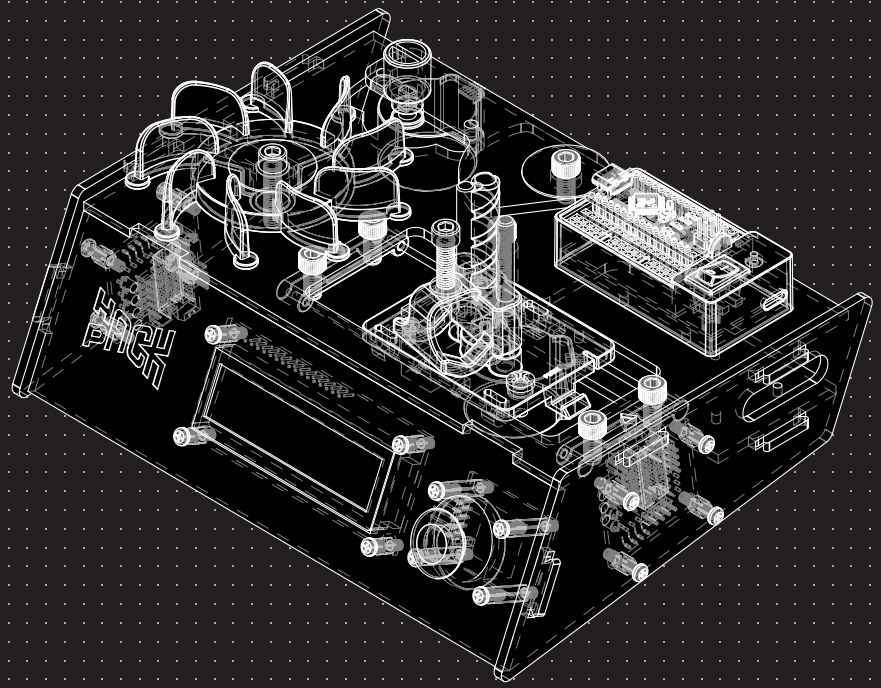
CRUNCH LABS

HACKPACK

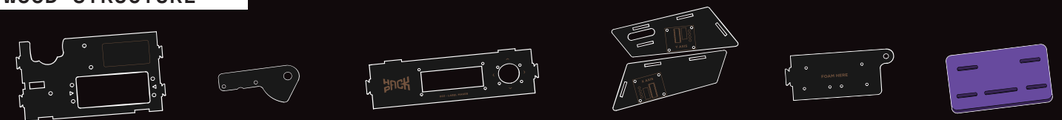


003 - LABEL MAKER

BUILD ALONG WITH MARK ROBER

CRUNCHLABS.COM/LABEL

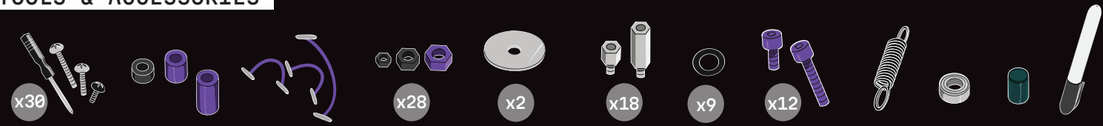
WOOD STRUCTURE



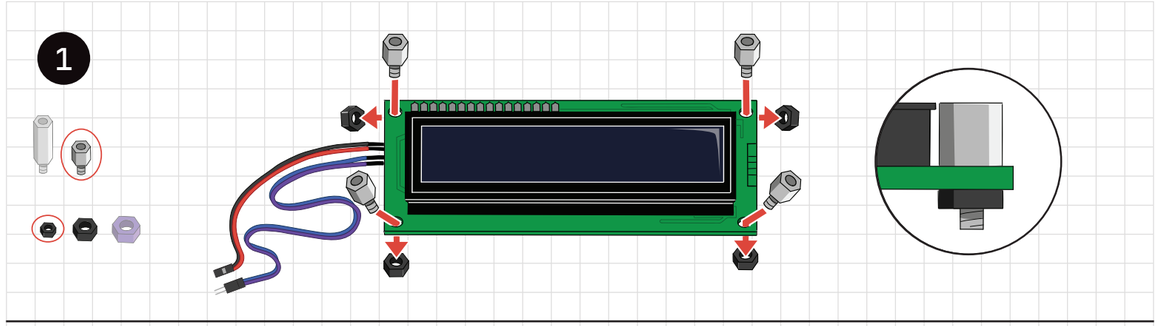
WRITING MECHANISMS

ELECTRONICS

TOOLS & ACCESSORIES



For missing and replacement parts, visit “My Account” at crunchlabs.com and we’ll ship them to you for free.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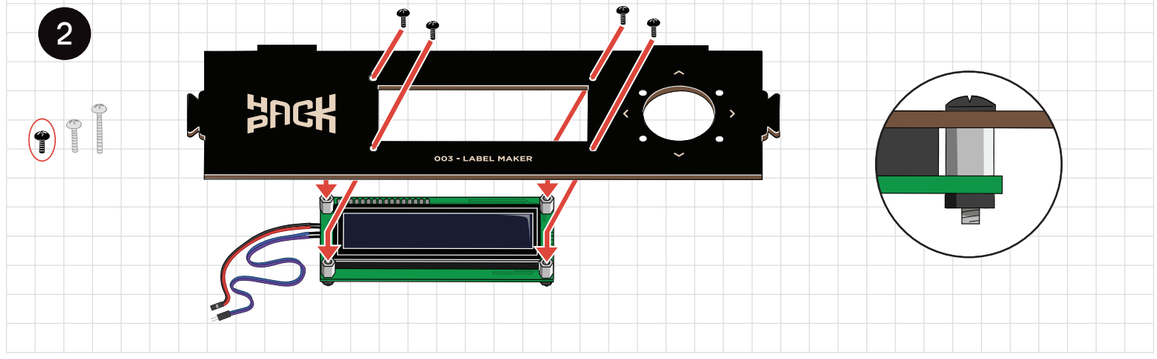
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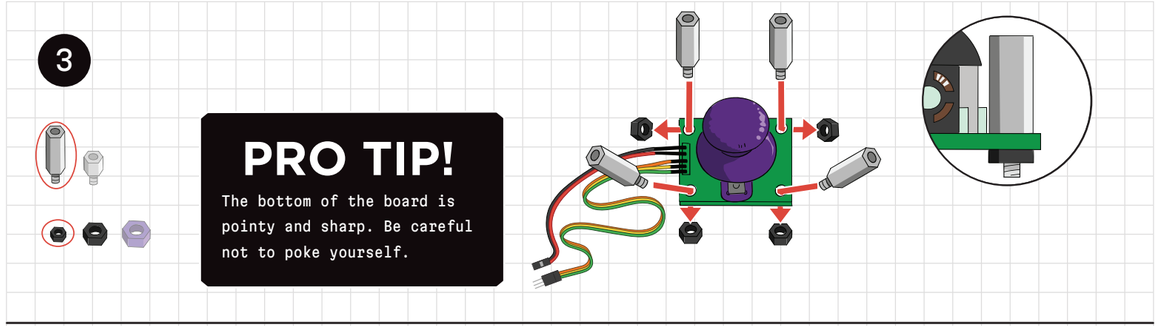
003 - LABEL MAKER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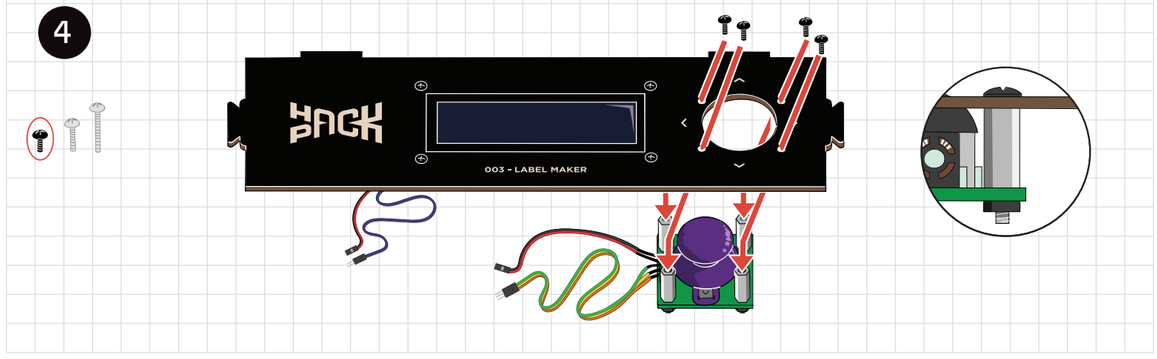
PRO TIP!
The bottom of the board is pointy and sharp. Be careful not to poke yourself.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003 - LABEL MAKER

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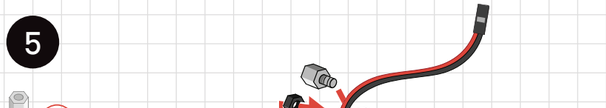

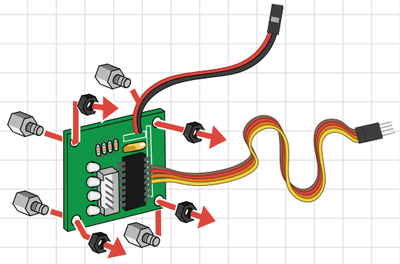

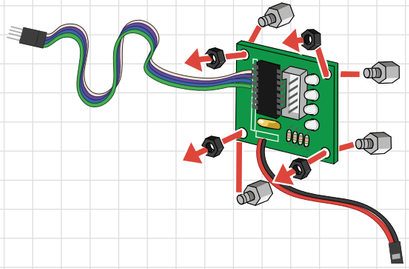

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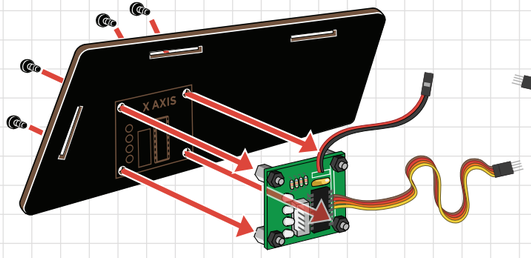

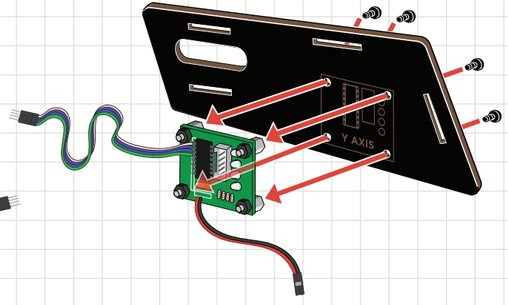

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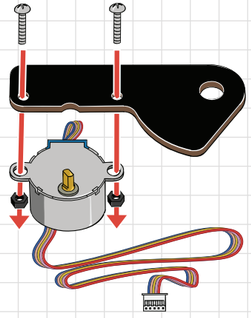
PRO TIP!

Make sure you are using the motor with long wires. This motor will connect to the X-axis.



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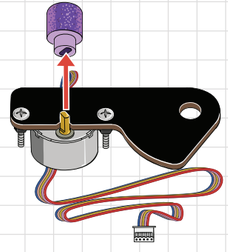

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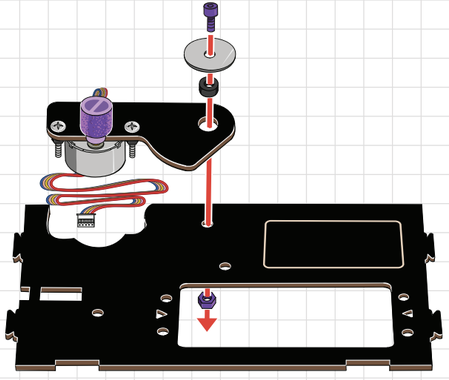

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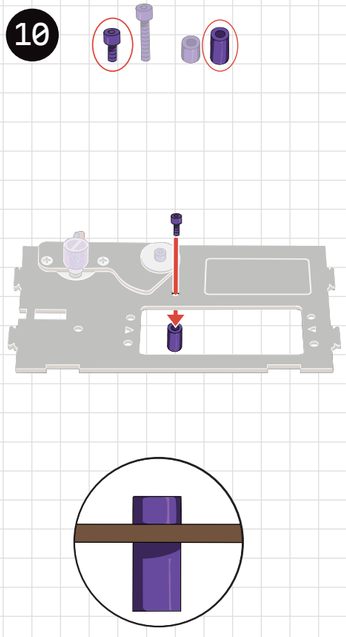

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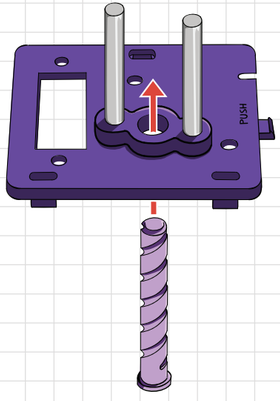

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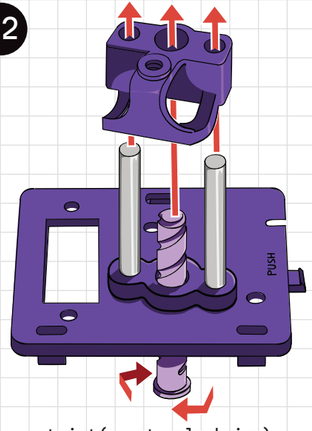


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twist(counterclockwise);
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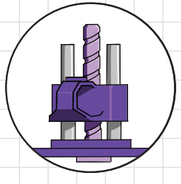

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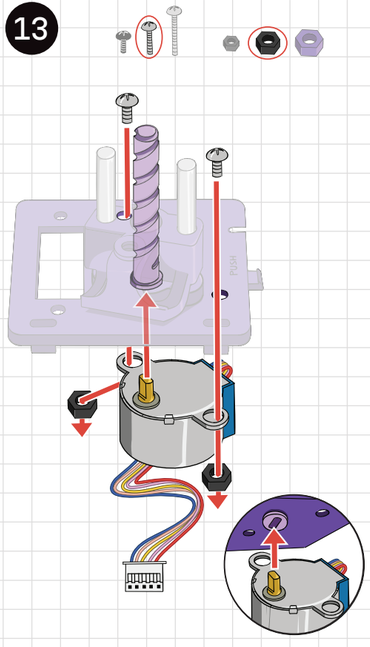

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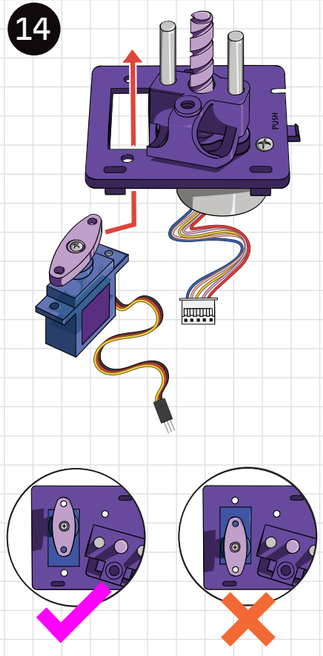

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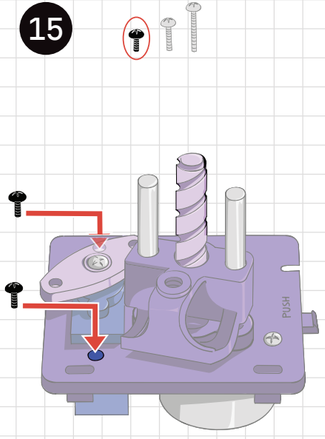

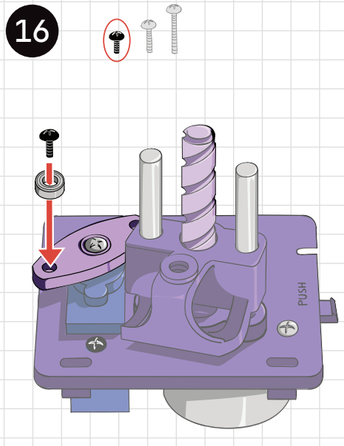
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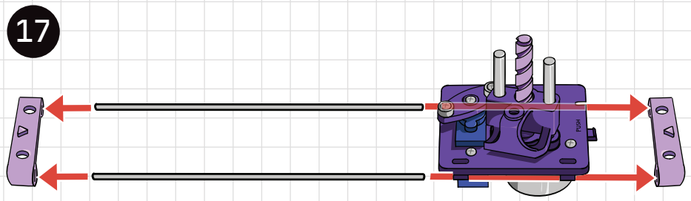
PUSH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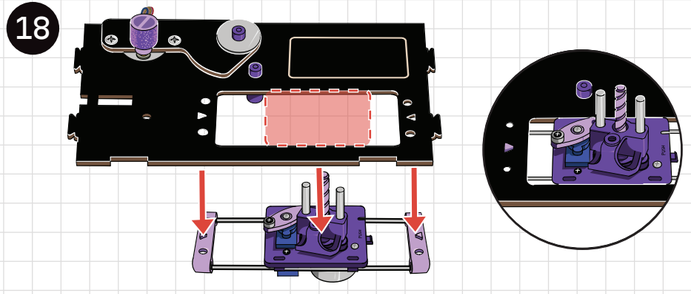
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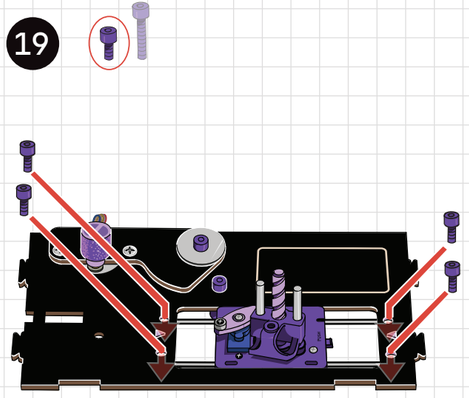
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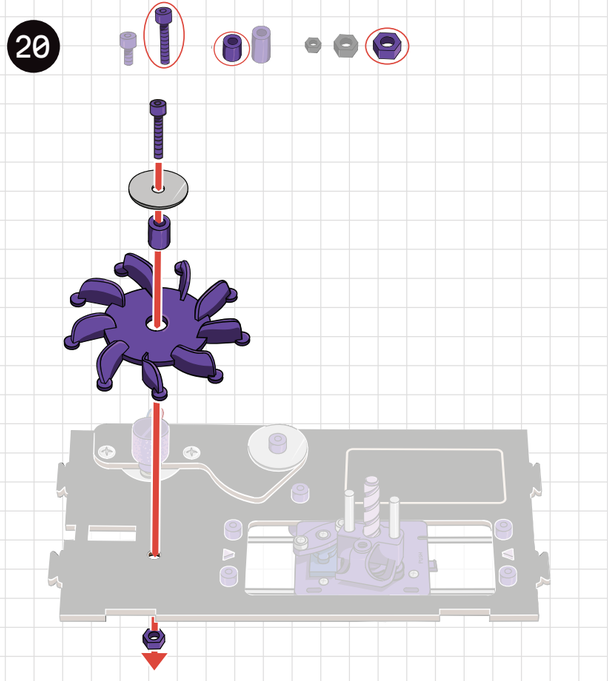
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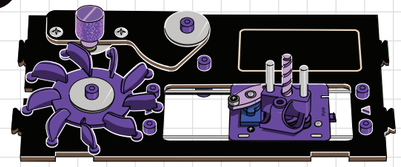

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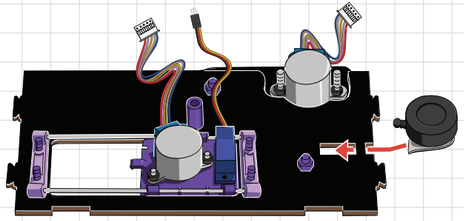

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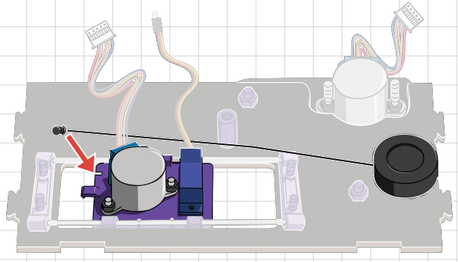

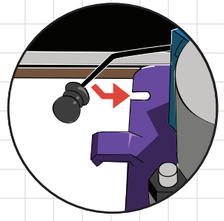

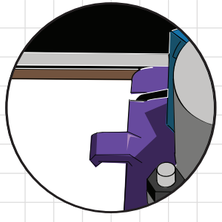

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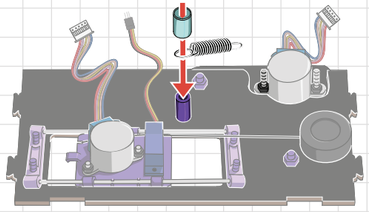

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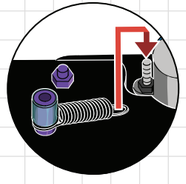

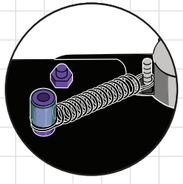

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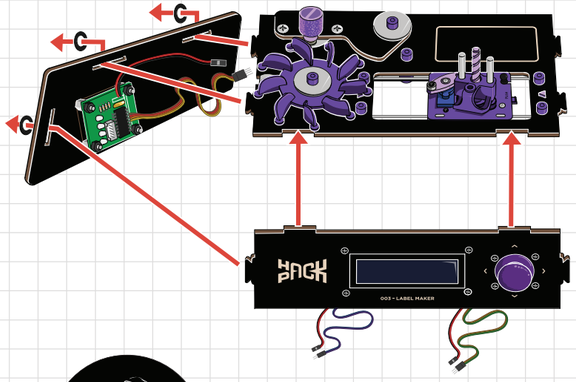

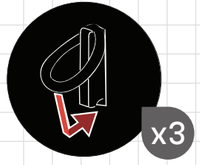

BUILD

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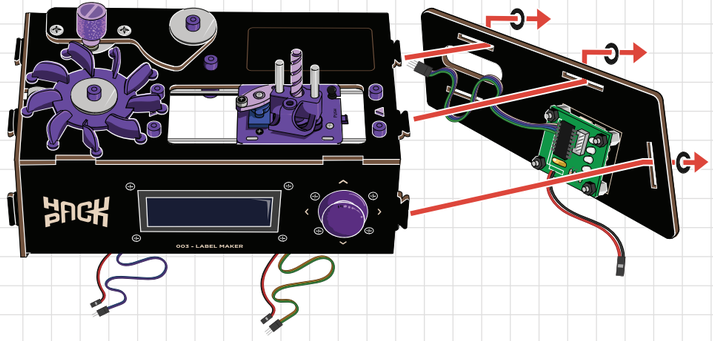

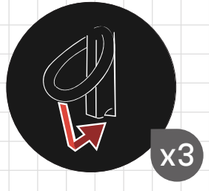

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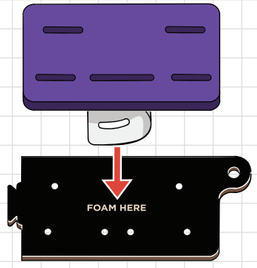

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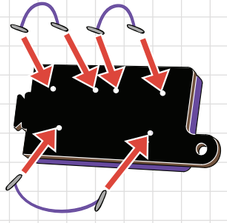

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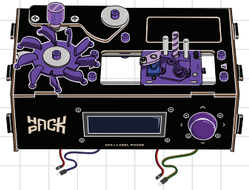

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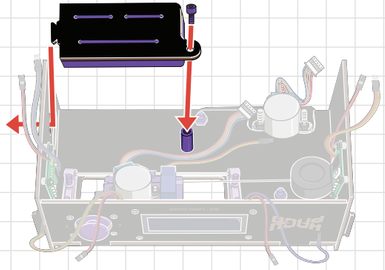

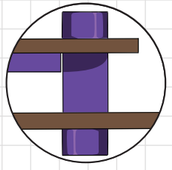

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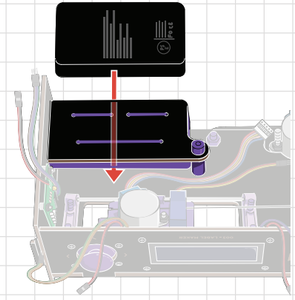

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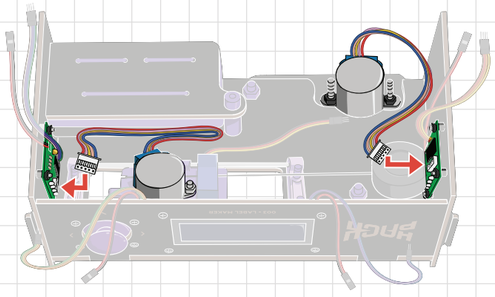

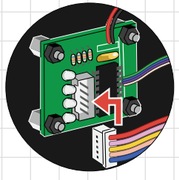

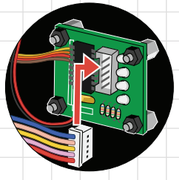

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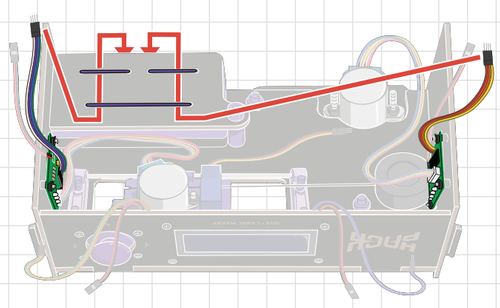

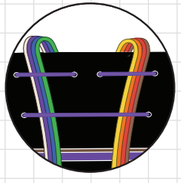

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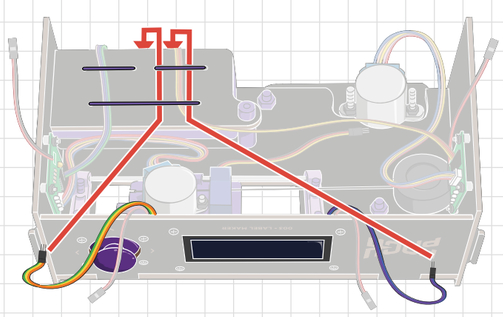

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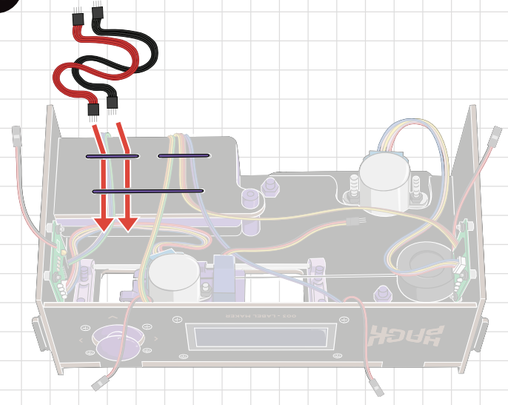

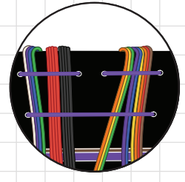

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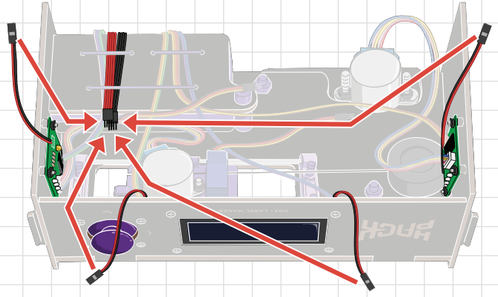

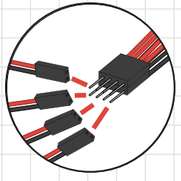

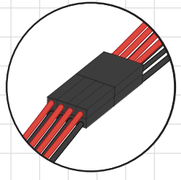

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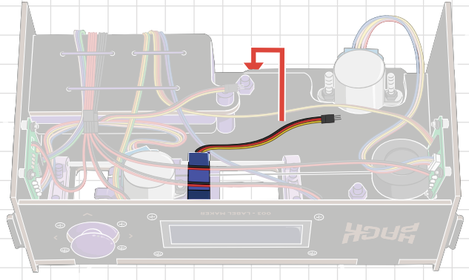
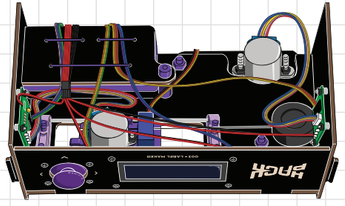


PRO TIP!

Make sure the servo wires are clear of other wires so that the Y-axis carriage can move freely.

38



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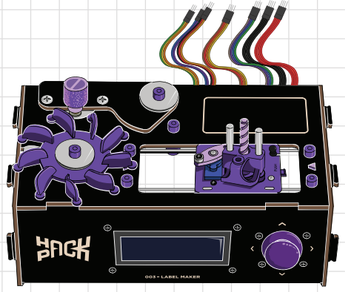

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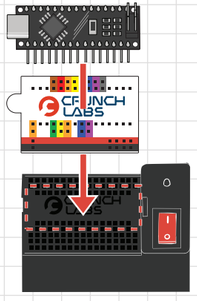

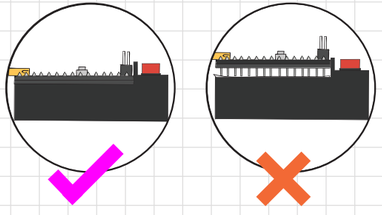

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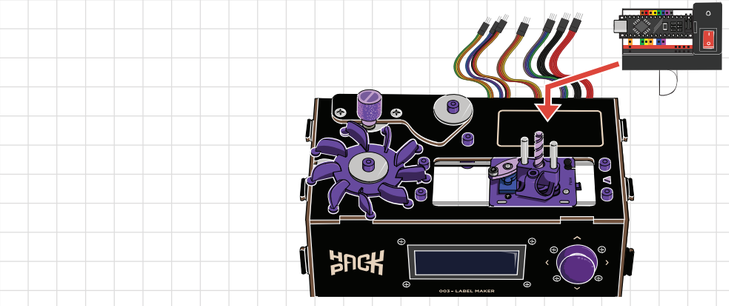

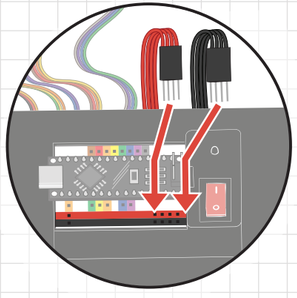

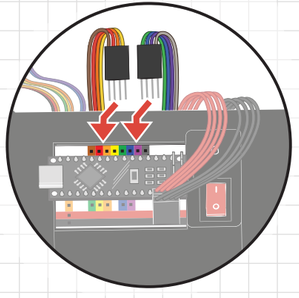

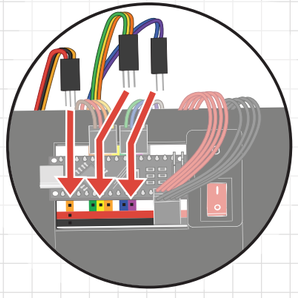

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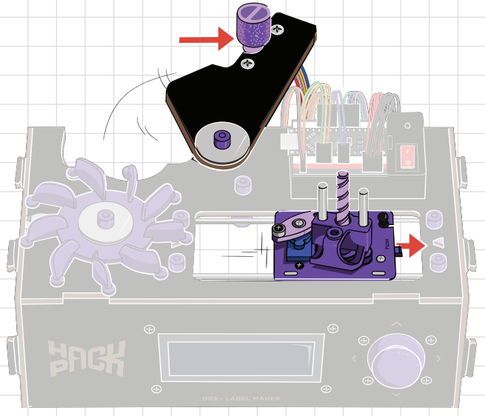

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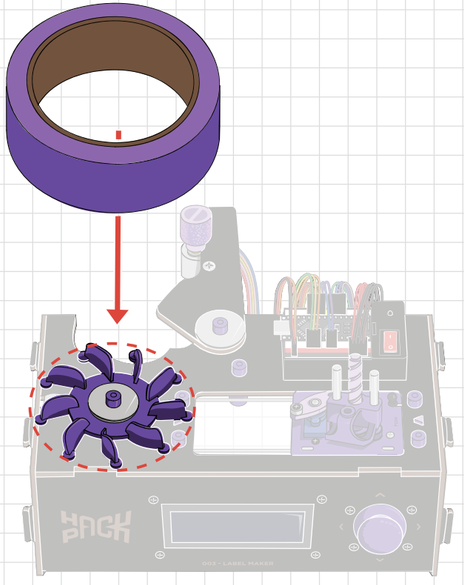

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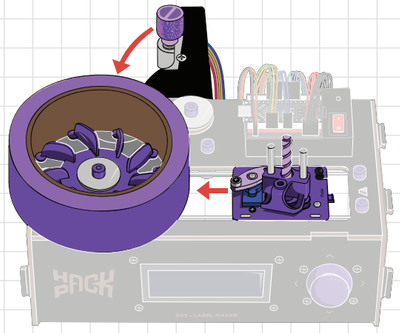

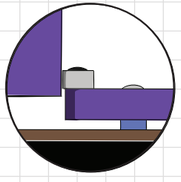

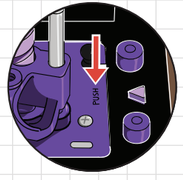

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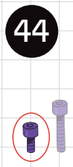
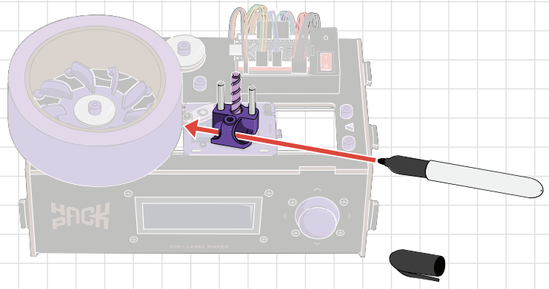
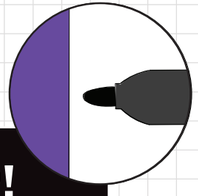
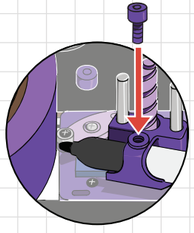




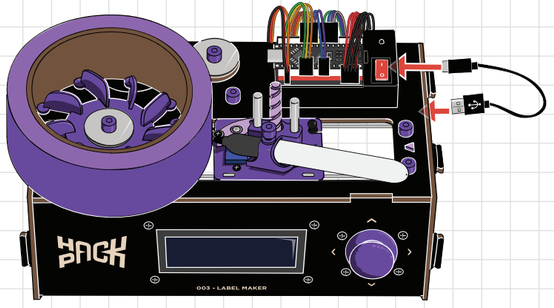


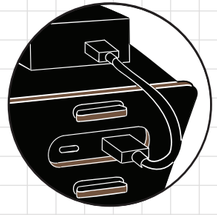


PRO TIP!

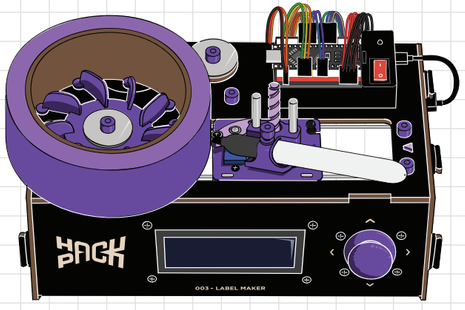
Make sure you leave a small gap between the pen and tape.

45





BUILT!

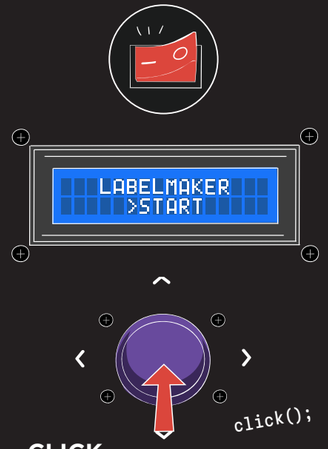


TEST

PRO TIP!

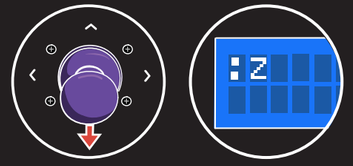
Make sure both are touching the tape.

Having trouble? Watch the video at crunchlabs.com/label



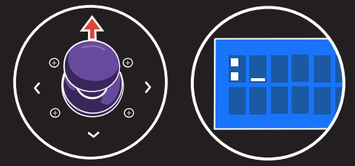
CLICK

Click the joystick to confirm your action on the label screen



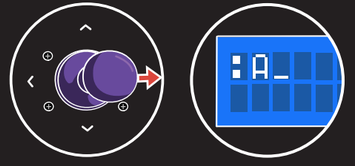
DOWN

Scroll DOWN on the joystick through the alphabet



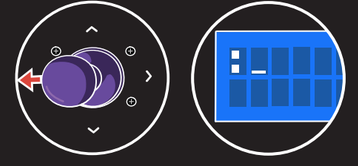
UP

Scroll UP on the joystick to get back to SPACE



RIGHT

Scroll RIGHT to add letters to the label

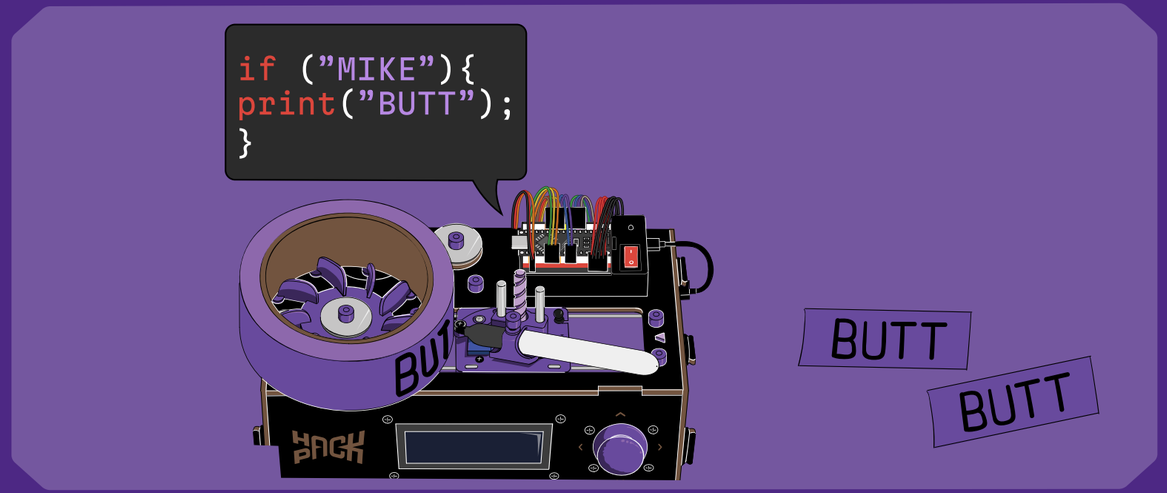


LEFT

Scroll LEFT to remove letters from the label

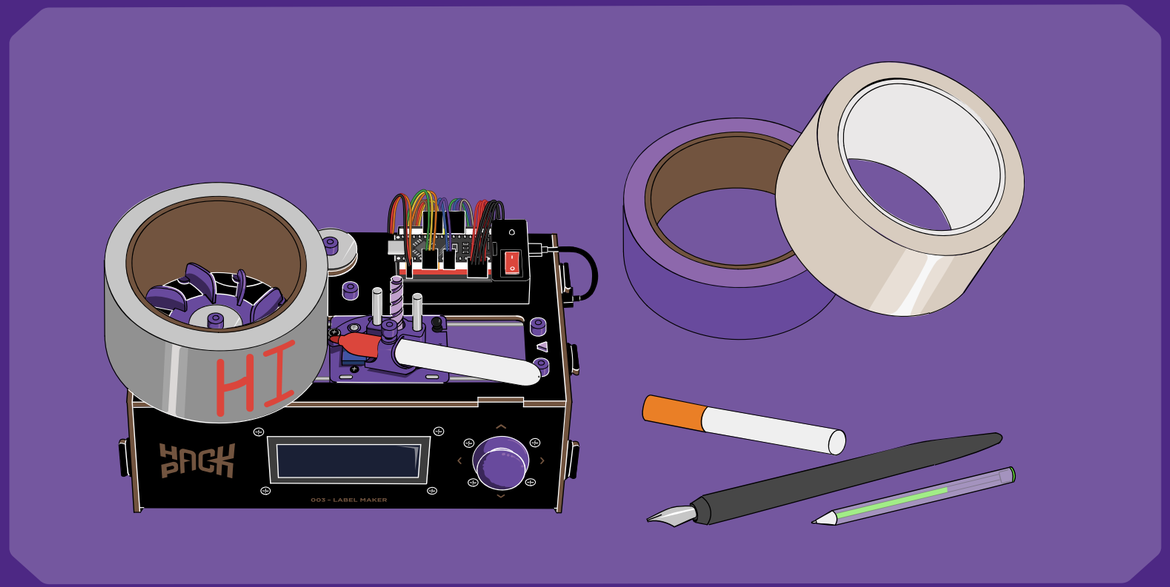
HOW TO PULL OFF THE NAME SWAP PRANK

Did you know you can swap out text to have the Label Maker write something unexpected when a certain word or phrase is entered? By adding an “**if**” statement, which basically says “if the text they want to print is “MIKE” instead write “BUTT”, you can trick your friends. Check out the hacks for Label Maker in the Hack Pack coding console, and select **PRANK** to try this out.



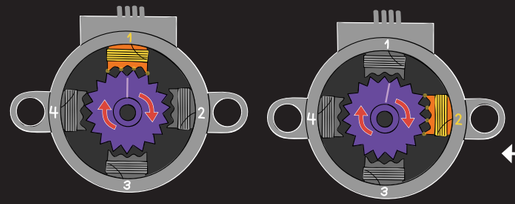
SWAP YOUR TOOLS

Try out different markers, pens, paintbrushes and even different types of tapes. See what you can create.

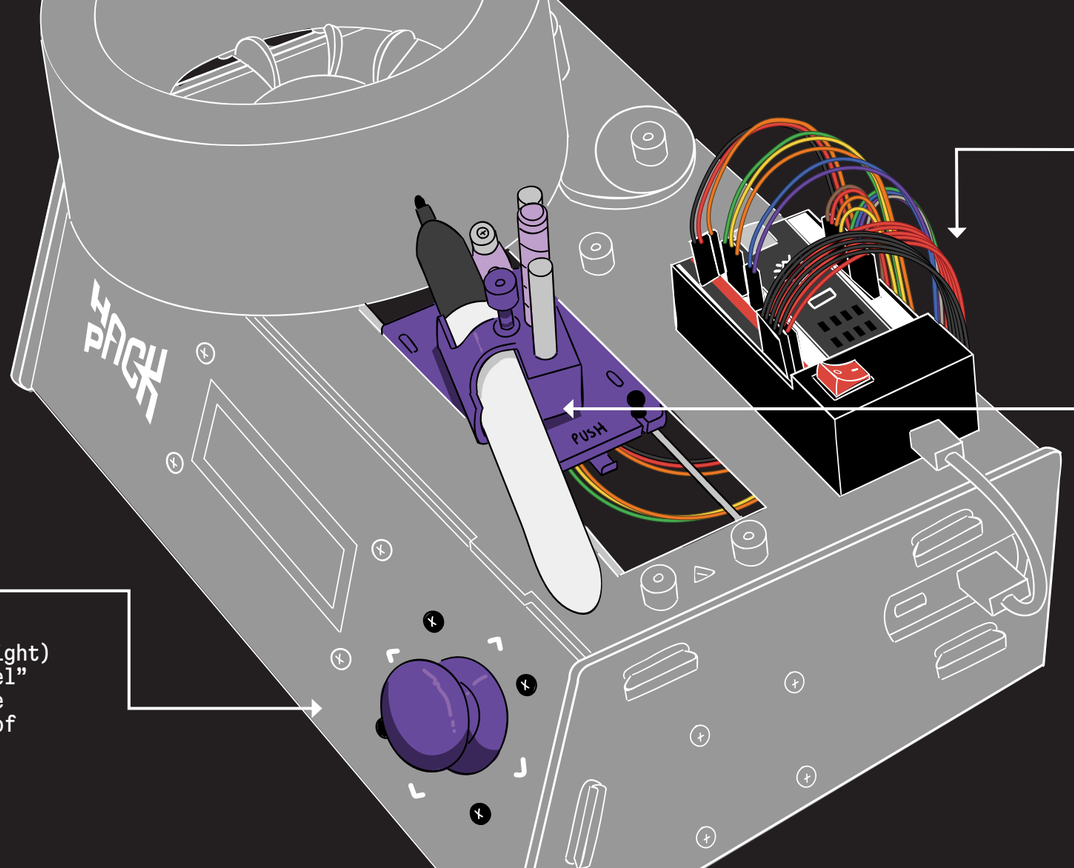


THINK

Stepper motors move in small discrete steps by energizing coils in a specific sequence to pull the magnet into alignment with tiny teeth inside the motor, called steps. Each step corresponds to a fixed angle of rotation, enabling very precise positioning and control.



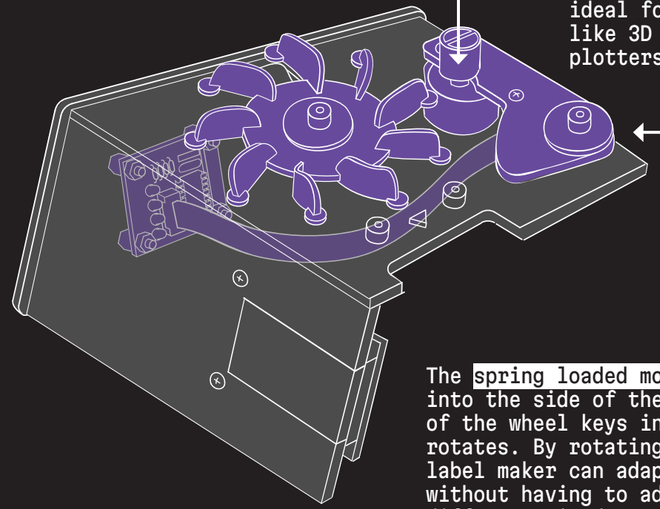
Joystick input (up down left right) from your thumb creates a “label” text which is translated by the microcontroller into a series of coordinates for each letter.



The microcontroller uses those coordinates to control the motion of a stepper motor via a wired connection to the stepper motor driver inside the mechanical spinner. First, the microcontroller breaks up the word letter by letter, and pulls from memory the coordinates that make up each letter. The microcontroller uses each coordinate to drive the stepper motors to the correct position by breaking up the movement into X and Y steps.

Like a regular DC motor, stepper motors are also controlled by turning electromagnets on and off to rotate a magnetic rotor core.

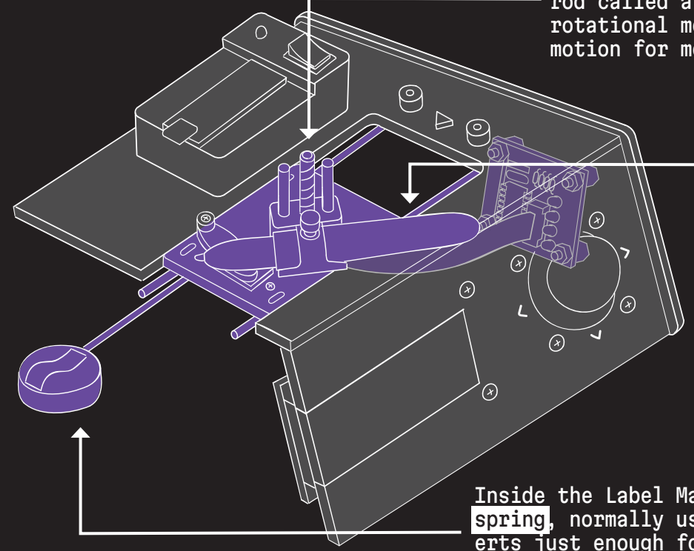
HOLDING DOWN THE TAPE



Stepper motors are specifically designed to rotate in small, distinct steps. They allow precise control over movement, making them ideal for applications requiring accuracy, like 3D printers, robotic arms, and pen plotters like your label maker.

The spring loaded motor arm presses the X axis motor into the side of the tape. Note how the gritty surface of the wheel keys into the surface of the tape as it rotates. By rotating the tape from the outside, the label maker can adapt to fit more sizes of tape, without having to adjust the width of the text for different sized tape rolls.

PRINT THE LETTERS



The Y axis motor drives a special spiraled rod called a lead screw, which converts the rotational motion of the motor into a linear motion for moving the pen up and down.

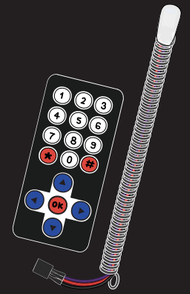
The entire Y-axis and pen assembly is mounted on linear rails, which allows the servo motor to pick the pen up off the paper, as well as adapt to different sizes of tape.

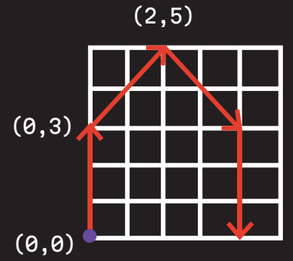
Inside the Label Maker, we used a constant force spring, normally used for keychains. The spring exerts just enough force on the marker so that it can write, while applying the same amount of pressure across a wide range.

SOFTWARE

Y2K TEXTING

Hack in the **IR reciever** from your Turret and type like your parents.





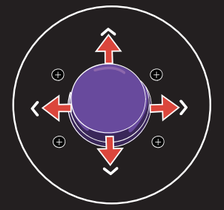
CREATE YOUR OWN CHARACTER

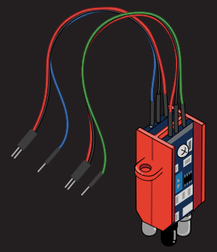
All the characters on the Label Maker exist on a 5 by 5 grid, go to the IDE to hack on your own.

HARDWARE

ETCH A SKETCH MODE

Program your Label Machine into an etch a sketch machine. Move by rotating your joystick.





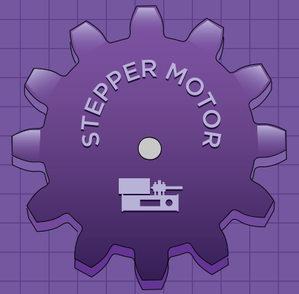
ANALOG GAMING

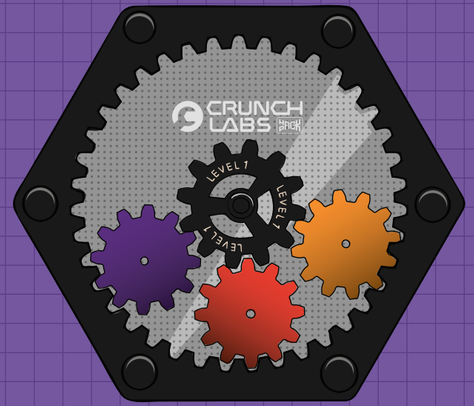
Turn your label maker into a gaming device by hacking in the **light sensor** from your Domino build instead of the pen.

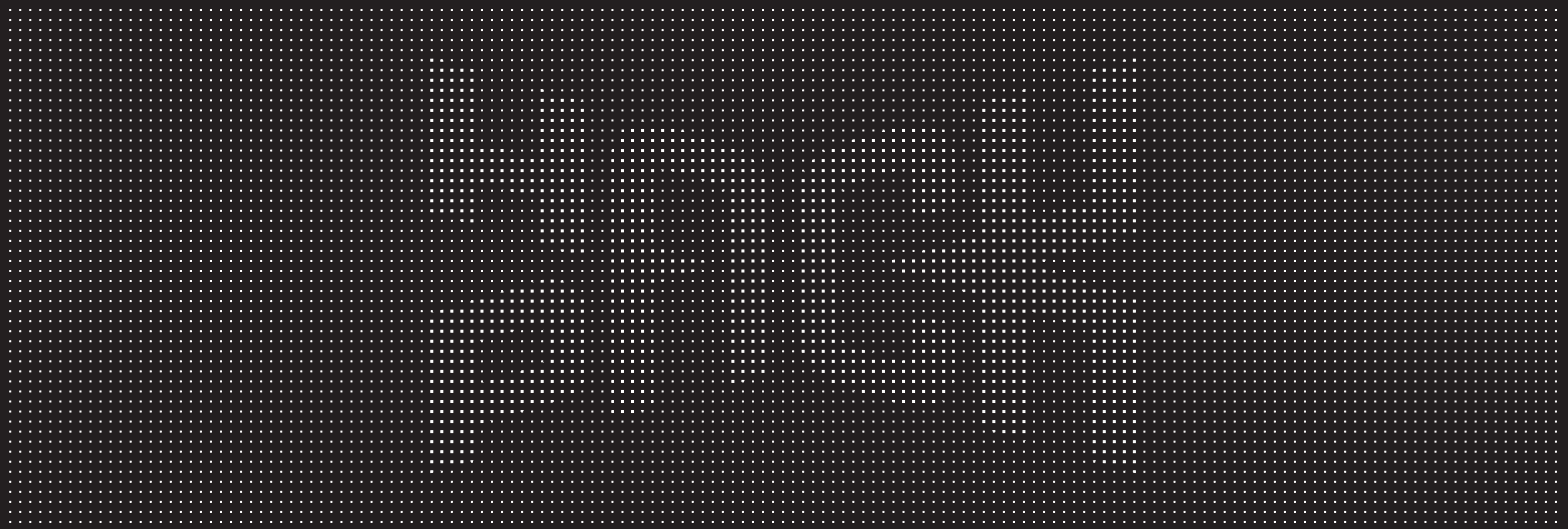
SHOW OFF YOUR HACKS

Share your software mods and explore more ways to hack your Label Maker on crunchlabs.com

ADD THE LABEL MAKER GEAR BADGE TO YOUR HACKPACK DIPLOMA.







WARNING: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This toy is intended for use by children over the age of fourteen years. These instructions contain important information, do not throw away.