The Noise Upstairs is a free improvisation jam night that has been bringing you some of the most exciting noisicians for the last two years. As part of The Noise Upstairs new proactive facelift, we are offering quarterly workshops, which will run on the weekends preceding the jam night, culminating in a 'featured performer(s)' spot on the night. If you are interested in taking part in the jam night, or the workshop, or for any other Noise related activities, visit the webpage at www.thenoiseupstairs.com and drop us a line, or sign up for the mailing list.

The Noise Upstairs presents a FREE Circuit-Bending Workshop
at FUEL Cafe 448 Wilmslow Road, Withington

THE NOISE UPSTAIRS presents a FREE Circuit-Bending Workshop

JUNE 21
JULY 5

Have you ever wanted your very own circuit-bent toy? Ever wished you could do it yourself?

Circuit-bending is an electronic art which implements creative audio short-circuiting. This renegade path of electrons represents a catalytic force capable of exploding new experimental musical forms forward at a velocity previously unknown. Anyone at all can do it; no prior knowledge of electronics is needed. The technique is, without a doubt, the easiest electronic audio design process in existence.

If you learn to solder and can drill a small hole to mount a switch in, you can circuit-bend. Everything else is a process of non-technical, routine experimentation in which various short-circuits are created in an attempt to alter the target device’s audio behavior.

During the course of this workshop you will go from having a basic electronic toy, to having a sophisticated circuit-bent instrument at the very end. In order to make sure that everyone has an exciting and interesting instrument at the very end we are limiting the target toys to ones that are tried and true, and will provide guaranteed results. On the following pages we will provide you with a break down of the toys that we will be working with, along with part numbers for all the switches, knobs, and jacks we will be using from Malpin.

We will provide you with all the necessary tools to circuit-bend, at the workshop, but it is recommended that you purchase the following if you plan on doing any bending between the workshop sessions or thereafter.

- A Low-wattage (30w or less) soldering iron with a very narrow tip.
- Thin rosin-core solder.
- Set of small, all-metal “jeweler’s” screwdrivers.

In addition to the optional tools, we will be needing some solid core wire (part# BL85G from Malpin, or similar), and whatever parts the toy you decide on requires.

Other than that, bring yourself, your toy, and your childlike curiosity, and get ready to have a great time!

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TOYS

Here is a list and breakdown of the toys we’re going to be working with. You can find them in charity shops, or in your attic, if you’re lucky. The best place to find them, however, is eBay.

### Keyboards

#### SA Series
This includes the Casio SA-2, and SA-5. These keyboards noisy, glitchy, and erratic. Good for recording, but very temperamental when it comes to performing.

- SA Series: [YouTube](https://www.youtube.com/watch?v=h0s2U-HCHBQ)

#### SK Series
This includes the Casio SK-1, SK-5, and SK-10. These keyboards are ‘flagship’ instruments as they have nearly endless bends. Very textural, and interactive.

- SK Series: [YouTube](https://www.youtube.com/watch?v=38s8FYWT_EQ)

### Drum Machines

#### DD-6
The Yamaha DD-6 Drum Machine. Good for distorted, glitchy beats and drum hits. Given the very loud built-in speaker and 1/4” output jack, it is stage ready from jump.

- DD-6: [YouTube](https://www.youtube.com/watch?v=e10Jq23x_XE)

#### DD-7
The Yamaha DD-7 Drum Machine. Similar to the DD-6 but where the DD-6 does glitches well, the DD-7 does drones well.

- DD-7: [YouTube](https://www.youtube.com/watch?v=PZ4iZG0Qmyw)

### Talking Toys

#### Speak &
This includes the Texas Instruments Speak & Spell, Speak & Math, and Speak & Read. This provides very interesting speech glitches and loops.

- Speak &: [YouTube](https://www.youtube.com/watch?v=CFhi1xqIlgs)

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**Individual toy breakdowns**

**CASIO SA-2**

This toy is one of the easier toys as it is relatively simple to bend. Due to the way it is built it is difficult to do any exploration on it, so this one involves simply opening it, connecting the bend points, and putting it back together.

- Parts needed:
  - ND91Y (or similar momentary switch)
  - FW08J (or similar 1Meg Potentiometer)
  - RW75S (or any knob of your choosing)
  - FT95D (or similar RCA Jack)

- Optional Parts:
  - An extra ND91Y/FW08J/RW75S set.
  - Two short, stubby bolt, or furniture handle to serve as “body contacts”

**CASIO SA-5**

The SA-5 is very similar to the SA-2. The main difference is that it has a larger bank of built-in sounds. The parts needed are identical to those needed for the SA-2.

**CASIO SK-1**

This toy is very fun to explore and bend. The SK series keyboards are of medium difficulty as you will be finding your own bend points, but nearly every connection you can find will sound amazing.

- Parts needed:
  - 3-10 of FH00A (or similar SPDT switch)

- Optional Parts:
  - FW07H (or similar 470k Pot, for pitch control)
  - RW75S (or any knob of your choosing)

**CASIO SK-5**

The SK-5 is very similar to the SK-1. The main differences are more realistic drum sounds, and built-in drum pads. The parts needed are identical to those needed for the SK-1.

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Rodrigo Constanzo has been circuit-bending since 1998. He has bent countless toys, keyboards, drum machines, and guitar pedals over the years. He can be found performing with, and without, toys as a solo performer, or as part of Takahashi’s Shellfish Concern, and Deaf To Van Gogh’s Ear.

For more info please visit:
- [Rodrigo Constanzo](https://www.rodrigoconstanzo.com)
- [Takahashi’s Shellfish Concern](https://www.takahashisshellfishconcern.com)
- [Deaf To Van Gogh’s Ear](https://www.deaftovanoghsear.co.uk)
Circuit-Bending 101

Breakdown of the process involved in bending.

1. Open the Target Toy
Most of the time this is as easy as removing a few screws.

2. Explore and Take Notes
This is main fun part of bending. With the toy open, use a probe and/or your fingers to test different connections on the circuit board itself. Make notes of what you find using a rating system, to make narrowing things down easier.

3. Plan Your Bends
Using the notes you created, you now have to plan on how to implement the bends. This can be done via simple toggle switches, or by incorporating momentary switches, body contacts, knobs, bolt-bays and other assorted methods. The sky’s the limit here.

4. Mark, Drill, and Paint
Now that you have a plan of what you want, you must decide where you want it. Most toys have a couple of spots where you can easily fit your mods. Find what works, drill the holes, and if you want to paint the toy, do so during this step.

5. Solder the Connections
With your switches, jacks, and pots in place, solder all of your connections.

6. Assemble and Test
Put the whole thing back together and test each bend individually to make sure everything is working as intended.

CASIO SK-10

The SK-10 is very similar to the SK-1/5 with the main difference being the size. This is about the size of the SA keyboards. The drums are also a throw-back to the SK-1 ‘blip bloop’ sounds.

Parts needed:
- 3-6 of FH00A (or similar SPDT switch)
- HF91Y (or similar 1/4” jack)

YAMAHA DD-7

The DD-7 is very similar to the DD-6. The parts needed are identical to those needed for the DD-6.

YAMAHA DD-6

The DD-6, like the SK keyboards are very easy to explore. This toy ranges from medium to advanced difficulty, depending on how far you want to take it.

Parts needed:
- 5-10 of FH00A (or similar SPDT switch)

Optional parts:
- 4-20 thin 1” bolts to create a “bolt bay” for complex bending combination.

SPEAK & SPELL/MATH/READ

The Speak & toys are advanced bends. They are hard to work with, because of the membrane keypad, but yield unique sounds for those who venture their way.

Parts needed:
- 3 of FH00A (or similar SPDT switch)

Optional parts:
- JM01B (or similar mini momentary switch)
- Another FH00A (or similar SPDT switch)
- FW07H (or similar 470k Pot, for pitch control)
- RW75S (or any knob of your choosing)
- A short, stubby bolt, or furniture handle to serve as a “body contact”

Interested in more?
Sign up to the Noise Upstairs mailing list to find out about future workshops, performances, and events.

Visit www.thenoiseupstairs.com to sign up.
How to Take Part:

Circuit-Bending Workshop

Interested in signing up for the workshop? Follow the instructions below and you’ll be well on your way to circuit-bending nirvana.

Pick a target instrument
Look through the individual toy breakdowns and video links and decide which toy you want to circuit bend. Buy/order the toy, the parts required for the toy you picked, and any of the optional tools/parts from the first page.

Book your seat
Given the limited space we have available to us (upstairs at Fuel) we can only accommodate so many people. As soon as you know you want to be involved, e-mail us at workshops@thenoiseupstairs.com saying what toy you plan on bending, or speak to Anton or Rodrigo at the Noise Upstairs jam.

THE NOISE UPSTAIRS

EVERY MONTH ON THE SECOND THURSDAY OF THE MONTH @ FUEL CAFE, WITHINGTON.

FOR MORE INFO: WWW.THENOISEUPSTAIRS.COM INFO@THENOISEUPSTAIRS.COM