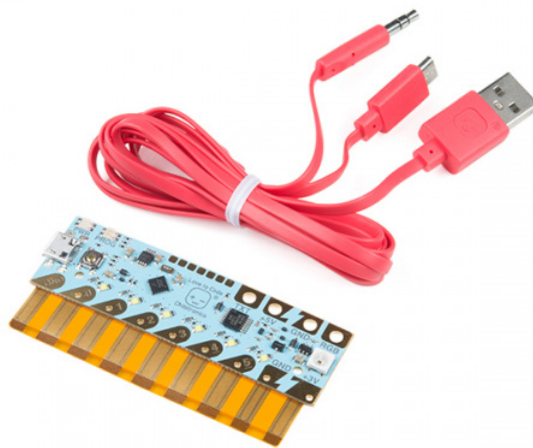


Getting Started with Chibi Chip and Clip

Introduction

Note: Content and images courtesy of Chibitronics.

Looking to add more functionality to your paper circuits? This tutorial goes over the how to assemble the Chibi Chip programmable microcontroller with the Chibi Clip to add more functionality to your paper circuits! We will also go over how to program your Chibi Chip microcontroller board by writing code (block-based and text-based) in a browser-based code editor and then transmit code through sound to your board.



Love to Code Chibi Chip Microcontroller Board

© DEV-14591



Love to Code Chibi Clip Mounting Accessory

© DEV-14593

Ready? Let's get started!

Required Materials

To follow along with this tutorial, you will need the following materials. You may not need everything though depending on what you have. Add it to your cart, read through the guide, and adjust the cart as necessary.

- Chibi Chip Programmable Microcontroller Board
- Chibi Clip Mounting Accessory
- Programming Cable with USB and Audio Connectors
- USB Power Supply
 - (i.e. Computer, Wall Plug or Portable USB Battery Charger)
- Programming Device with 3mm Audio Jack
 - (i.e. Computer, Phone, or Tablet)
- Internet Connection

Suggested Videos

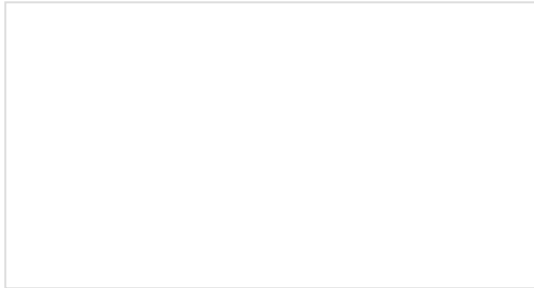
Product Showcase: Chibitronics Paper and Sticker Circuits





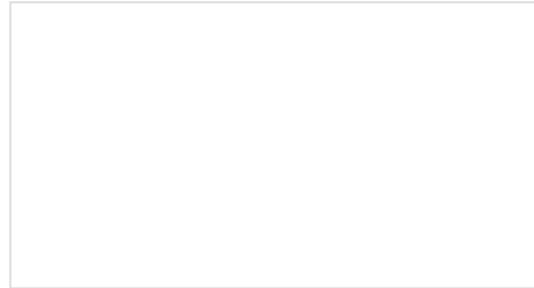
Suggested Reading

You may need to know the following concepts before working with one of these boards:

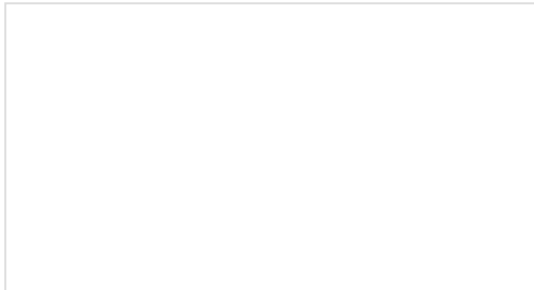


What is a Circuit?

Every electrical project starts with a circuit. Don't know what a circuit is? We're here to help.

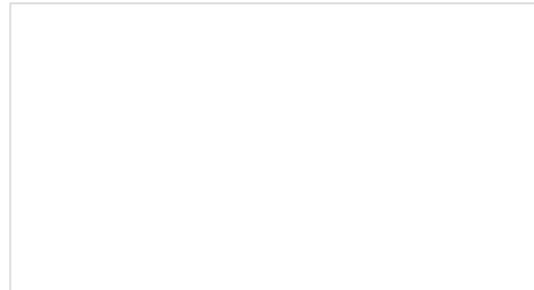


Voltage, Current, Resistance, and Ohm's Law
Learn about Ohm's Law, one of the most fundamental equations in all electrical engineering.



Polarity

An introduction to polarity in electronic components. Discover what polarity is, which parts have it, and how to identify it.

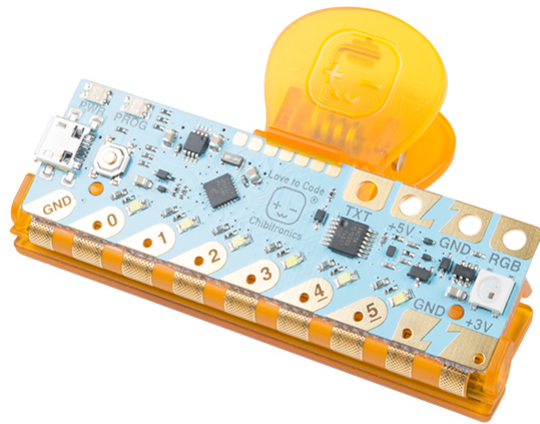


The Great Big Guide to Paper Circuits
Let's take a look at different materials we can use to combine paper crafting and electronics.

Assemble Your Chibi Clip

Note: The Chibi Chip and Clip will be pre-assembled in the Love to Code Creative Coding Kit.

The following will show you how to connect the Chibi Chip programmable board into a reusable clip to add more functionality to your paper circuits!



Suggested Viewing

How to Assemble the Chibi Clip

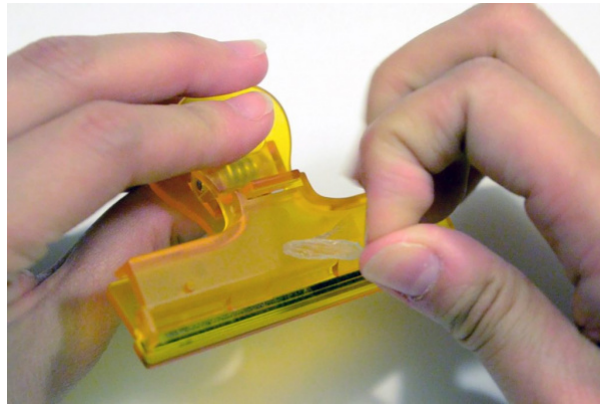


Hardware Hookup

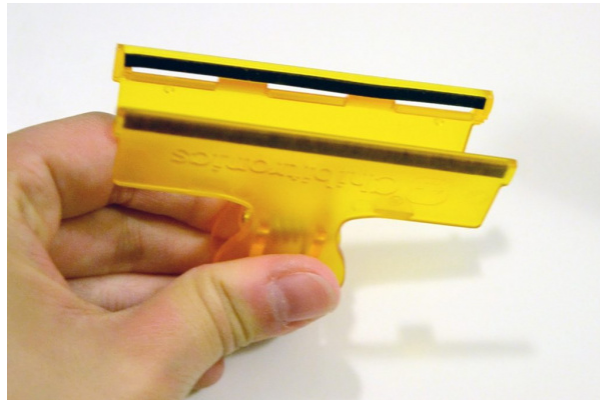
Remove example paper insert.



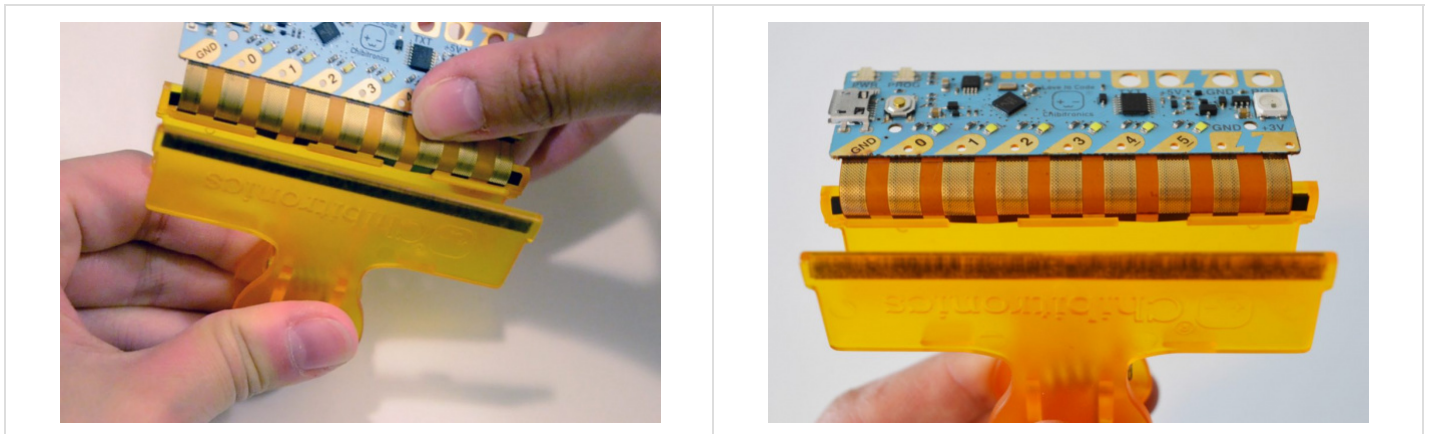
Remove the adhesive tape from your clip holder.



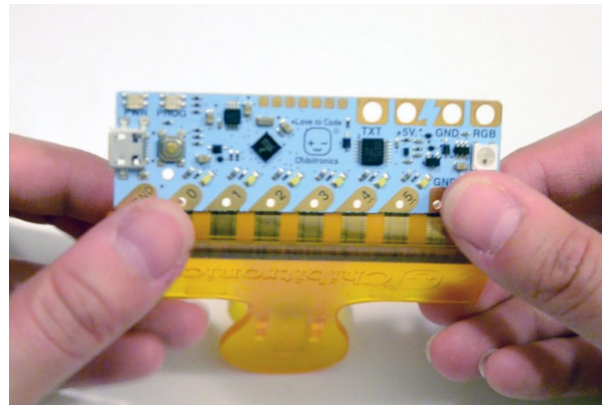
Flip the clip over so that the flat side showing "Chibitronics" faces up and open the clip.



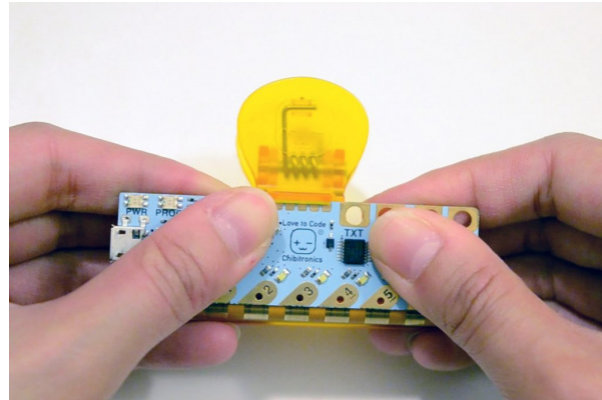
Hold your Chibi Chip with flat side facing up and insert the flexible part into the three notches on the mouth of the clip.



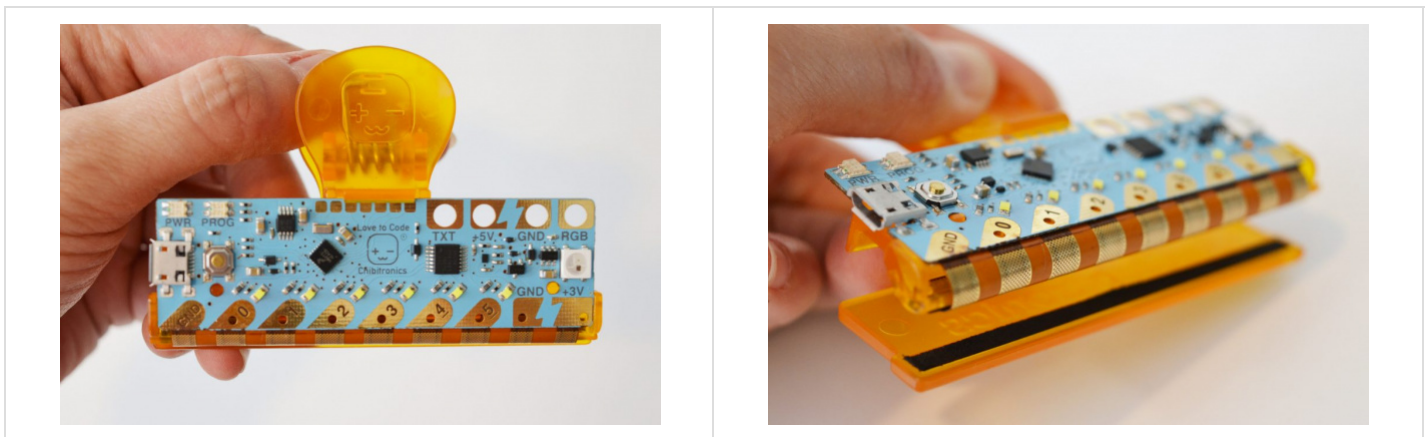
Close the clip and gently bend the board up over the clip.



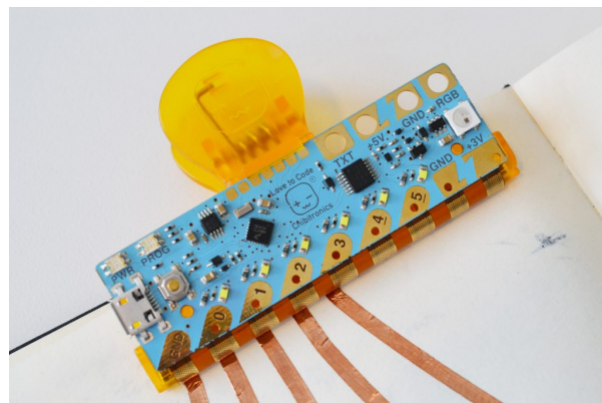
Slide the rigid board into the hook at the top of your clip.



You're done! Now you can open and close the clip with your Chibi Chip attached.

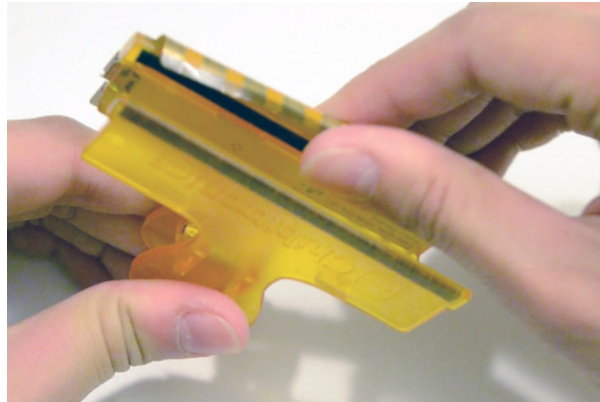


Try creating a simple circuit with one LED and traces that align to the Chibi Chip and clip's tabs.



Removing Chibi Chip from Clip

If you need to remove the Chibi Chip from your clip, slide out the flexible part from the clip and the rest of the board will slide off.



Power Your Circuit

You can power your Chibi Chip with any **5V** USB power supply! Here are a few examples.

Love to Code Powered Binder

⚡ **Heads up!** You will need 3x AA batteries, which are not included with the Love to Code Creative Coding Kit. The Love to Code powered binder can run on regular and rechargeable batteries.



1500 mAh Alkaline Battery - AA

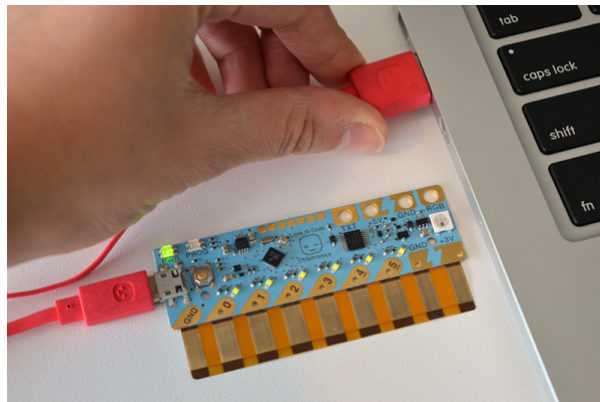
● PRT-09100

If you have a Love to Code powered binder with batteries, you can plug in the USB cable directly into the binder. To turn on your binder, slide the power switch to the left like this:

Plugging in and Powering on from Chibitronics on Vimeo.

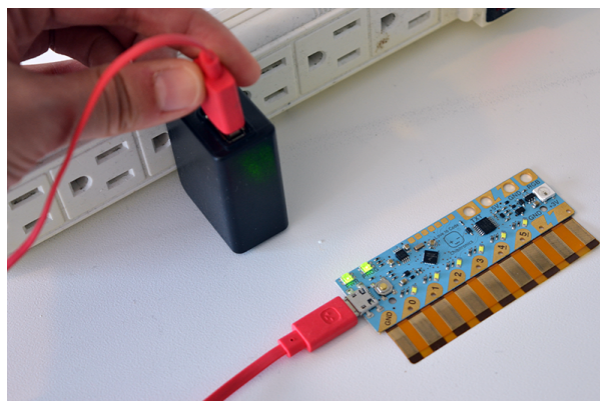
Computer USB Port

You can also use a computer or laptop USB port to power the Chibi Chip.



USB Wall Adapter

USB wall adapters also make great power supplies since you don't need to worry about running down batteries.



USB Battery Packs

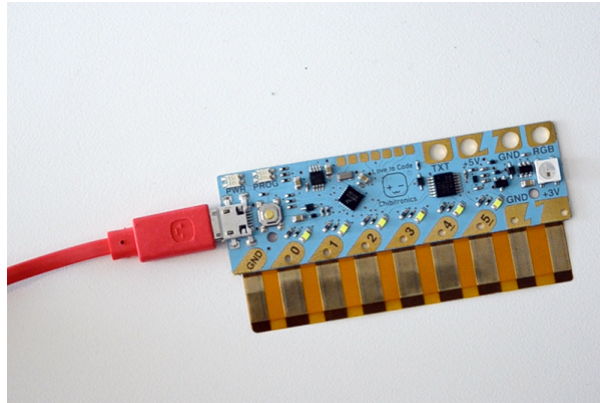
Finally, USB phone charger battery packs work as a handy portable power supply! Make sure your charger battery pack has an on/off switch so that you can keep the power supply on. The Chibi Chip runs on low power so the battery pack may automatically turn off by itself.

Uploading via Audio

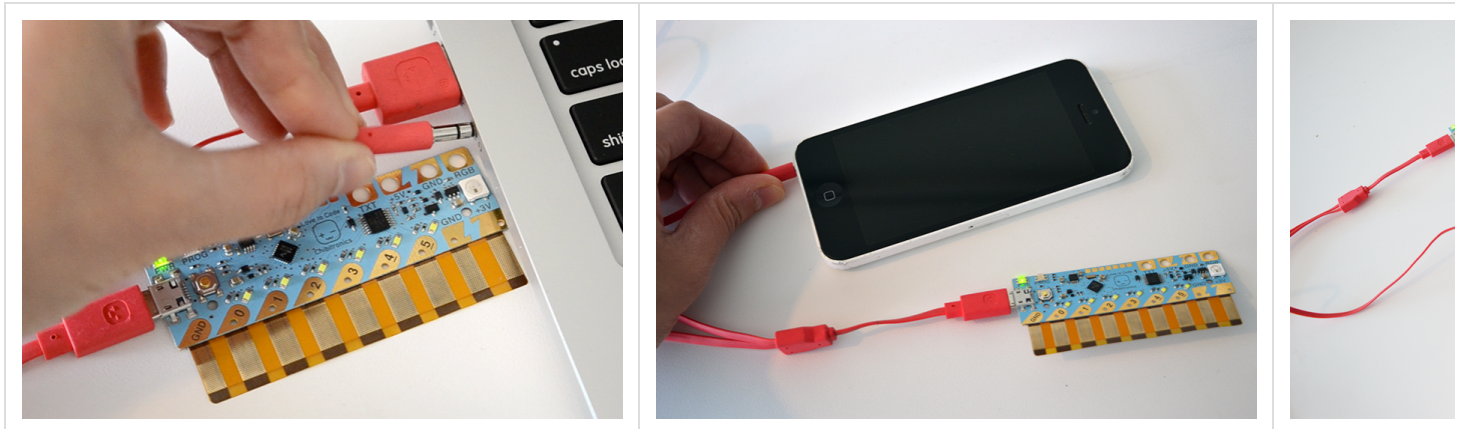
The Chibi Chip uses an audio connector to upload code! Let's go over how to make the connection.

Hardware Hookup

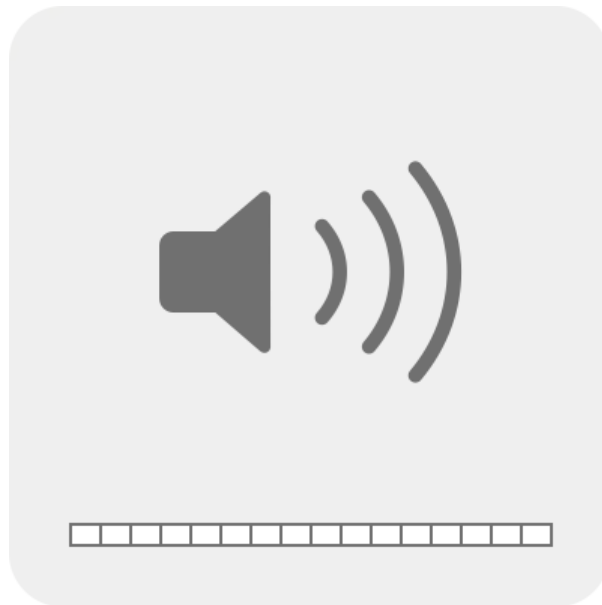
Plug in the other end of the micro-B USB into the Chibi Chip board's USB connector.



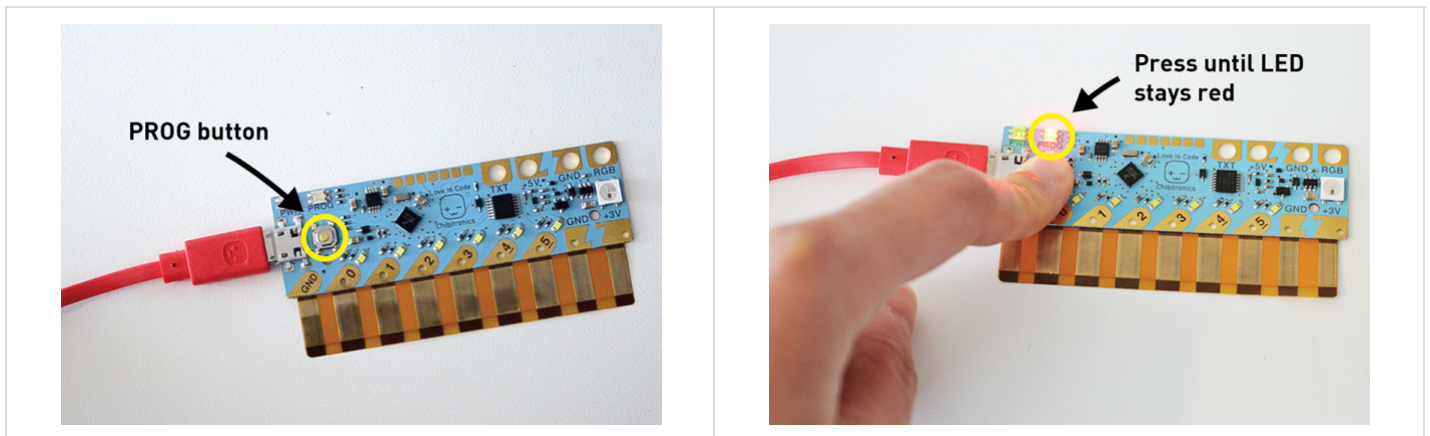
Plug the audio cable into the audio jack of your programming device (i.e computer, phone, or tablet).



Unmute your device and turn the volume all the way up. This will make sure the code plays to your Chibi Chip loud and clear!



Press the **PROG** button on the Chibi Chip and hold it until the PROG light blinks and stays red. This puts your Chibi Chip into programming mode – it'll know to listen for code!



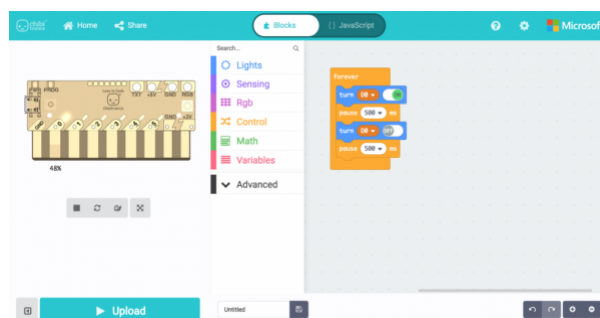
Open your programming editor of your choice and write some code! You can either go with a block-based code editor or text-based code editor.

Software: MakeCode

To program the Chibi Chip, there are two options available depending on your preference. Both require an internet connection to upload code to the microcontroller.

Block-Based Code w/ Microsoft MakeCode Online Editor

If you're new to code, try Chibitronic's Scratch-inspired block-based code editor in Microsoft MakeCode!

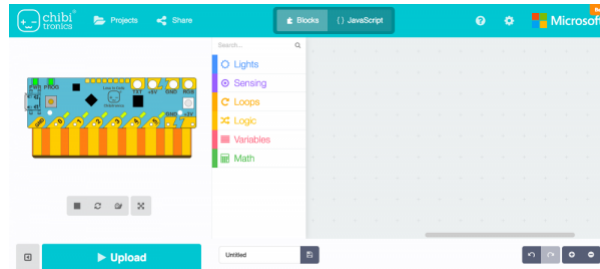


To start coding in the editor, head over to <https://makecode.chibitronics.com/>.

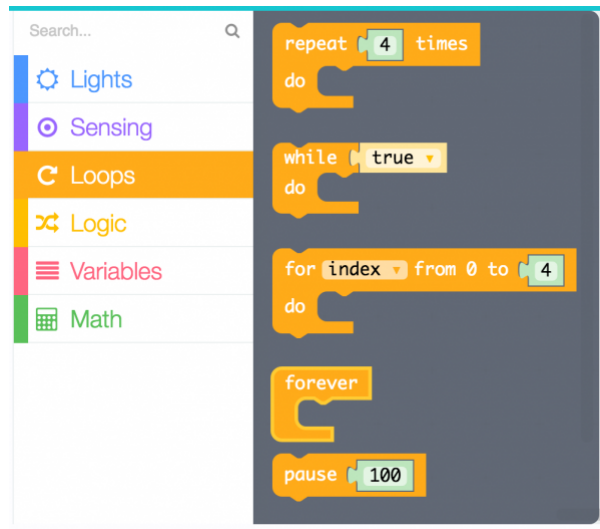
CHIBI CHIP'S MAKECODE ONLINE EDITOR

Upload Your Block-Based Code

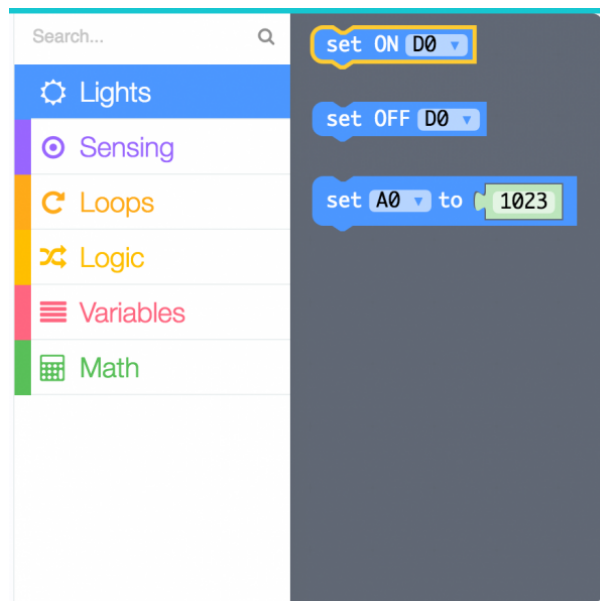
Once you head over to MakeCode, click on the “+ New Project”. You can also follow along by clicking on “Get Started! > Start Tutorial” to guide you this tutorial.



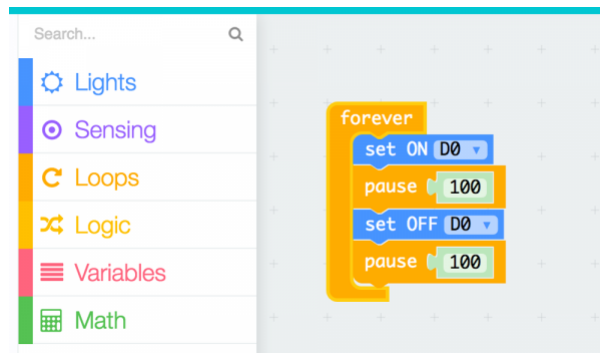
Then drag and drop the *forever* and *pause* code blocks in the *Control* category.



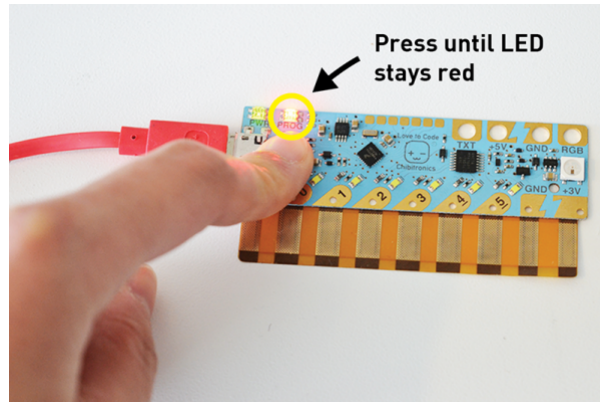
Then drag and drop two *set D0 to ON* blocks of the *Lights* category. Change one of the blocks to *OFF*.



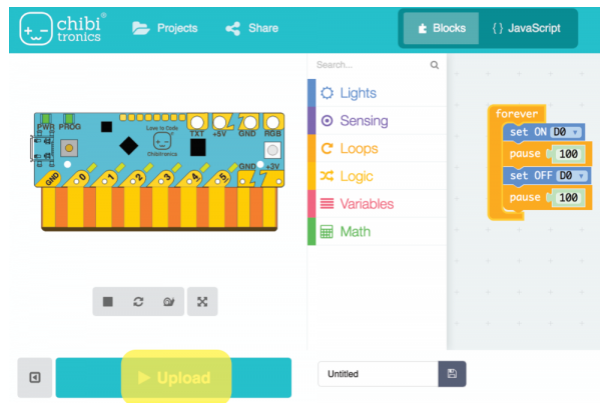
Link the blocks together to blink the LED like so.



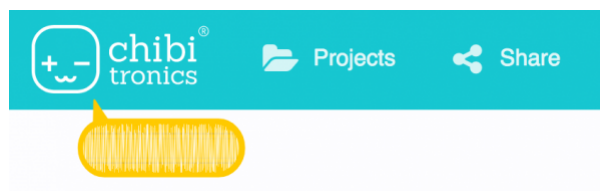
Check to see that the PROG light on your board is red. If it isn't, press the PROG button until the light stays red.



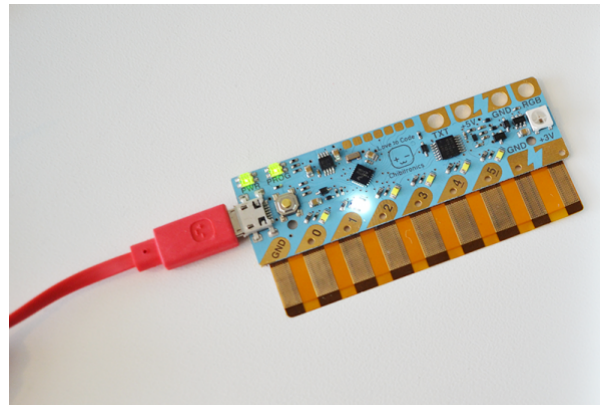
Then press the **Upload** button at the bottom of the page.



Now you should see this sound animation appear on the screen. When the sound animation stops, the code is finished uploading. Congrats! You've uploaded your code!



Now your board should have a blinking light.



Now that you have your first program uploaded. Try playing with the code and creating your own light and blink patterns!

Software: ChibiScript (Arduino)

If you would like to start with text-based coding, try using ChibiScript, an Arduino-based beginner-friendly coding language. You can code directly in Arduino programming language with this text-based editor!

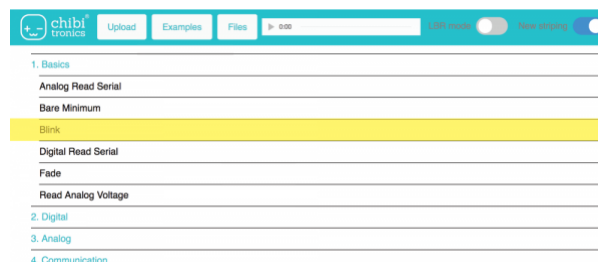
```
chibi tronics Upload Examples Save Load
1 // Love to Code
2 // Volume 1: Basic Switch
3
4 int pressed = 0;
5
6 void setup(){
7   pinMode(0);
8   pinMode(5);
9 }
10
11 void loop(){
12   pressed = read(5);
13
14   if (pressed == 1){
15     on(0);
16   } else {
17     off(0);
18   }
19 }
```

To start coding, head over to <https://lfc.chibitronics.com/>.

CHIBIScript ARDUINO ONLINE EDITOR

Upload Your Text-Based Code

After heading to ChibiScript, click on **Examples > 1. Basics > Blink** to open up the blink example code. It should look similar to the image below.

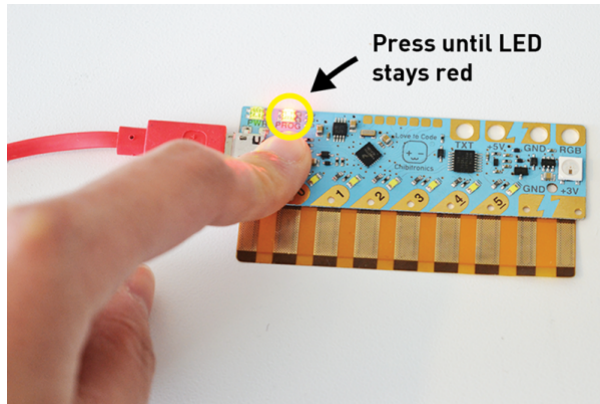


Once the blink example is open, you should see an example of how to blink the LED connected to pin 0 similar to the image below. Let's change the pin by replacing " 0 " to " 1 ".

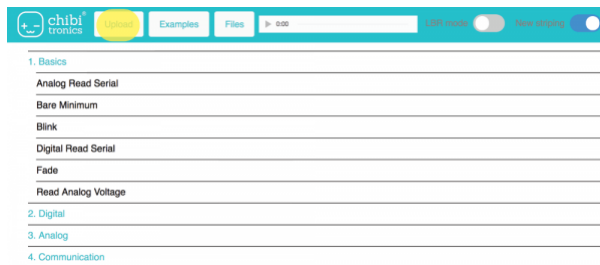
```
chibi trionics Upload Examples Files prog 100% Done uploading

1 // This example is Chibitronics Love to Code tested!
2 /*
3  * Blink
4  * Turns on an LED on for one second, then off for one second, repeatedly.
5  *
6  * This example code is in the public domain.
7  */
8
9 // Pin 1 has an LED connected to it on the chibitronics I2C board
10 // give it a name:
11 int led = 1;
12
13 // the setup routine runs once when you press reset:
14 void setup() {
15   // initialize the digital pin as an output.
16   pinMode(led, OUTPUT);
17 }
18
19 // the loop routine runs over and over again forever:
20 void loop() {
21   digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
22   delay(1000);            // wait for a second
23   digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
24   delay(1000);           // wait for a second
25 }
26
```

Check to see that the PROG light on your board is red. If it isn't, press the PROG button until the light stays red.



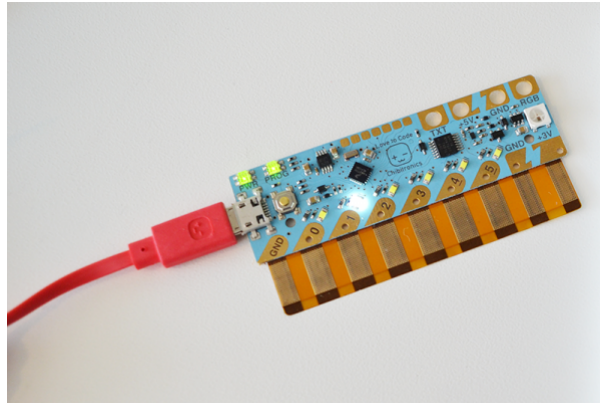
Finally, click the **Upload** button to play the code to your Chibi Chip!



You will see a sound animation appear on the bottom of the screen.



That means the code is being uploaded! When the code is done uploading, the red PROG light on your board will turn back to green to let you know that programming is done successfully. Now you should see your LED blink on the defined pin. Congrats! You've uploaded your code. Your Chibi Chip should now have a light blinking!



Now that you have your first program uploaded. Try playing with the code and creating your own light and blink patterns!

Love to Code (LtC)

STEM Reimagined: Craft Meets Code

Note for Educators: Love to Code Vol 1 is made available under a CC BY-SA-4.0 license. This means you are free to download, copy, print, translate, and remix elements of the book.

We only require that you attribute Chibitronics, and that any derivative works (such as translations and lesson plans) also use the same CC BY-SA-4.0 license. Please click the CC link for more details on the license.

Check out Jie Qi's Love to Code Volume 1 for the MakeCode block-based and ChibiScript/Arduino text-based editor. You'll learn to make LED lights shine and blink with loops and variables, craft paper switches and program them with conditional statements, and make complex light patterns with multithreaded programming. Finally, level up your coding skills with our debugging chapter, which shows you how to find and fix problems in projects.

Love to Code Volume 1

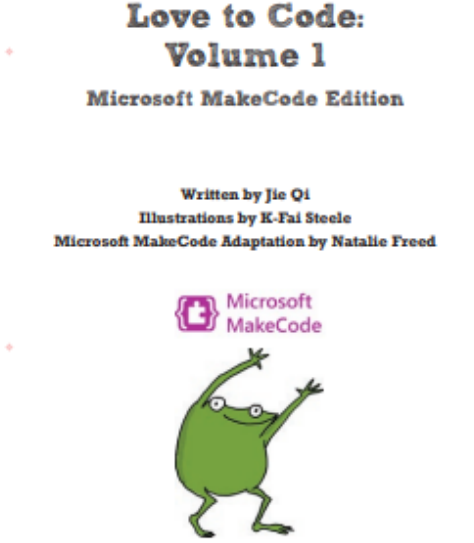
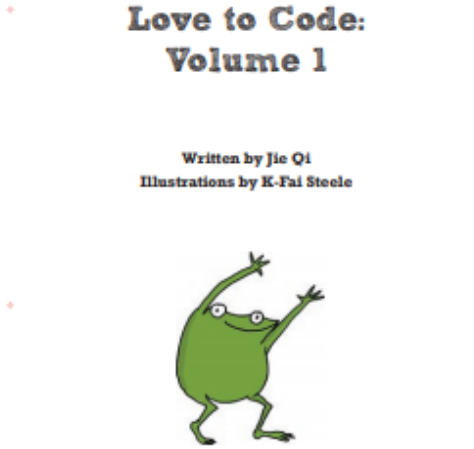
Note: The Love to Code (LtC) Volume 1 storybook is included in the Love to Code Chibi Chip Starting Kit. It uses the Chibiscript and Arduino code.



Love to Code Creative Coding Kit

🔊 KIT-14590

Both adaptations are free for download! Click on the links below based on your programming preference and download to start coding with the Chibi Chip.

	
<p>Love to Code Volume 1 for MakeCode (PDF)</p>	<p>Love to Code Volume 1 for ChibiScript and Arduino (PDF)</p>

Walk-Through Demo Videos

Check out the Chibitronics demo videos to help guide you through the chapters. The following videos were filmed for the Chibiscript and Arduino code. If you are following along with the Love to Code Volume 1 MakeCode Edition, the code will be similar but in block-based code.

Chapter 1: Light Up an LED

Walk-through of Chapter 1: Light up an LED from Chibitronics on Vimeo.

Chapter 2: Code to Blink!

Walk-through of Chapter 2: Code a Blink! from Chibitronics on Vimeo.

Chapter 3: Add a Switch

Walk-through of Chapter 3: Add a Switch! (part 1) from Chibitronics on Vimeo.

Walk-through of Chapter 3: Add a Switch! (part 2) from Chibitronics on Vimeo

Chapter 4: Fade In and Out!

Walk-through of Chapter 4: Fade in and out! from Chibitronics on Vimeo.

Troubleshooting

- If the sound animation didn't appear, try refreshing the page and uploading again.
- Check that your volume is all the way up and unmuted. You can test this by unplugging the audio cable and see if you can hear the static (that's your code!) when you press the upload button. If you hear the sound then plug the audio cable back in and try uploading again.
- Remember to press the **PROG** button on your board before you click upload so that it's in programming mode and the **PROG** light is red.
- If you are having issues with your circuit or compiling code, check out the debugging tips or chapter listed in the:
 - Love to Code Volume 1 for MakeCode: Debugging (PDF pg 70)
 - Love to Code Volume 1 for ChibiScript and Arduino: Debugging (PDF pg 68)

Still having challenges? Send us a email at info@chibitronics.com.

Resources and Going Further

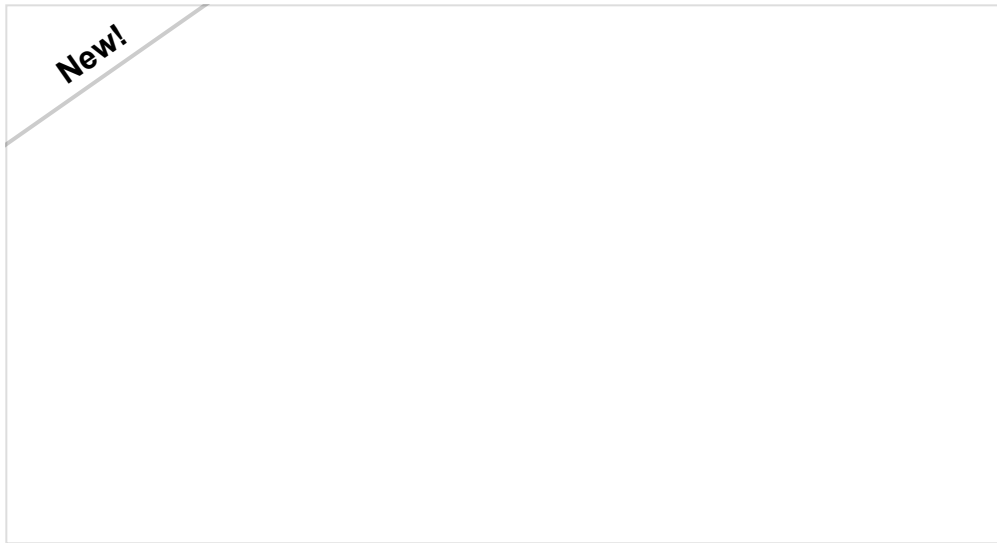
Thanks for trying out Chibitronics Love to Code boards. They would love your feedback to make the experience even better! Do you have ideas or comments for us? Please send them our way at info@chibitronics.com. Happy making!

Now that you've successfully got your Chibi Chip up and running, it's time to incorporate it into your own project! For more information related to paper circuits and the Chibi Chip, check out the resources below:

- Chibitronics Official Website
 - Educators: Lesson Plans & Paper Circuit Templates - Lesson plans and paper circuit templates.
 - How-To Tutorials - Here, you'll find step-by-step instructions, tutorials, and videos on how to get started with Chibitronics products.
 - Project Gallery - Additional tutorials and examples using Chibitronics products.

- Love to Code
 - Microsoft MakeCode Editor (Block)
 - Love to Code Volume 1 for MakeCode (PDF)
 - ChibiScript and Arduino Editor (Text)
 - Love to Code Volume 1 for ChibiScript and Arduino (PDF)
- Chibitronics GitHub Repository
 - Chibi Chip Default Firmware
 - Chibi Chip Schematic (PDF)
- Vimeo: Chibitronics - Demo videos
- SparkFun Product Showcase: Chibitronics Paper and Sticker Circuits
- SparkFun Paper Circuit Templates

Need some inspiration for your next project? Try crafting your own paper circuit holiday greeting card from Chibitronics!

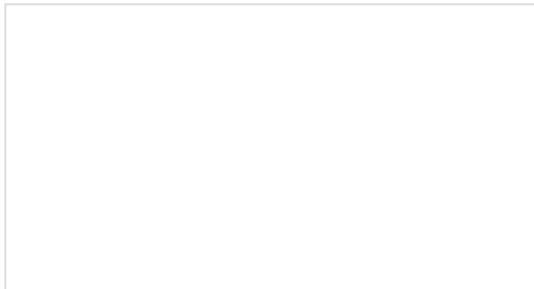


Craft a Holiday Greeting with Love to Code

MARCH 23, 2018

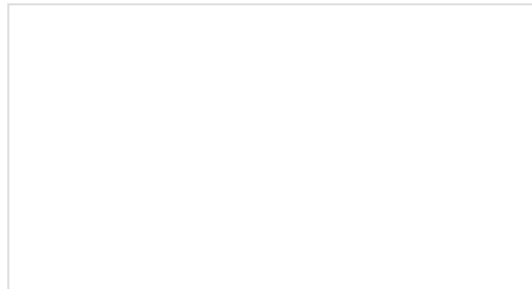
Craft your own paper circuit holiday greeting using the LEDs, a Chibi Chip, Love to Code!

Or check out some of these related tutorials:



Quick Illuminated Boxes

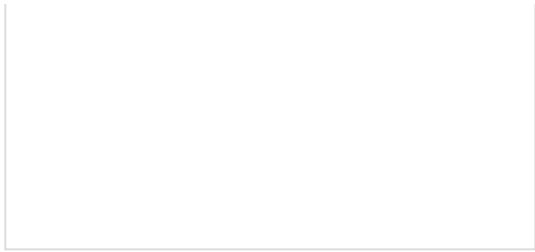
A quick tutorial to show you how to add LEDs to gift or holiday bags or boxes.



The Great Big Guide to Paper Circuits

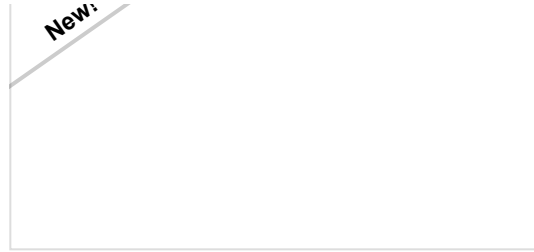
Let's take a look at different materials we can use to combine paper crafting and electronics.





LED Butterfly Pop Up Card

Craft an illuminated butterfly pop up card with copper tape, two LEDs, and a battery.



Craft a Holiday Greeting with Love to Code

Craft your own paper circuit holiday greeting using the LEDs, a Chibi Chip, Love to Code!