

# Daryll's Digital Domino

<http://lahack.com/ddd>



## Contents:

|  |                               |
|--|-------------------------------|
| 1 Printed Circuit Board                                    | 1 4011B Quad NAND IC          |
| 1 battery clip   | 1 .1uF capacitor (disc)       |
| 1 tactile switch   | 1 IR photo transistor (black) |
| 1 6.8M Ohm resistor - blue(6), grey(8),green(1M), gold(5%) | 1 IR LED (clear)              |
| 1 10K Ohm resistor - brown(1), black(0), orange(1K), gold  | 1 Red LED (Uh, Red?)          |
| 2 33 Ohm resistors - Orange(3), orange(3), black(1), gold  | 1 lightning sticker           |

## Instructions:

First connect the battery holder to the bottom of the board. Note that you'll need to stretch the clip a little to make it fit, but once it's in there it'll snap in good and solid. The open end of the clip should face the edge of the board that doesn't have any holes. Solder the two connectors on the top of the board. This is the only piece on the bottom of the board. The rest of the components will be mounted from the top.

Install the button on the board. Notice that button as a small marking on one side. That mark should be pointed at the top of the board. Flip the board over and solder the four leads. It might be useful to use helping hands to hold the board in place while you're soldering.

Find the 6.8M resistor. Bend the legs so the resistor makes a U shape. Then push it through the holes in the board. It doesn't matter which direction you place it. Then bend the legs on the back of the board to hold it in board. Solder the two legs. Then cut the extra portion of the legs off. Repeat the process for the 10K resistor. And both of the 33 resistors.

By now you should be getting good at soldering. The next piece we'll install the IC. Note that it has a small semi circle on one side and that needs to match up with the drawing on the board. The legs on the IC are usually spread out a bit wider than the holes on the board so gently squeeze them enough to make them straight down and they'll fit. Flip the board over and solder all 14 pins.

Next we'll install the .1uF capacitor. Your board may say .22uF, but we changed it after the board was printed. This capacitor doesn't care which way it is installed. Other capacitors do, so be careful about that in the future.

Next we're going to install the NPN transistor. It's the three legged piece. We'll need to bend the middle leg to fit in the hole in the board. Line up the flat side of the transistor with the flat side of the drawing on the board.

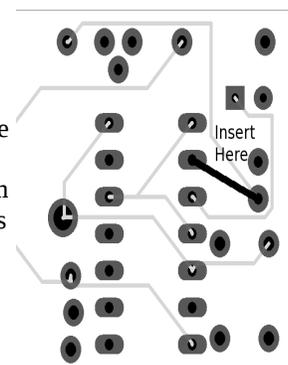
Now we're going to install the RED LED on the bottom right of the board. Note that it has a flat edge. That edge should be lined up with the drawing on the board. The RED LED should sit flat on the board.

Above the RED LED is the IR LED. Again pay attention to the flat side of the LED. You don't want this to sit all the way down on the board. Leave about 1/4" of extra legs and then bend the IR LED so it sticks out off the board.

Now, we're going to install the IR photo transistor. We're going to do it like the IR LED. Check the flat side, leave a 1/4" and bend it over. Don't trim the legs on the bottom of the board just yet.

Unfortunately, we've got an error in version 1.0 of the board that needs a fix. We're going use the bottom leg of the IR transistor to make a trace to pin 2 of the IC. If your board is upside down, the picture on the right matches the upper right corner of the board. Bend the lower leg of the IR transistor so that it touches pin 2. Solder that in place. Now bend the remaining length up and trim it and the other leg of the IR transistor. If you trimmed the IR transistor legs before you got to this step just use a bit of left over leg to make to connection.

Attach the sticker to the bottom of the battery clip. This will prevent it contacting any grounded surface. Insert the battery with the plus side up as shown on the clip. It'll be a good tight fit.



**Enjoy!** Check out the website for ideas on how to modify the parts for different behaviors, and other ideas on how you can play with your new Digital Dominoes. This is an open hardware project so the schematic, parts list, and PCB board are also available there. We'll also post any interesting news that might come up.