

AERIAL TUNING UNIT (ATU)

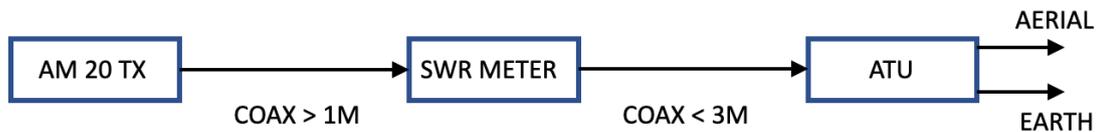


ATU shown with AM20

The Aerial Tuning unit is housed within a Steel box with ABS front and back size 15x15x7cm. It is a simple design to be used with the AM20 Transmitter in order to match a long wire of random length. Good results have been achieved at the top end of the Medium Waveband and with an 18-metre-long wire. An earth stake fitted for local Earth connection. The ATU is capable of tuning a long wire to resonate between 800KHz to 1650KHz. Obviously, the best arrangement would be a length at just over a quarter of a wavelength as this represents 40-50 ohms match and is resonant to the operating frequency. Aerials are complicated things but there is a lot of information available on the Internet if you want to experiment. The limiting factor is always the available space for the aerial. A quarter wave vertical radiator is much preferred by professional broadcasters.

A typical RF set up is shown below:

AM20 TYPICAL ARRANGEMENT



As the AM20 has an output impedance of 50 ohms, so 50-ohm coaxial cable is used to connect the AM20 to the SWR meter and ATU. SO259 connectors are used.

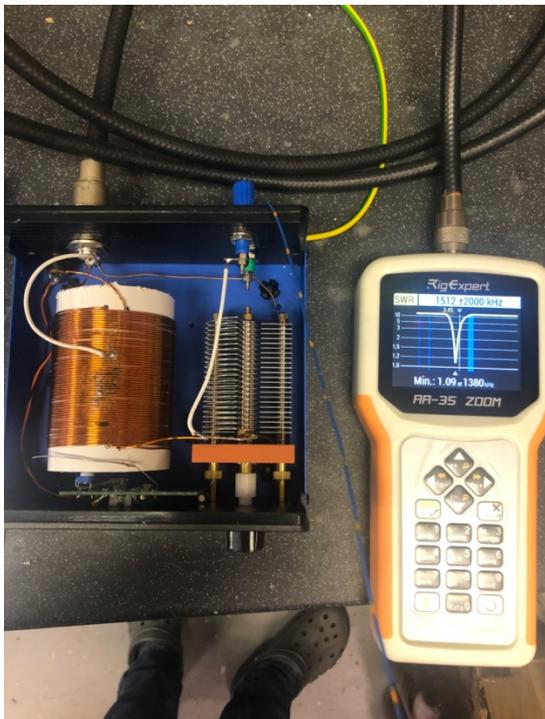
A short length of less than 1 metre can be used between the AM20 and the SWR meter.

A longer cable is used between the SWR meter and the ATU, the ATU being located away from the AM20 as far as practical, for stability reasons.

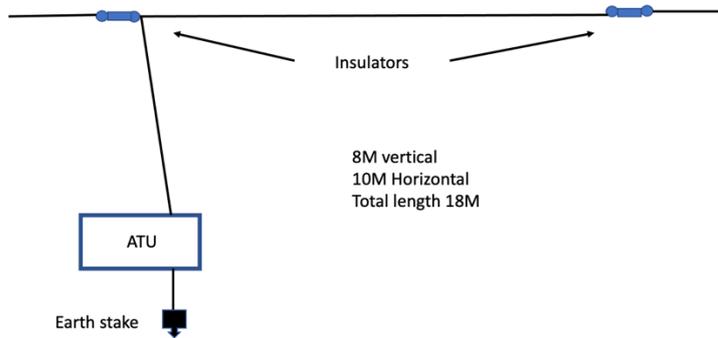
It is worth noting that RF can get into the audio feed and create severe instability. It is therefore advisable to keep the audio feed well away from the RF elements.

Some SWR meters are accurate from 1MHz onwards, this is very useful for setting up the aerial system. Use it to adjust the slider on the coil within the ATU for best forward power and minimum return loss. Expect to use a lot of the coil in the ATU for matching at short end-fed aerial to the transmitter.

An even more elaborate and reliable way is to use a modern analyser such as the RigExpert AA-35 Antenna Analyser.



Typical Long wire Aerial arrangement

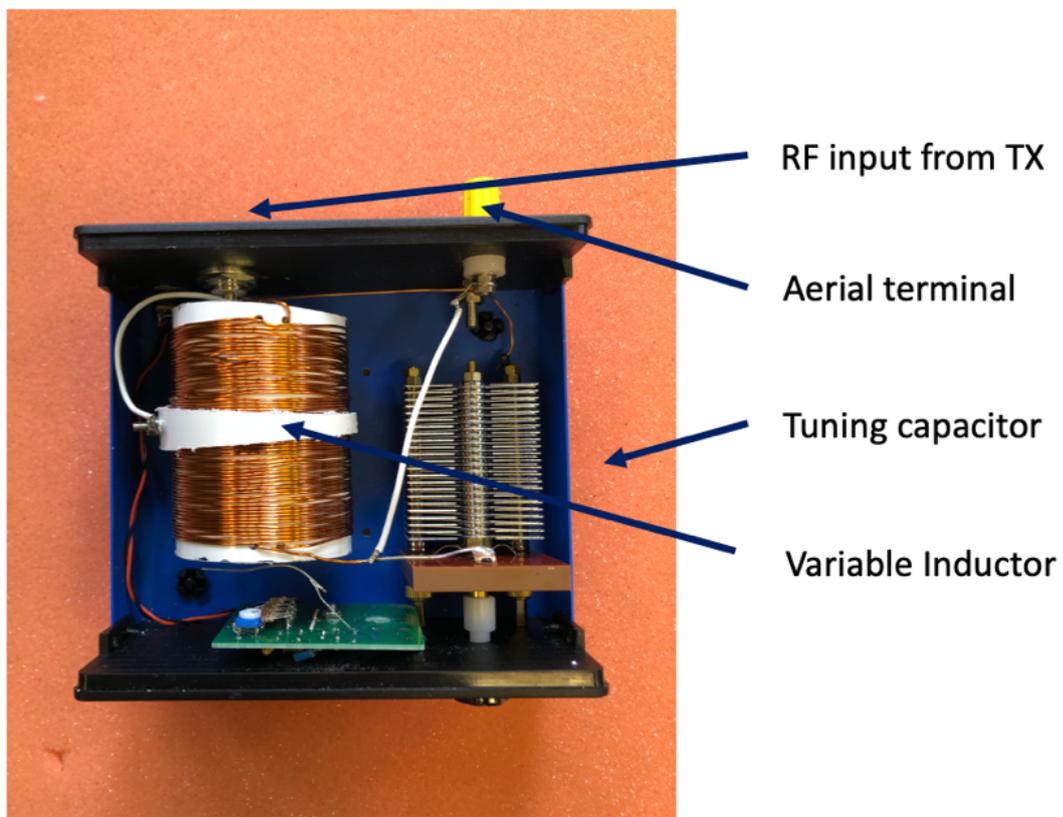


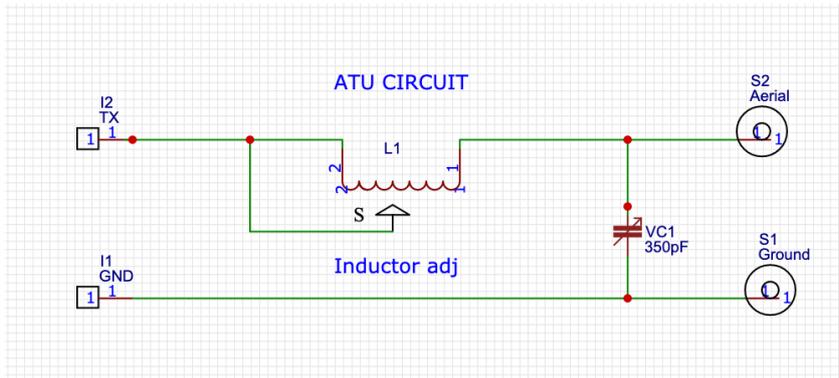
Inside the ATU enclosure is housed the variable inductor on a 50mm former and a 360pF High Voltage Variable Capacitor.

The coil is adjusted by the slider in combination with the capacitor for a 50-ohm match and thereby obtaining the lowest VSWR.

Terminal posts are used for connection to the aerial feed and earth.

ATU internal view

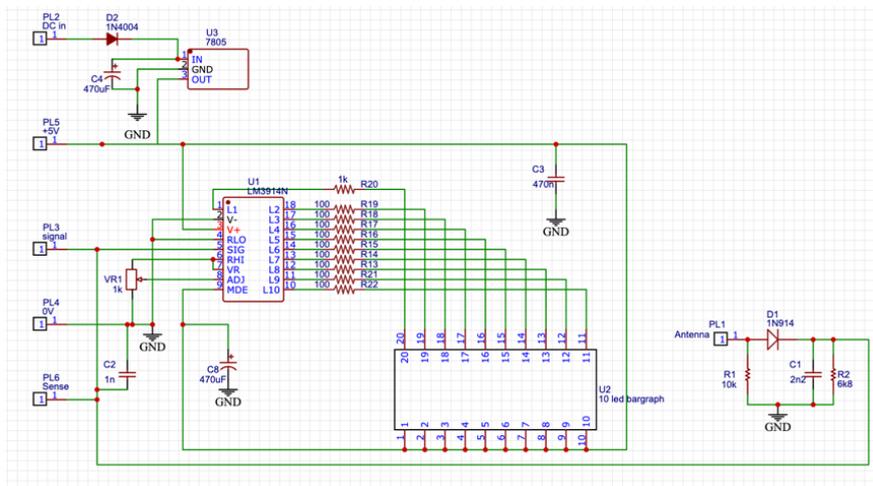




Wiring diagram of the ATU.

NB. The adjustment on the variable inductor can be problematic, so we advise you solder the tapping to make sure the connection is solid. If at all possible!

To help with tuning a display board is fitted which uses a LM3914 driving a 10 segment bargraph LED. RF signal pickup is via a small aerial in-built inside the box. A 2.5mm DC power socket on the rear panel is fitted to feed 9-15v DC for the display supply.



Circuit diagram of the display unit.

Typical ATU settings using the 18-metre long wire:

FREQ	1602	1560	1449	1366	1280	1140	1020	940	819
Turns	24	25	30	30	35	40	45	50	55
CAP	50%	55%	50%	50%	40%	49%	52%	50%	52%