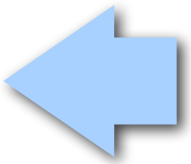
# The DKK-OCHO
## Complete build guide

spikenzielabs.com

Version 0008

Note these symbols. They call attention to certain elements of the build that require additional care & attention.

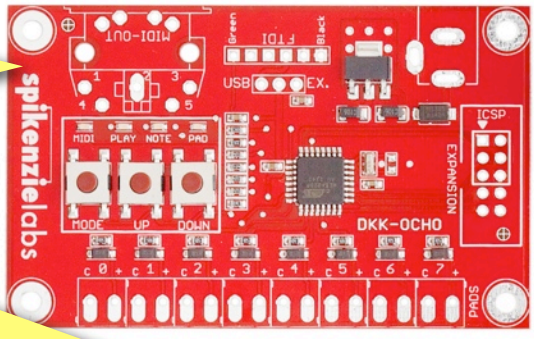
Caution



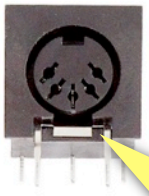
Look here...

Info

**Unpack the electronics :**




DKK-OCHO PCB SMT parts pre-soldered



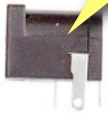
MIDI Din Connector

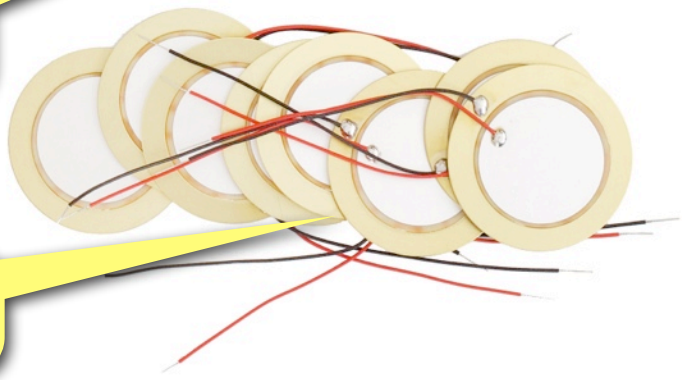
90 degree FTDI header

8 x 2pin Screw terminals

Shunt-Jumper, 3 pin header

DC Barrel jack





8 Piezo discs

## Safety + Fun = Fun Safely

Some of the steps in the build of this kit require the snipping component legs. If you're building this kit on your own, or with a someone else, we **STRONGLY** recommend whoever is present is wearing safety glasses. When the legs are snipped, the can fly off in unpredictable directions, at a high speed. Also, be sure to follow the safety instructions that came along with your soldering iron.

**Note :** A word about solder. For people new to soldering, we recommend using leaded solder. It is much easier to solder with it. Lead free solder requires a much higher temperature. In all cases, **wash your hands** after handling solder. Especially before eating.

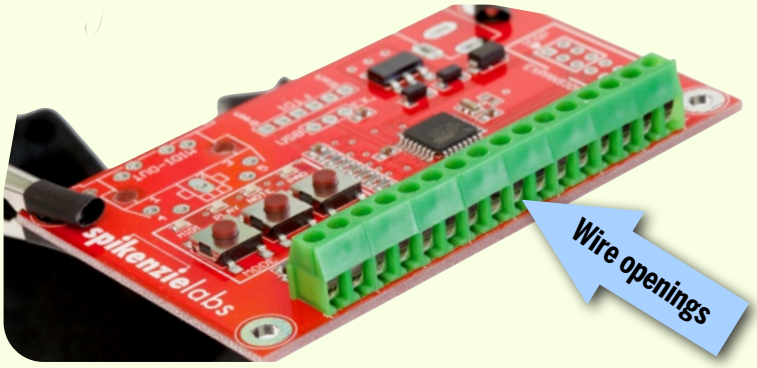
Be safe, and enjoy.

## Screw terminal connecting & soldering :

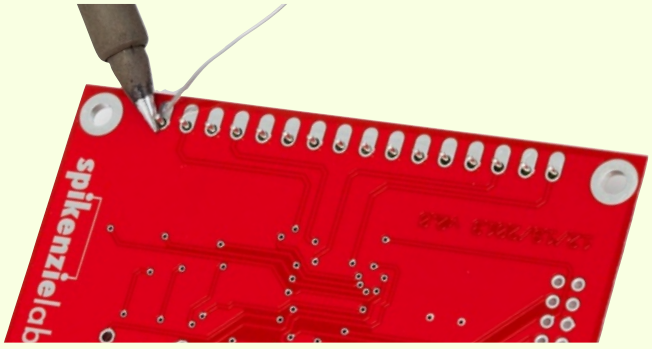
One at a time, slide the 2 pin screw terminals together until you have 8 of them in one strip. They connect by sliding down the side of the next one.

If you notice a break as in the photo below, separate them, and try again.

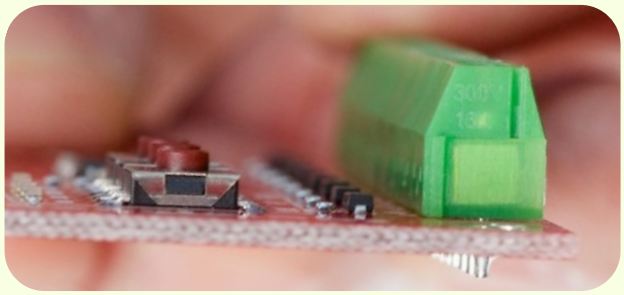
Place the strip of screw terminals onto the DKK-OCHO PCB with the wire openings aiming out.



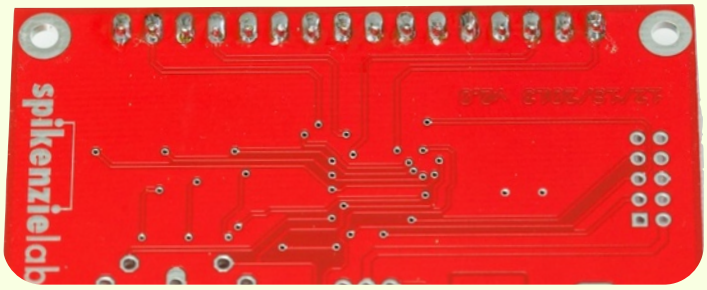
Hold the strip in place with tape, or your finger, and solder all 16 pins on the bottom of the PCB. Check to make sure that they are laying flat against the PCB before you solder all the pins.




When complete,your screw terminals should look like this:



All 16 pins properly soldered:
Check to be sure you didn't forget any.

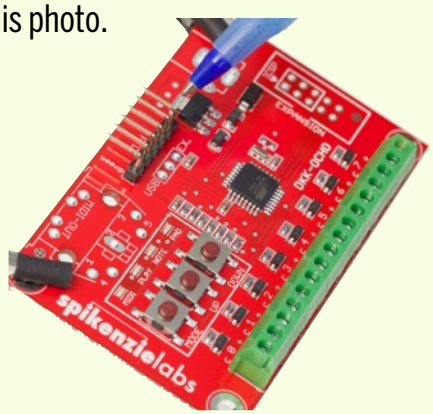



## The 90 degree pin header :

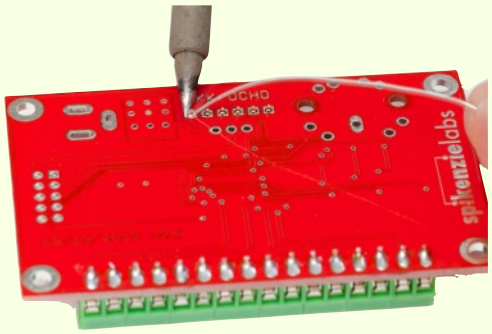
The pin header is where you connect a FTDI cable to connect with your computer. With this connection, you can use your computer's audio software to play samples. This same port is used to tune the drum pads, and upload new versions of the OCHO firmware.

Place the end with the black stopper through the holes in the PCB as in this photo.

Hold the pin header in place with a piece of painter's tape.




Solder the six pins for the header.

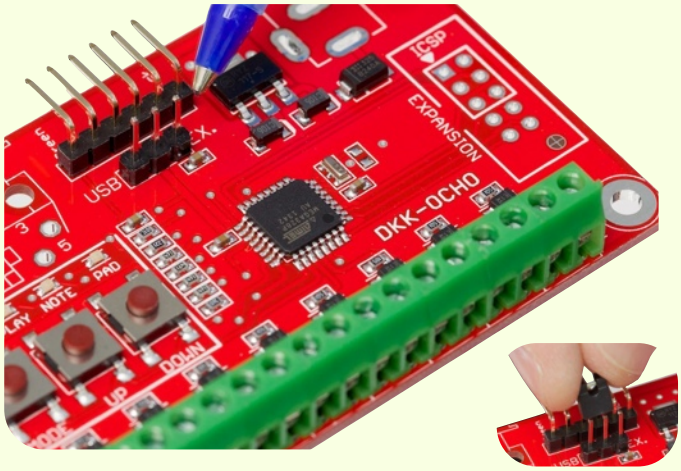


## Power select jumper :

The DKK-OCHO can be powered by USB (via a FTDI Cable, or alternatively by a 8-18v AC adapter that is center positive on the DC barrel jack.

This shunt jumper tells the DKK-OCHO where to get the power from.

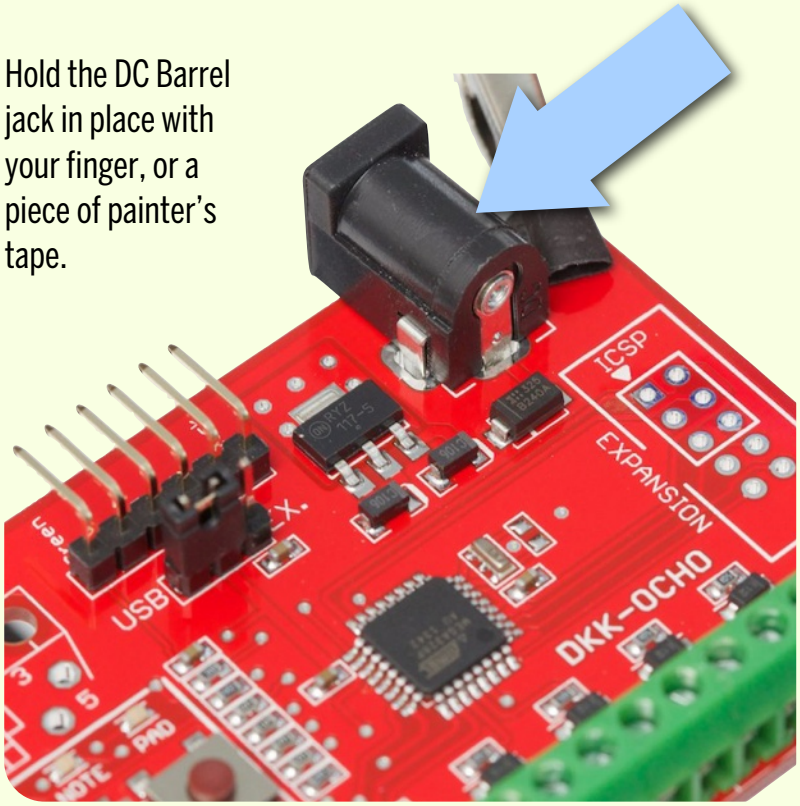
Hold the three pins in place, and solder from the bottom. Attach the shunt to the corresponding pair




## The DC Barrel Jack :

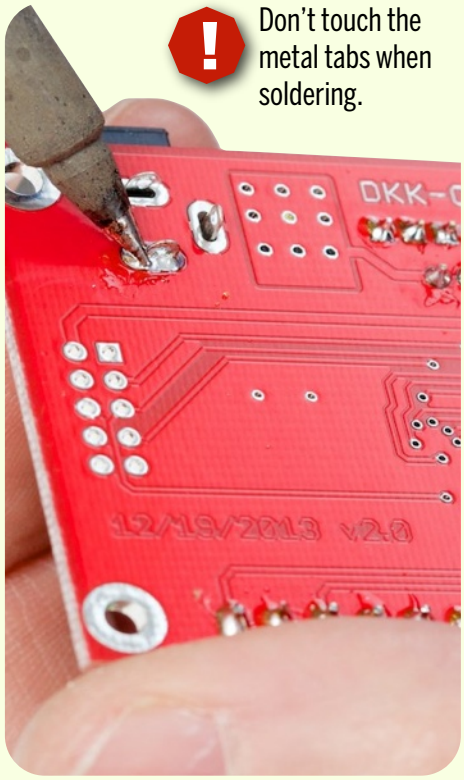
Slide the DC Barrel jack's solder tabs through the three slots on the PCB.

Hold the DC Barrel jack in place with your finger, or a piece of painter's tape.



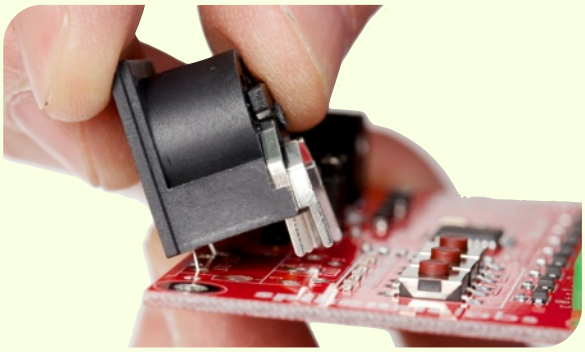

Solder the DC Barrel jack.
Be sure to check that it is laying flat against the PCB.

Don't touch the metal tabs when soldering.

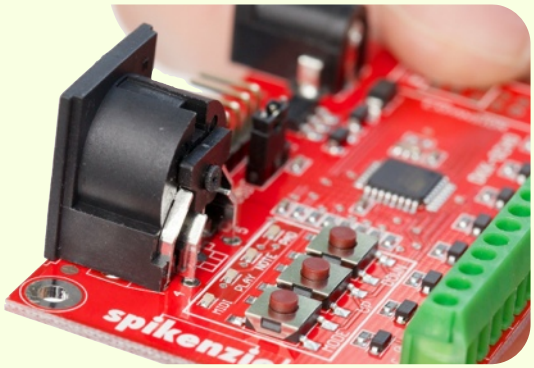


## The MIDI Jack :

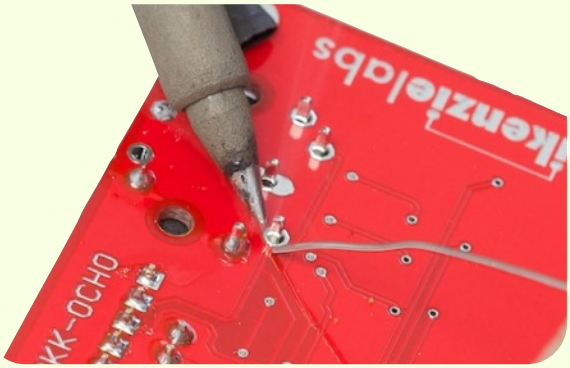
Start with the 2 pins at the face of the midi connector, and then angle down the rest of the pins. When the connector is flat against the PCB, hold it in place with your finger, or tape.



MIDI Jack fully seated on the PCB.



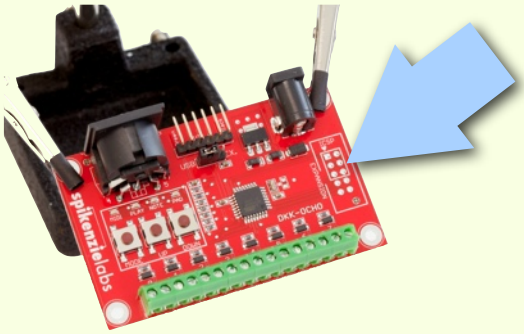
Solder all seven pins.




## The Expansion Port : Not yet implemented.

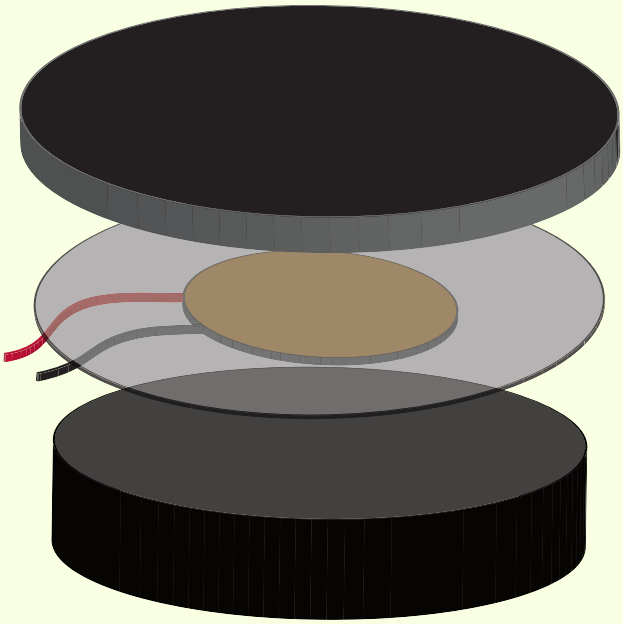
Future expansion of the DKK-OCHO to OCHO expansion accessories, and other peripheral possibilities is going to be a breeze with this snazzy expansion port.

For the moment, leave it as is. Or if you would like to hack away at it, by all means.



## How to build drum pads :

Building a drum pad in essentially just putting together a sandwich of layers with a piezo sensor in the middle. You use one of the provided piezo disc sensors per pad.



The top layers protect the sensor from damage and reduce the amount of noise from the drum stick hitting the sensor. We like to use a mouse pad.

The middle layer is a piece of metal that helps transmit the strike from the stick to the piezo sensor.
(Cut sheet of metal). Piezo glued on it's flat side under the metal with epoxy, wires extended out

The bottom layers help keep the drum pad from rattling on the table, dampens the strike enough to not false-trigger the neighboring pads, and gives it a solid mounting base. We like to use soft foam, like what is used to pack electronics.

The drum pads shown here were all assembled onto one piece of 1/4" plywood. The pads were made small so that it could be used easily on a table-top. We encourage you to be creative when building your pads. Larger, or smaller. We've seen all types of materials used for drum pads... Eg: PVC pipes, food containers..

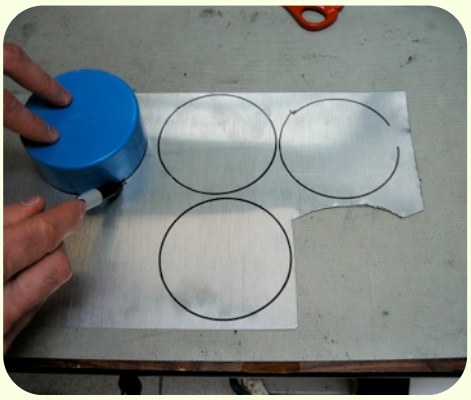
The possibilities are many. Whatever your choice of drum pad, build one, test it.

**You will need:**

- Mouse pad (Neoprene) or soft rubber.
- Metal discs. (Thin sheets from hardware or auto parts store)
- Soft light foam.
- Epoxy.
- Spray glue.

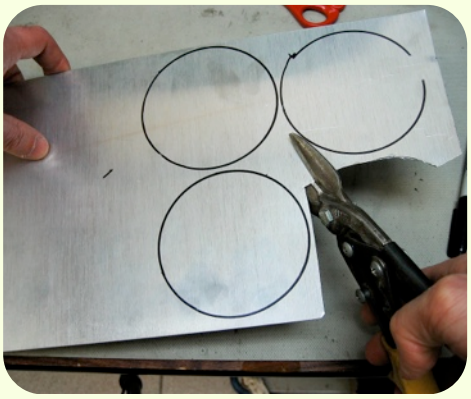
**Tools required:**

- Scissors
- Tin snips
- Sand paper (Rough)
- Pen / Sharpie



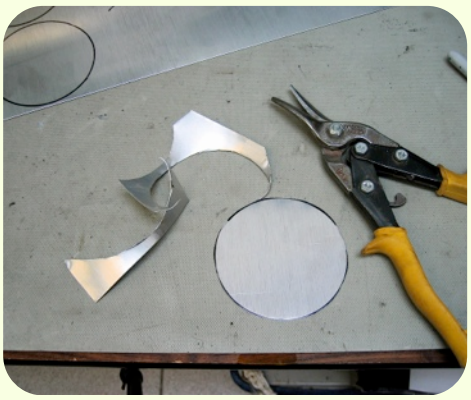
Draw circles the on the metal sheet.

You choose the size.  Here we took the plastic cap off of something, and we are using it as a tracing template.



Cut out the circles that you drew on the metal sheet with the tin sips.

WEAR SAFTY GLASSES and gloves !



Repeat for all of the drum pads.

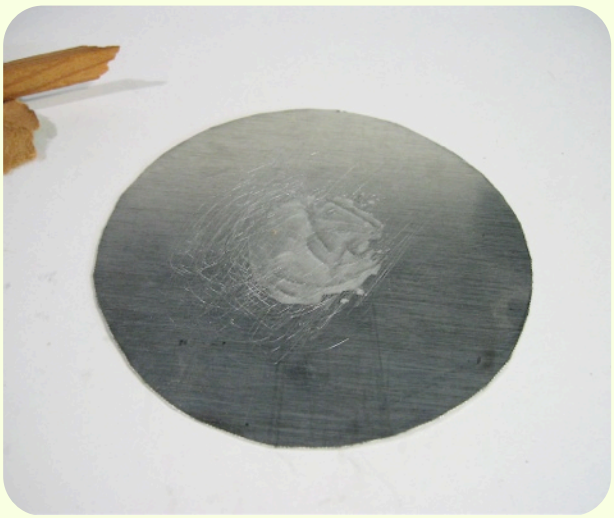
Careful some of the edges may be sharp.

Rough-up the center of each disk on one side. This is were you will glue the piezo.

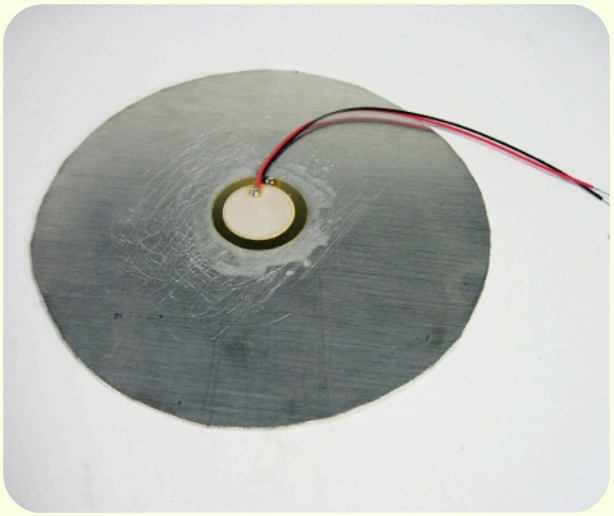
The abraded surface will form a stronger bonding surface for the epoxy adhesive.

Mix your 2 part epoxy on a piece of scrap. Mix well, as per the directions on the pack.

(Hot glue also works, but it is harder to get flat.) This is because the metal cools it too quickly.



Apply a thin amount of glue to the roughed up area on the metal disc.



Press the piezo into the glue with the wires and light colored side up.

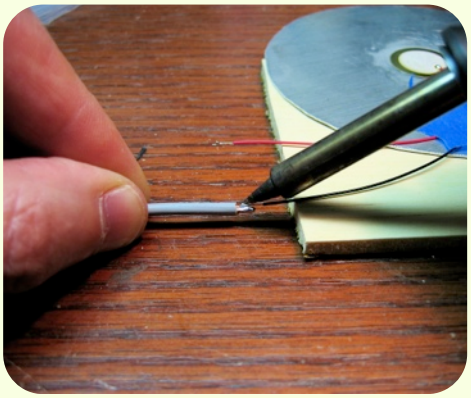
Put these aside until the epoxy has cured.

Make lengths of wire to connect the Drum kit to the piezos.

It is best to use two colors. It is important that the red and black wire of the piezo go to the correct places on the drum kit.

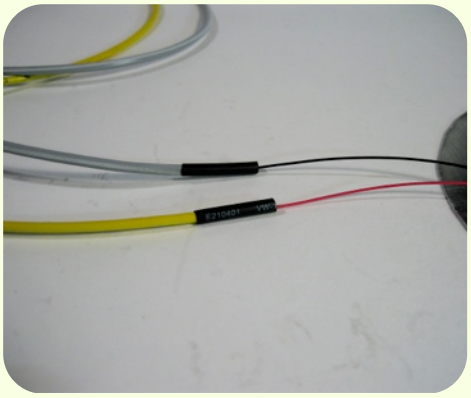
To make soldering the wires to the piezos easier, tin the wires. To tin the wires, hold your soldering iron on the wire for a moment then melt solder onto the end of the wire so that it is shinny and silvery.

Do the same for the red and black wires connected to the piezos.

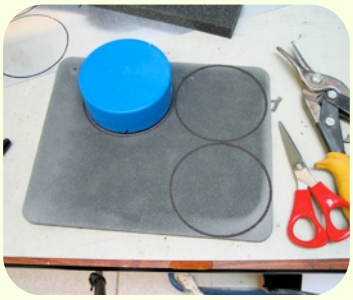


Hold one wire at a time and place the tinned end next to the tinned end of the wire from the piezo and heat them with the soldering iron. The solder should easily melt and connect the wires together.

Hold still until the solder is solid, for a good connection.



The joint between the wire and the piezo is quite weak. To strengthen it we recommend using heat shrink tubing. You may also use electrical tape or hot glue.

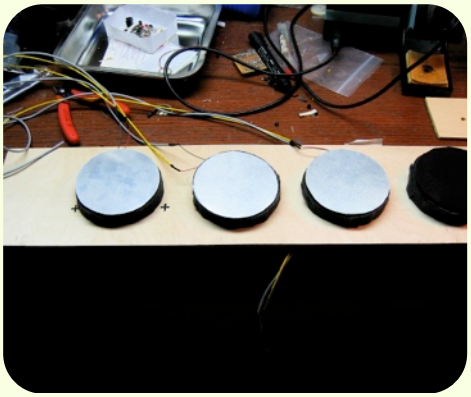


Using the same diameter circle that you used in the first step, draw circles on the bottom foam and the mouse pad.

Using a pair of scissors, cut out the circles that you just drew.

**Note:** The pads work best when the foam parts are the same size as the metal parts.

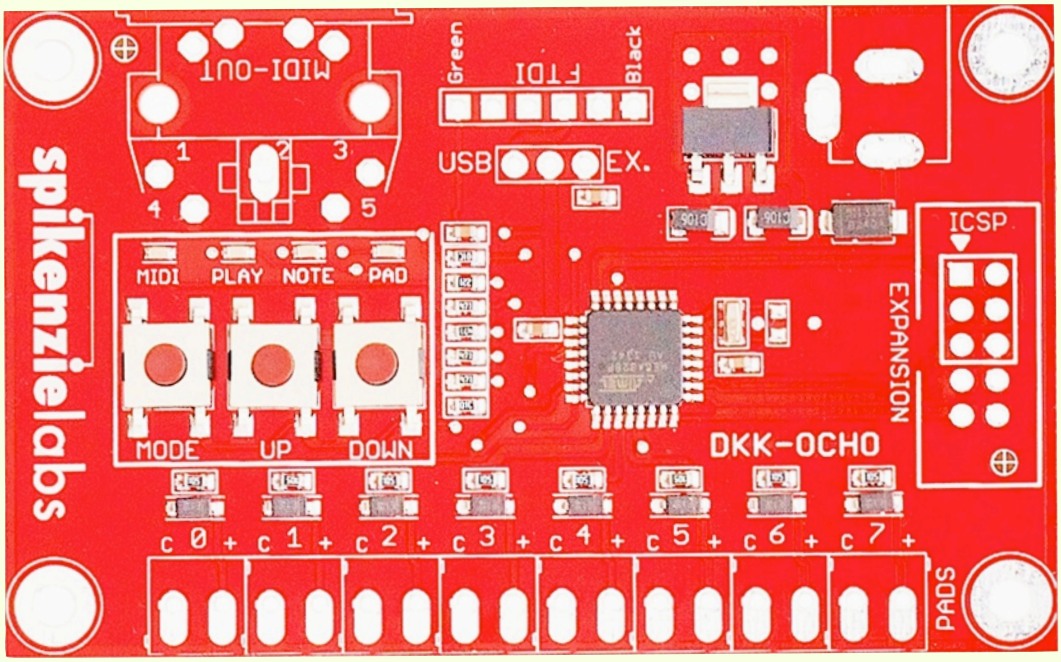

Using spray glue, coat one side of the base foam. Then place it glue side down onto the surface where you would like to build your drum pad. Press and hold to bond these layers together.



Decide how you would like to route your wire, before you complete this step. It will be harder to move the wires after.

Using the same technique as above, apply epoxy to the bottom of the metal plate (side with the piezo) and glue it on top of the foam.

Now glue the mouse pads on top of the metal plates.




Starting at connector 0. Connect the wire pairs to the OCHO. In the photo above, (un-assembled for clarity) note the individual boxes for the screw terminals.

The C connects to the black wire for the piezo, and the + connects the red wire. Connect each of the piezos in this pattern. (Black wire on the left, red wire from the piezo on the right). If you are not using a color coded piezo extension wire, double check to make sure your have the red & black connected properly.

If you are using less than 8 drum pads, the unused screw terminals may be left empty. You can also adjust the OCHO sketch to not read the unused pads.

You can connect the DKKAI directly to your MIDI synth using the on board MIDI connector.
The OCHO is pre-configured to run at 31520.

If you are going to be using our Serial - to - MIDI software, download it, and follow the instructions online to configure your OCHO. Keep in mind you will need to also load the OCHO sketch, and change the baud rate to 57600. The Serial - to - MIDI software does not work at 31250 bps.

You can read up on it here: www.spikenzielabs.com/SpikenzieLabs/Serial_MIDI.html