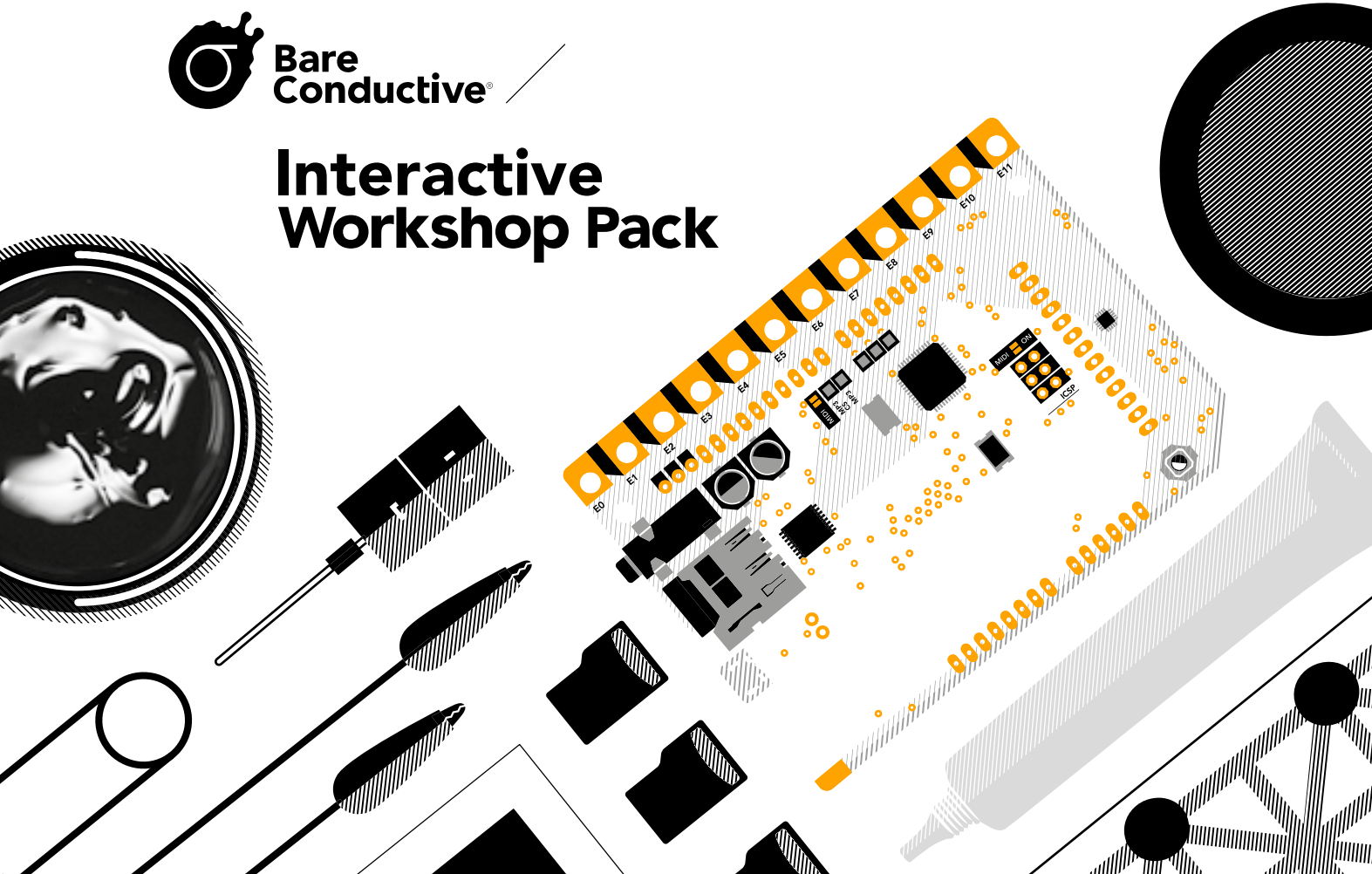
Bare Conductive

# Interactive Workshop Pack



# Let's get started

This guidebook has all the instructions you need to make three projects using the Touch Board, Electric Paint and Printed Sensors.

**Components glossary**
A guide to what you get and what it's for:

**About**
Definitions and resources for Electric Paint, Touch Board and Printed Sensors.

**Printed Sensors - MIDI Paper Orchestra** Creating paper instruments to compose a tune.

**Electric Paint - Memory Game**
Painting an interface to play an interactive memory game.

**Capacitive Sensing - Interactive Posters** Plan, design, make and program interactive posters.

To find online versions of these tutorials including video, please visit **bareconductive.com/make**

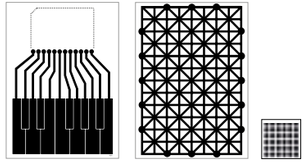
Share your project **@bareconductive**

**Electric Paint**
Your design and electronics projects are about to change forever. Paint circuits and sensors or use as a conductive adhesive on almost anything including paper, plastic, textiles and conventional electronics.

**Key Features**
_ Conducts electricity when dry
_ Paint, stencil or screen print
_ Air-drying
_ Nontoxic and solvent free
_ Water soluble
_ Paint over with water-based paints
_ Electric Paint 10ml dispenses up to 5m
_ Electric Paint 50ml screen prints up to 0.8m$^2$

**Touch Board**
One tool, a million possibilities. Create sensors with its 12 electrodes to trigger sounds through its MP3 player. Use our cross-platform installer to add loads of code examples to the Arduino IDE.

**Key Features**
_ Capacitive touch and distance sensing
_ Arduino compatible
_ No programming required
_ Code and libraries for the Arduino IDE for optional programming
_ MP3 Player / MIDI device
_ MicroSD card socket
_ Standard 3.5mm audio socket
_ LiPo battery charger
_ USB HID compatible
_ USB MIDI compatible



**Instrument Sensors**
These sensors have been pre-printed in the shape of an instrument with Electric Paint, and coated with a clear seal making them smudge and water resistant. This means you can start playing music immediately. Every sensor has exposed (unsealed) nodes, which can be connected to the Touch Board.

**Printed Sensors**
Test your ideas quickly without needing to design your own pattern or waiting for Electric Paint to dry. Customise and hack your sensors to make them fit any project. Every Printed Sensor has 16 exposed (unsealed) nodes.

**Carbon Dots**
Use these adhesive carbon dots to quickly and reliably connect your Touch Board to your sensors. They're conductive and double sided, which means you can easily attach and remove your Touch Board.

**MicroSD card**
The microSD card is used to store MP3 sound files for the Touch Board's mini MP3 player. It's just like the memory card in your camera.

**MicroSD Card Reader**
The microSD card reader allows you to view and change the MP3 files on the microSD card via your computer.

**Mini Speaker**
This speaker is light, portable, and USB chargeable. The Touch Board has an on board audio socket so you can plug in the speaker, or connect your own speakers or headphones if preferred.

**USB Hub**
Use the USB hub to power your Touch Board. Each hub has 4 USB sockets so you can connect up to 4 devices at once.

**Micro USB cable**
The Micro USB cable allows you to power your Touch Board directly from your USB hub. When connected to your computer, you can use it to send data to and from the Touch Board, and to upload code via the Arduino IDE.

**Alligator clip test leads**
Alligator clips provide an easy way to connect to your Touch Board's electrodes or prototype different layouts. Use them for projects where you want to quickly test your sensors before making a permanent connection with Electric Paint.

**Sticky Tabs**
Use these tabs to mount your Touch Board or sensor cutouts to a wall and make sure they stay in place.

**Velcro Stickers**
Mount your speaker easily to the wall and detach for charging. Use these if you are building a vertical project, or if you want to secure the speaker in place.

# Electric Paint

**Conductive paints** combine resins or adhesives with powdered conductive particles to create a conductive liquid or paste. When dry, the conductive particles in the paint allow electricity to flow through the material. They are used for printing conductive traces in circuit boards, or in our case, for making painted or printed sensors.

**Electric Paint** is a nontoxic, water based, conductive paint. It uses carbon black as a conductor so it's not metal based. **Electric Paint** adheres to a wide variety of substrates and is easily removed with water. It is black in color and can be sealed and painted over with a water-based paint.

## ADVANTAGES / PRODUCT BENEFITS

- Electrically conductive
- Nontoxic
- Water-soluble
- Compatible with standard printing processes

## PROPERTIES

**Color /** Black

**Viscosity /** Highly viscous

**Vehicle /** Water-based

**Shelf Life /** 6 months after opening

**Drying /** Dries at room temperature in 5 – 15min

## APPLICATION

**Electric Paint** is a unique material that can be applied in many different ways, from a paintbrush and stencil to common printing processes like screen-printing. To achieve consistent electrical performance, it is best to apply **Electric Paint** in an even layer. It is not inkjet printer compatible. **Electric Paint** can be removed with water.

## SUBSTRATES

**Electric Paint** acts much like a poster paint, and can be applied to a wide range of materials. It adheres well to paper, wood, acrylic and textiles. Hydrophobic surfaces such as some glass and plastics will exhibit poor adhesion, though this can be improved by roughing the surface with sandpaper or similar.

## FLEXIBILITY

**Electric Paint** is somewhat flexible, but this depends on two factors; layer thickness and choice of substrate. Regardless of substrate, a consistently thin layer of paint creates the most flexible surfaces. Areas of paint with wide variation in thickness tend to fracture. Substrates which are flexible, but not stretchy (such as paper) work better than materials like synthetic fibres which stretch in multiple dimensions.

## COLD SOLDERING

**Electric Paint** can work well as a cold solder joint. Whether used to solder a surface-mount or through-hole component onto a circuit board, or to adhere a component to a piece of paper. This material is almost infinitely repairable. These unique properties mean that components can be harvested from projects, cleaned and reused.

## DRYING

**Electric Paint** dries at room temperature, and gives off no fumes during the drying process. Drying time can be reduced by placing the material near a low intensity heat source.

## CONDUCTIVITY

**Electric Paint** contains conductive carbon particles which come into contact when water evaporates from the material, making it conductive when dry. When powered, **Electric Paint** can hold an electric charge to create a capacitive sensor, or allow an electric current to flow.

## POWER SOURCES

**Electric Paint** is designed for use with low voltage DC power sources at low currents and has not been tested with sources exceeding 12VDC at 50mA. Higher voltages are not recommended.

# Resources

**www.bareconductive.com/tutorials**

Check out these online resources for step-by-step instructions, tips and techniques on how to use **Electric Paint**.

## How to screen print with Electric Paint

Screen print with Electric Paint to create crisp graphics and sensors. This is a simple method you can use to apply an even and thin layer of Electric Paint onto a flat surface. With this method you create multiple copies of the same image or highly precise graphics. This tutorial shows how to use a vinyl stencil with your screen.

**Search: screen print**

## Create a tape stencil for Electric Paint

Using Electric Paint to create slick graphics is easy, even if you don't have screen printing equipment. This tutorial provides some tips on how to use a stencil with Electric Paint. You'll get a quick demonstration on how you can use a stencil or create your own using masking tape.

**Search: stencil**

## How to seal Electric Paint

Electric Paint is a water-based paint, which means that it is easy to wash off, but also can be prone to smudging – even when it's dry. By sealing the paint, you will protect your design and make it smudge-proof. This tutorial shows you how to use a clear coating to seal Electric Paint.

**Search: seal**

## A quick tutorial on diluting Electric Paint

Electric Paint is composed of conductive particles suspended in a water-based solution. As such, it can be diluted by simply adding water. Be careful though! This will also decrease the conductivity of the material. Follow this tutorial to find out how you can dilute Electric Paint for best results.

**Search: dilute**

## How to cold solder

Cold soldering is a great alternative to traditional soldering and doesn't require a solder iron. All you need is Electric Paint! In this tutorial, we'll demonstrate how to cold solder onto the Touch Board and other materials!

**Search: cold solder**

# Touch Board

**Capacitive sensing** is a proximity sensing technology. Capacitive sensors work by generating an electric field and detecting nearby objects by sensing whether this field has been disrupted. These sensors can detect anything that is conductive or that has a significantly different permittivity than air, like an animal, human body or hand.

The **Touch Board** is a microcontroller with 12 dedicated capacitive touch sensing electrodes. It can be programmed using the Arduino IDE, and can be recognised by a computer as a USB HID device, a keyboard, MIDI device, serial and more.

### PRODUCT FEATURES

- Capacitive touch and distance sensing
- Arduino compatible
- Code examples and libraries for the Arduino IDE
- Pin layout supporting Arduino shields
- HID and MIDI capable

### PROPERTIES

**12 touch electrodes /** Connect to the MPR121 for capacitive touch / proximity sensing

**Audio output /** 3.5mm stereo socket

**Storage /** Up to 32GB via microSD card

**Power /** via Micro USB

**Reset /** button to recalibrate sensors

### APPLICATIONS

The **Touch Board** can be used to control or automate outputs triggered by touch or proximity. Common outputs are lights or sounds to create interactive interfaces. However, the raw data can also be used for passive monitoring or occupancy sensing.

### FIELD PROJECTION

Each of the **Touch Board's** 12 electrodes can create its own electromagnetic field which can be calibrated to detect up to 1m in distance. This means that sensors can be made to work through other materials, and even on three-dimensional shapes. This allows for a unique degree of design freedom as sensors can be hidden, and turn materials and objects into 'smart' materials and objects.

### INPUTS

The **Touch Board's** electrodes can be used to trigger events such as sound or light based on active inputs such as gesture or touch. Passive events like contact or proximity can also be mapped and the data interpreted to trigger an interface, or to provide information remotely about a specific event.

### TARGETS

The **Touch Board's** electrodes can detect a range of targets all the way from the touch of a fingertip, to a drop of water, or the proximity of a whole person. This target detection can be optimised through a combination of electrode calibration and sensor design.

### ELECTRIC PAINT

Electric Paint can be used alongside the **Touch Board** to extend its electrodes and create sensors beyond the hardware. The paint can be applied to most materials free-hand using the Electric Paint tube, or with a paintbrush. Electric Paint can also be printed to create thin, flexible, low-cost sensors. This material and hardware combination is a powerful toolset to integrate capacitive sensors into the environment.

### PROGRAMMING

The **Touch Board** can be programmed using the Arduino IDE just like any Arduino board. We use the Arduino platform because it is easy to understand for people who have not programmed before, while still allowing advanced users to write sophisticated programs. We have a library full of code examples so that getting started with more complex projects is easy even for those with very little programming background.

# Resources

**www.bareconductive.com/tutorials**

Check out these online resources for step-by-step instructions, tips and techniques on how to use the **Touch Board**.



## What is distance sensing?

Although it's called the Touch Board, what the electrodes are really doing is sensing proximity via capacitive sensing. When you set a sensor's thresholds to be relatively high, the Touch Board only responds to actual contact or touch, rejecting proximity events.

**Search: distance**

## Touch Board + Grapher

We've developed the Grapher as a tool to visualise the 12 sensors of the Touch Board. This way you can see how your sensors are behaving, which is useful for developing and prototyping.

**Search: grapher**

## What is capacitive sensing?

The 12 sensors of the Touch Board use capacitive sensing. But what exactly is capacitive sensing? And what other technology uses capacitive sensing? This tutorial gives you a brief oversight about this amazing technology.

**Search: capacitive**

## Making distance sensors: trigger the Touch Board with proximity

The Touch Board works great out of the box to detect touch. But it's also possible to trigger sounds from a distance. We call this proximity mode. This tutorial will take you through an example and explain these principles.

**Search: distance sensors**

## Getting started with the Touch Board

This tutorial is a step-by-step introduction to your Touch Board. It will take you through powering it up and changing the sounds on your micro SD card, all the way to using our stencil and Electric Paint to create a series of graphical touch sensors on paper!

**Search: getting started**

# Printed Sensors

**Flexible sensors** can be made using techniques such as screen printing, flexography, gravure, offset lithography, and inkjet. They are manufactured on a range of substrates, from plastics, to paper and textiles. The Printed Sensors in this pack are inexpensive because they are printed on paper, using our Electric Paint.

Your **Printed Sensors** and **Instrument Sensors** have been screen printed with Electric Paint and coated with a clear seal, making them smudge and water resistant.

### PRODUCT FEATURES

- Water and smudge resistant
- Customisable into custom shapes and sizes
- Flexible - sensors to be bent without cracking
- Recyclable

### PROPERTIES

**Dimensions /** 210mm x 149mm

**Card Stock /** 270gsm

**Hatch Fill /** 45% filled with Electric Paint

**Nodes /** exposed nodes

### APPLICATIONS

**Printed Sensors** can be used with the Touch Board to quickly extend the sensors from the board. They can be used as touch or proximity sensors. **Printed Sensors** can be attached to any surface like wood, cardboard or foam to create smart interfaces. Use tape, glue, spray mount or any other standard adhesive to attach them.

### CONNECTING

**Printed Sensors** are sealed, however each sensor has up to16 unsealed access nodes. These allow you to connect the sensors to the Touch Board. There's many different ways to connect to your **Printed Sensors**. Electric Paint can be used as a cold solder, or carbon dots can be used to connect between hardware and sensor, although this is a more expensive option. For temporary and quick prototyping, alligator clips can be used to connect from the sensors' nodes to the electrodes. Connections must be made via the exposed nodes.

### USAGE

**Printed Sensors** are screen printed on paper, which makes them flexible, and allows you to cut them down to at least 16 pieces, with an access node each. You can also cut strips of the sensors and use them to connect the front of your surface to the back, by bending the sensor around a corner. The pattern on the **Printed Sensors** was designed to be used as a touch or proximity sensor.

### INSTRUMENT SENSORS

**Instrument Sensors** are a specific design of our printed sensor technology. This pack contains three different instruments: piano, drums, and sampler. You can use them to either play the respective instrument on the Touch Board or you can change the board's code and use the sensors as interfaces for your programme.

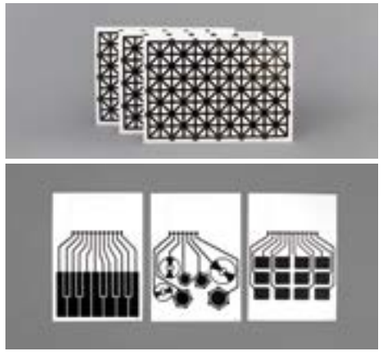
### SENSOR DESIGN

**Printed Sensors** and **Instrument Sensors** are examples of the types of designs you can achieve when designing printed and flexible sensors. Depending on the application, you can create your own sensors on a range of materials. When using proximity sensing, the pattern on the sensors can affect performance, so it's important to follow our sensor design guidelines. You can use a range of conductive inks or experiment with our Electric Paint to create sensors with various printing methods.

# Resources

**www.bareconductive.com/tutorials**

Check out these online resources for step-by-step instructions, tips and techniques on how to create your own **Printed Sensors**.



## How to cover Printed Sensors with a different colour

If you need to quickly create a touch or proximity sensor in a colour other than black, then this is the right tutorial for you! In this tutorial we are going to show you how to cover Printed Sensors with a different colour.

**Search: cover printed sensors**

## Electric Paint sensor design rules of thumb

In this tutorial we will give you some guidelines for creating painted sensors. Following these guidelines you should be able to design the best sensors for your specific application.

**Search: sensor design**

## How to integrate Printed Sensors

Using Printed Sensors is a great way to save time, as they can be cut into any shape you like, are already sealed for you and don't require drying time. Your interface can be a variety of things, such as paper, wood or plastic – whatever works for your project.

**Search: integrate**

## How to use stencils with Printed Sensors

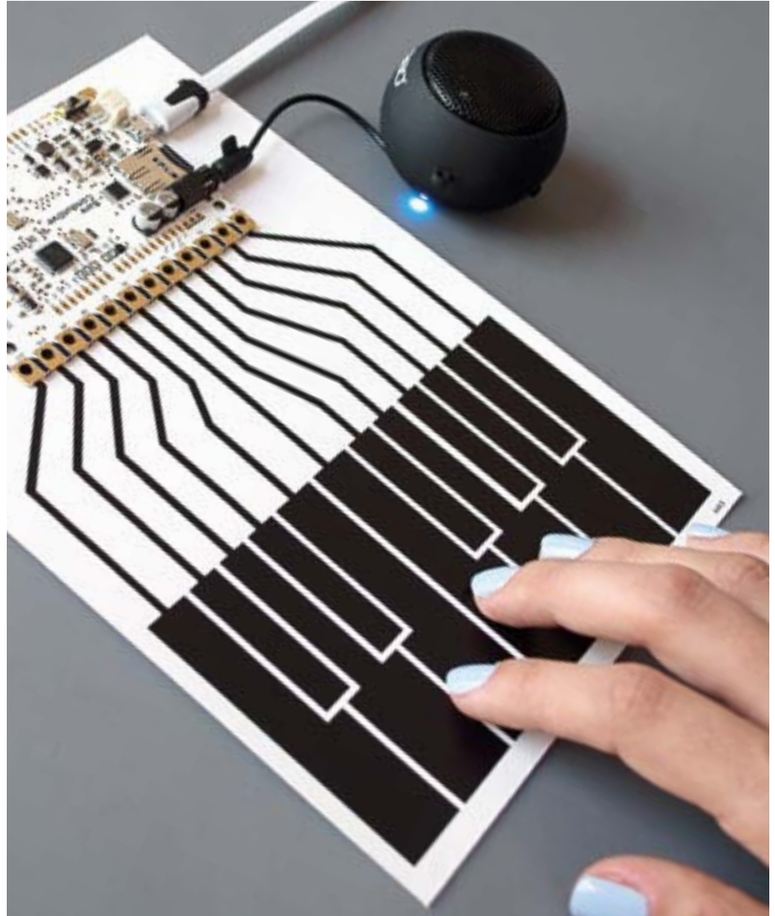
There are many benefits to using stencils in your projects. They're a great way to create precise forms and lines with Electric Paint, even if you don't have a steady hand. Additionally, you can cover the electric wiring that makes your project work. Its a cleaner, more finished way to present your projects and its also quite simple

**Search: stencils**

## The best design for printed flexible sensors

When you look at the Printed Sensors, the first thing you might notice is the gridded pattern of Electric Paint. More than just a good looking pattern, the Printed Sensors show how precisely you can work with our paint.

**Search: sensor design**



# MIDI Paper Orchestra

Make a paper piano, drum, or sampler using the **Touch Board** and **Instrument Sensors**.

When you're done, get your teams to band together and play their favourite tune, or create custom intstruments.

Touch Board, Electric Paint 10ml tube, Instrument Sensors, carbon dots, mini speaker, micro USB cable

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Also useful but not included: masking tape, wall-mounted USB plug

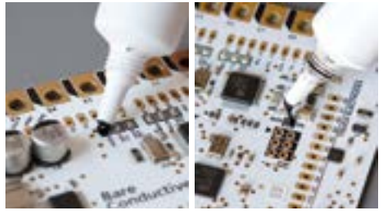
**TAKE IT FURTHER**

**1 //** Explore the MIDI sound library and select different sounds for your sensors.
**2 //** Design your own Instrument Sensors using Electric Paint
**3 //** Use the Instrument Sensors as interfaces for a game

**Step 1 Set up your digital tools**
If you haven't set up the Touch Board with Arduino before, please do so by following this online tutorial: **http://bit.ly/TBWPArduino**

**Step 2 Solder the MIDI solder bridges**
To use the Touch Board's onboard MIDI functionality, you need to connect two solder bridges on the board. You can cold solder the bridges using Electric Paint. If you want to go back to MP3 playback mode and play MP3 sound at a later stage, simply remove the solder bridges.

Give the paint a few minutes to dry.



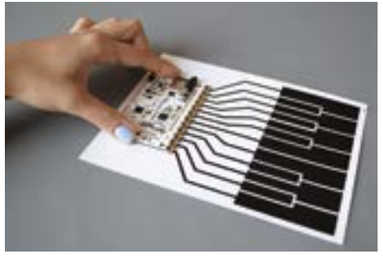


**Step 3 Connect to your Instrument Sensor**
Your Instrument Sensors have been screen-printed with Electric Paint, so attaching them to the Touch Board will turn them into an interface.

To attach the Touch Board to the Instrument Sensor you can either use carbon dots or cold solder with Electric Paint. Carbon dots aren't as stable as Electric Paint but they don't require any drying time. Electric Paint takes a few minutes to dry, but is more stable.

If you are using the carbon dots, peel the white back off the first carbon dot. With the back removed, center the carbon dot to the round

node of the Instrument Sensor. Press down firmly through the plastic. Repeat the process with all the nodes. Then attach the Touch Board, carefully aligning the electrodes of the Touch Board with the carbon stickers.
If you want to cold solder the Touch Board, please have a look out our cold soldering tutorial: **http://bit.ly/TBWPSolder**



**Step 4 Upload the MIDI code**
With the board attached to the nodes, it's time to upload the MIDI code to the Touch Board. Connect your Touch Board to your computer with the USB cable and turn the device on. In the Arduino IDE, go to

File→Sketchbook→Touch Board Examples→Midi_Piano

Make sure to select the correct Board and Port settings before hitting upload.

**Step 5 Plug and Play**
When you have uploaded the code, take the speaker, turn it on and connect it to the Touch Board. Try playing the notes on the paper, you should hear a sound when you touch a key.

**Step 6 Swap instruments**
The MIDI code is set to "electric piano" by default. If you want to try out a "grand piano", a different instrument or sound, you can find detailed instructions on how to change the instruments inside the Midi_Piano code. Use the other Instrument Sensors to play different instruments or form an orchestra!

We'd love to see a video of your paper orchestra! Share your images or videos via Instagram or Twitter **@Bareconductive**.

If you have any trouble, have a look online at our Troubleshooting Guide, our FAQs or contact us at **info@bareconductive.com**

# Memory Game

Use **Electric Paint** to design and control an interface. Configure the **Touch Board** as an HID keyboard.

When you're done building this project you can get competitive with this interactive memory game.

Touch Board, Electric Paint 50ml jar, Micro USB cable, alligator clip test leads
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Not included: masking tape, paint brush, coloured paper, foam board

**TAKE IT FURTHER**
**1 //** Set a new brief, get each team to open up Processing and modify the code to change the visual interface, or have them change the game completely.
**2 //** Get each group to create a new game from scratch. They can design an interface using Electric Paint and modifiy the Touch Board's inputs/outputs using the Arduino IDE.

**Step 1 Set up your digital tools**
Before beginning, make sure to download Processing as it can take a while. If you haven't set up the Touch Board with Arduino before, please do so by following this online tutorial: **http://bit.ly/TBWPArduino**

**Step 2 Cut the buttons**
To begin, you'll need 3 yellow, 3 green and 2 red sheets of paper or cardboard. Cut these into shapes about 30cm in size. Cut out a small triangle for your start/reset button. Mount these onto foam board to make sure your buttons are robust.

**Step 3 Paint the buttons**
Next, we'll apply Electric Paint to turn the buttons into sensors. We painted diagonal lines and used masking tape to neatly apply the paint. Make sure to 'fluff' the tape first to avoid ripping the cardboard.

Paint a line on each of the 8 buttons and cover the start button completely. Remove the masking tape, and let the paint dry for 15 minutes. You should have 8 buttons with a diagonal line, and a black start button.

**Step 4 Upload the code**
While the paint dries, connect your Touch Board to a computer and turn it on. In the Arduino IDE, go to

File→Sketchbook→Touch Board Examples→HID_Keyboard

Go to line 50, comment it out, and comment line 52 in. Make sure to select the correct Board and Port settings before hitting upload.

When the code has been uploaded, swipe across the electrodes on the Touch Board, from E0 to E8, to test the code. The numbers "801234567" should appear. You can remove the line, we're just checking the code is working as expected.

**Step 5 Prepare the game in Processing**
If you haven't used Processing before, open and close it once so that it generates the necessary files. Download the file here:
**http://bit.ly/TBWPMemoryGame**

Unzip the file and move the folder "MemoryGame" to the right location.

Mac
Documents/Processing

Windows
Libraries\Documents\Processing
My Documents\Processing

Linux (Ubuntu)
Home/Processing

With the folder in place, open Processing. You need to install the "Sound" library for the game. In Processing, head to Sketch→Import Library→Add Library…

In the search field, look for "Sound" and then click "Install". Once you have installed the library, open the game sketch, by heading to File→Sketchbook and then opening "MemoryGame".

**Step 6 Connect to the Touch Board**
Once the paint has dried and the code has been uploaded to the Touch Board, turn the Touch Board off and disconnect it from the computer. Select 8 alligator clips and attach them to electrodes E0 to E8. Connect the other end to the painted buttons making sure that paint is in contact with the clips. Make sure that none of the cables is crossing over each other, as this might cause interference. In the end, you want to have a set-up similar to the image on the bottom.

**Step 7 Play!**
Re-connect the Touch Board to the computer and turn it on. In Processing, run the game and then press your start button to play.

Memorise the sequence of colours and press the corresponding buttons. Work your brain and enjoy the memory game!

# Interactive Poster

Make an interactive poster using the **Touch Board** and **Printed Sensors**.

Upload sounds or record your own audio tracks to tell a story. Make your presentations more engaging with interactive visuals that play sounds!

Touch Board, microSD Card Reader, microSD Card, mini speaker, Micro USB cable, alligator clip test leads, sticky tabs, velcro stickers

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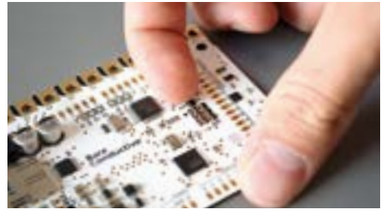
Not included: masking tape, foamboard

**TAKE IT FURTHER**
**1 //** Use Electric Paint to draw your own graphics as interaction points.
**2 //** Use different code. Follow our online tutorials to use MIDI, HID or other libraries to produce different outputs for your interactive poster.

**Step 1 Set up your digital tools**
If you haven't set up the Touch Board with Arduino before, please do so by following this online tutorial: **http://bit.ly/TBWPArduino**

**Step 2 Plan your poster**
Before you start making the interactive poster, you need to plan it out. Think about what your interactive points will look like, where they will be positioned, and what material your poster will be. In this example, we are using 4 printouts of animals as our interactive points.

**Step 3 Prepare the Touch Board**
If you have set up the Touch Board for MIDI before, make sure to remove all Electric Paint from the MIDI bridges. You can chip it off with your fingernail.



Then, connect the Touch Board to your computer with the USB cable and turn it on. In the Arduino IDE, go to

File→Sketchbook→Touch Board Examples→Proximity_MP3

Make sure to select the correct Board and Port settings before hitting upload.

**Step 4 Audio / MP3 files**
We've selected some animal facts recorded in MP3 format for our sounds. You can use sounds, a song, or record your own tracks, use a Text to MP3 converter. The choice is yours!

Once your MP3 files are ready, turn the Touch Board off, remove the SD card, and insert the card with the card reader into your computer. On your computer, find the MP3 files that you want to use. The names of the tracks must be TRACK0XX.mp3, where the XX is the corresponding electrode. For example, TRACK000.mp3 is played when electrode E0 is triggered, TRACK003.mp3 for electrode E3 and so on, up to TRACK011.mp3. We'll be using electrode 0, 3, 6 and 11.

Once you have uploaded all the tracks to the card, remove the SD card from your computer and insert back into your Touch Board.

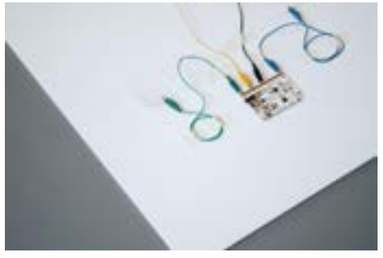
If you want to have a detailed tutorial on how to upload your own MP3 tracks, check out the detailed tutorial online: **http://bit.ly/TBWPChangeMP3**

**Step 5 Cut the Printed Sensor**
Cut the Printed Sensors into the number of sensors you require. Make sure that each piece has at least one access node on it. Nodes are the exposed circles that are on the perimeter of the sensors.

**Step 6 Attach the Printed Sensors**
Attach each Printed Sensor behind it's designated interaction point (your image). It helps to define these first so you can align the Printed Sensors directly behind. You can use the sticky tabs to attach the Printed Sensors to the poster.

Place the Touch Board at the bottom centre of the poster so that you can easily connect to all your sensors. You can use the sticky tabs to stick them on.

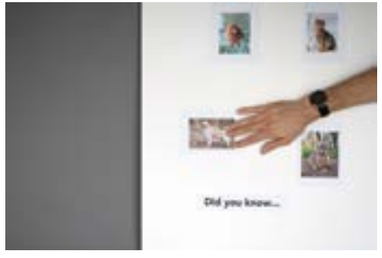
**Step 7 Connect the Printed Sensors**
Connect each Printed Sensor piece to the Touch Board using alligator clips. It's easiest if you space the clips out on the Touch Board, for example, connecting E0, E3, E6 and E11.



In order to reduce troubleshooting, it's useful to coil up any slack wires and secure them with masking tape. Cables that hang around loosely tend to cause interference with each other.

**Step 8 Test the sensors**
Turn on your speaker and connect it to the Touch Board. You can attach it using a velcro sticker. Connect the Touch Board to power and turn it on. Test one sensor at a time by approaching it with your hand. You should hear your tracks!

**Step 9 Test your interactive poster**
With everything in place, you can now add the final touches to your interactive poster. With the Touch Board and the speakers turned on, touch your interactive points on the front. You should hear your tracks again!




We'd love to see a video of your projects! Share your images or videos via Instagram or Twitter **@Bareconductive**.

If you have any trouble, have a look online at our Troubleshooting Guide, our FAQs or contact us at **info@bareconductive.com**

# Resources

View online versions of the projects above, or find loads more useful tutorials and project ideas at **bareconductive.com/make**

## How to use proximity sensors

Capacitive sensors allow you to either have touch sensors, proximity sensors or even a combination of both. With the proximity sensors, you can choose between having an "on or off switch" or using the proximity sensing to gradually fade an LED on or off.

**Search: proximity sensors**

## How to clean the electrodes

You might have used your Touch Board with some Electric Paint, but now you want to clean it. This is really simple and safe to do and all you need are some baby wipes and toothpicks. This tutorial will guide you on how to clean your board in 3 simple steps.

**Search: clean electrodes**

## Touch Board troubleshooting

If you have just started using the Touch Board, you might not be familiar with how to debug or troubleshoot any issues you might be having. Perhaps the electrodes of your board are not responding to touch. In this tutorial, we show you how to debug the Touch Board.

**Search: troubleshooting**

## The Touch Board as an HID keyboard

Have you ever wanted to use your Touch Board as an HID keyboard input to your computer? You might want it to control your favourite online arcade game, or maybe you have another use in mind that requires keypresses. Either way, follow this tutorial and soon you will be typing away via the power of capacitive touch.

**Search: HID**

## How to create talking plants

In this tutorial, we're going to show you how to create talking plants. When you approach the plant with your hand, you can hear a voice message. This can be instructions on how to take care of it or just information about the plant. For example, we have created little instructions that tell the listener how much water the plant needs.

**Search: bluetooth**

## How to fade an LED on with proximity and the Touch Boardd

In this tutorial we show you how to fade an LED on with proximity and the Touch Board, creating a dimmer effect.

**Search: proximity**

# Products

Re-stock on Electric Paint and Printed Sensors, or explore other great products from our range at **bareconductive.com/shop**

## Electric Paint 10ml

Running low on Electric Paint? Don't let your projects wait. Order more tubes today.

## Electric Paint 50ml

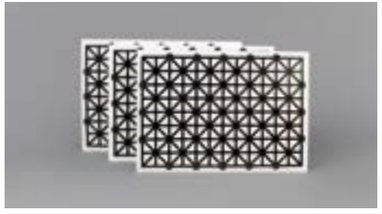
Haven't tried screen printing with Electric Paint yet? Get your hands on this jar, asap.

## Electric Paint 1L

Scale up your projects. The 1L tub has enough material to bring your biggest ideas to life.

## Printed Sensors (set of 3)

No time to paint? No problem. Stock up on Printed Sensors and get prototyping in no time.



## Light Up Board

Integrate light into your next project with the Light Up Board. Pre-programmed with six different light modes.

## Pi Cap

Give your Raspberry Pi the power of 12 touch sensors. Add audio, polyphonic playback, GPIO connectors and more!