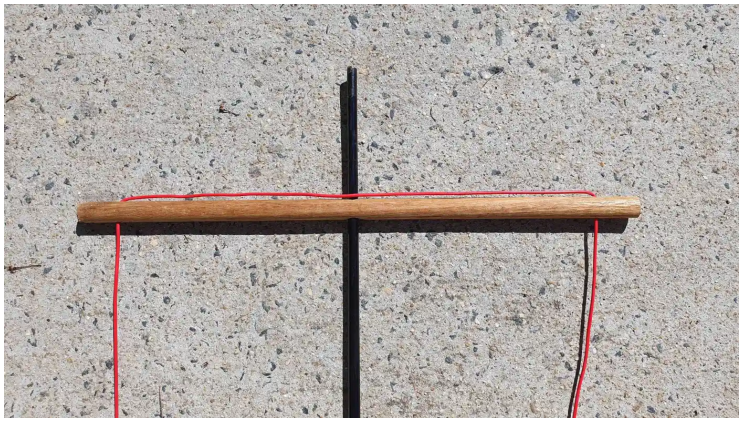
- 420 mm length of 16 mm dowel (top arm)
- 420 mm length of 12 mm dowel (bottom arm)
- 2.2 metre length of insulated 18 AWG multi-strand copper wire.
- BNC panel mount
- 2 x M3 screws, washers and nuts

- 1 x solder tab
- 2 x M3, 18 mm brass screws
- 1 50 mm x 30 mm section of kitchen cutting board
- Telescopic fibreglass pole, avoid using a carbon fibre pole.

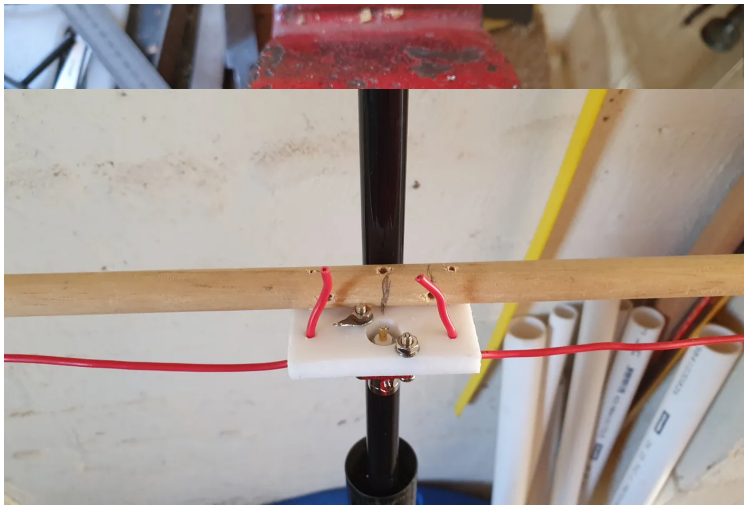
Basic layout and simple to build. 🙂 See update 11 October 2020 (scroll to the end.



145 MHz Rectangular Loop Antenna layout 360 mm x 690 mm

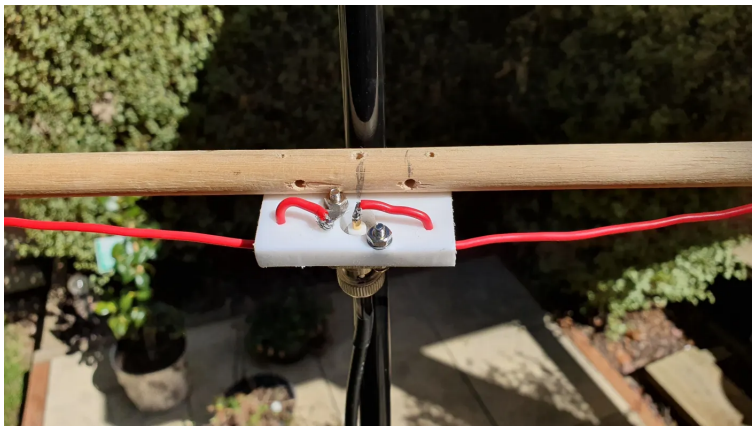


16 mm dowel top cross-arm transfers the weight of the antenna to the telescopic pole.

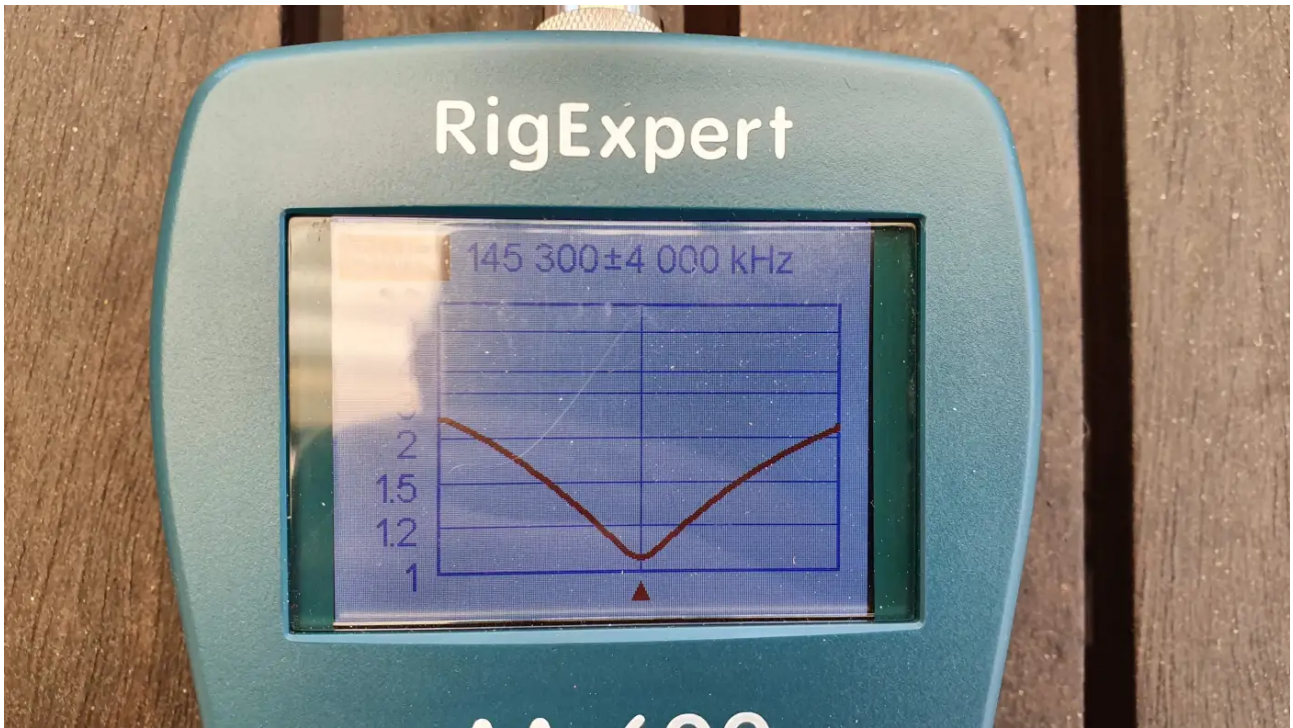


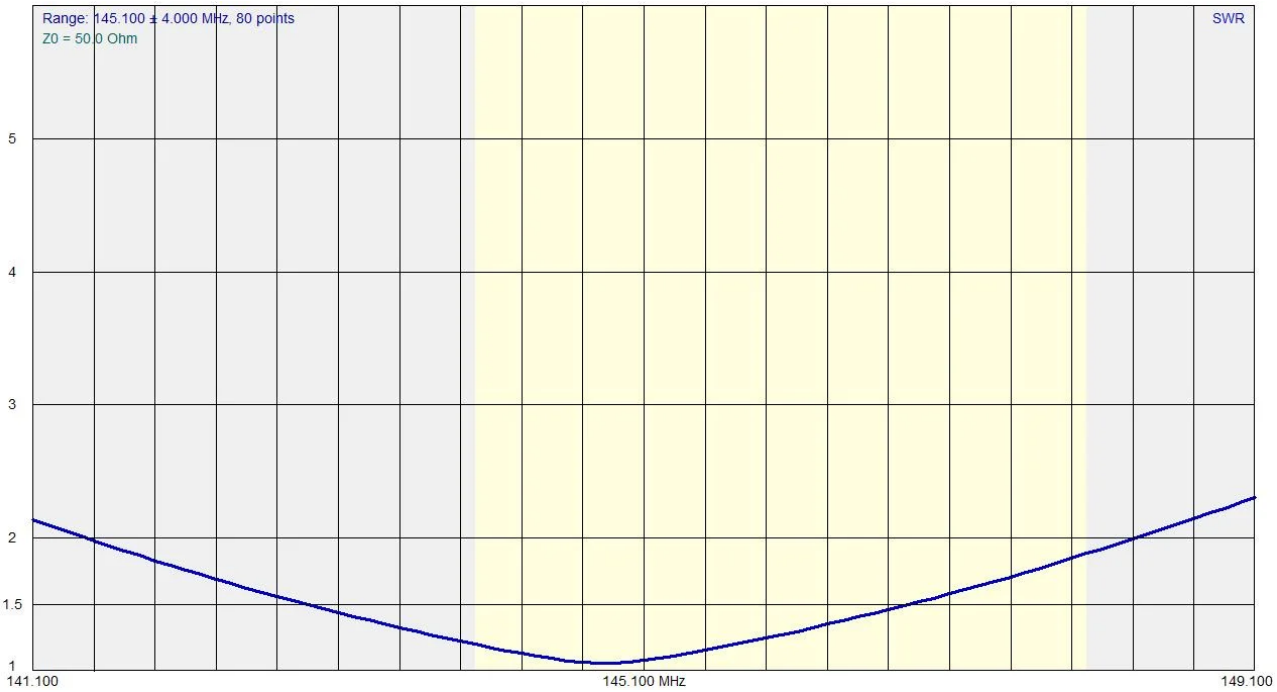
BNC panel mount, mounted to a section of kitchen cutting board. The nylon board is mounted to the center of the bottom dowel cross-arm

50 ohm feed point – antenna wire is passed through 2.5 mm holes for strain relief. Solder one side of the loop to the BNC center pin and the opposite side to the body solder tab.



Bottom cross-arm feed point. To secure the feed point to the pole, pass a short length string through the dowel and around the pole and tie off. Connect a length of RG58AU Mil Spec coax to the BNC socket.
RF Choke. If required wind 9 turns of RG58AU coax around a 25 mm (1 Inch) former. Make a 1 turn loop near the feed point for strain relief on the coax BNC plug. Finished 2m 145 MHz rectangular loop antenna.





RigExpert AA600 VSWR scan – 141 to 149 MHz
2m 145 MHz rectangular loop VSWR and Return Loss graphs

Combined weight is 150 grams (5.2 ounces)
Thanks to Peter VK3YE for publishing his article in AR Magazine, Edition 5 (Sep-Oct 19).
Peter's YouTube video can be found here

Post update 30 June 2020

Summit to Summit QSO from VK2/SW-036, 941m ASL to VK2/ST-010 1219m ASL. On Sunday 28 June 2020 using this antenna on a 4m telescopic pole I made a S2S contact with VK1HAB on 146.5 MHz FM at 5 watts over a 94 km path of difficult terrain. Remember horizontal polarisation has less RF attenuation than vertical polarisation at the same output power level.

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