

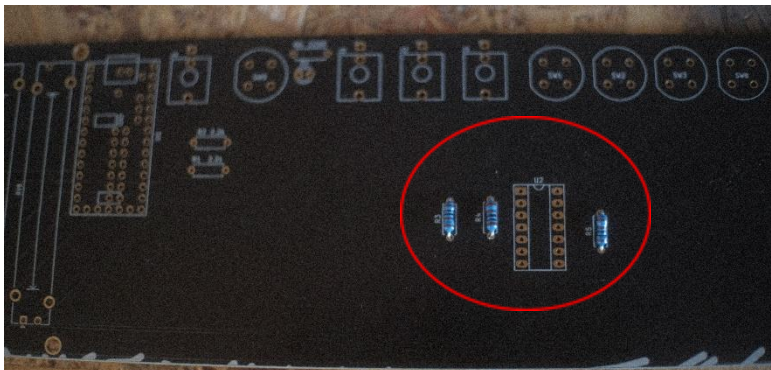
Teletouch build guide

Teletouch is mostly a pretty straightforward DIY build, but there are a few areas that require care and attention.

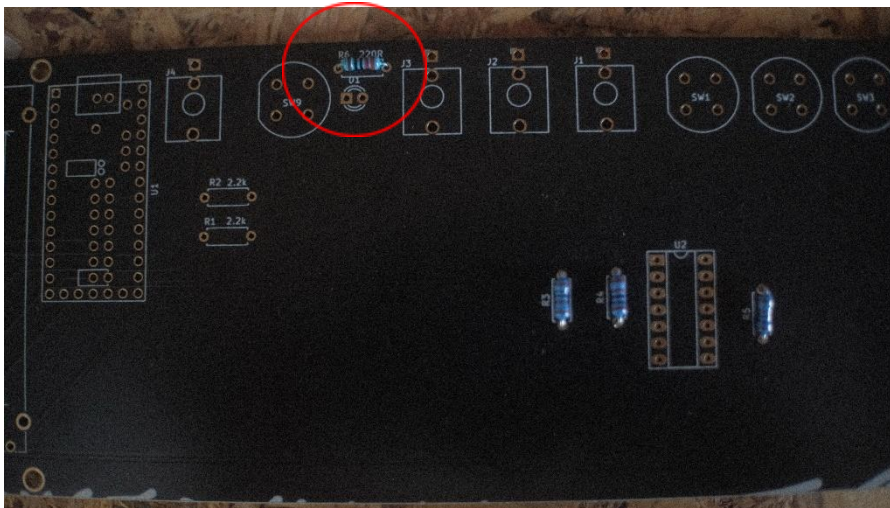
Read this build guide fully before beginning soldering.

Use high quality solder and a fine tip soldering iron. The solder quality especially makes a huge difference, especially on the SMD headers. If this is your first time soldering, practice extensively before starting Teletouch.

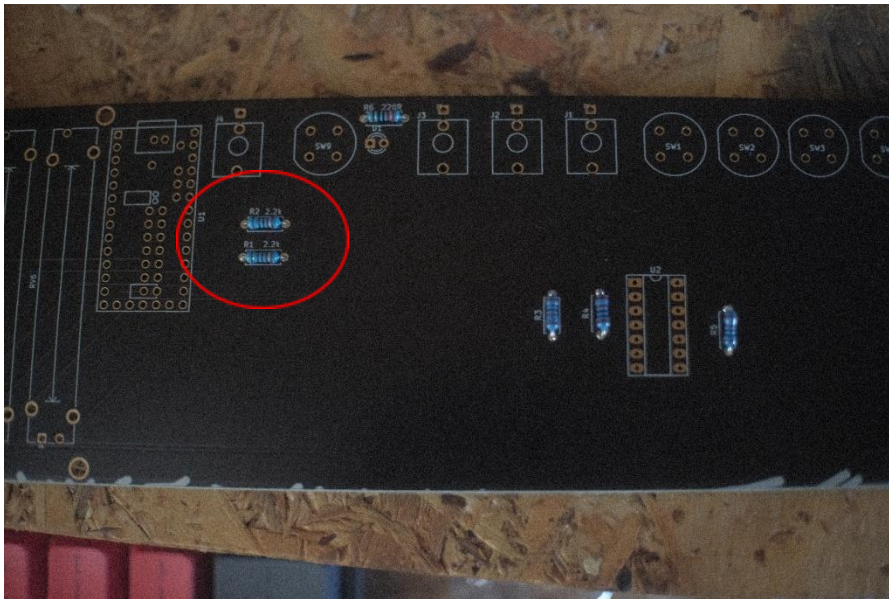
- First, check your Teensy works by flashing the blink example and checking for a blinking red light.
- Place 1k resistors in the holes marked r3 and r4 and r5.



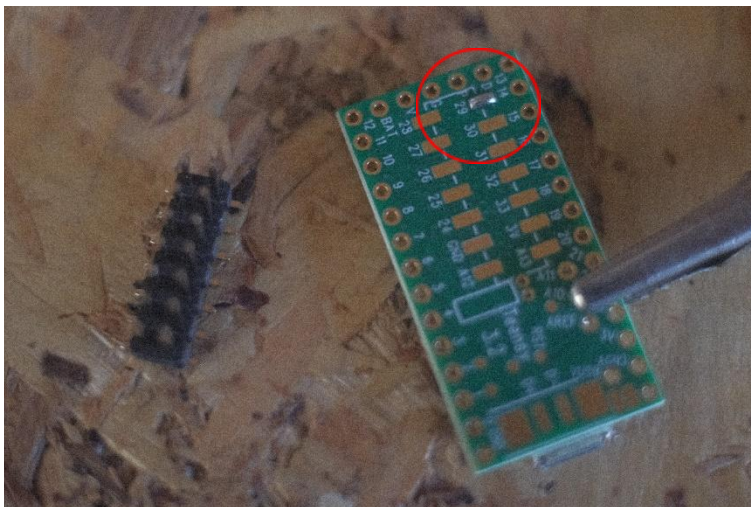
- Place the 220R resistor in hole marked r6.



- Place the two 2.2k resistors in the holes marked R1 and R2.

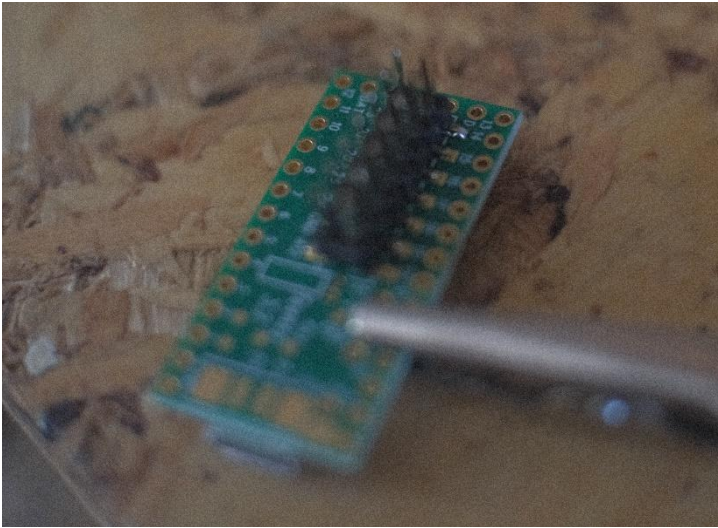


- Now flip the board and solder all six resistors.
- Solder the 2x7 SMD header to the pads on the underside of the Teensy. To do this, solder a very small blob of solder on a corner pad of the Teensy, as shown in the photo below.

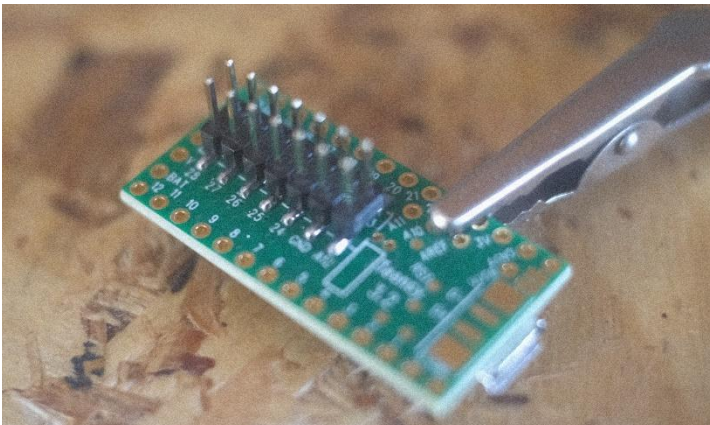


Then place the header on top and while holding it in place, heat the pad and pin while the solder is liquid. This will give you a second or two to line up the header with the pads, and

when you remove your iron, the header will be set in place.

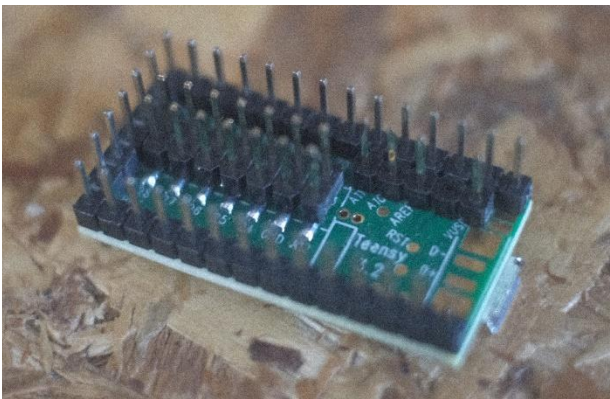


Make sure it is lined up nicely and don't be afraid to reflow the corner to get the position just right before soldering the rest of the SMD pads.

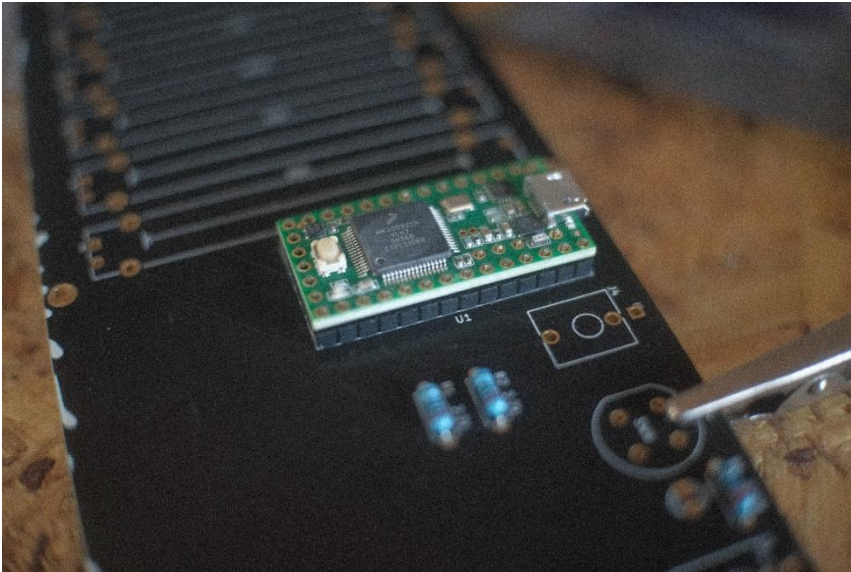


Once soldered, plug the teensy in via USB and check the flash example is still working.

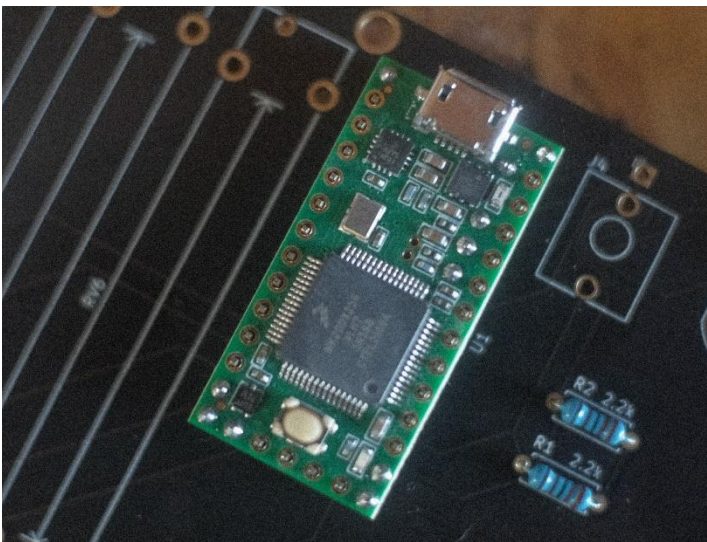
- With the SMD pads soldered, place pin headers into all the holes in the Teensy, including a 1x5 header with the 4th pin removed. Don't solder them yet.



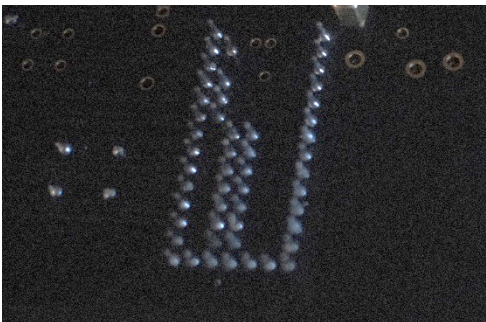
Now, without any of the headers soldered, place the Teensy onto the PCB, making sure all pins are seated and lined up properly.



You can now solder all the Teensy's through-hole pads. To make sure they don't move around, solder the corner pads first, as pictured.

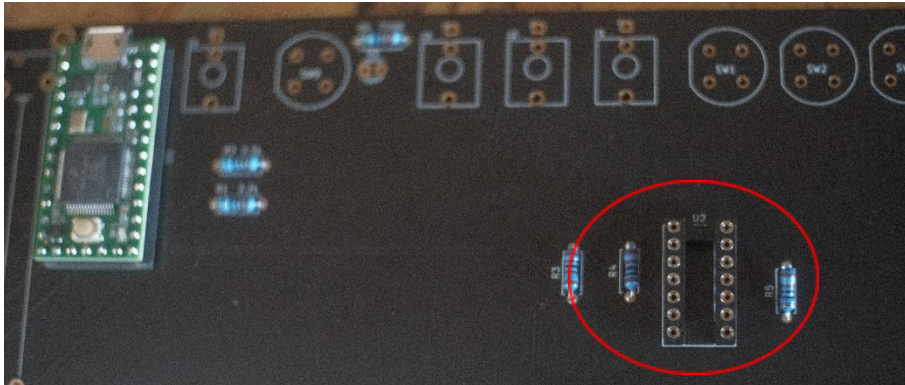


Then flip the PCB over, and solder all the pins to the PCB.

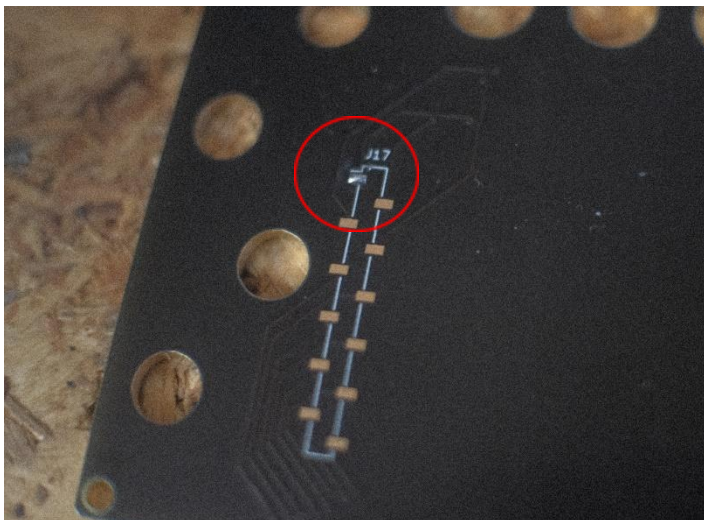


We do it this way to make sure everything gets soldered in a way that lines up. Once soldered, power up the Teensy again to make sure it still flashes.

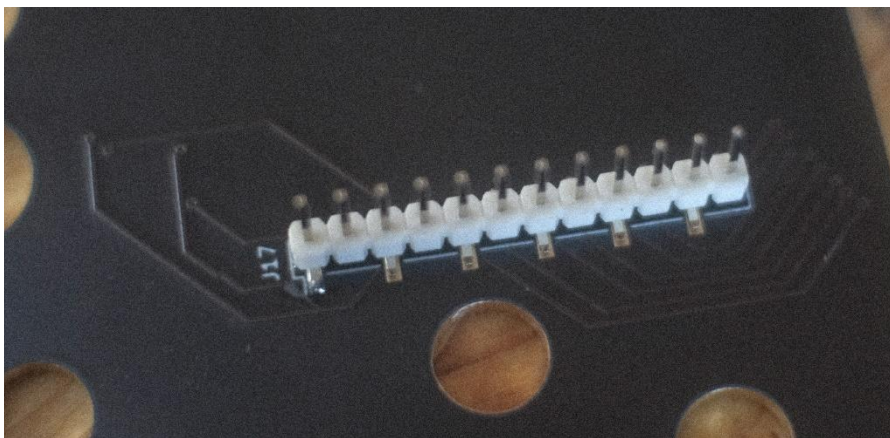
- Now solder the IC socket, lining up the notch with the notch on the PCB's silkscreen.



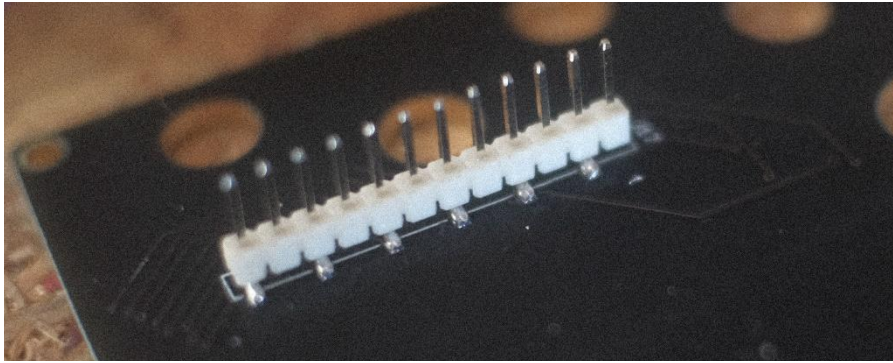
- Next is the long SMD header. Cut it to length (12 pins) so the first pin is pointing left, to match the PCB footprint. Take the top panel, and place it face down. Like we did with the Teensy, put a tiny blob of solder on an end pad.



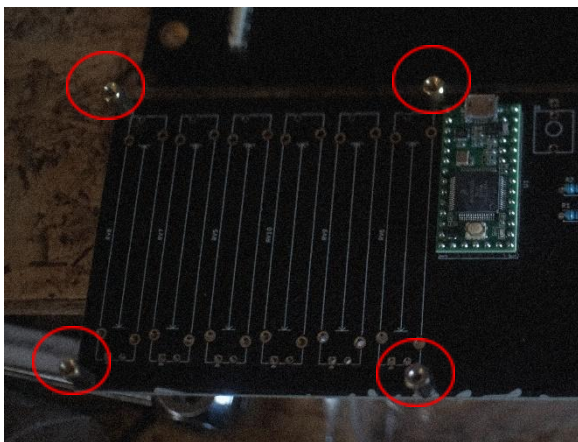
Place the 1x12 SMD header on top, and reflow the blob while lining up the header feet with all the pads.



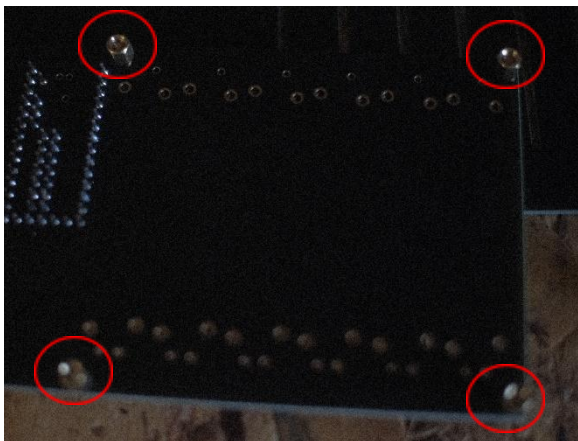
Get it nice and lined up, then solder the remaining pads.



- With the bottom PCB facing up, place six 10mm standoffs in the six 3mm holes around the bottom pcb. Screw these standoffs into the 6mm standoffs on the underside of the pcb.

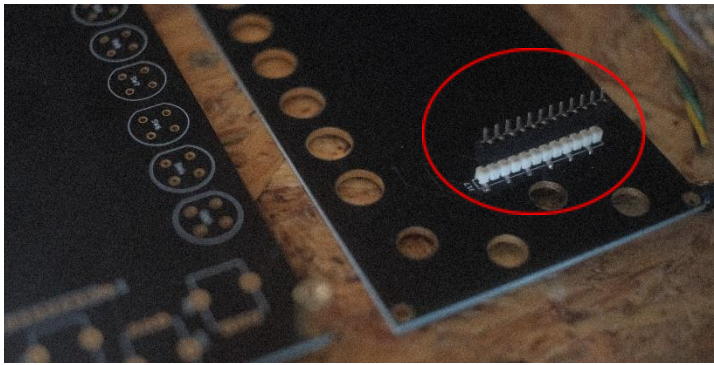


top

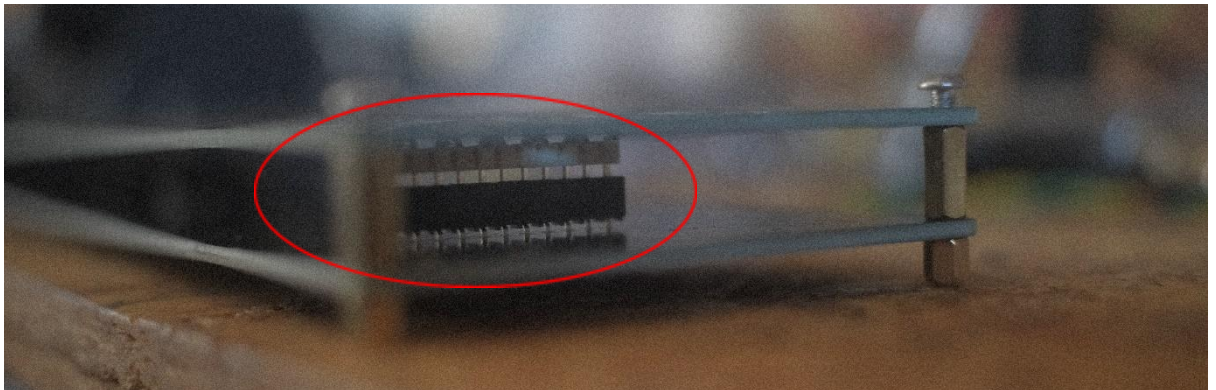


bottom

Now cut the female header to length (12 pins) and mount onto the SMD header we just soldered.



Bring the two PCBs together, lining up this header with the 12 holes of the bottom panel, and line up the standoffs.



With everything in place, flip the whole assembly over and solder the 12 through-hole header pins to the bottom PCB. Then unscrew standoffs and very carefully separate the two 1x12 headers.

- ⚠ From now on, be **very** careful when separating the boards, being very gentle with the headers. Pulling the PCBs apart with too much force risks lifting the pads under the SMD header.

- Place all the push switches and the single LED on the bottom PCB.



Now re-mount the top panel, making sure the header mounts while lining up the switches with the top PCB's switch holes. Screw a few of the m3 bolts into the standoffs to hold the

two PCBs in place and flip the assembly, then solder the switches. Be careful that when soldering the switches they are as flush as possible with the panel and fully seated on the bottom PCB. Laying the front panel on a flat surface can help with this, as can placing something heavy on top of the PCB to keep it pressed down. If you are still having trouble, use a piece of low tack tape to hold the switches down while the PCB is upside down.

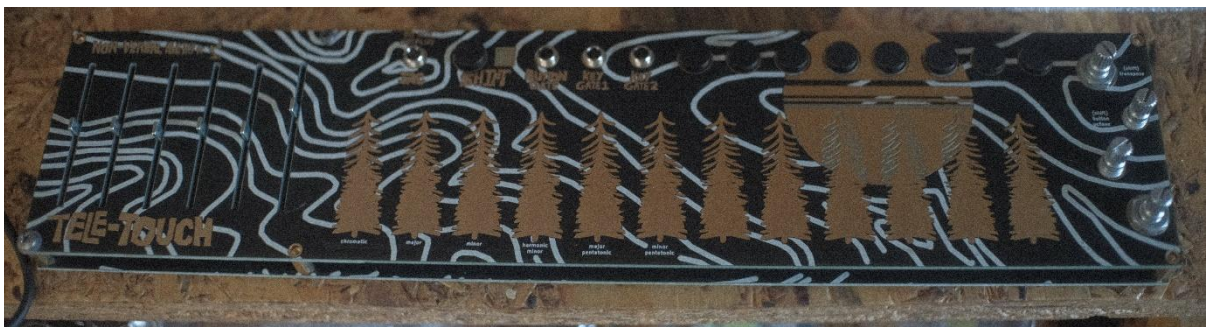
The LED can be a little way away from the front panel too, for a more diffused light, but make sure it is pointing at the little window.



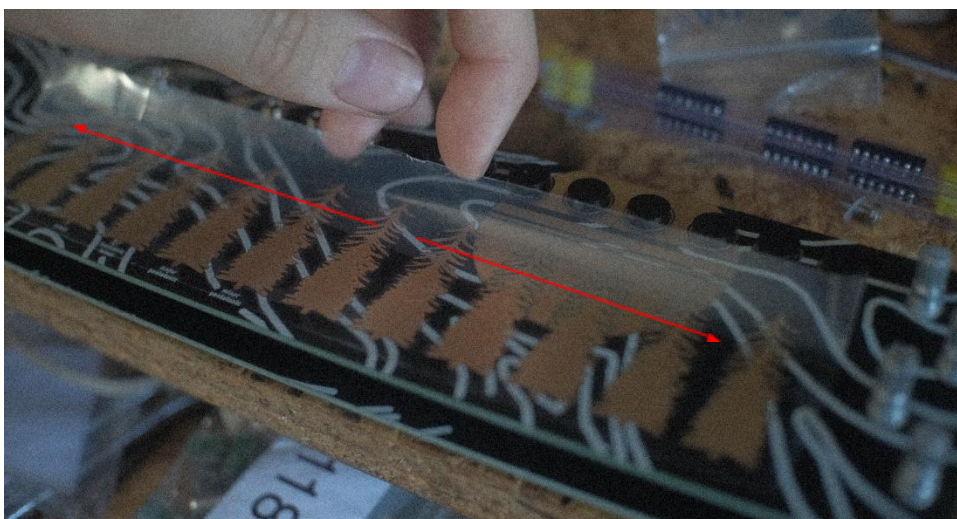
- Carefully separate the PCBs again and place the pots, jacks and sliders. Make sure the leftmost jack is the green stereo jack. At this stage you may also mount the IC into its socket and flash the Teletouch firmware to the Teensy, though this firmware will not work until everything is soldered.



The pots are a tight fit in the holes and may need their side legs straightened a little to fit. Once again, re-fit the front panel and make sure everything is lined up and well seated, using the m3 screws to keep everything lined up. This can be quite tricky, but be patient. Now turn the assembly over and solder the pots and sliders, making sure none of them have lifted out of their footprints when the assembly got flipped.



- Clean the touch plates with a microfibre cloth. If using a sheet of clear vinyl, cut it into a 110mm x 50mm rectangle, and if using 50mm polytunnel/weather seal tape, cut it to 110mm, and very carefully stick it so it covers all trees.
- Start by sticking the long bottom edge, and while smoothing down the tape with a cloth from the middle to the left and right edges (as illustrated by red arrows), slowly ease the sheet down until it is fully stuck down. This is the best way to apply without creating bubbles.



There may still be some tiny gaps due to the thickness of the silkscreen and solder mask pcb layers, but try to smooth down with a cloth as much as possible. Without this layer, the touch pads are so sensitive the pulse in your finger will affect the pressure signal!

- Finally, if you have not already done so, flash the Teensy with the Teletouch firmware, available on the Lines thread and Teletouch product page. You may need to remove the top panel one last time to access the button on the Teensy that puts it in bootloader mode, but I have also been able to push the button with a flat head screwdriver (wrapped in a little insulation tape) while the panels were connected just fine.
- Your Teletouch is now finished! It will need to be calibrated before it can properly detect keypresses, so follow the steps in the operation manual (found on the Lines thread and Teletouch webpage) to do that.

- To quickly test it's working, plug the gate outs into Teletype scripts 1-3, and add 'TR.P 1' to those three scripts. The button gate should flash a TT trigger out LED when a button is pressed, the key gate 1 should flash when a key is pressed, and key gate 2 should flash when a second key is pressed while the first one is already being held. To test I2C is working, plug the I2C jack with a stereo jack to your Teletype (WHILE BOTH ARE SWITCHED OFF), and type the command 'IIA 41' in TT. Now call 'IIQ 1'. Teletype should return the number of the last pressed key. Now press a different key and call the command again and check the returned value on Teletype also changes. To test MIDI out, plug into a suitable MIDI host and check that keys and buttons are sending note on/off information, and sliders and pots are sending MIDI CCs.