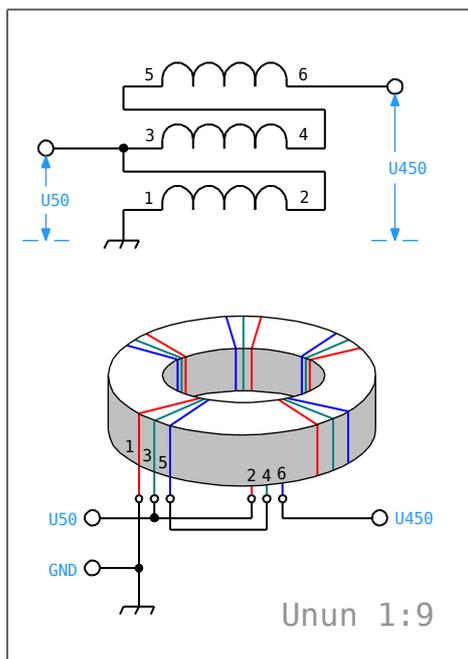


Toroid Unun 1 : 9

This is a simple wide band antenna transformer, used with various long-wire antennas; random and long wires, Beveridge's and some vertical antennas. It is unbalanced magnetic voltage transformer with galvanic contacts between terminals. Construction is traditional trifilar winding over 36 mm ferrite toroid.

- Unbalanced to unbalanced, impedance **1:9, 50 Ω to 450 Ω**.
- Frequency range from **2 to 30 MHz** with SWR less than **1,5**.
- Power capacity up to **100 W** (SSB), 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 **FT140-61**, material **61** or with material **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 tested with (6 x 3) to (9 x 3) turns; by this count we may slightly adjust the frequency range. With **7 x 3 turns** we got best results on widest frequency range.

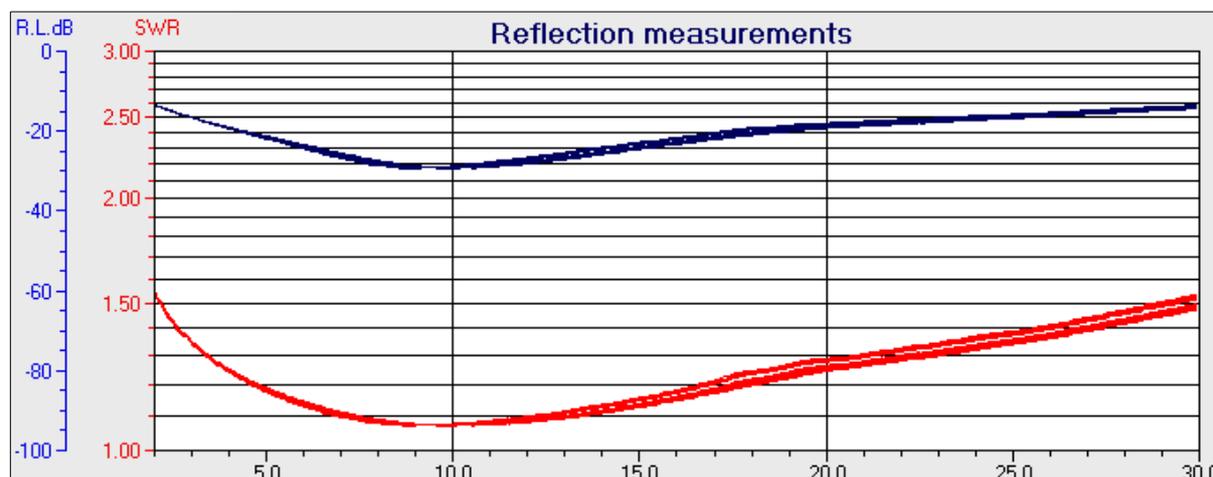


Typical Enclosure

This unun is boxed into ABS enclosure, Hammond 1594BBK. *Do not use metal enclosure for high-impedance 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, if needed.

HF 2 to 30 MHz SWR and Return Loss

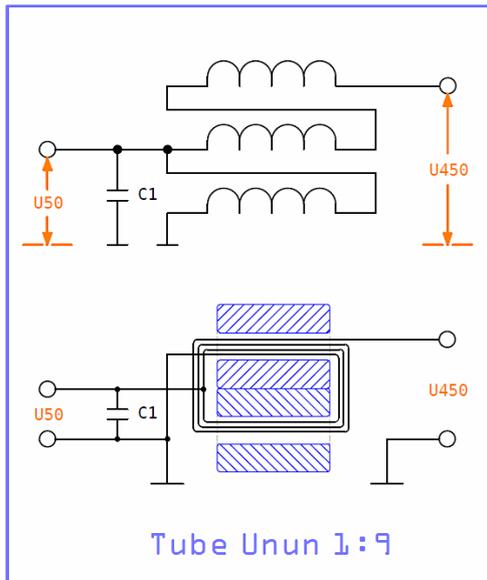
We measured SWR and return loss with Mini VNA Pro instrument. The 450Ω low-inductance load resistor (thick film) was connected directly from output to ground terminal. *The efficiency of this unun was not measured.* On chart you see that the perfect SWR range is rather narrow; you may only slightly move this range by changing the winding.



Tube Unun 1 : 9

This is a simple wide band antenna transformer, used with various long-wire antennas; random and long wires, Beveridge's and some vertical antennas. It is unbalanced magnetic voltage transformer with galvanic contacts between terminals. Construction is traditional winding using two parallel ferrite tubes.

- Unbalanced to unbalanced, impedance **1:9, 50 Ω to 450 Ω**.
- Frequency range from **< 1 to 70 MHz** with SWR less than **1,5**.
- Power handling far over **100 W**, with proper antenna.



Typical Enclosure

This unun is boxed into ABS enclosure, Hammond 1594BBK. *Do not use metal enclosure for high-impedance 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, hot glue or epoxy, if needed.

HF 2 to 30 MHz SWR and Return Loss

We measured SWR and return loss with Mini VNA Pro instrument. The 450Ω low-inductance load resistor (thick film) was connected directly from output to ground terminal. *The efficiency of this unun was not measured.*

Tube Core and Winding

With proto we used **Wurth 74270057** Ferrite tubes, OD 19 mm, ID 11,5 mm, length 51 mm. Material **4W620**, permeability $\mu=620$ (similar to 43). Both ferrite tubes were clued parallel on class-fiber circuit board material. We used coaxial cables center conductor for winding. The material is **RG174 U** with PE isolation, OD = 1.45 mm, test voltage 3.0 kV. This unun needs **2 + 4** full turns of wire, tapping at two turns from ground side. Capacitor **C1** is used to compensate the winding capacitance and smooth the SWR curve. Capacitor values (E12) from 10 pF to 100 pF were selected with 100 pF variable capacitor. The selected capacitor is disk ceramic, **22 pF**, voltage rating **3 kV**.

