hamware.de AT-615 Tuner
Remote Head Hardware Modifications

By Rick Williams – VE7TK

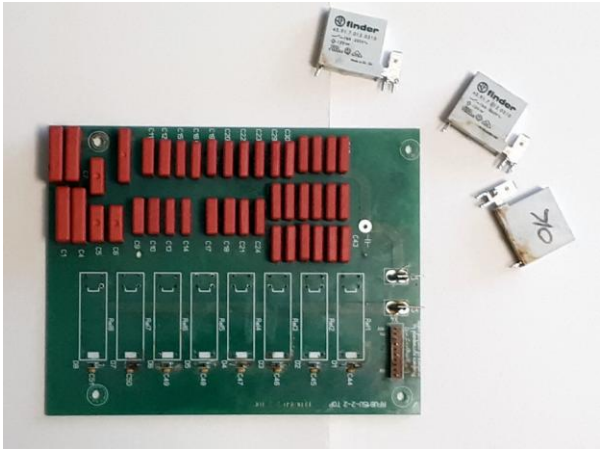
Warning: These modifications were made to my personal hamware.d AT-615U tuner. They are not supported or endorsed by hamware.de. Those undertaking these modifications do so at their own risk.

In the fall of 2020 I purchased a used AT-615u (the "u" signifies the unbalanced version) remote tuner on-line. I installed the tuner at the base of my 43ft vertical antenna and it performed very well for about 2 years.

Relay Replacement:

In 2022 I began to experience relay failures on both the capacitor and inductor boards. To put this in context, I live on the west coast of Canada in a rather wet environment. I have found, after years of working with electronics in this region, that it can be almost impossible to make an enclosure water tight. Without extreme measures condensation will often invade the electronics and cause problems. This is what I encountered with my AT-615.

The original 12 VDC relays used in the AT-615 could be described as open-frame with a plastic cover. Sadly the condensation I experienced was causing rust to develop on the spring arms of the relays. The contacts were fine but the switching action was compromised with some relays. I removed and replaced ALL 18 relays on the capacitor and inductor boards. The replacement relays were identical to the original. The photo below shows the capacitor PCB with the 8 relays removed. Also, you can see the signs of rust on the base of some of the relays.



About 15 months later the relays failed again! After much searching I was able to find a sealed relay with adequate specifications that had a similar footprint.

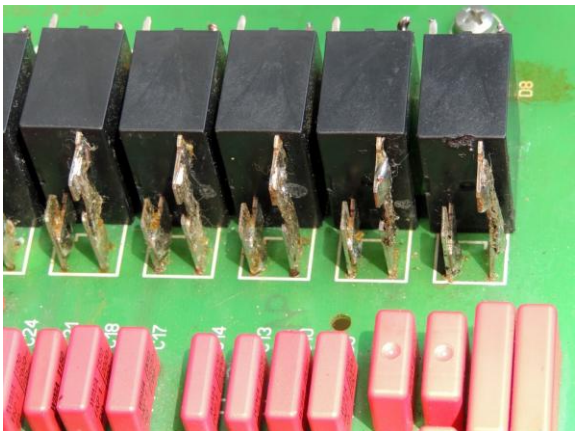
https://www.digikey.ca/en/products/detail/cit-relay-and-switch/J120D1AS12VDC/12503177



Mounting the new relay required a bit of ingenuity and I was able to use the PCB connection on the original relays to accommodate the new relays. The PCB mounting point for the new relays was actually cut off of the original relay with tin snips (see circled area of the photo below).



These mounting points were soldered into the original location on the board and connected to the new relays directly (for the lower contact) or using flattened RG-58 braid for the upper contact. These relays have performed flawlessly since their installation.



Reducing Condensation

In an effort to reduce condensation within the plastic housing AND the outdoor enclosure, I installed screened vents. In the rear of the plastic enclosure I added 2.5 cm screened vents near the top and the bottom. The wooden weather proof ground mounted box was also vented with 5 cm screened vents as shown in the photo below.



The goal was to allow any moist air and condensation an opportunity to vent before condensing on the relays and other tune PCB components. The last 2 years of operation have shown these modifications to be successful.

25 Pin Connector

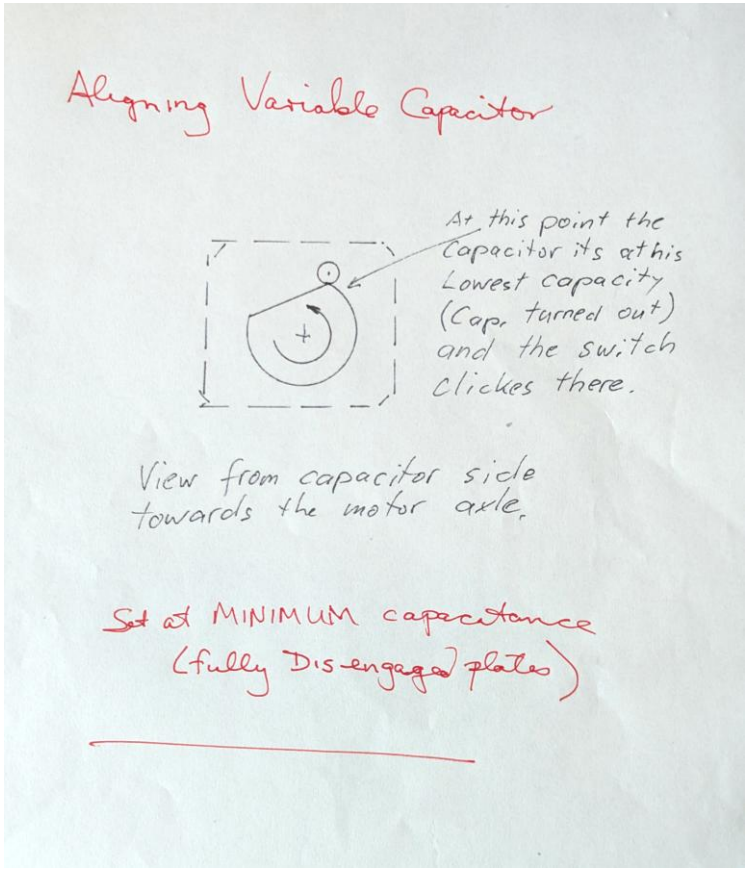
I replace the 25 pin control cable interface plug on the remote unit with a 25-pin DB25 male connector. The 25 conductor interface cable connector was replaced with a mating female DB25 connector.

My purpose in changing these connectors was to enable me to bring the remote unit into the shack and easily attach it to the controller using a standard 1 metre long 25 conductor serial cable for testing.



Stepper Motor Alignment

The proper initialization of the stepper motor requires that it must be aligned such that the micro-switch engages as all the plates of the rotating portion of the variable capacitor are disengaged from the fixed portion of the capacitor. I found the following sketch on-line (unfortunately I do not have a reference).



I hope you find this useful. Enjoy and best 73,

Rick – VE7TK