

THE  
NOISE  
UPSTAIRS  
WORKSHOP

MAY 9  
MAY 30

# instrument building PART 1

Third Bridge Guitar:  
Drones, harmonics and so much more.



**THE NOISE UPSTAIRS** presents a **FREE Instrument Building Workshop**  
at **FUEL Cafe 448 Wilmslow Road, Withington**

Have you ever wanted to make your own instruments? Well now you can!

Instrument design is many things to many people. It brought us the modern orchestra, the engineering feat that is the grand piano, the digital sampler, and a near endless world of things in between.

There are several classes of instruments (as can be seen on page 3) and we will explore nearly all of them through our multi-part Instrument Building Workshops. During this first workshop we will be exploring some of the basics of Idiophones and Chordophones, with our Contact Mic Instrument and Third Bridge

Guitar, as well as general Instrument building and design skills.

The workshop will happen over the course of two days. Sunday May 9th at 7PM and Sunday May 30th, and 2PM. With a special "Home Made Instrument" themed Noise Upstairs on June 10th. The first workshop date will deal with an overall introduction to instrument making, some information on Contact Mics, and the construction of the Contact Mic Instrument. The second session will deal with the Third Bridge Guitar. You may attend one or both, as each session will focus on the separate instruments.

Since we are making experimental musical instruments, some of the plans and parts on the following pages are not as specific as the details given during our Circuit Bending Workshop last year, as these instruments can be built in a variety of ways. I will provide you with some rough

information on the materials and parts needed, and everyone will make a slightly different version of the instruments.

We will provide you with all the necessary tools to make the instruments needed. So other than having some timber cut at B&Q when you buy it (see following pages) everything else will happen at the workshop. So read on, and get ready to build yourself into DIY nirvana!

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**THE NOISE UPSTAIRS  
WORKSHOPS**



5/2010

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](http://www.thenoiseupstairs.com) and drop us a line, or sign up for the mailing list.

# INSTRUMENTS

Here are the two instruments we are going to be focusing on in this first instrument building workshop.

## Contact Mic Instrument

The Contact Mic Instrument is an Idiophone that uses Contact Mics to amplify the plucking, strumming, striking, and scraping of small objects mounted on a board. A variety of very interesting sounds and textures can be found in the most mundane of items.

### Videos

<http://www.youtube.com/watch?v=KZgnzfUIUXU>

<http://www.youtube.com/watch?v=id0MDuHX1hY>

<http://www.youtube.com/watch?v=5POYFpcUiro>

## Third Bridge Guitar

The Third Bridge Guitar is a guitar like instrument that has a "third bridge" in the middle of the strings. We place a pickup or contact mic on one end of the strings and then play the other end, so instead of hearing what we play, we instead hear the sympathetic vibrations that travel across the "third bridge" to the side of the instrument with the pickup/contact mic on it.

### Videos

<http://www.youtube.com/watch?v=A8uGNY2Qf9Y>

<http://www.youtube.com/watch?v=LLuoUvevRDI>

<http://www.youtube.com/watch?v=SS-v0NzO-Ts>

# CONTACT MIC INSTRUMENT

For the contact mic instrument you will need the following:



- A flat soundboard to mount everything onto. This can be anything ranging from piece of wood 20cm x 20cm, to a cutting board, to a cigar box, to a piece of plexiglass. As long as it's relatively sturdy, flat (nothing textured), and you can drill into it (no glass), it should be fine. MDF/compressed wood should be avoided, although it can be used. The more resonant the base, the better sounding your instrument will be. Try tapping it with your finger to test how it sounds.



- The sounding materials. Again, this can be anything, but a few good choices could be a comb, a ruler (metal or wood), rubberbands, springs, paper clips, nails (big and small), bolts (big and small), door stoppers, screws, washers, guitar strings etc... Use your imagination, and whatever you have laying about the house. The more you bring, the better, even if you don't use it all. Watch the videos linked above for inspiration.

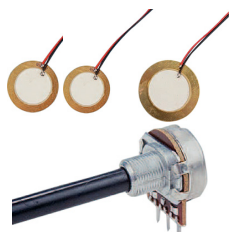


- A contact mic. At least one is needed, but having more will give you more options (see optional materials below). These can be purchased from Maplin as Piezo Transducers. Item # YU82D, YU83E, YU85G, QY13P are all suitable. Different sizes will sound different, with a general rule of thumb being, the bigger the piezo, the more low frequency it will reproduce.



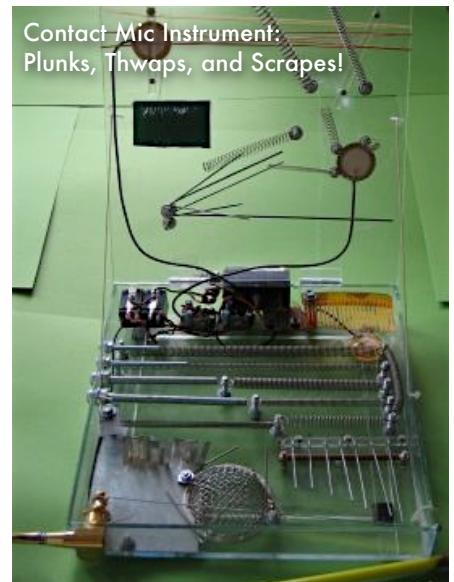
- An output jack. Depending on the thickness and layout of your soundboard you can use either a standard Chassis Socket such as item# HF91Y (keep in mind the space needed on the opposite side of the jack), or more simply a "Socket" style one, such as item# HH19V. This one can easily be mounted on top of a flat surface, and can be made removable if you so desire.

### OPTIONAL MATERIALS



- Additional Contact Mics. You might find that having several contact mics will produce a fuller sound on your instrument. Or you can wire the contact mics to separate outputs for stereo sound. Or you can wire separate contact mics to a switch to select between them (like a guitar pickup selector).

- Volume and/or Tone Pots. Item# FW26D can serve as both volume and tone pots. You would also need a .01uF Capacitor if you are wiring a tone control. This would be item# WW18U, though any .01uF Capacitor will do.



Rodrigo Constanzo has been building instruments since 1998. He has circuit bent countless toys, keyboards, drum machines, and made many acoustic and electro-acoustic instruments. He can be found performing as a solo performer, or as part of Takahashi's Shellfish Concern, and Deaf To Van Gogh's Ear.

For more info please visit:

[www.rodrigoconstanzo.com](http://www.rodrigoconstanzo.com)

[www.takahashishellfishconcern.com](http://www.takahashishellfishconcern.com)

[www.deaftovangoghsear.co.uk](http://www.deaftovangoghsear.co.uk)

Moodswinger:  
Very fancy and well crafted  
Third Bridge Guitar.



## THIRD BRIDGE GUITAR

For the third bridge guitar you will need the following:

- A flat body for the instrument. Again, this can be very open ended. I've used everything from furniture grade plywood, to the lid of a Harmonium. One thing to keep in mind is that if you want to use it with regular guitar strings, you should keep it under about 70cm. It also needs to be a minimum of about 8cm wide, but it can be as wide as you'd like. You can buy Kiln Dried Timber from B&Q and they will cut it to your specifications. The thicker the wood, the more string tension the instrument will take, which translates to being able to tune the instrument higher.

- Tuning pegs. You can use standard guitar tuning pegs but those can be very expensive. You can find some on the cheap at eBay or local music shops. Depending on the thickness of your wood, some recessing might need to happen for the tuners to work. You can also use zither pins which are quite a bit cheaper than tuners and allow for a lot of strings in a small space. Alternately you can use eyebolts to make simple friction tuners as seen in this video: <http://www.youtube.com/watch?v=MKg20Cg7gUA> I've generally used zither pins in my instruments as I bought a box of 100 several years ago.

- Pickups. We need at least one pickup. Guitar pickups are ideal, but can be expensive. You can generally find some going for very cheap on eBay, and asking at a local music shop for pickups gutted out of guitars. I've bought 3 humbucking pickups for \$15 in the past this way. Humbuckers are better, but singlecoils will work fine. Alternately you can use a contact mic. Contact mics work by picking up vibrations through the body of the instrument, so it would be less effective as a "third bridge guitar", but it would still sound great.

- Bridges. We need two outer bridges and one central bridge. Here you can get very creative. Something like a door handle is a fairly cheap and sturdy option for all three needed. You can also use a drum stick held in place with nails, or a bottle of beer, or a real guitar bridge. I've always gone with a "door handle" approach myself. Make sure your bridge fits your body wood and pickup width. Standard pickups are about 8cm.

- An output jack. See Contact Mic Instrument part list above for details.

- Strings. Electric guitar strings will work best. You can use a set of standard strings, or use all of them the same gauge for tight/close tunings. The thinner the gauge the higher the pitch, so choose accordingly.

### OPTIONAL MATERIALS

- Additional Pickups or Contact Mics. You can add a 2nd guitar pickup to the other side of the instrument to give you a polyphonic sound every time you hit a single string or you can add a pickup (or pickups) to different places along the body for different tonal variations.

- Volume and/or Tone Pots. See Contact Mic Instrument part list above for details.

- Frets. Depending on the height of your instruments "action" you can add frets. A very cheap way to do this is using standard construction nails. You can saw the heads off, or use finishing nails.

# Instrument Building 101

Breakdown of the classes of musical instruments.

## 1. Idiophones

Instruments like the Xylophone and Marimba. They produce sound by vibrating themselves. They are sorted into concussion, percussion, shaken, scraped, split, and plucked.

## 2. Membranophones

Instruments like Drums or Kazoos. They produce sound by a vibrating membrane. They are sorted into predrum, tubular, friction, kettle and mirlitons.

## 3. Chordophones

Instruments like the Piano or Cello. They produce sound by vibrating strings. They are sorted into zithers, keyboards, lyres, harps, lutes, and bowed.

## 4. Aerophones

Instruments like the Pipe Organ or Oboe. They produce sound by vibrating columns of air. They are sorted into free, flutes, organs, reedpipes, and lip-vibrated.

## 5. Electrophones

Instruments like the Theremin or Laptop. They produce sound by electronic means.

## Interested in more?

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

Visit [www.thenoiseupstairs.com](http://www.thenoiseupstairs.com) to sign up.





# Instrument Building Books

Musical Instrument Design  
*Bart Hopkin*

Handmade Electronic Music  
*Nicolas Collins*

Making Marimbas  
*Bart Hopkin*

Gravikords, Whirlies and Pyrophones  
*Bart Hopkin*

Getting a Bigger Sound  
*Bart Hopkin*

Funny Noises  
*Bart Hopkin*

## INSTRUMENT BUILDING RELATED LINKS

### Experimental Musical Instruments

EMI has been in the experimental instruments business forever. It used to be a quarterly journal, but now they sell books, parts, and reference materials.

[www.windworld.com](http://www.windworld.com)

### Odd-Music

Oddmusic is a great webpage, and mailing list devoted to odd, DIY, and electronic instruments.

[www.oddmusic.com](http://www.oddmusic.com)

### Stewart-MacDonald

Everything for building and repairing stringed instruments. Plenty of kits, parts, etc...

[www.stewmac.com](http://www.stewmac.com)

### Elderly Instruments

More of everything for building and repairing stringed instruments. Plenty of kits, parts, etc...

[www.stewmac.com](http://www.stewmac.com)

### Arduino

Amazing embedded programming platform which includes very cheap microcontroller and free software with a very helpful and active community.

[www.arduino.cc](http://www.arduino.cc)

### Make

DIY magazine and webpage. General purpose DIY but many interesting music instrument projects.

[www.makezine.com](http://www.makezine.com)

### SparkFun

Great resource for all things DIY electronics. Tons of kits, components, development tools, etc...

[www.sparkfun.com](http://www.sparkfun.com)

### Iner Souster

Interesting experimental instrument blog.

[inersouster.blogspot.com](http://inersouster.blogspot.com)

### Godfried-Willem Raes

Amazing 'Automatons' which are instruments that can play themselves. Mostly all built are acoustic instruments controlled by microcontrollers.

[www.logosfoundation.org/instrum\\_gwr/automatons.html](http://www.logosfoundation.org/instrum_gwr/automatons.html)

### Ciat-Lonbarde

Peter Blasser's incredible webpage, with unique and amazing instruments. He also has several 'Paper Circuits', which are great sounding instruments.

[www.ciat-lonbarde.net](http://www.ciat-lonbarde.net)

## How to Take Part:

### Instrument Building Workshop

Interested in signing up for the workshop? Follow the instructions below and you'll be well on your way to DIY nirvana.

### Buy your materials



Look through the individual instrument breakdowns and video links. Buy/order the parts and materials, including any option parts

you want.

### Book your seat



Given the limited space we have available to us we can only accommodate

so many people. As soon as you know you want to be involved, e-mail us at

[workshops@thenoiseupstairs.com](mailto:workshops@thenoiseupstairs.com)

saying that you want to take part, or speak to Anton or Rodrigo at the Noise Upstairs.

## THE NOISE UPSTAIRS

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

FOR MORE INFO:

[WWW.THENOISEUPSTAIRS.COM](http://WWW.THENOISEUPSTAIRS.COM)  
[INFO@THENOISEUPSTAIRS.COM](mailto:INFO@THENOISEUPSTAIRS.COM)