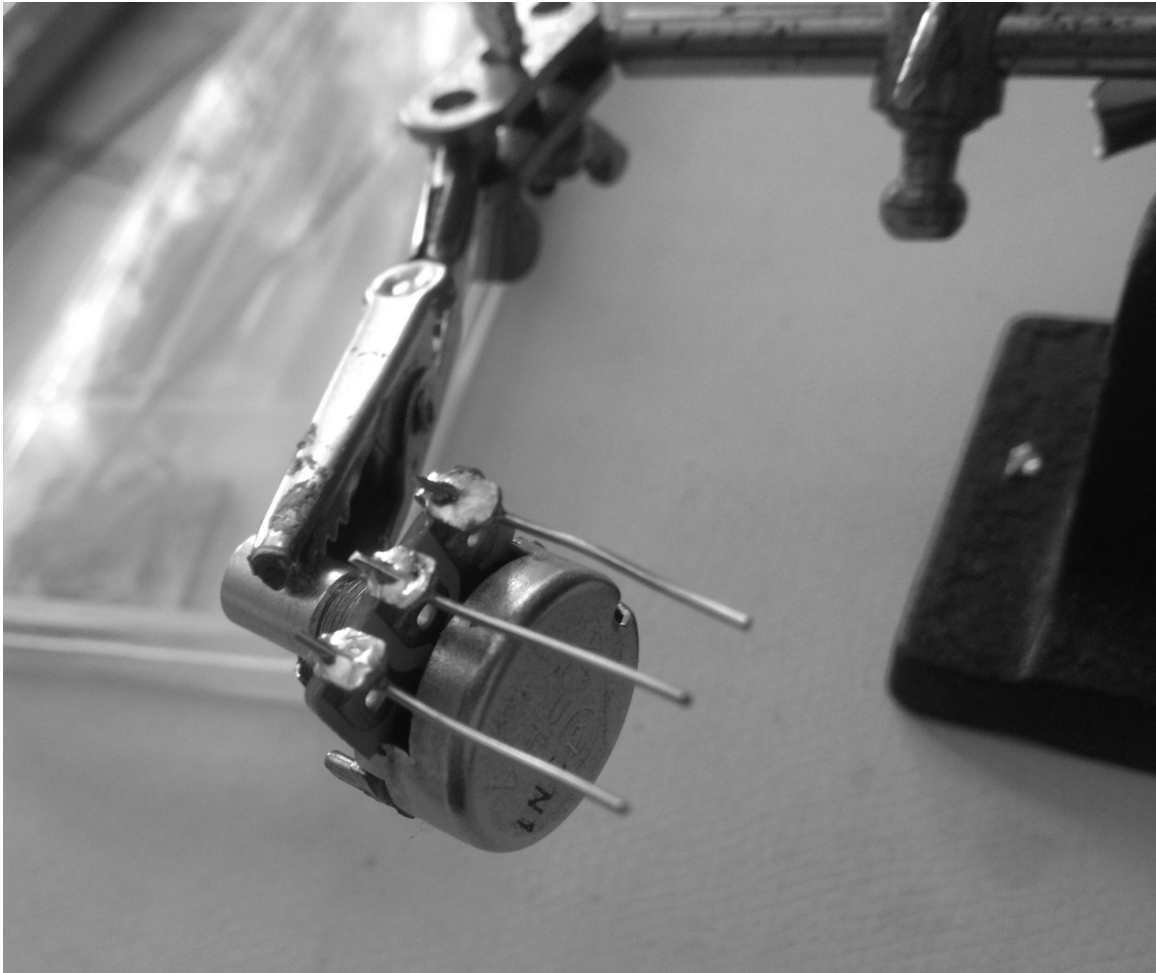


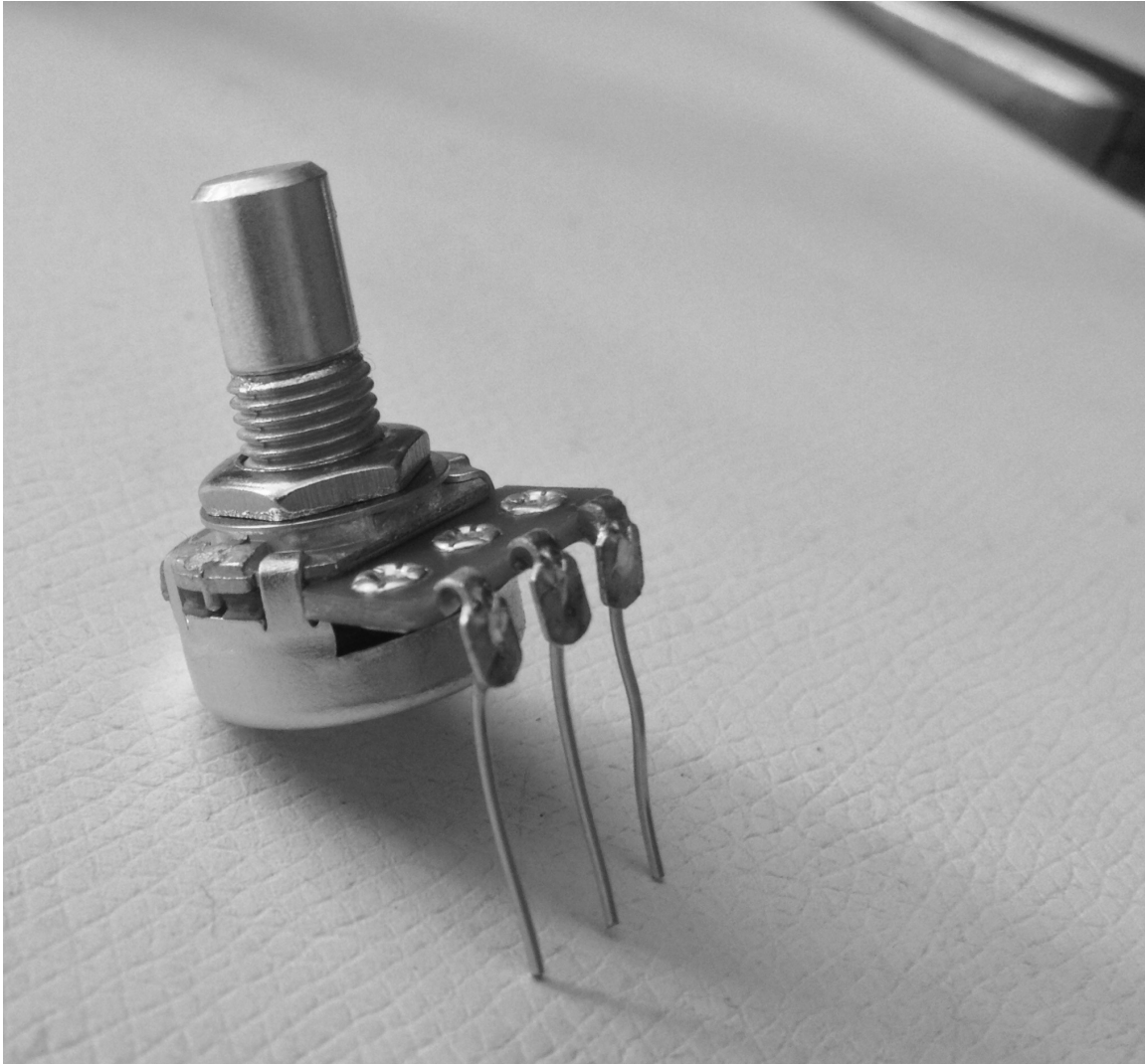
## Preparing the pots

All pots must have their legs extended using bus bar wire in order to connect to the Hardware PCB. The amount of bus bar needed is approximately 0.5" per leg. An effort should be made to keep the bus bar at a 90-degree angle, centered on each leg, but precise alignment is not necessary since the bus bar has a lot of play when mounting the pots to the PCB. The most important thing is to "trim" the bus bar where it meets the solder lug, so that it sits flush with the lugs (see photos). Finally, the anti-rotation tab must be clipped or snapped off.

*Partially completed pot. Note the unclipped excess bus bar above the solder lugs:*



*A fully prepared pot. Bus bar has been clipped close to the lugs, and the anti-rotation tab has been removed:*



### **Mating the Hardware and Motherboard PCBs**

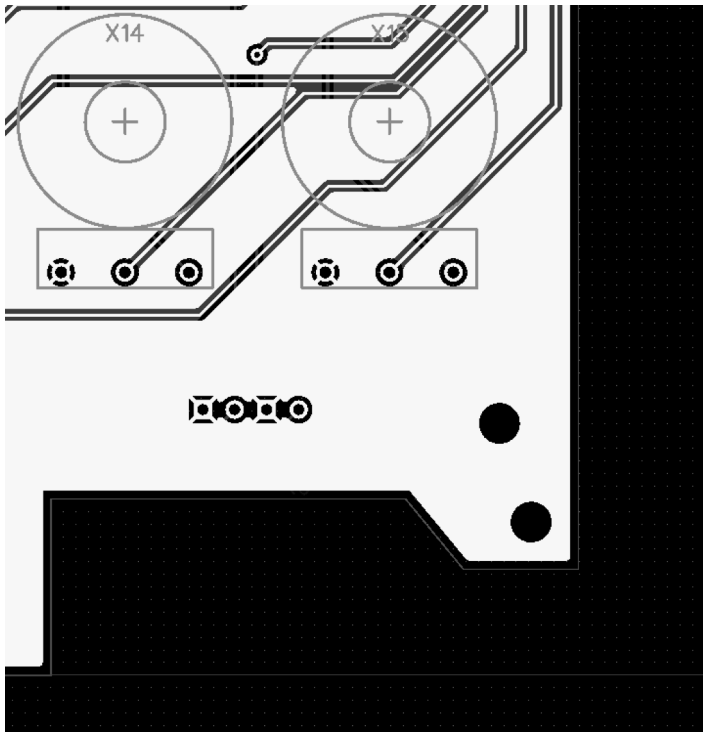
The Hardware and Motherboard PCBs connect in a standard “PCB sandwich” style design, electrically connected via IDC headers and secured with metal spacers. The two boards should face “away” from each other —i.e., component sides should face outwards, with the headers and spacers in the middle of the sandwich connecting the PCBs by their solder sides. Note that the Hardware PCB actually contains components on both sides—the solder side is the less populated one, containing only Op Amp ICs and some capacitors.

We recommend that the Female / Male IDC headers be soldered first, before soldering anything else on the PCBs. It doesn’t matter which board gets the female

headers and which gets the male. To make sure alignment is correct, install and screw down the spacers before soldering. Once the headers are soldered, the spacers can be removed and the sandwich separated to begin soldering the rest of the boards.

*A special note about mounting the Hardware PCB spacers:*

There are two closely spaced mounting holes near the RCA video connection area of the Hardware PCB. The lower hole is for mounting the Hardware/Motherboard spacer. The top hole mounts a spacer that faces the other direction, and connects to the front panel to add structural integrity.



### **Building the SD Card PCB**

The SD Card PCB is connected to the Motherboard PCB via a 6" ribbon cable connected to J6. The PCB itself is mounted to the front panel at a right angle, aligned with the cartridge slot.

*How to mount the SD Card PCB to the front panel:*

The mounting hardware is constructed by attaching a 0.375" spacer to a small L-bracket. There are two such mounts, one on each side of the SD Card socket.

One side of each L-bracket is attached to the front panel, and the other to the spacers that connect to the PCB. *The L-bracket has a long and a short side.* The long side is connected to the spacer, and the short side is connected to the front panel.

The long side can be identified by a faint horizontal line running along its interior (see photo).

Note the faint horizontal line below the threaded hole. This line only appears on the long side of the bracket.



The L-Bracket is secured to the spacer using a 4-40 screw. Once the mounts have been assembled, they should be screwed into the front panel first. The SD Card PCB should be secured to the mount only after all other boards have been assembled, at the very end of the build.

A completed mount with spacer, L-bracket, and screw. There are two such mounts, one on either side of the SD socket:



### **Building the Hardware PCB and Panel Assembly**

Before building the Hardware PCB, prepare the front panel by snapping in the plastic LED covers (these may require some force to snap in), attaching the SD Card mounts, and screwing the two video RCA jacks into place.

Now place all the panel hardware (jacks, pots, switches, and LEDs) on the Hardware PCB, but don't solder anything yet.

Before soldering anything, fit the front panel over the Hardware PCB and guide the hardware through the panel holes. All panel hardware should be secured with their appropriate nuts/washers prior to soldering.

*About the 3.5mm jacks:*

Since JK3, JK4, and JK5 are so close together, they're mounted using only 3 legs. The fourth leg should be clipped off prior to installation.

*About the RCA jacks:*

The RCA jacks are connected to the solder points labeled "RCA" on the Hardware PCB using four short wires. These are the only components that are "flown out" rather than mounted on the PCB directly.

*About the NKK toggles:*

The 90945A760 washer replaces the stock washer that comes with the NKK switches. The larger washer is needed to cover the large mounting hole.

*About the Alpha pots:*

The pots should be pulled up through the mounting hole so that they sit flush against the panel. *Make sure they are pulled all the way up— some of the pots sit over IC legs which will short if the pots are too low.*

The included washer and nut should then be tightened, but only by hand (no pliers). Over-tightening prior to soldering can twist the pots and bend the bus bar connection to the hardware PCB.

After the pots have been soldered in place (thus stiffening the bus bar connections), their nuts can be tightened fully using a pair of needle nose pliers.

## **Programming the Firmware**

Firmware is programmed using a Parallax Prop Plug (Product ID 32201). An in-circuit header is provided for programming at J15 (PGM).