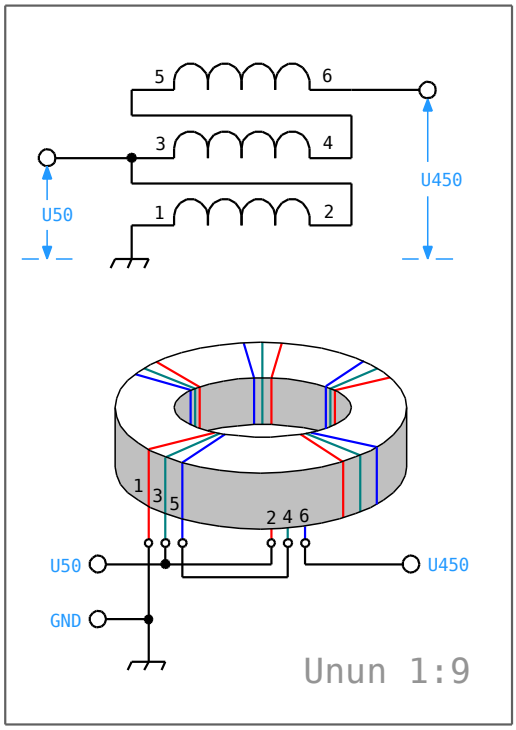
Unun 1 : 9

This is a short description of wide band antenna transformer used with various long-wire antennas; random and long wires, Beveridges and with some vertical antennas. This medium power unun can handle up to 100W transmitter power. It is unbalanced magnetic voltage transformer with galvanic contact between input and output windings. This construction is a traditional trifilar winding over 36 mm ferrite toroid core.

- Unbalanced to unbalanced, impedance **1 to 9**, 50Ω to 450Ω.
- Frequency range from **3 to 30MHz** with SWR less than **1 : 1,5**
- Power handling capacity up to **100W**, with proper antenna.

Circuit Diagram



Toroid Core and Winding

With proto we used **Ferroxcube TX36/23/15-4C65** toroid, material **4C65**, Al=170nH, u=125. Similar toroid is **FT140-xx**, with material **61**, or **31** for lower frequencies.

The wire is now 0,25mm^2 Suhner Radox stranded high temperature industrial wire, conductor diameter 0,57mm, insulator diameter 1,35mm. Any similar wire should be OK, also 0,50mm^2. Thin wire produces lower capacitance.

We used traditional trifilar winding without twisting the coil wires. Details on pictures. We tested the turns count with 3 x 6 to 3 x 9 turns. With the count we may slightly adjust the frequency range. With **3 x 7 turns** we got best results on widest frequency range. Please, look at the SWR charts on the following page.

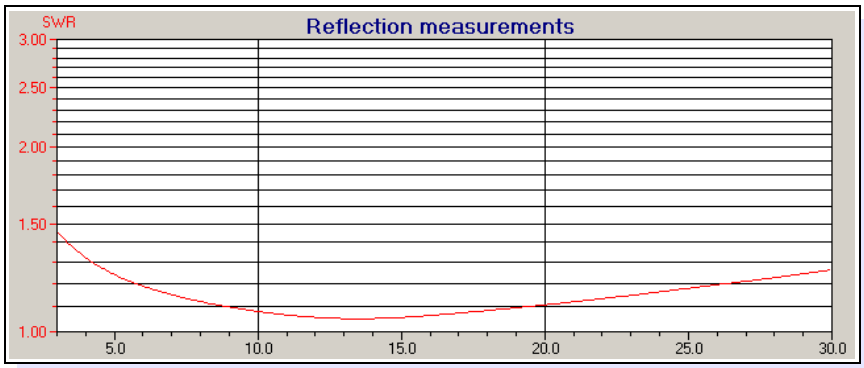
Typical Enclosure

This unun is boxed into ABS enclosure, Hammond 1594BBK.
Do not use metal enclosure for high-impedance baluns|ununs !
Output connectors are 6,3mm Abiko terminals and the coaxial connector is a standard BNC female with flange. The enclosure may be potted with beeswax or epoxy.

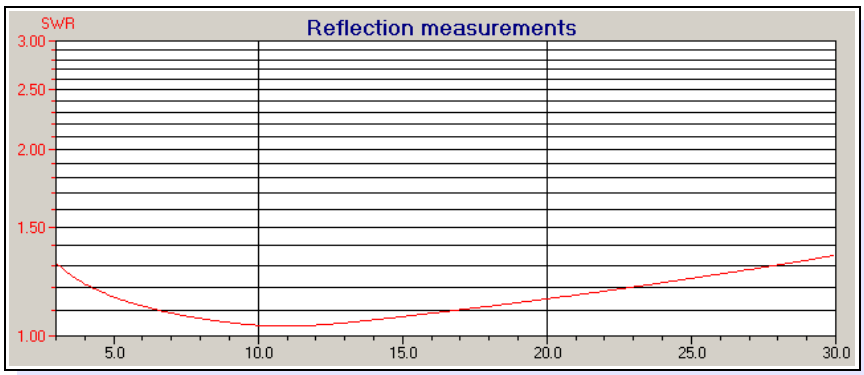
SWR measurements

We measured the SWR charts (on following page) with Mini VNA Pro instrument. The 450Ω low-inductance load resistor (thick film) was connected directly across the short output wires. The efficiency of this unun was not measured. On charts you see that the perfect SWR range is rather narrow and you may only slightly adjust this range by chancing the winding.

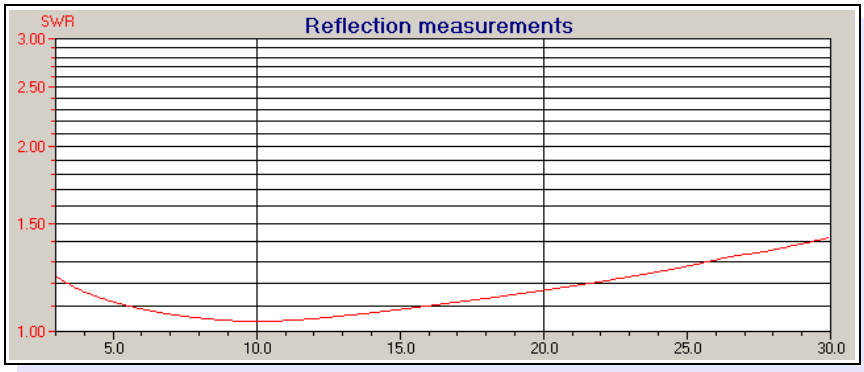
6 x 3 Turns:



7 x 3 Turns:



8 x 3 Turns:



9 x 3 Turns: