



KAT2 CALn note; ATU cautions

Many of you have commented that it is not possible to achieve a CALn null of 000. This occurred when we changed C50/51 from a 0.01 μ F cap to a 0.001 μ F cap. This is not a defect of the ATU, but merely a result of the shorter RC time constant (1/10 of the original) of the SWR detect circuit. This change was found necessary to prevent SSB distortion caused by an ALC time constant that was slightly too slow with the original 0.01 μ F caps.

I have worked with many ATU's over the past few months, and all of them that had the smaller value caps behaved this way. This is not cause for concern. The null that is achievable is still a very small voltage, and will cause no problems. An analog or digital voltmeter can also be used on the "top" of REFL pot R2 to easily set and verify the null of C55. This may be an easier way to get close to the best null, than relying on the K2's LCD alone.

If everything is working as it should, there will be a very small REFL voltage (millivolts) reading once C55 is properly nulled. I see 006 to 009 typically on 40m at the 5 watt level. Use the shortest possible connection to the dummy load. The best setup is one of the small 15 watt dummy loads sold by Radio Shack and others, that terminates in a PL-259 plug. A BNC-to-SO-239 adapter then allows the shortest connection possible. A homemade 50 ohm dummy load that has very short connections is also OK.

We will probably slightly change the firmware and manual in the future to prevent operator concern over not being able to reach a CALN null reading of 000. This will not be an issue for anyone who has the earlier ATU firmware, since the operation of the ATU will be identical. The change will be only a cosmetic one.

If C55 does not null well, then you must investigate the reason for this. Often, the dummy load or cable is the cause, so do not assume the dummy load is working perfectly. A dummy load that is part of an antenna tuner or one that is switched in (as with a coaxial antenna switch) is often *not* a good 50 ohm low reactance match to use to set C55.

Some folks have wired the connector incorrectly on J7, which plugs in to P6 on the K2's main RF pcb. Watch out for this. The center conductor lead goes toward the middle of the K2, not the right side panel.

A short or open on the ATU itself is often the cause of a failure to null C55. This may be hard to



find, and may require the ATU be partially disassembled (the LC board at least) to find the cause of the problem. Most problems, are of course related to the toroid transformer at T1 on the ATU's control board.

It should be mentioned that the component leads of the capacitors (and the toroid leads, too) must have their lead lengths shortened enough to prevent piercing the bottom of the relays when installing these components on the opposite side. Pre-trim the leads so that no more than the thickness of the PCB is left before installing and soldering the caps and toroid leads. DO NOT press a long lead of a component into the PCB hole when soldering it in. To do so invites a short circuit of the relay, as the bottom of the relay case is quite thin and easily pierced. Spend some time constructing the LC board neatly, and it will give you many hours of trouble-free service.

Be careful to not burn the sides of the relays with the soldering iron, as the internal clearance is very small. It is wise to use as much care as possible when building the ATU, to avoid a difficult process of troubleshooting it later. Allow yourself enough time to build this option, use a well lit bench area, and use a minimum of solder when soldering the relays so their pins can be trimmed flush and not cause shorts when the toroids and caps are mounted later. Most problems are on the LC pcb, or around T1 on the Control pcb.