



This document describes how to upgrade the K42 Rev A CW Keyboard kit. There are two parts of the kit that will be upgraded; the first is the LCD display will be swapped out to one that has backlight. The second will be upgrading the PsoC controller to one that provides much better CW reader performance.

Before you start working on the kit you will need to gather the following items:

- 1) A low wattage (40W) or temperature controller soldering iron with fine tip.
- 2) Good grade of Rosin core solder, Please do not use ACID CORE Solder !!
- 3) Good pair of fine wire cutters
- 4) Fine needle nose pliers
- 5) Philips head screwdriver
- 6) 1/4 inch Nut Driver
- 7) A 5/64 inch Allen wrench to remove the control knob
- 8) A desoldering tool, this can be a Solder-Vac, Solder-Wick, or vacuum desolderer.
- 9) A magnifying glass is very helpful

The LCD replacement procedure is quite difficult and these instructions assume you have reasonably good skill at removing parts that are soldered on a PC board. The LCD display desoldering procedure is time consuming and if not done correctly will certainly damage the printed circuit board.

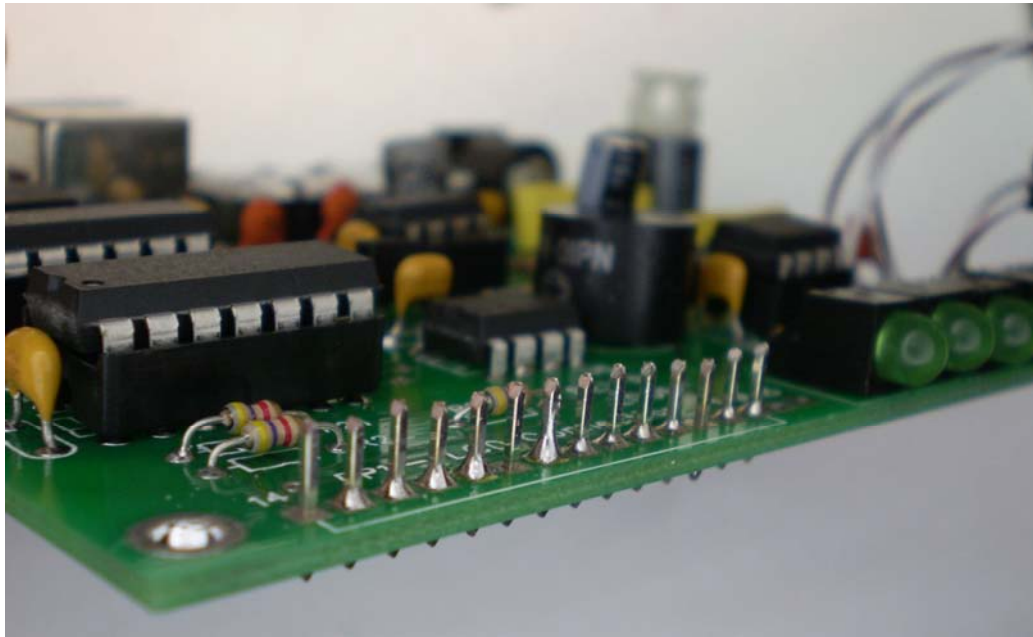
It is very important to take your time and carefully follow the instructions and assembly photos. A step by step process will be presented that must be followed exactly as described.

K42 Update Kit - Bill of Materials

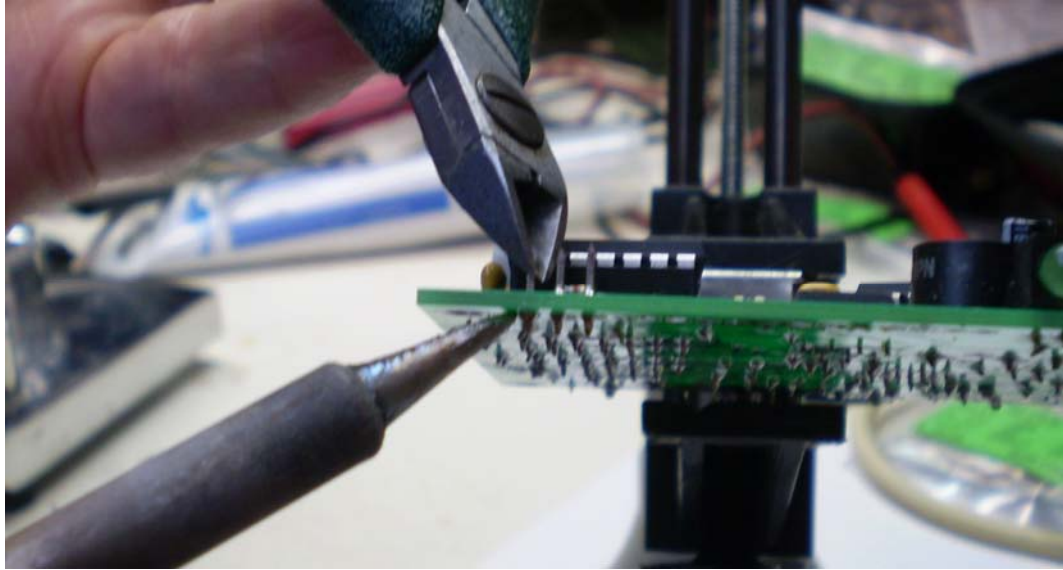
___ R1	47 ohm ½ W resistor (yellow violet black)
___ J1	16 pin LCD replacement connector
___ DP1	Sunlike 1602SD LCD Display w/backlight
___ U2	PsoC Processor Rev B
___ Spacers	Two 1/4 inch plastic spacers

Kit Upgrade Procedure

- 1) First step is to completely remove the K42 logic board from the enclosure. First remove the two nuts that hold the display in place and also the four 4-40 screws that hold the board to the enclosure base. To make things easier, either remove the rotary encoder or unsolder the wires that connect to the encoder. Put the hardware in a safe place because you will need it to put the K42 back together. Be sure to discard the two plastic spacers, these will be replaced by ones included in the upgrade kit.
- 2) Using a pair of fine wire cutters, cut the display header halfway between the PC board and the display. It works best if you start at one end and work across the connector. When you have separated the display from the board you can either discard the display or save it for a future project.



- 3) Now individually heat up each header lead from the bottom of the board and remove it from the PC board. Just use enough heat to reflow the solder so that you can pull the lead out of the board with a pair of fine needlenose pliers or wirecutters. Excess heat will damage the board and cause pads and etch to separate from the PC board.



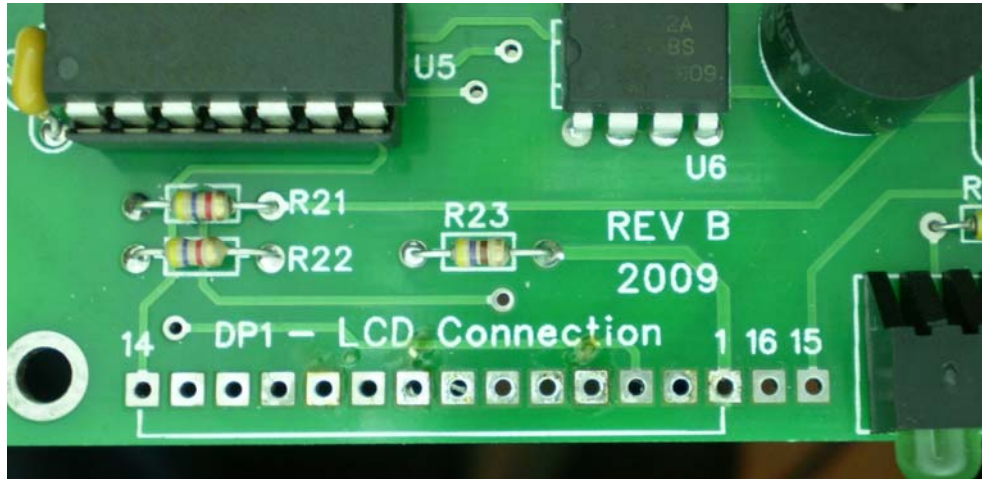
- 4) Now the tricky part, all of the solder must be removed from the display header holes so that you can install a new display header. I recommend using a Solder-Vac desoldering tool:



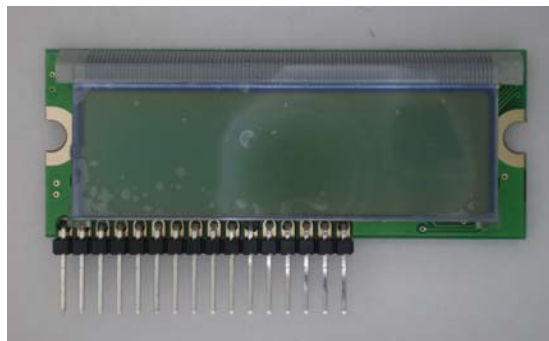
It is also possible to do this with Solder-Wick or a vacuum desoldering tool.

I'll repeat this because it is so important, use just enough heat to do the job, excess heat will damage the board and cause pads and etch to separate from the PC board.

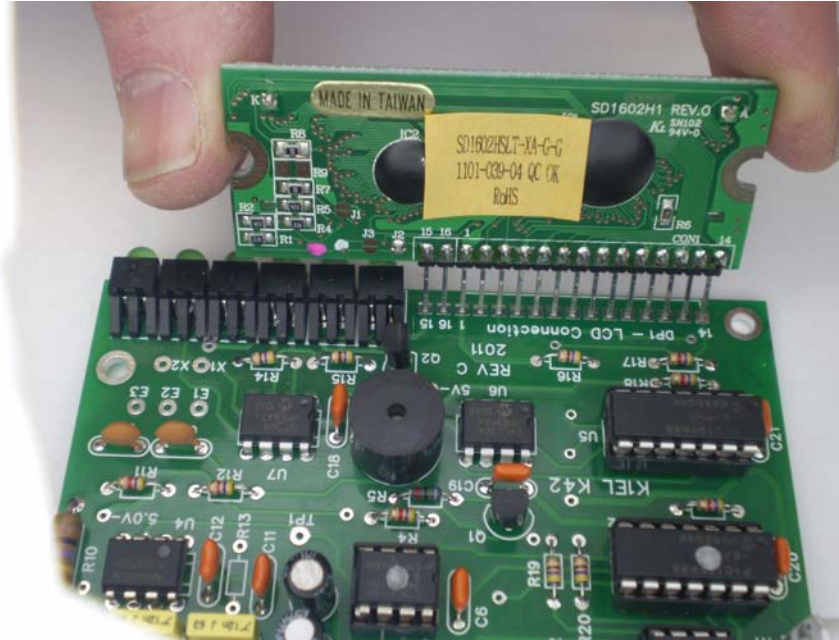
Here is what the board should look like after clearing the holes, make sure that the new header fits easily into all of the PCB holes.



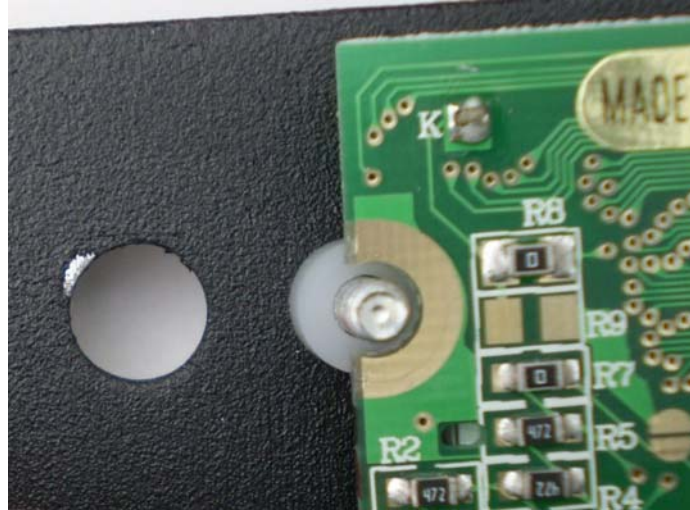
- 5) Attach the 16 pin connector to the LCD display, make sure you put it on the correct side and that it is installed as shown in the pictures below. The connector must be in the same plane as the PC board of the display. You will have to work at getting the connector into the display PC board. There is a plastic spacer on the board that will give you some grief but you will find that if you angle the connector just right it will snap into place. Solder first one end pin and then the other end alternating back and forth until all the pins have been soldered. The first two solder points are the most important since they set the alignment for the whole connector. Take your time and get it right.



- 6) Install R14, a 47 ohm ½ watt resistor on the K42 logic board, this should have been left empty in the original assembly. If you have something installed there remove it and replace it with the 47 ohm part.
- 7) Place the two new 1/4 inch spacers on the enclosure mounting studs.
- 8) Install the display assembly into the holes on the PC board and then put the assembly into the enclose base so that the display fits on the mounting studs. Install all four 4-40 screws that hold the K42 logic board to the enclosure base.



- 9) Use two 4-40 nuts with lockwashers (from the original assembly) to hold the display in place. Before tightening the nuts make sure the display is centered in the enclosure window. Line up top and bottom, left and right, and check that the display is not crooked. When you are sure this is correct, tighten the display holding nuts. It can be helpful to center the mounting stud in the display cutout ahead of time.



- 10) Now sneak in with a soldering iron and solder two pins at each end of the connector. I recommend soldering the fourth pin in from each end.



- 11) After the solder joints have cooled (this is important) remove the PC board assembly from the enclosure base and solder the remaining connector pins from the bottom of the board. Solder one pin at a time alternating end to end. Go slow, allowing each joint to cool before doing the next. A big risk here is overheating the board which will cause warpage and affect the display alignment.
- 12) After finishing this step, power up the board and you should see a nice backlit display. You will probably need to tweak the contrast control since this display will have a different set point for best contrast. Note that there is no way to turn the backlight off; this feature is only supported in the new K42.
- 13) Now you can reassemble the logic board back into the enclosure. Make sure you use the correct plastic spacers; the new spacers are slightly longer than the originals.
- 14) The last step is to remove the Rev A PsoC IC from location U3 and replace it with the one provided in the upgrade kit. With this installed you will see PvB displayed in the K42 signon screen. Note that the picture on page one shows a picture of the Rev C assembly with PsoC Rev C. You will see K42vA, WkvA, and PvB in your signon display.

The new PsoC controller will provide much better CW copy but is still subject to the same basic limitations as the original, that being noise sensitivity and inability to copy senders with poor fists. The gain of the new PsoC is higher than the previous version and the spacing adjustment is now more limited.