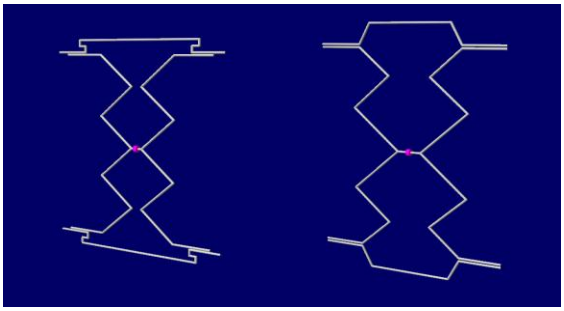
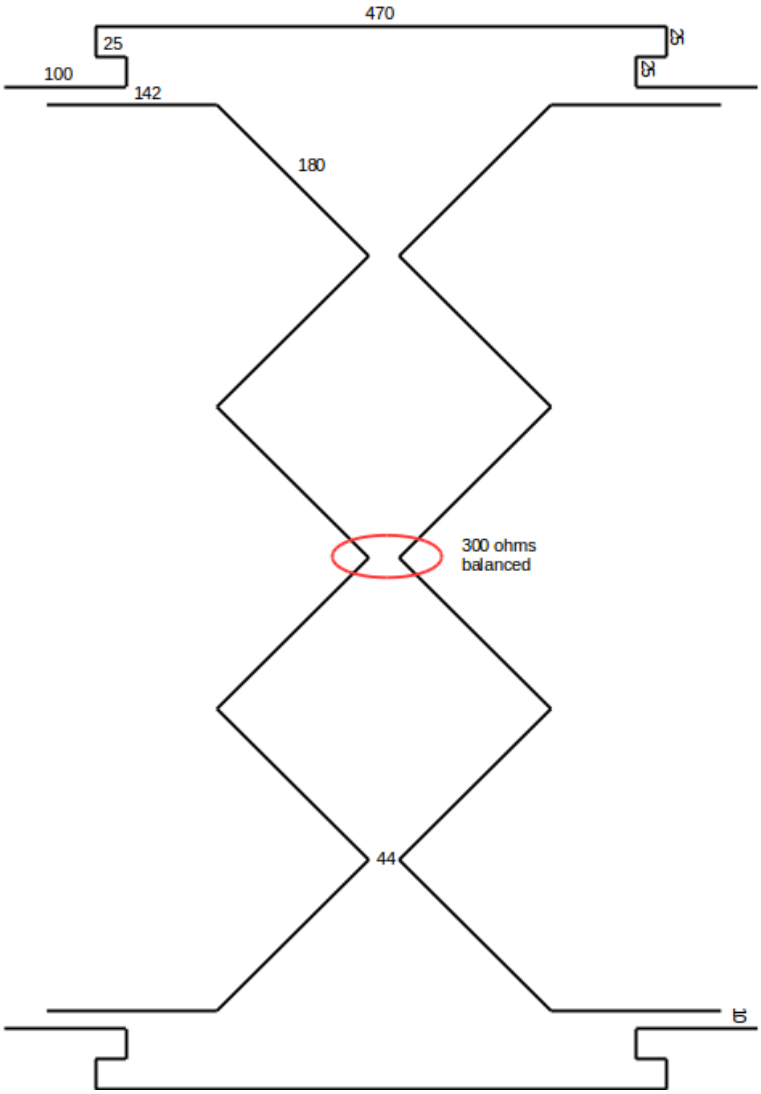
GRAY-HOVERMAN, THE WIDEBAND TV ANTENNA



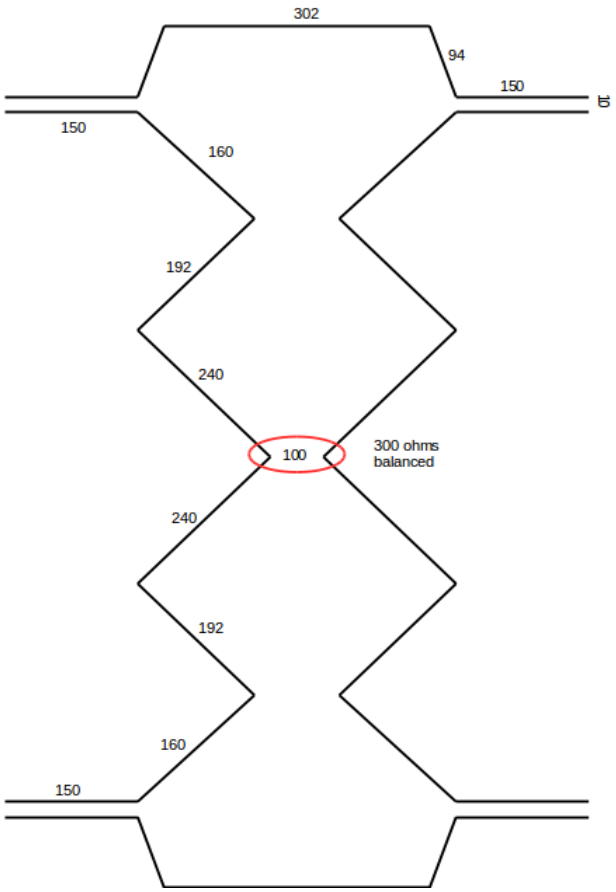
Air TV channels transmit on frequencies ranging from 170 MHz to 860 MHz. The VHF-Hi band covers 175 to 230 MHz, while UHF covers 470 to 860 MHz. The gap between is used for cable TV. Receiving all these frequencies is difficult when using a single antenna. More than that, the better your antenna is, it will have a better selectivity, thus receiving a single frequency.

The Gray-Hoverman antenna has been designed by Doyt R. Hoverman and it was patented in the sixties. His design only covered a part of UHF band. However, with some improvements, the antenna can receive well both the UHF as well as VHF-Hi. This post will show two variants of this antenna that can be used to receive 170 to 230 MHz channels (5 - 12) and a part of UHF between 470 - 720 MHz (21 - 52 channels) with a minimum gain of 5 - 6 dBi. These are the simplest to build. There are however designs that offer a minimum gain of 8 dBi on VHF and 10 dBi on UHF (check the Links section).

These antennas can be used for any kind of signal that can be received on the mentioned frequencies: analog TV, DVB-T, DVB-T2, ISDB-T, ATSC. The design is distributed according to the GNU GPL version 3 license.



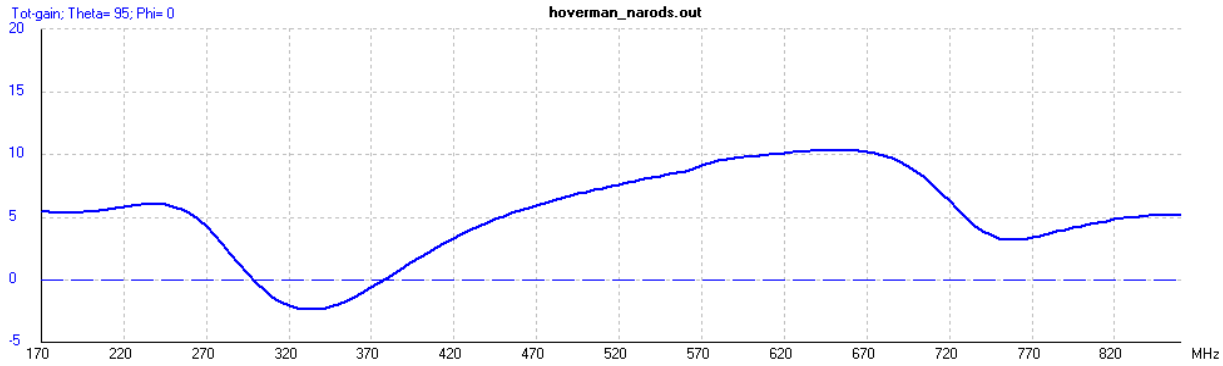
Variant 1 (links 2 and 4)



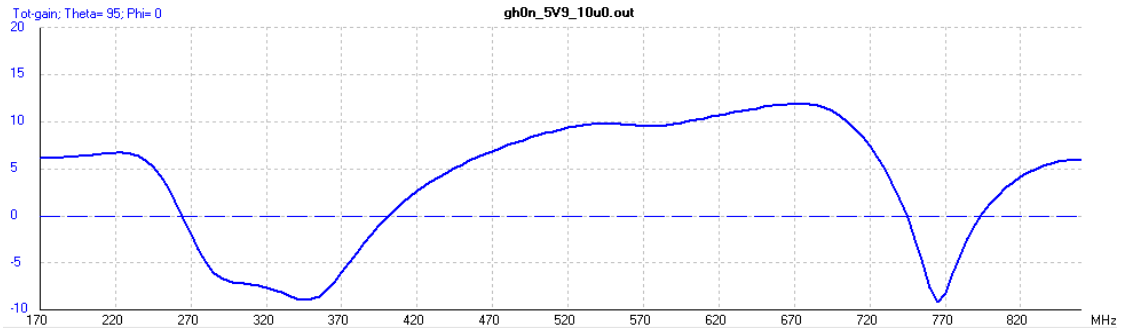
Variant 2 (link 3)

All dimensions are in milimeters. The antenna can be built with aluminium or copper of 3 to 8 mm diameter.

The gain of these antennas is shown below (4nec2 simulation).

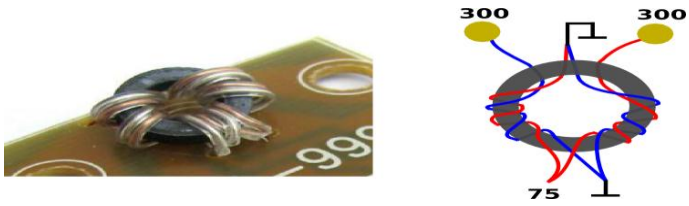


Gain (dBi) of variant 1.



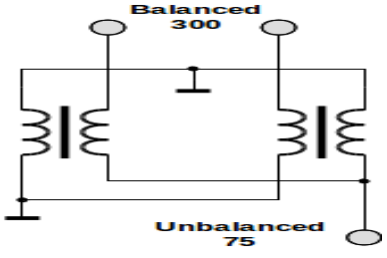
Gain (dBi) of variant 2.

The antenna impedance is 300 ohms balanced. A balun should be used or you can build one similar to those in commercially available antenna amplifiers. If you don't have the parts for it, you can ommit it. Good results were obtained without it, by conecting the coaxial cable directly, the central wire to an element and the cold wire to the other.



The balun

A toroidal core with an external diameter of 8 to 15 mm will be required. Wind two by two turns of double-wire cable. Here is the equivalent schematic.

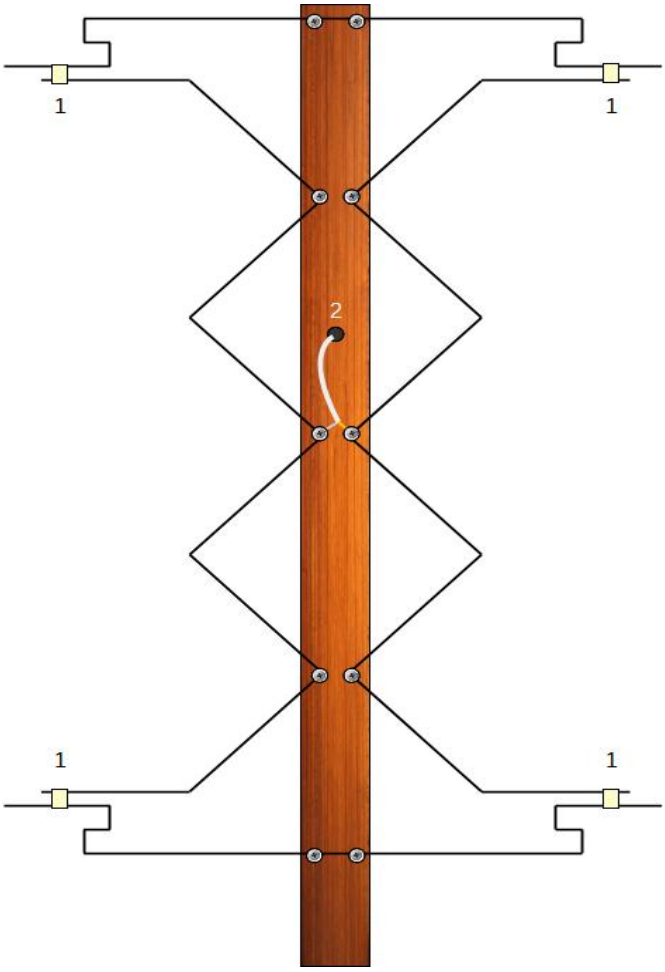


The balun schematic

The performance of these antennas can be improved by adding some reflectors.

See the designs here. No reflector variant is easier to build and receives two sides.

A construction variant is shown below. The antenna sits vertically, as shown.



Construction detail. 1. Duct tape 2. Pass through hole to prevent a cable position that would allow water to enter and oxidize the cable wires.

Source: http://onetransistor.blogspot.in/2015/01/gray-hoverman-wideband-vhf-uhf-antenna.html