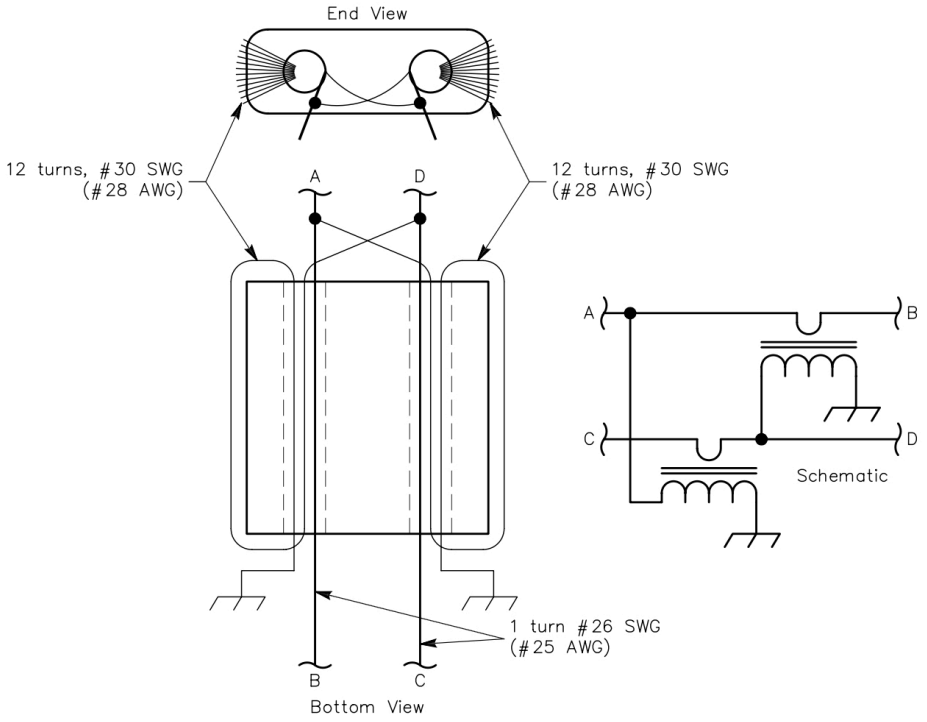
SWR low power design

The basics of SWR is to measure the forward and reflected power in the feeder to the antenna. This indicates the match or mismatch of the transmitter to the ATU and/or the antenna.

The forward and reverse waves are detected using a transformer coupler.

Having researched lots of sites with various SWR designs I have come across one that give a neat coupler. This looks like this:



TX input is at port C, and antenna connection is to port D, the Forward output is from port A and the Reflected power from port D. This gives a very neat winding pattern and connections to the binocular core. The advantage of using a single core is that the two transformer have the same "Al" or inductance per turn, and so are matched.

The core used is the BN-43-302 and the voltage ratio which equals the turns ration is 10:1. This gives a 2.2V Forward output on D (= 100mW, +20dB) from a full scale power measured of 10W (22V, +40dB). Here are the dBm/Power/Vrms/Vpk-pk values in a table

At Z0 = 50R			
dBm	Power	RMS	Pk-Pk
10	10mW	0.7V	2V
20	100mW	2.2V	6.3V
30	1W	7V	20V
40	10W	22V	63V
50	100W	70V	200V

The Forward D and Reverse C outputs are fed to two AD8703 log detectors, which have a

max input capability of +20dBm or 100mW or 2.2Vrms. For higher powers a lower turns ratio or attenuators should be used to make sure the input to the AD8703 is not more than +20dBm or 2.2Vrms. The outputs D & C are each loaded with a 50R (or 51R) resistor to ground. The AD8703 outputs go to a Arduino Nano inputs A0 (D) & A1 (C). Software displays the FWD & REF signals as logarithmic bar charts. With text displays of PWR (FWD) and SWR,