

## **Fitting the Cumbria Designs X-Lock version 3 to an Elecraft K1 by Dave, G4AON**

### Background

My K1 drifts in excess of 100 Hz per hour and doesn't stabilize for more than 3 hours. The X-Lock gives it a stability of a few Hz within seconds of switch on, it holds lock without slip during transmit and lock isn't lost with RIT use\*. I do not use XIT, as the button is assigned a secondary function of "side tone" to assist with netting, however testing with XIT temporarily in use did not cause a lack of lock on return to receive.

There may not be space to fit the board to a K1 which has the internal battery pack. The optional K1 noise blanker installation shouldn't cause a problem with fitting an X-Lock, however not having the noise blanker fitted to my K1, I cannot be certain.

The board was constructed as per the Cumbria Designs manual, with the status LED mounted on the X-Lock PCB as I didn't want (or need) to fit it to the front panel of the K1.

### Installation

Matt, W6ZBA, had already written an eHam review of an X-Lock fitted to a K1, so I asked him for connection details. Matt appeared to have connected the X-Lock "counter input" to P1, pin 10 of the K1. I was not able to obtain sufficient VFO level from that point and used the emitter of the VFO buffer (Q9) instead. Supply came from P1, pin 16 (+ve) and pin 20 (-ve).

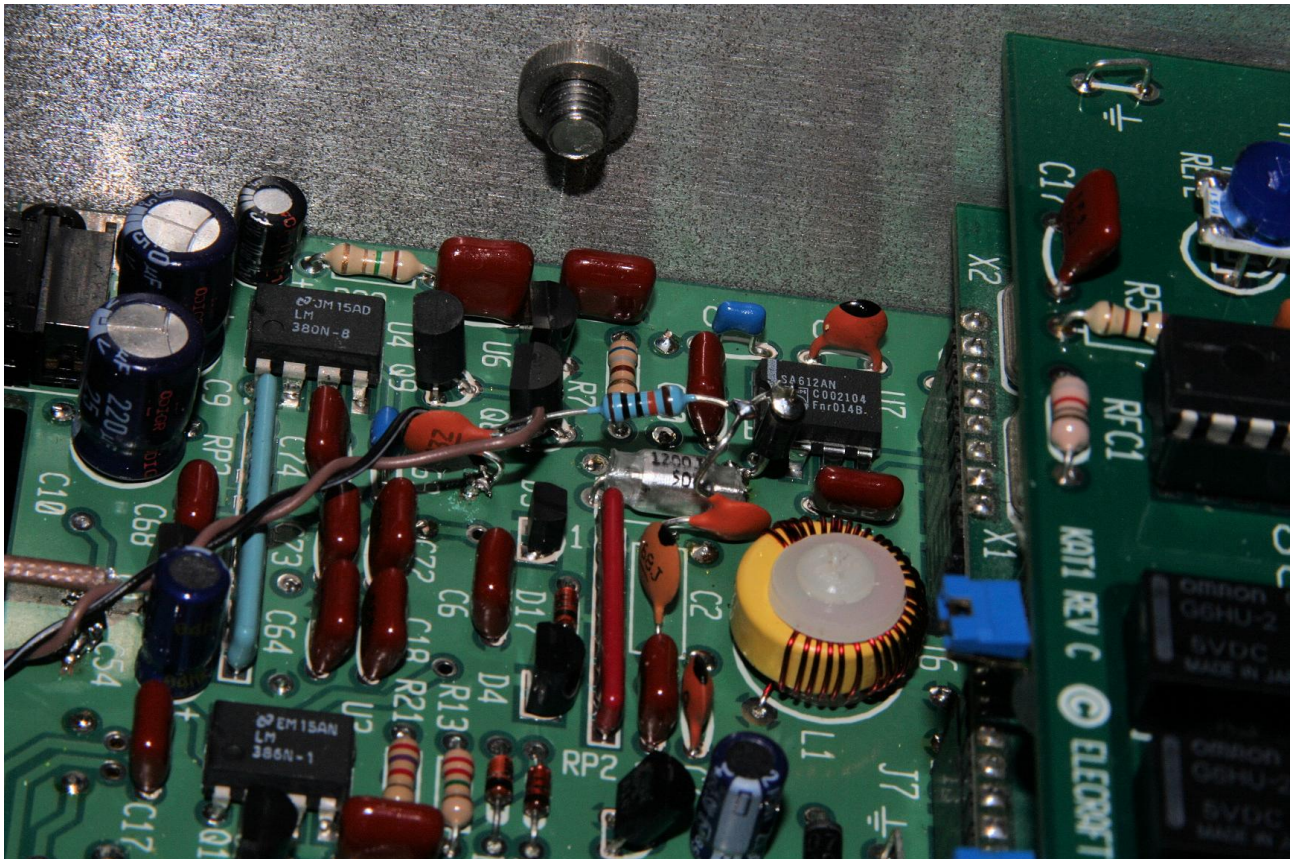
The VFO connection was via the supplied 1N4004 diode, 100K resistor and a 22 pF capacitor. The connection point in the K1 was the junction of C2, C7, C5 and L1 (the top of the VFO coil). The components were built "ugly style" on top of the K1 RF board, connecting the 22 pF capacitor to the left hand side of C2 (as viewed from the front of the K1).

The X-Lock board was initially tested using a temporary installation of wrapping it in thin bubble wrap and mounting it in the space between the control panel and the band boards on the left hand side of the K1, as viewed from the front.

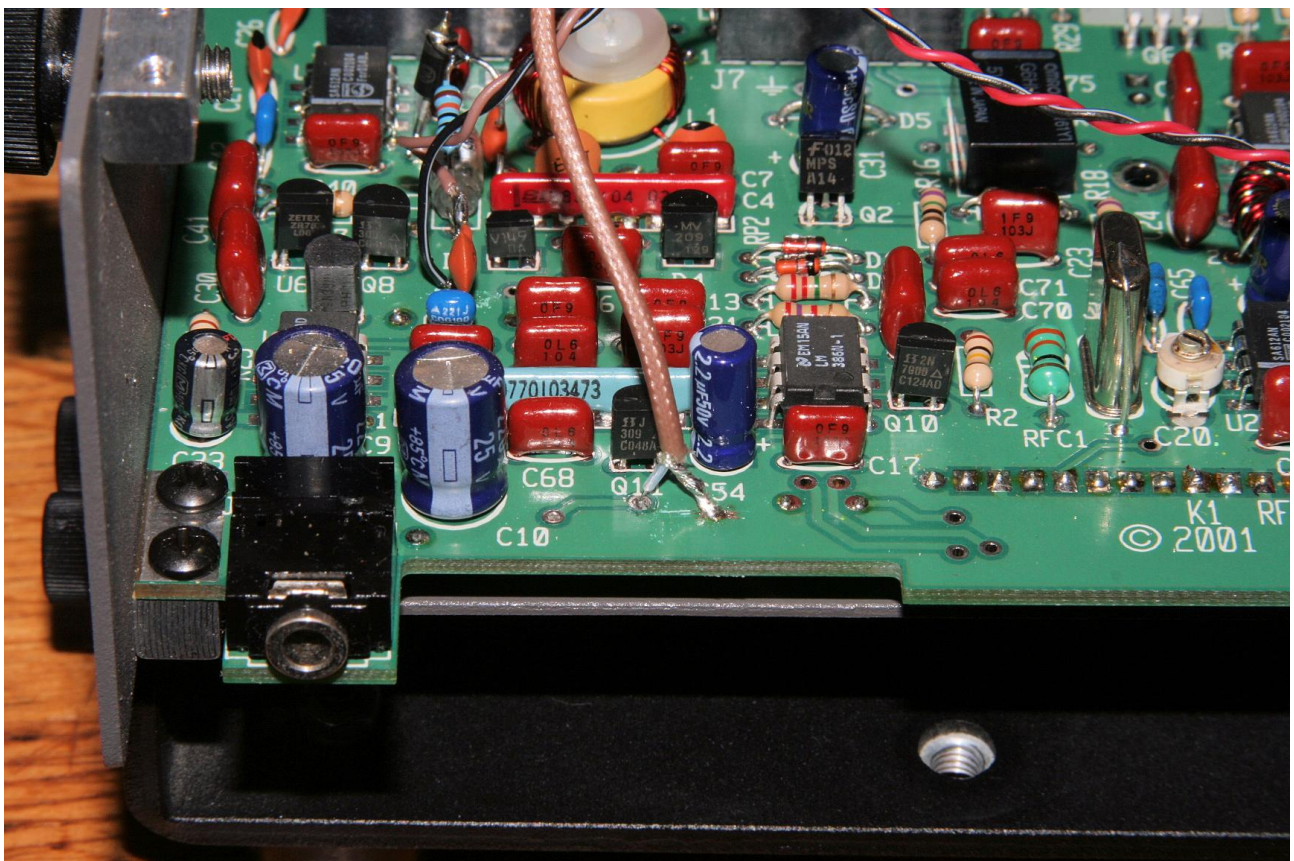
For a semi permanent installation, I fixed the X-Lock board under the side panel screw hole, where the bolt from the tilt stand screws into. I used a generous amount of hot melt glue and also glued a piece of thin card under the X-Lock board to avoid shorting it to components on the K1 main board. Mounted this way, it is important to shorten the mounting screws if you use a wide range tilt stand (KTS1), as the tilt stand screws protrude into the K1 and would press against the X-Lock components.

If drilling holes in the side panel is not an issue, the X-Lock can of course be secured to the side panel with right angle brackets or threaded aluminium blocks.

\* Small offsets of RIT can be seen as drift by the X-Lock, it works well provided care is taken to avoid setting RIT a few Hz away from centre. Even if it does shift a few Hz as a result of accidentally small RIT offsets, it's not a real issue.



The anode of the 1N4004 and ground connection of the 10 nF capacitor were taken to convenient ground plane points on the K1 RF board.



The image above shows the VFO buffer output taken from the top side of the K1 RF

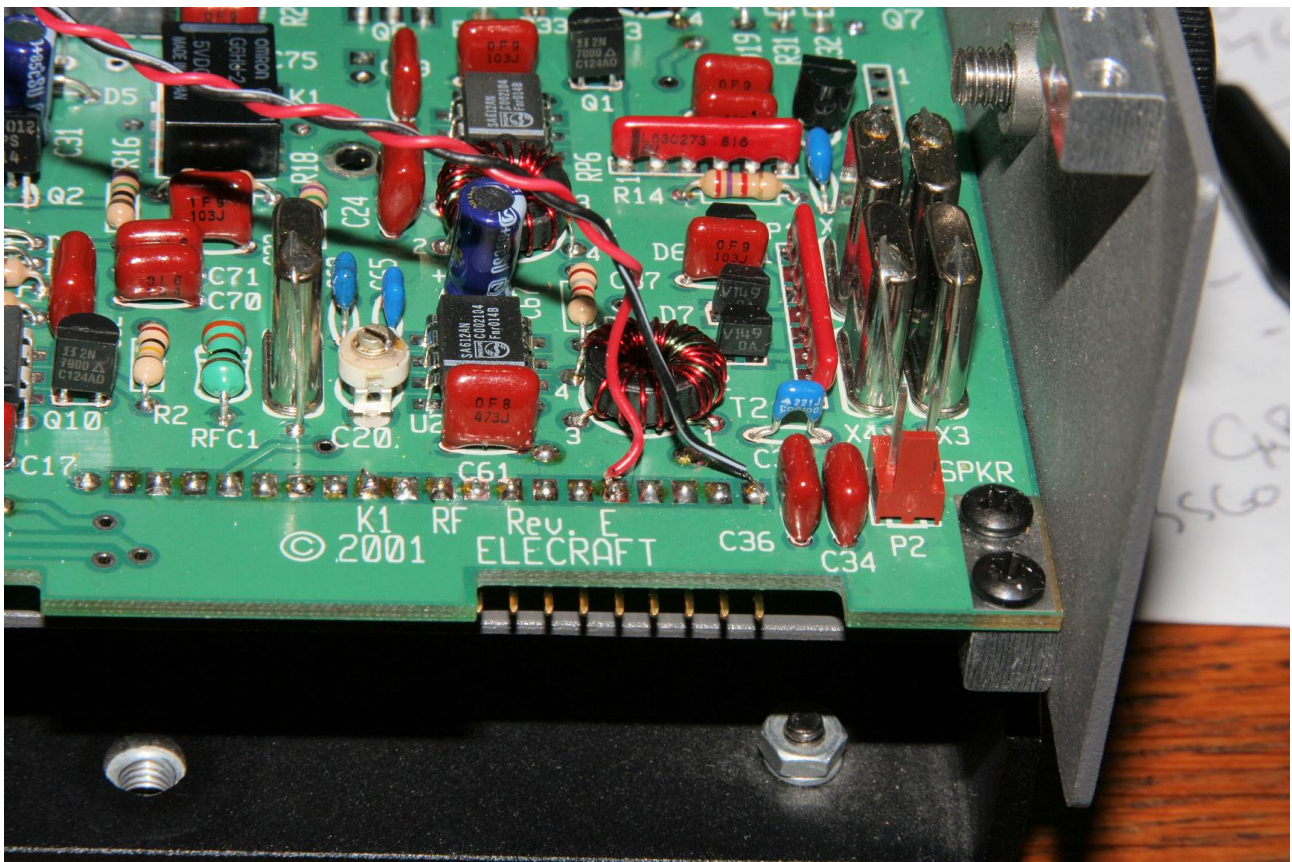


board, the short PCB track on the top side of the board carries the VFO output to C8, which is mounted under the board. A 3 inch length of RG-178 PTFE coax, similar to RG-174, was used for the VFO buffer to X-Lock input lead.

The picture below shows the connection point for the X-Lock supply, after re-fitting the front panel arrange the supply wiring to the front panel side of P1 to avoid it running near the BFO crystal or T2.

I made no changes to the configuration of the X-Lock and did not connect to "External RIT", ie I made no connection to the "T/R" board connection.

Stability is within a few Hz over periods of an hour or two, with no sign of VFO warble or loss of lock, even when switched on and used from cold.



Above image shows the power feed from pin 16 and 20 of P1 on the K1 RF board.

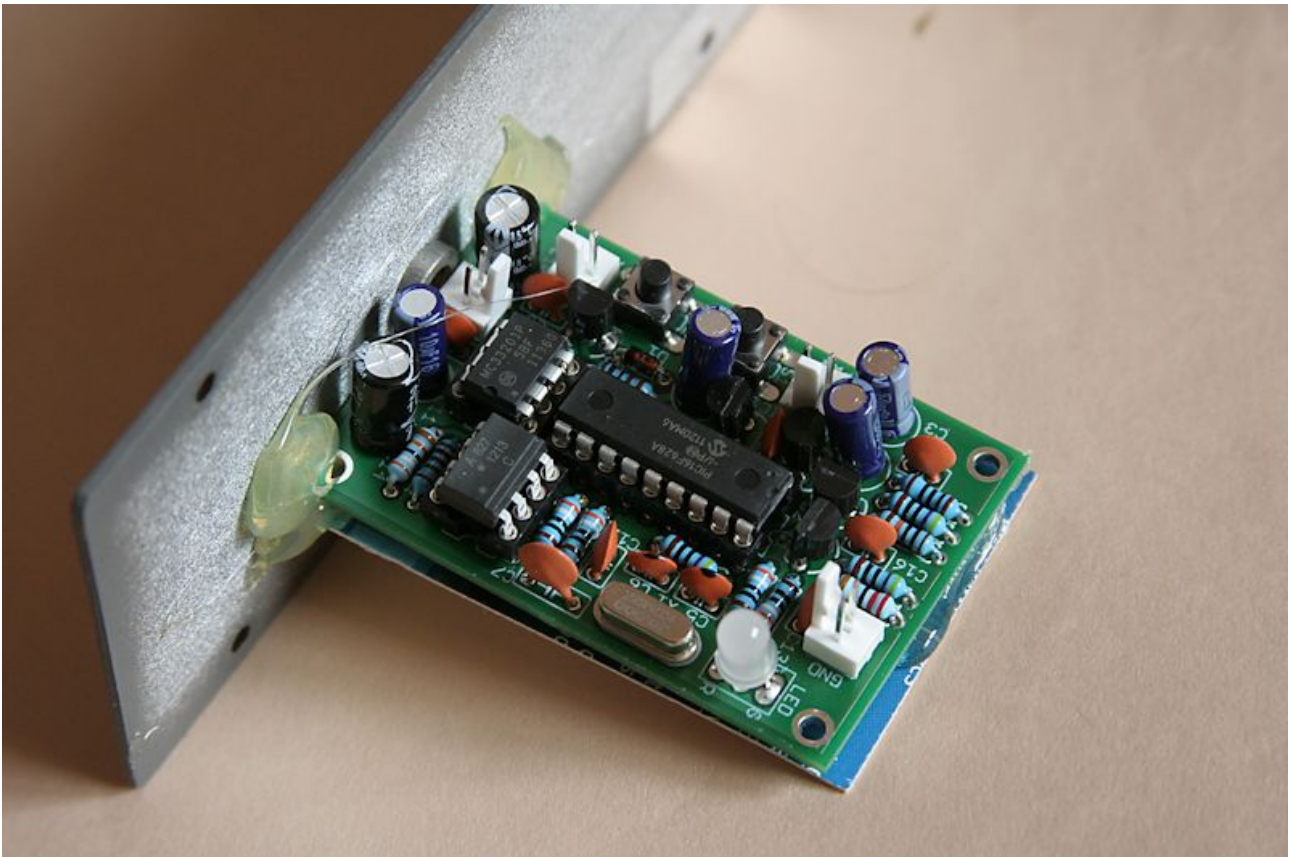
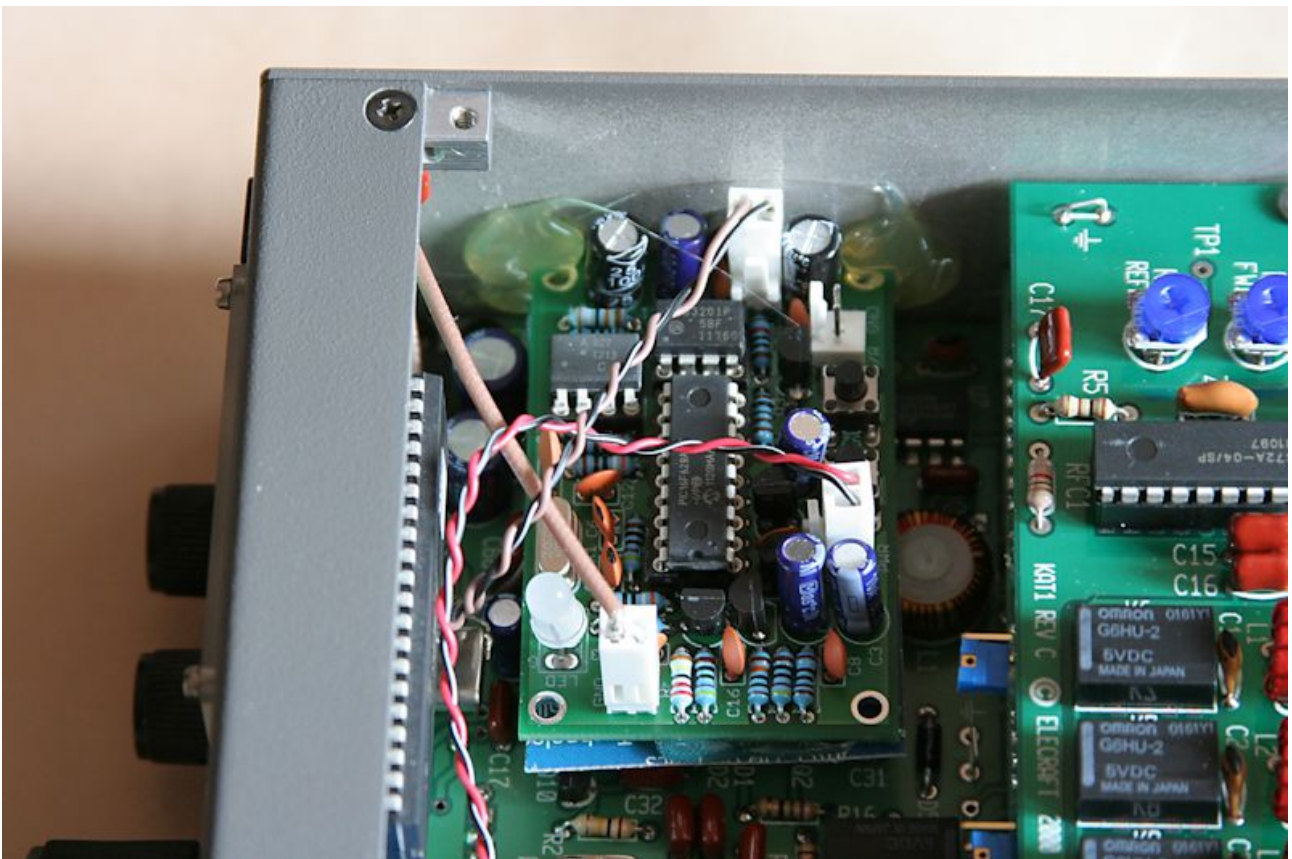


Image showing the X-Lock secured with hot melt glue to the left hand side panel, just under the side fixing hole. Note the card glued under the board. Below is the X-Lock installed



Thanks to Matt, W6ZBA, for hints and tips on connecting the X-Lock.