SLO - AD MOD

For the Casio SK5/SK8

By Graham Meredith ©2007

This simple mod enables you to increase the attack and decay times of the instrument preset sounds and samples. If you select a sound with a fast, sharp attack, for example, the piano or guitar sound, it will slow the attack and decay down, and make it sound synth-like and completely different to the stock sound!

It will also work on the SK1, only the wiring points may be slightly different (I don't have an SK1 as yet, to know).

How it Works

The SK series of Casio samplers create their attack and decay shape for each sound by sending out a CV (control voltage) signal from the processor to the VCA unit for each of the 4 voices that make up the polyphony of the sounds, just like a real analog synth does.

There are 4 CV signals, each separate to the other, one for each voice. The VCA opens and shuts for each voice in response to the CV signal it receives. If it receives a CV signal that rises fast, then gradually decreases over time, the VCA amplifies the instrument sound rapidly, then gradually fades it away, such as in the example of the piano preset sound. If it receives a CV signal that rises slowly, then fades slowly, it responds in accordance to that, and makes a sound that fades in and out, for example, the violin sound.

Since each of these 4 CV signals are simply DC voltages, varying from 0 to 2.5V DC as they fade in and out, altering these voltages will have an effect on the volume and attack/decay characteristic of the sounds.

If we connect a capacitor between a CV line and a 0V ground point on the circuit board, the capacitor absorbs any sudden change in voltage on the CV line as it charges up and discharges. This has the effect of slowing down the rate at which the CV line increases or decreases its voltage signal, and so the VCA "sees" the CV signal slowly increasing, and then slowly decreasing, in comparison to the original signal shape. It then increases and decreases the volume of the sound more slowly, fading in and out. The piano preset sound now sounds like some synth pad sound, swelling and fading when played.

The rate at which the capacitor slows down the CV signal is proportional to the size of the capacitor. For example, using a 20uF capacitor will make the sound fade in and out twice as slow as a 10uF capacitor. Using larger values still, will make the attack and decay rates even slower. You can choose any size you wish, to suit your need!!

Cost estimate: about $10.00

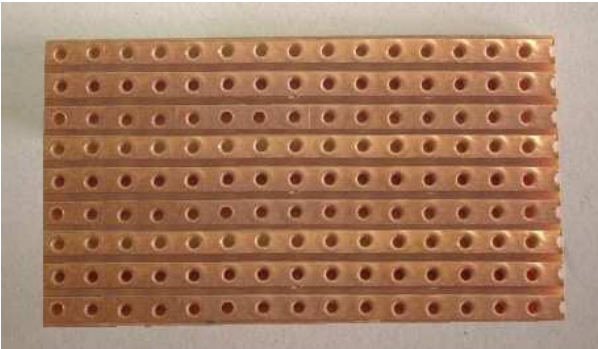## Equipment:

Soldering iron, 15W maximum
Solder
Wire cutters

Parts required:

"Veroboard" hobby PCB strip
4cm x 4cm – 1x

Capacitors:

Electrolytic RB type capacitors, SMD type (Surface Mount Device) of varying value – 4x of each value.
Start with values of 10uF, 47uF, or 100uF. 10V voltage rating, or above.

Other parts:
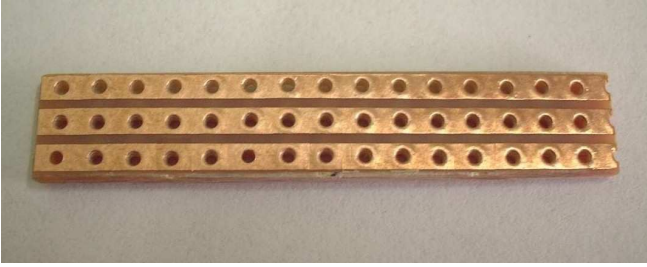
Toggle Switch

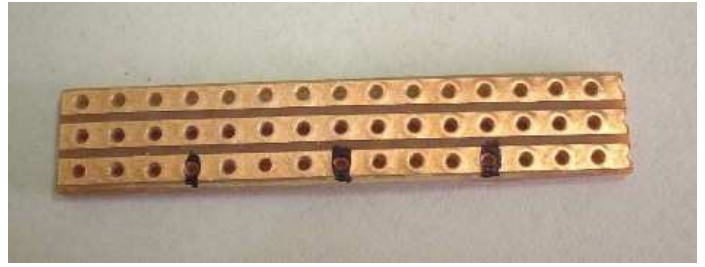**4PDT (4-pole, double throw):**

Rainbow cable, 30cm length:
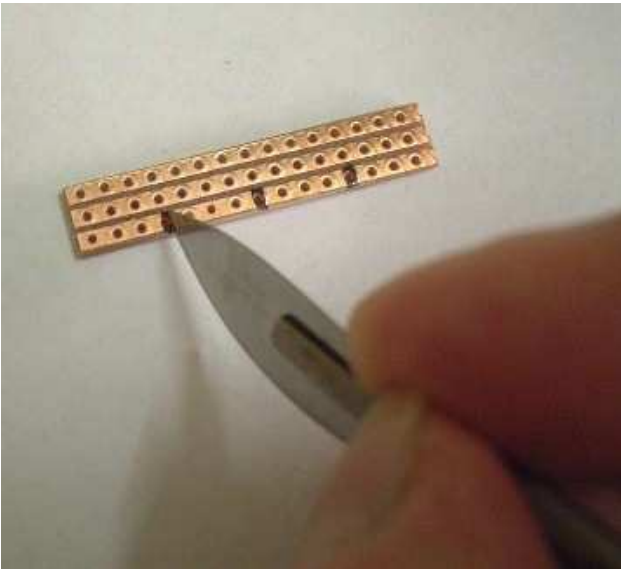
Procedure:

Cut a strip of Veroboard to the size shown below:
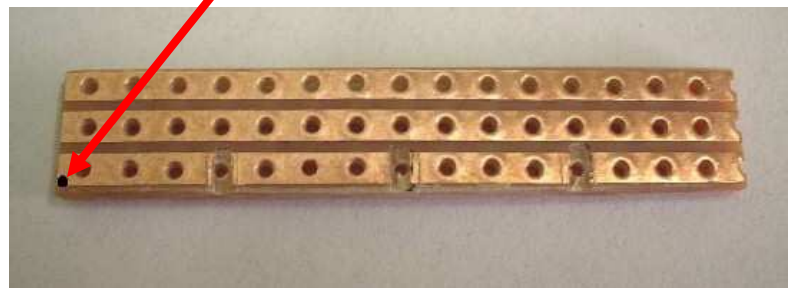
Mark with a felt tipped pen, the following marks:


Cut these marks in the tracks with a sharp hobby knife to break the conductive track:

Your board should now look like this. Put a dot here on the board for orientation, and also on the other side, in the exact same place.


Take a capacitor to be installed. This example is a 100uF, 10V SMD electrolytic capacitor. It will give a long, slow attack time of around 2 seconds, which is good for synth string pad sounds:
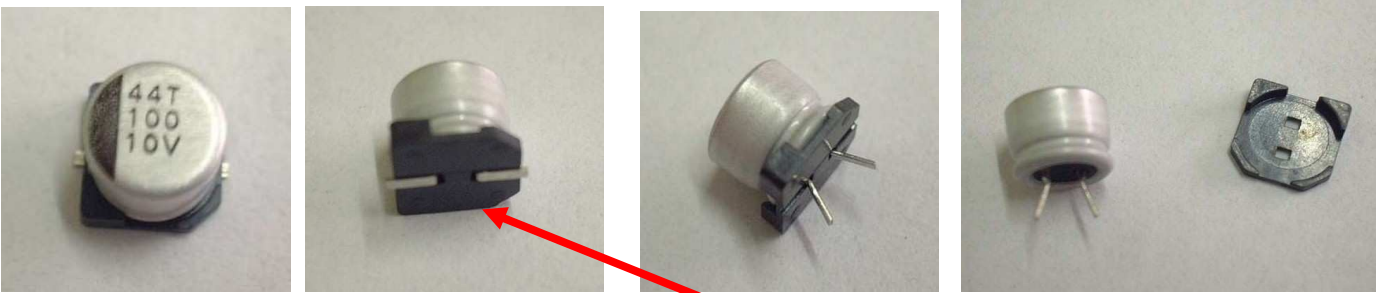

It has a plastic base on the bottom of it which can be removed (we will not need it).
**Bend the legs down carefully to remove the base.**

Take the Veroboard strip and turn it over to the front. Note the dot position indicating the orientation of the board. Mark the following marks on the board:
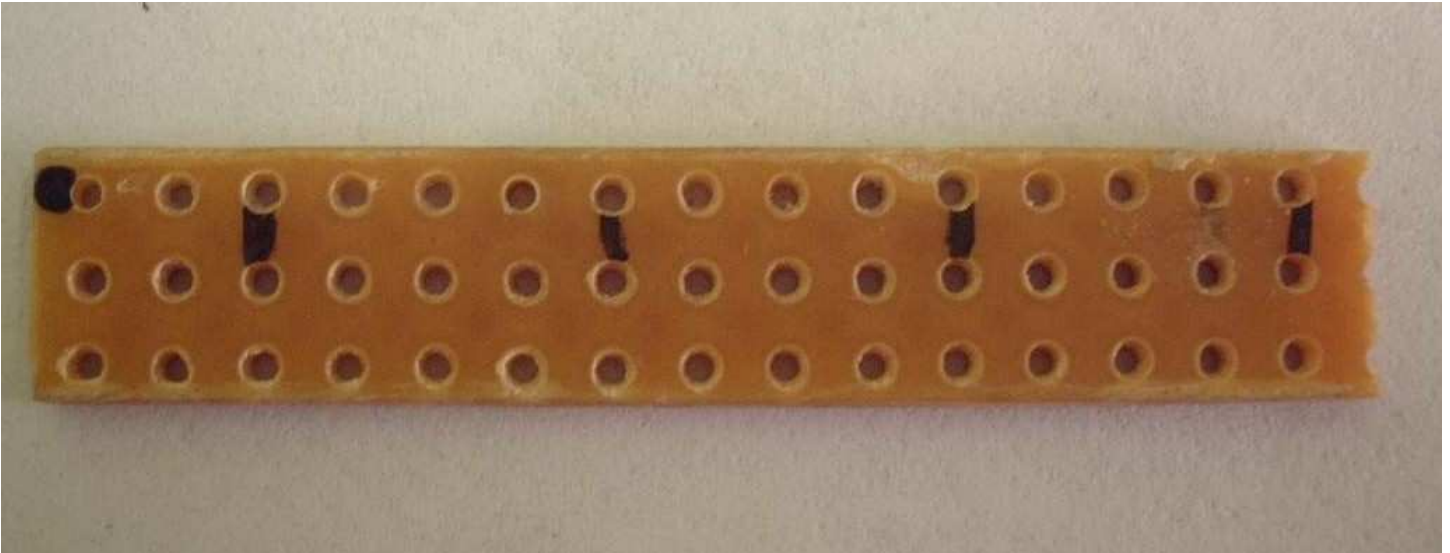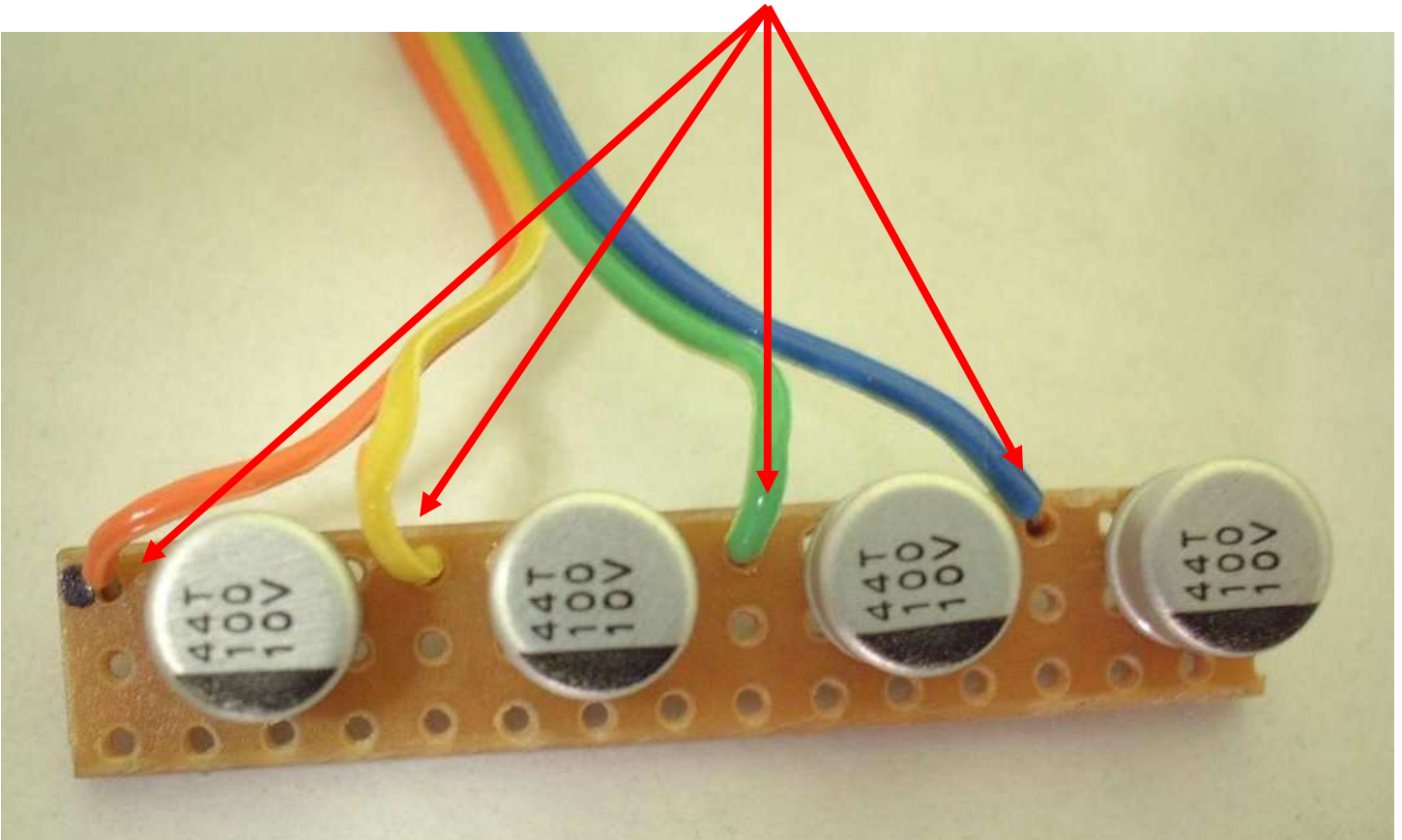

Insert the 4 capacitors in the holes at these 4 marked points. Make sure the capacitors go the right way up, as they have a + and – leg. The black crescent marks the – leg.
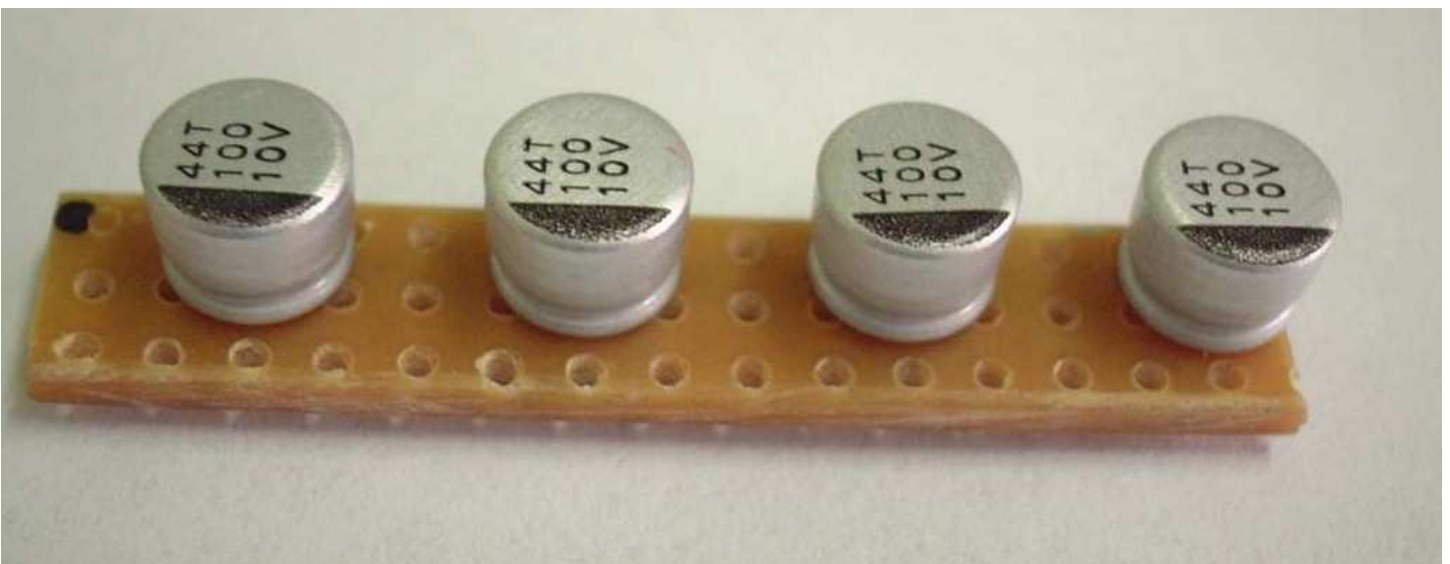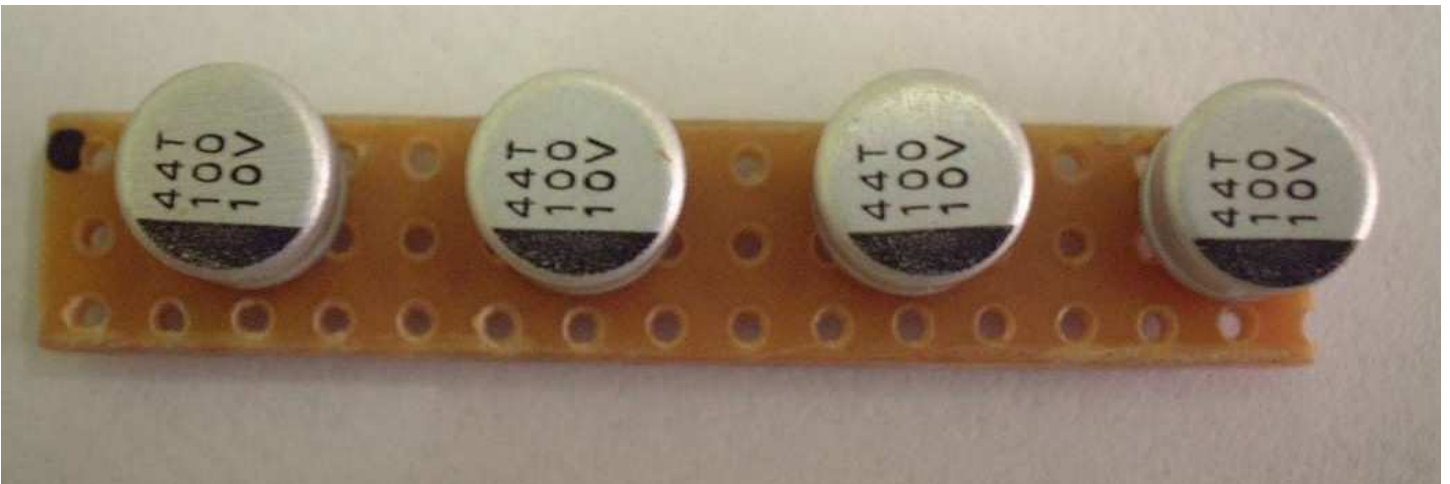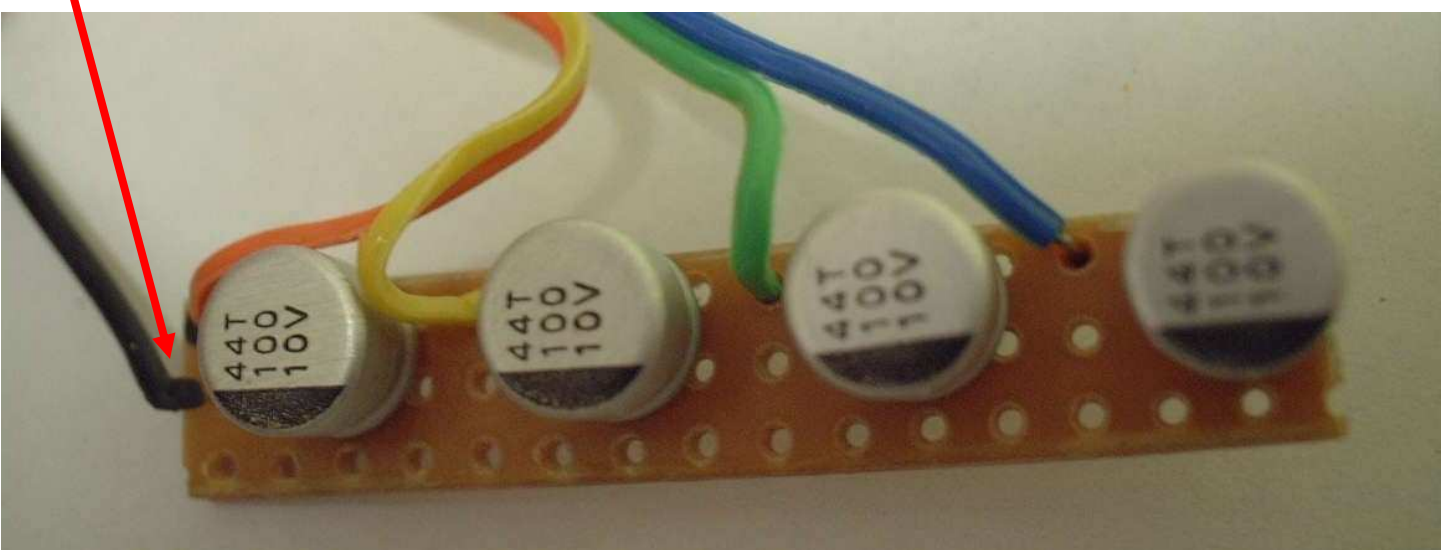
Turn the board over and neatly solder the capacitors in place:
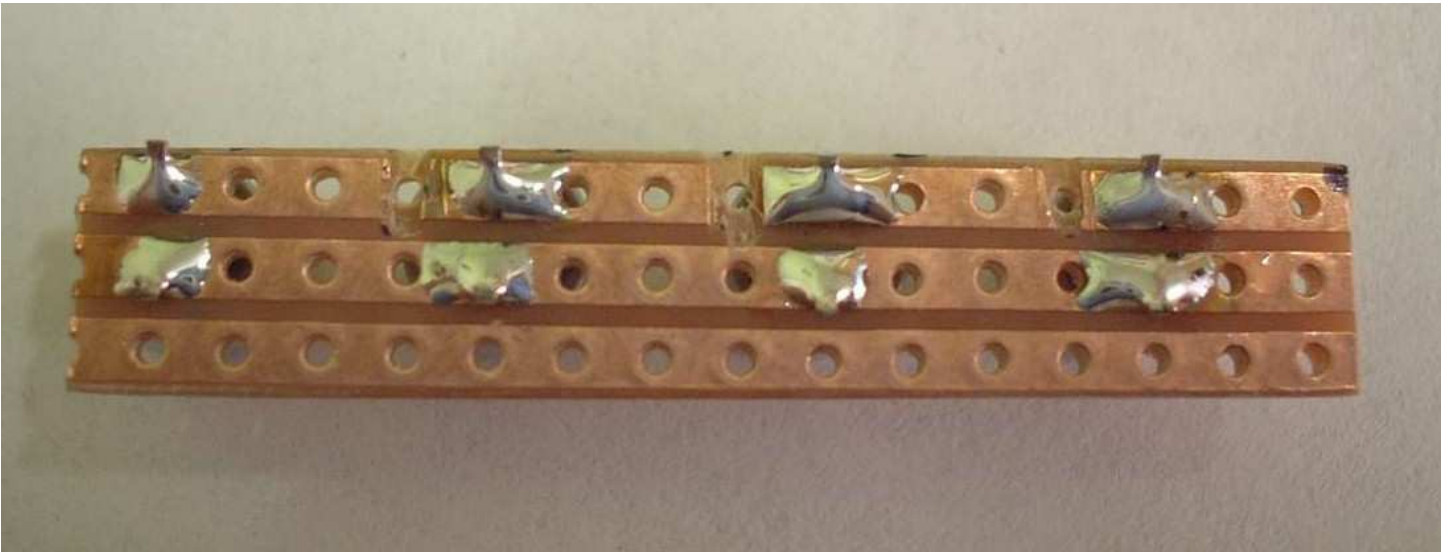

Take a piece of rainbow cable, and pull out a 15cm strip of the orange, yellow, green and blue wires. Solder one end of the wires into the holes as shown:

Take a 15cm piece of black wire and solder it in the hole as shown:

Take the 4PDT toggle switch, and solder the other ends of the orange, yellow, green and blue wires to 4 OUTER terminals of the switch (either side doesn't matter, so long as all the wires are soldered to the same side):
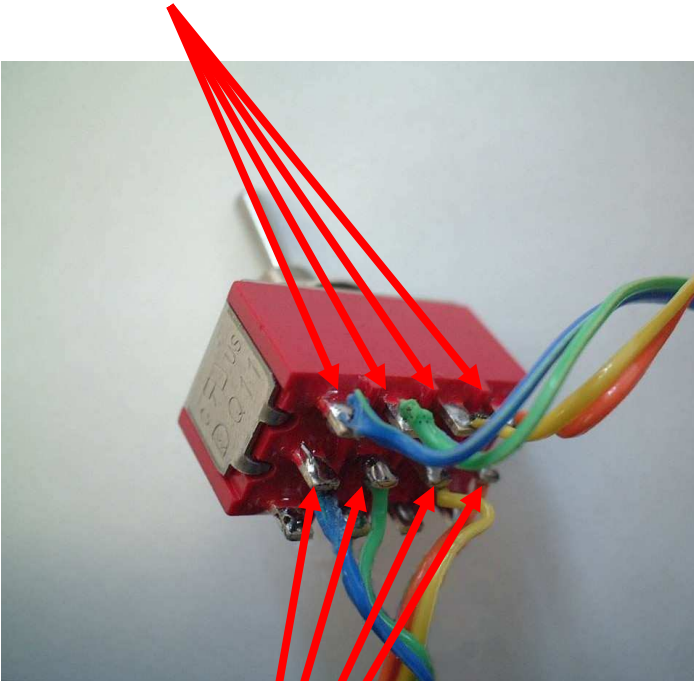

Take another 15cm piece of orange, yellow, green and blue cable, and solder one end to the 4 corresponding CENTRE terminals of the toggle switch

<u>The circuit is now complete, and ready for installation into the SK5 or SK8!!</u>

Installation

Remove the batteries or power supply from the SK5 or SK8, lay it on its face and undo the back cover. Unscrew the screws holding the SK circuit board in place, and carefully lift it and prop it up on its edge, without disturbing any connecting cables attached to it.

Solder the other ends of the orange, yellow, green and blue wires coming from the CENTRE terminals of the toggle switch to the specified places on the circuit board of the SK5 or SK8:
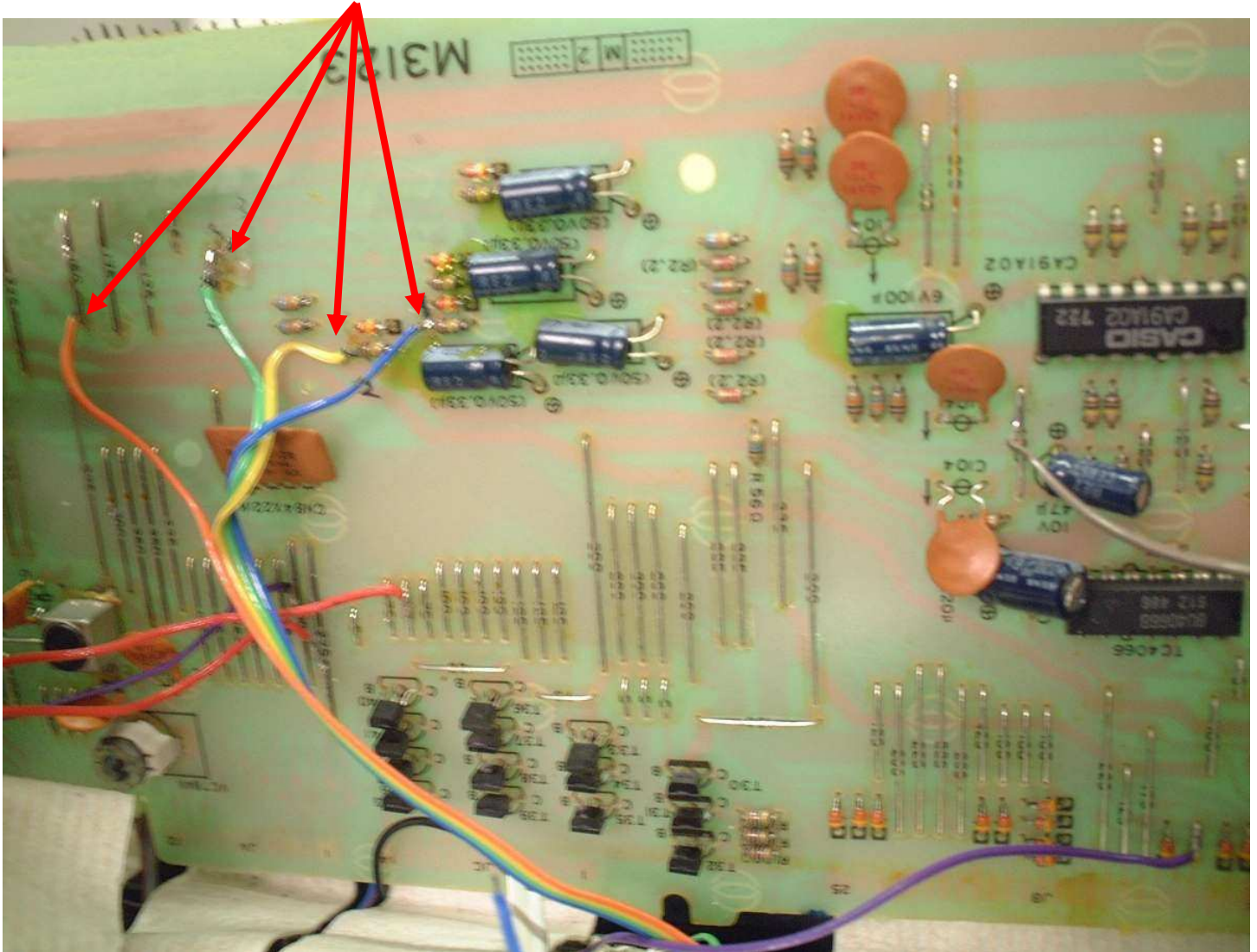
Two of these points, points 2 and 4, solder onto the legs of resistors. The other points, 1 and 3, solder on to wire links.
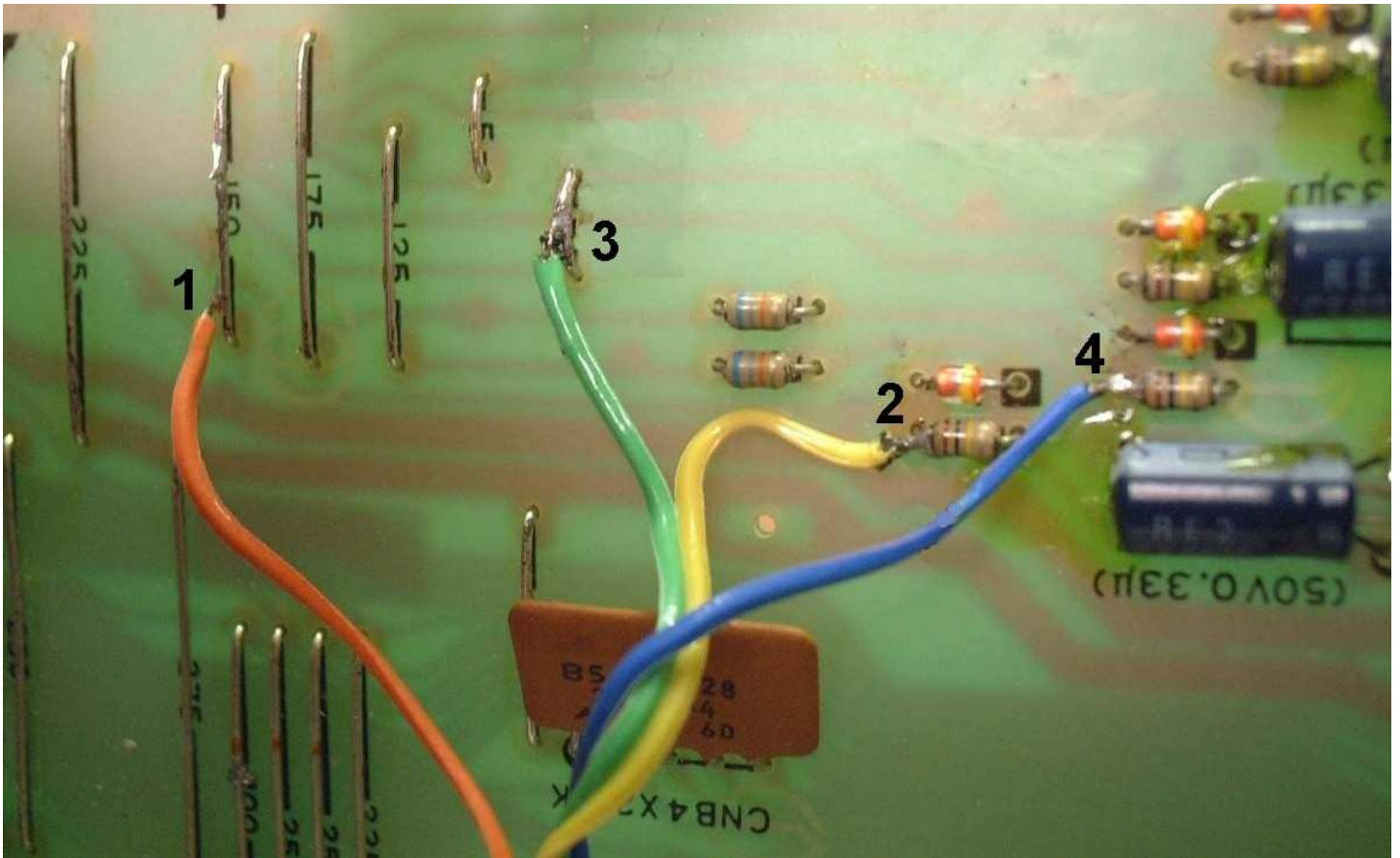
Mount your completed circuit board with double-sided foam tape to a convenient location on the SK circuit board, such as here:
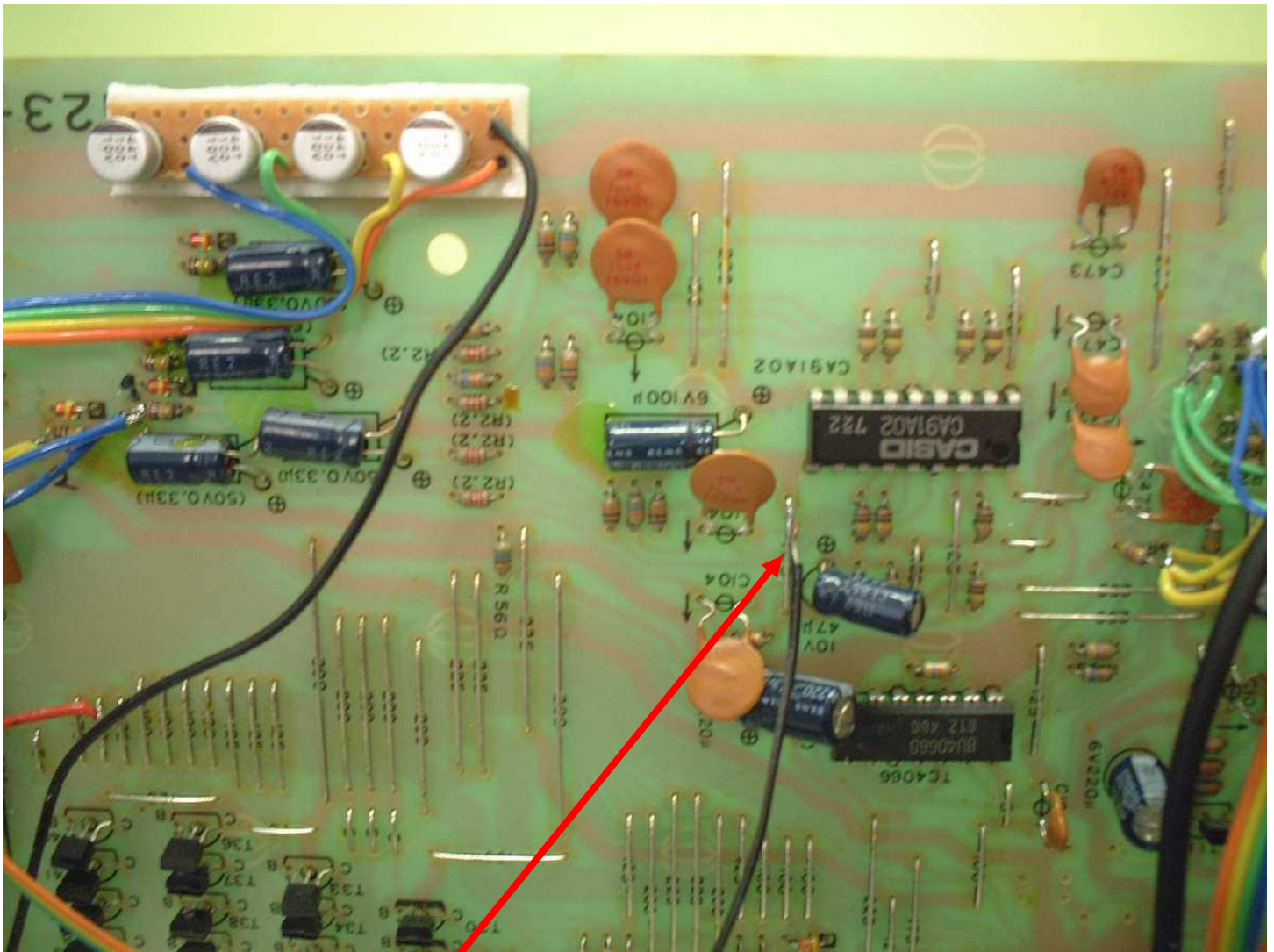
Solder the free end of the black wire to this link here:

For the moment, leave the toggle switch hanging free outside the SK casing until you've tested the board.

Replace the SK circuit board and screw it in place. Rest the back casing on the SK but do not screw it down, let the toggle switch hang out between the casing halves. Turn the SK over so you can access the keyboard.

Testing the circuit

Connect a power supply (this is much easier than installing the batteries with the back casing off) to the SK, and switch the keyboard on. Turn the volume up about 1/3 of the way up. Select a sound with a sharp attack, such as the piano or guitar.

Play a note and hold it down. Depending on which position you have the toggle switch in, you will hear the original, sharp attack, or a slow, swelling sound, building up to a certain volume. The decay of each sound will also be longer, too.
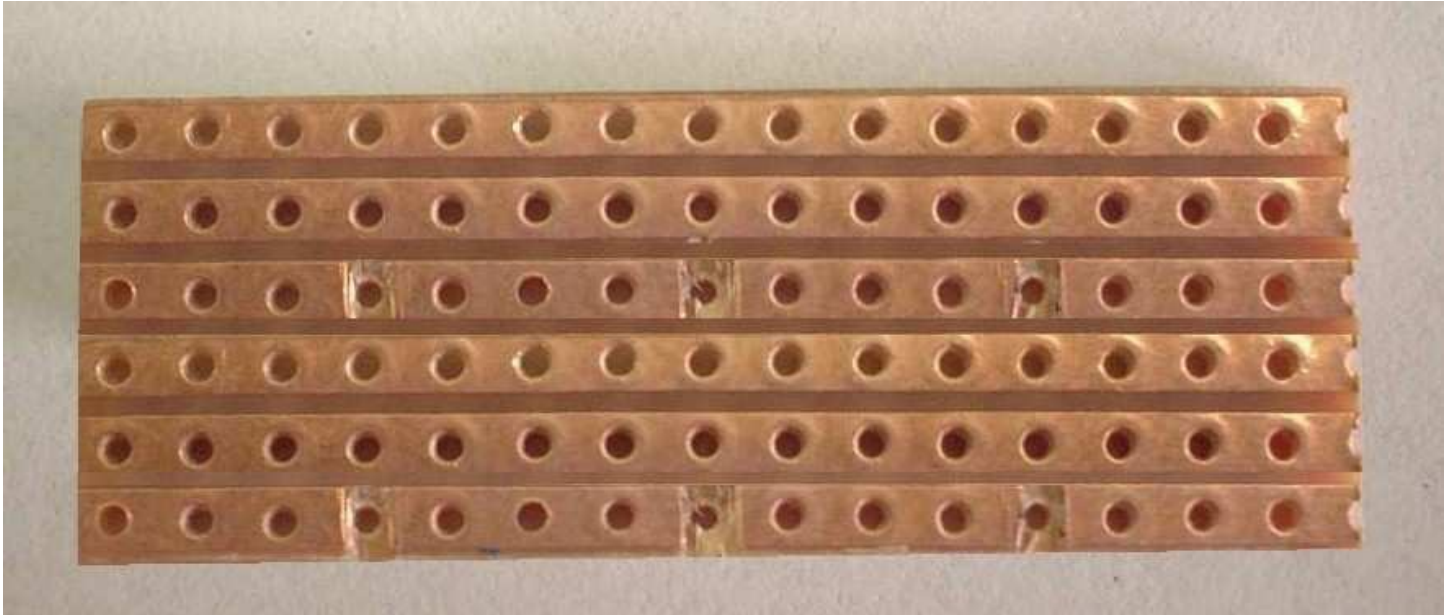
Switch the switch the opposite way. You should now get the other result – either the slow, swelling sound or the original, sharp sound. Once you know its working, mount the toggle switch in a convenient place in a hole in the SK case, and reassemble the case.

Enjoy!!!!

Other suggestions:

Try making a board with several rows of different value capacitors. If you make a board with 2 rows, such as a row of 100uF capacitors and a row of 47uF capacitors, you could use a 4-pole, 3-way rotary switch to switch between the 2 banks of capacitors to get 2 different "preset" attack/decay rates (the 3rd position on the switch can be used as "off")!!

Here's what your circuit board should look like for this:

Use this 4-pole 3-position rotary switch instead of the toggle switch:

http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=576481