Giant LEGO NES Controller

Create your own giant NES Controller out of LEGOs. Use it to play silly games on your computer.

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INTRODUCTION

This variation on our NES Controller project makes use of a very large amount of LEGO bricks in order to make a very large USB game controller in a classic NES style. While fundamentally no different then the original project, it does require a gross amount of LEGO parts in order to build.

On the upside it's really fun to play Super Mario Brothers on a massive oversized game controller.

TOOLS:

- Scissors (1)
- Computer (1)

PARTS:

- Crazy Circuits Invention Board (1)
- Jumbo Pushbutton Chip (6)
- LEGO Bricks (1)
- Maker Tape (1)

1/8"

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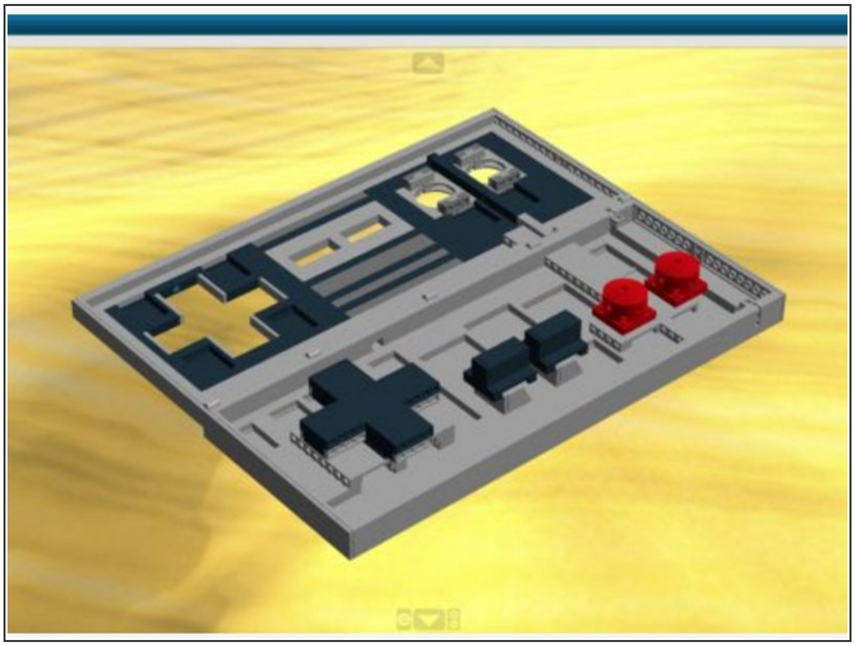
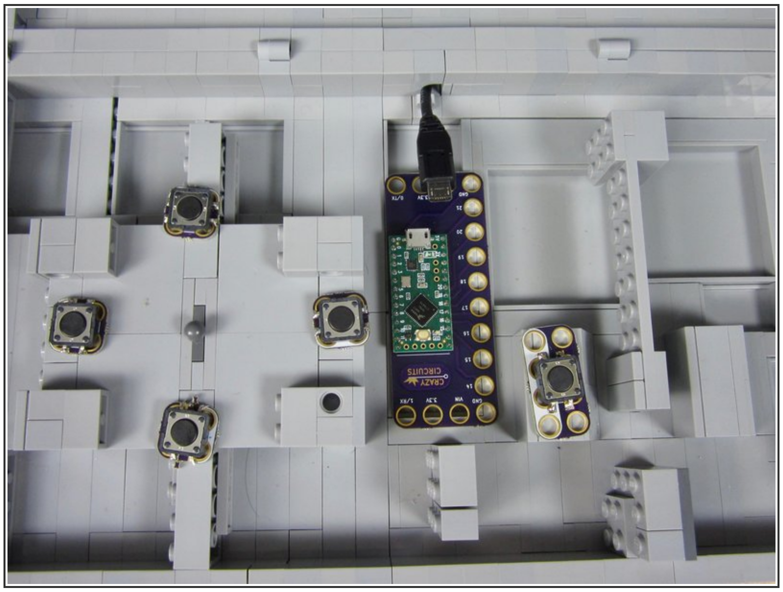
Step 1 — Build the Controller

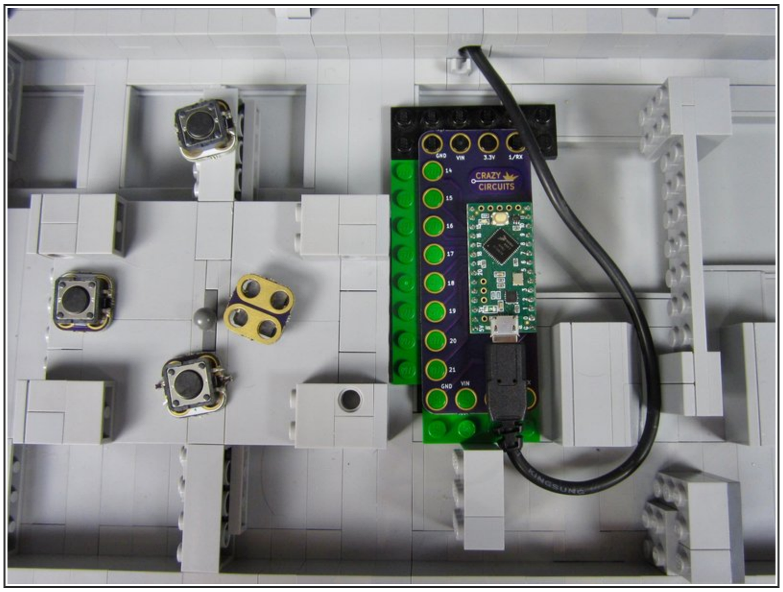


- Download the free LEGO Digital Designer software.
- Download our Giant LEGO NES Controller file for use with LEGO Digital Designer. (Click the link and then click the Download button found on the site.)
- Within LEGO Digital Designer you can grab a parts list. Use this list and buy way too many bricks from BrickOwl or BrickLink.
- Once all your parts show up use the "Generate Steps" feature built into Digital Designer to create your own directions.

ⓘ We spent around $125 buying up all the bricks for this project. This makes the project a bit more expensive than most LEGO kits, but quite a bit less than the big kits being sold these days.

Step 2 — Lay Out Your Parts





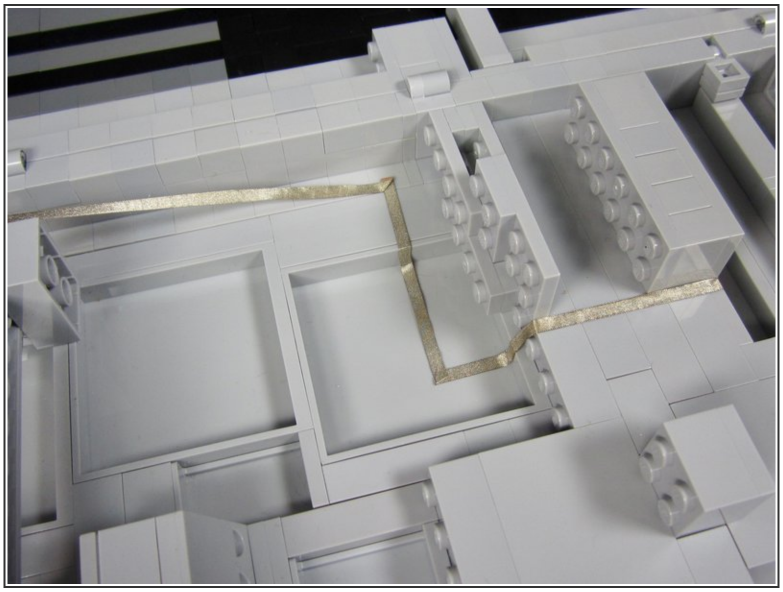
- Figure out where you're going to put everything inside your controller.

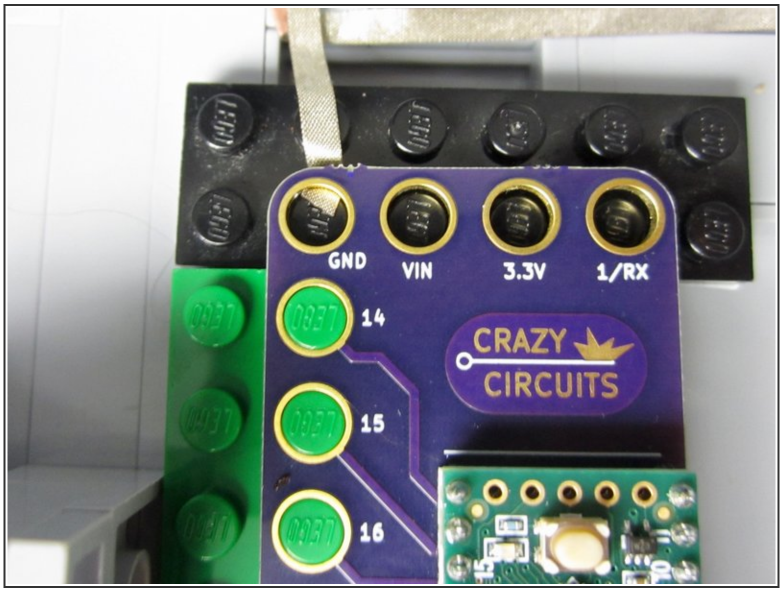
ⓘ We used some slightly smaller sized Jumbo Pushbuttons for the D Pad. You can get your own made up by grabbing files from our GitHub and then getting them made from OSHPark. We'd just recommend using our standard ones.

⚠ Since the inside of our controller is smooth we cheated a bit and taped down some plates so that the Invention Board was more secure. We also used double sided tape to secure down all the buttons.

⚠ We used a slightly different prototype version of our Invention Board for this project, since we were worried about spacing. However our standard board would also fit just fine in the space available.

Step 3 — Run a Common Ground

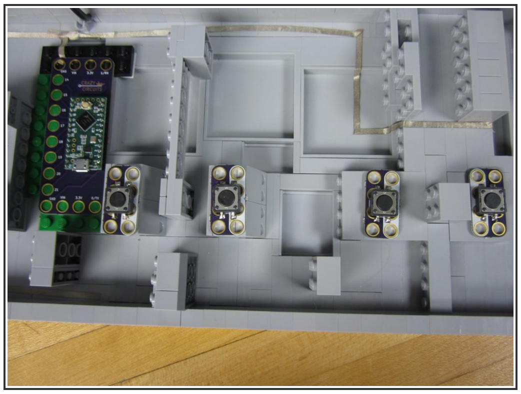


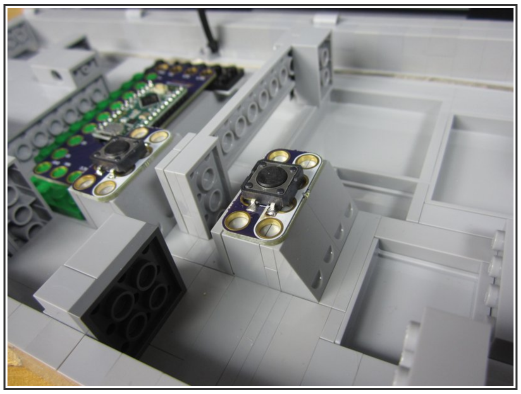


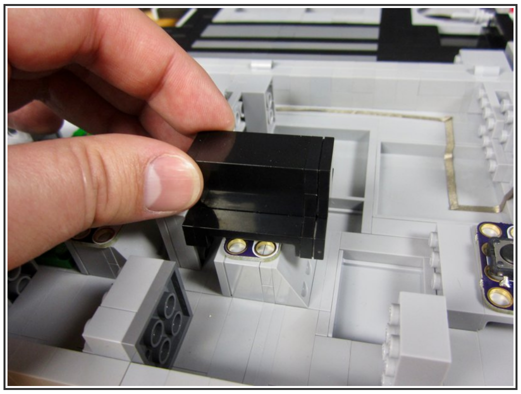
- Run a very long line of tape from a Ground connection on the Invention Board all the way to the end of the board.

We'll be using this to hook up Ground for several buttons.

Step 4 — Tape Down the Buttons







- Use a small piece of double sided foam tape to secure down all the Pushbuttons.
- Our current code doesn't allow for a "Start" and "Select" button. None the less, we wired them in anyways so we can eventually add functionality when we update the code.

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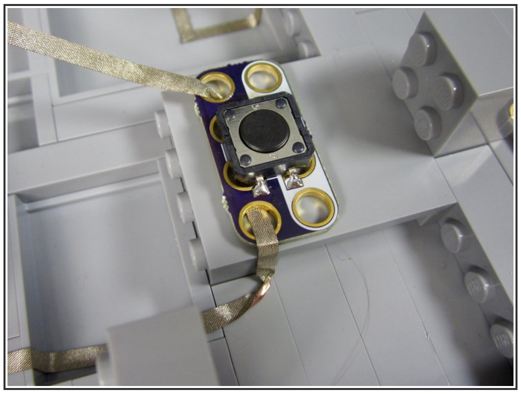
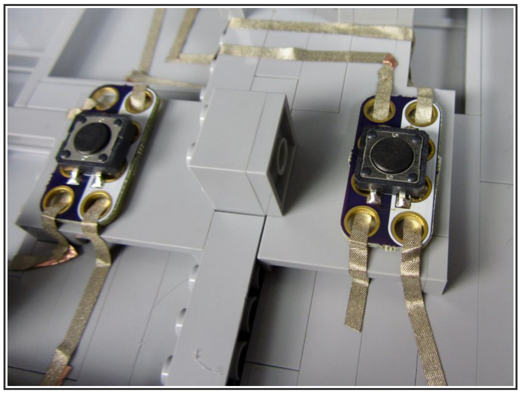
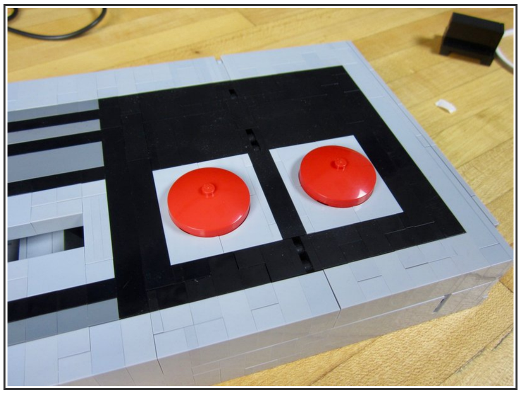
Step 5 — Connect A & B to the Invention Board

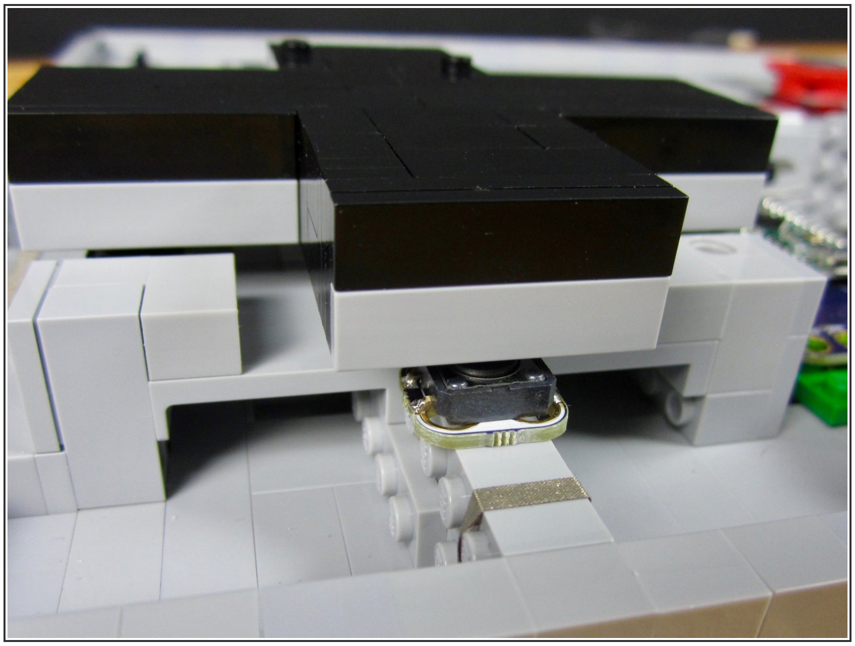




- Connect the colored side of the B button to Pin 0.
- Connect the colored side of the A button to Pin 1.
- Connect the white side of each button to the Common Ground.

ⓘ The Pins you use don't matter. You can easily change that in the code.

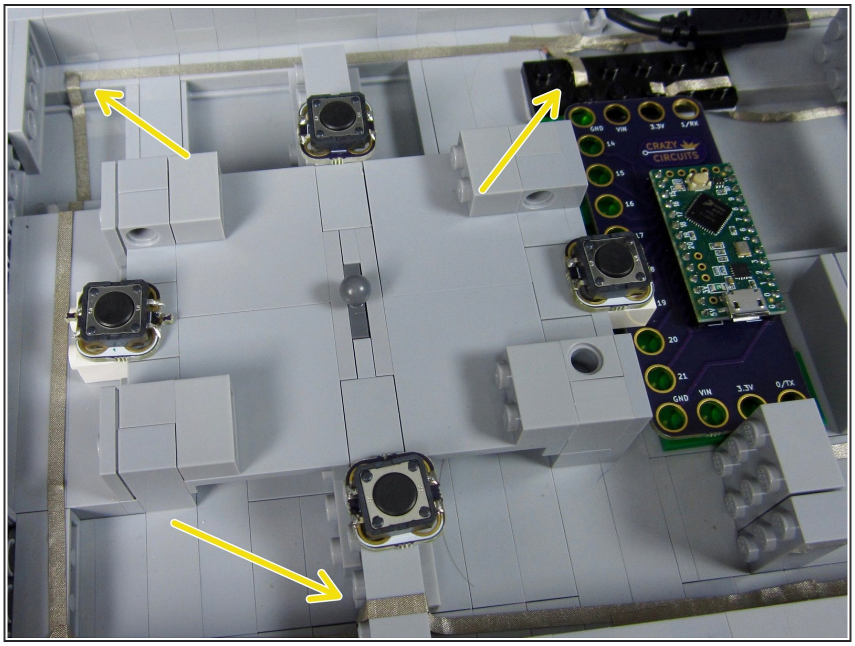
ⓘ We weaved the tape through the holes to make a solid connection. It helps to test your connections with a Multimeter.

Step 6 — Tape Down the D Pad



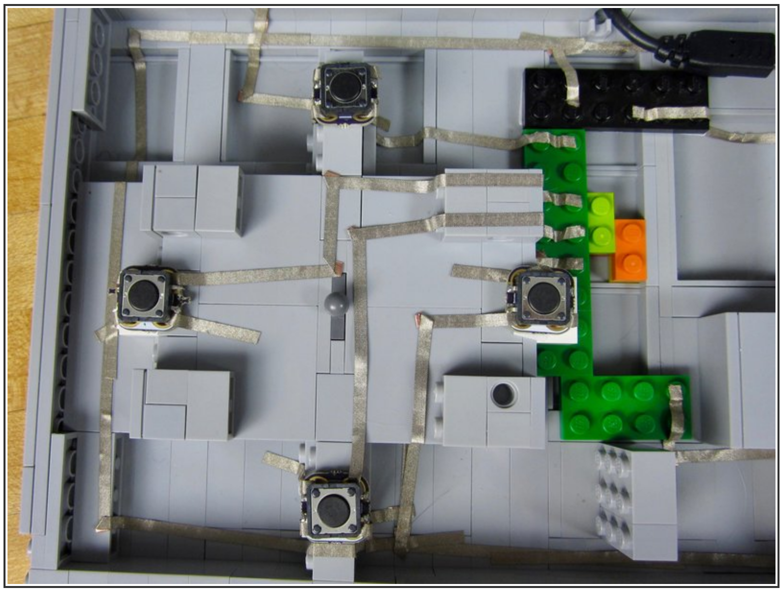
- Position and tape down the four D pad buttons.
- Put your LEGO D Pad in place and test to make sure each button is being pressed. You should hear a little "click" then pressed.

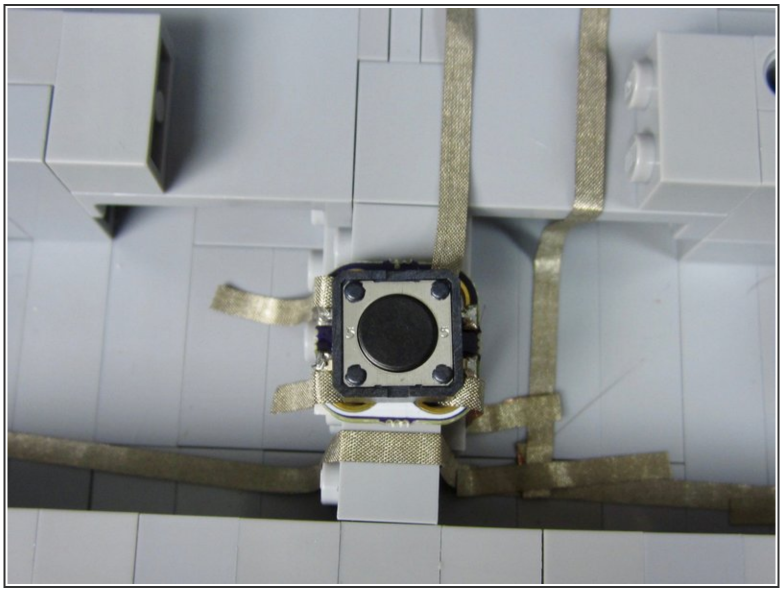
Step 7 — Make a Common Ground



- Make a Common Ground line from your Invention Board around your D Pad.
- Feel free to attach it to the original Common Ground you made. Test with a Multimeter to make sure all your connections are strong.

Step 8

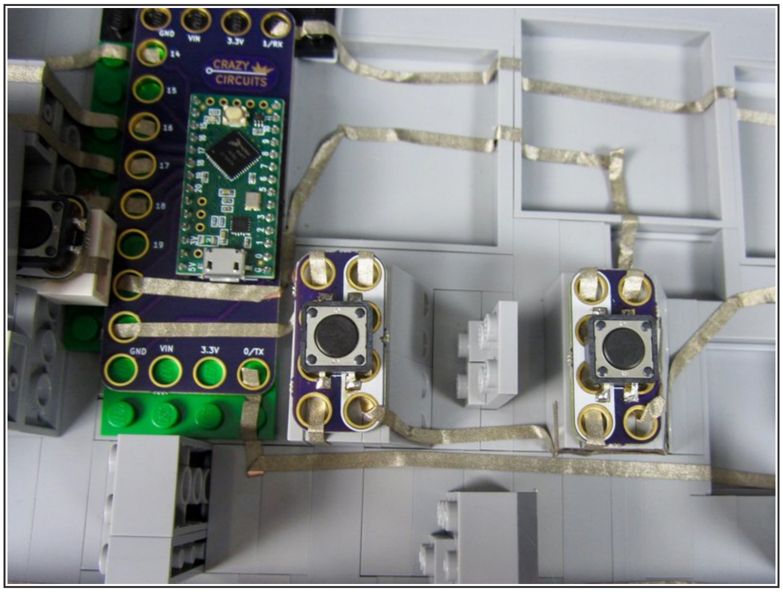


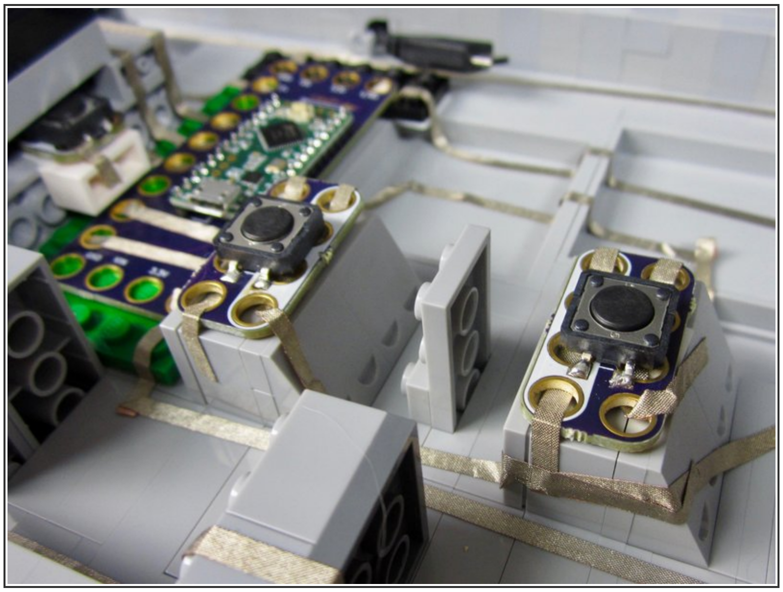


- Connect each of the D Pad buttons to the Invention Board.
- We used Pins 14, 16, 17, and 18. Again, it doesn't matter which numbered pins you use as we can change things in the code.

⚠ Don't overlap lines of tape. This can cause issues such as shorts and problems with digital signals. When in doubt just redo a line. The tape should peel up and be reusable.

Step 9 — Optional: Wire up Start and Select

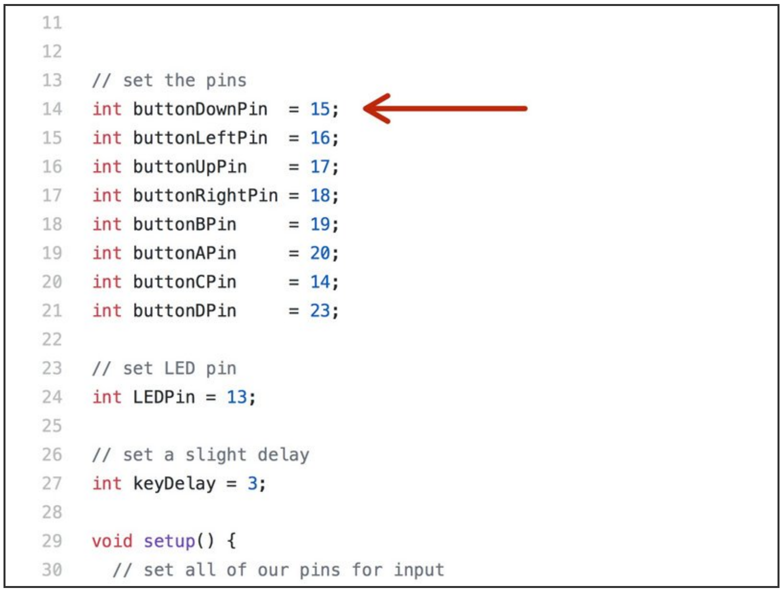




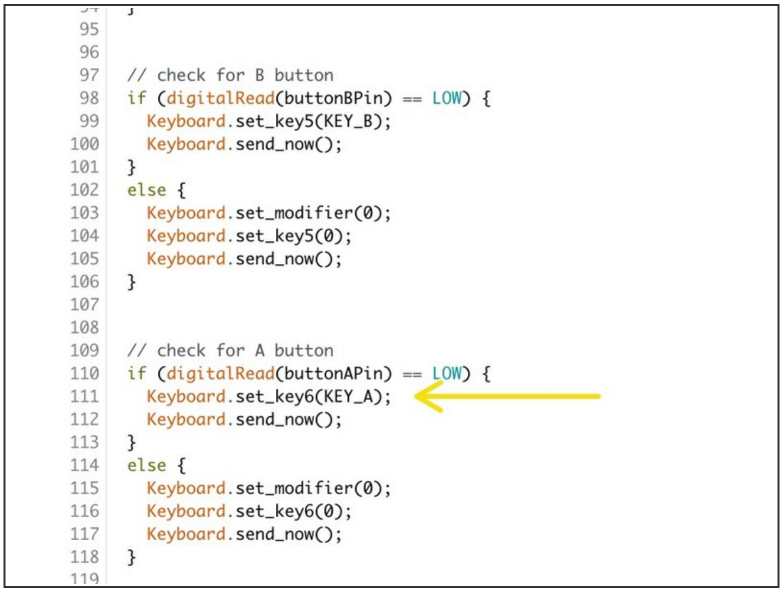
ⓘ Our current software doesn't have code for the Start and Select buttons. Yet.

- If you want to wire in the Start and Select buttons do so now.

Step 10 — Upload the Code



```
11
12
13  // set the pins
14  int buttonDownPin  = 15;
15  int buttonLeftPin  = 16;
16  int buttonUpPin    = 17;
17  int buttonRightPin = 18;
18  int buttonBPin     = 19;
19  int buttonAPin     = 20;
20  int buttonCPin     = 14;
21  int buttonDPin     = 23;
22
23  // set LED pin
24  int LEDPin = 13;
25
26  // set a slight delay
27  int keyDelay = 3;
28
29  void setup() {
30    // set all of our pins for input
```

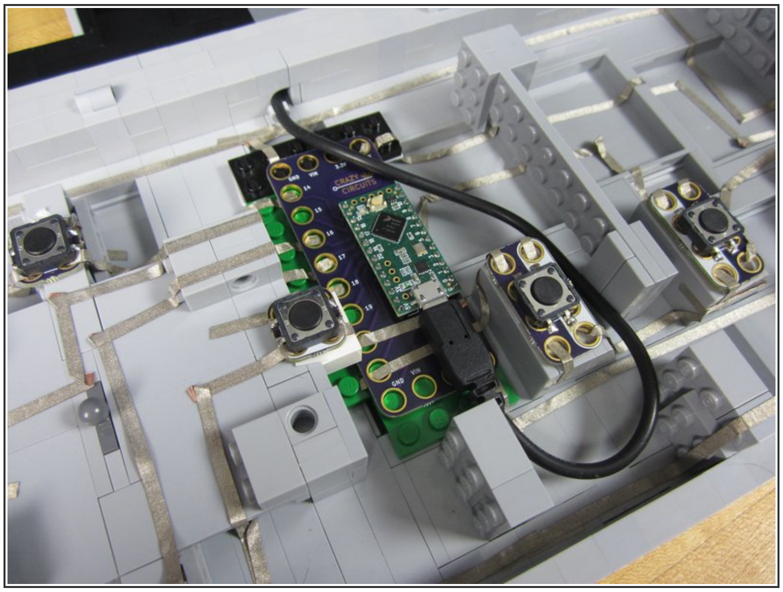


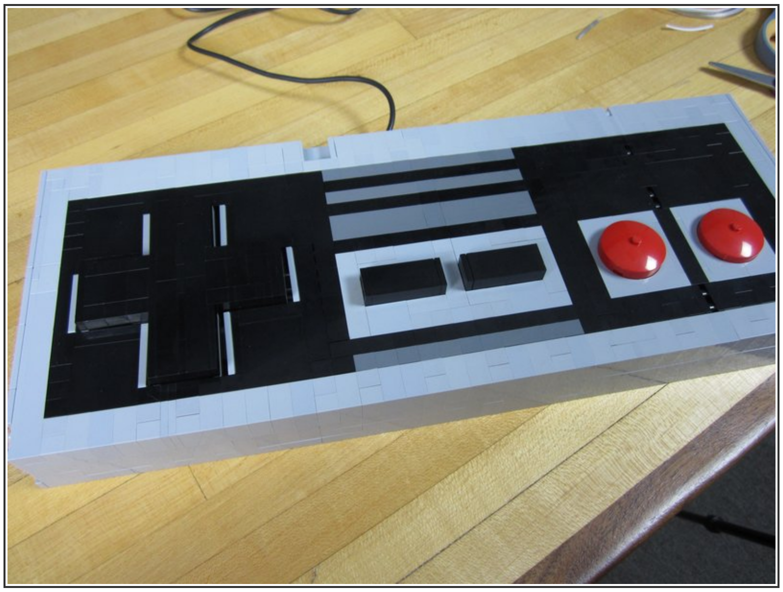
```
 95
 96
 97  // check for B button
 98  if (digitalRead(buttonBPin) == LOW) {
 99    Keyboard.set_key5(KEY_B);
100    Keyboard.send_now();
101  }
102  else {
103    Keyboard.set_modifier(0);
104    Keyboard.set_key5(0);
105    Keyboard.send_now();
106  }
107
108
109  // check for A button
110  if (digitalRead(buttonAPin) == LOW) {
111    Keyboard.set_key6(KEY_A);
112    Keyboard.send_now();
113  }
114  else {
115    Keyboard.set_modifier(0);
116    Keyboard.set_key6(0);
117    Keyboard.send_now();
118  }
119
```

⚠ If you've never used the Invention Board before, STOP! Read the Invention Board User Guide. You need to install both the Arduino Software as well as some additional software for programing.

- Open up Arduino. Open a new project window. Copy and Paste in this code.
- You're probably going to need to change a but of code. Lines 14-21 let you change which Pin is which button.
- For instance, in Line 14 says that Pin 15 is the "Down" button. If you connected your "Down" button to a different pin you need to change that number. Same thing for all the other pins.
- Our code makes your computer think that our Invention Board is a USB Keyboard. When you press one of your Pushbuttons your computer types a keyboard key. You can change which keys are pressed in the code.
- For example, line 111 control shows that the "A" Pushbutton will in fact type the letter A when pressed. If you change **Key_A** to **Key_F** that button will now type the letter F. The other buttons are controlled the same way.

Step 11 — Test Everything... Again





- Seriously. Test everything again with a multimeter.
- Make sure your double sided tape is holding your buttons down.
- Make sure you code is correct. When in doubt, open up a text document and start pressing buttons. Does the "Up" make your curser go up? Does the "A" button type the letter A?

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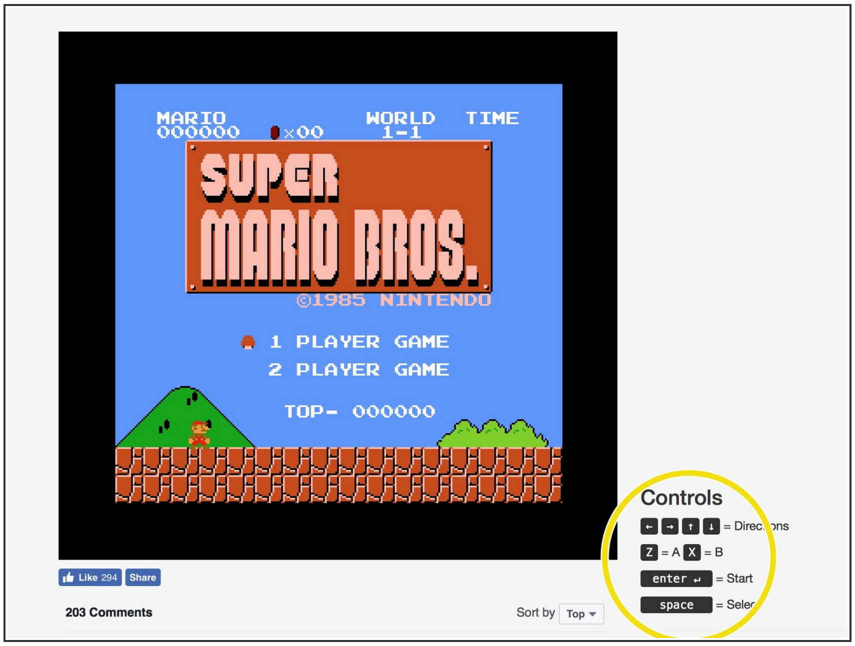
Step 12 — Playing Mario in a Browser



- Use this link to play Super Mario Brothers in your web browser.
- Notice how this website requires you to use the Z and X keyboard keys to control Mario. You'll need to slightly modify the code and re upload.
- There are many many places online that allow you to play classic video games in a web browser or on your computer.
- If you've got access to a Raspberry Pi you can use your controller with that system as well.

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