Backpack #1: OpenMV Camera

by CEEOInnovations

SPIKE Prime Backpacks are extensions for LEGO Education SPIKE Prime.

The Open MV camera is the brain for the Camera Backpack that allows you to integrate image processing and machine vision capabilities of the Open MV camera to LEGO SPIKE Prime.

We also have a Grove Sensor Backpack that allows you to connect cool sensors, a Pyboard Backpack that lets you connect to the WiFi, a Micro:bit Backpack that enables radio communication, and a Breadboard Backpack that you can use to prototype circuits.

Supplies:

OpenMV camera (link)

OpenMV connector PCB (link)

Headers

2 - 1x8 Female header pins (long pins) (link)

2 - 1x4 Female header pins (comes in the same box as above)

1 - 1x8 Male 1.27 header pins (from Mouser) (link)

Lego pieces

4 - 1x3 beams

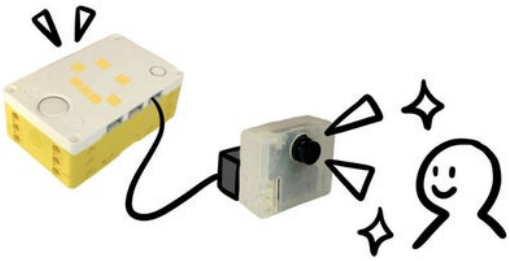
1 - 1x7 beam

10 - pegs

1- Distance Sensor connector

Case design (link)

Paper case design (link)



Step 1: Printing the Connector PCB

The Connector PCB will connect the OpenMV camera to the SPIKE Prime.

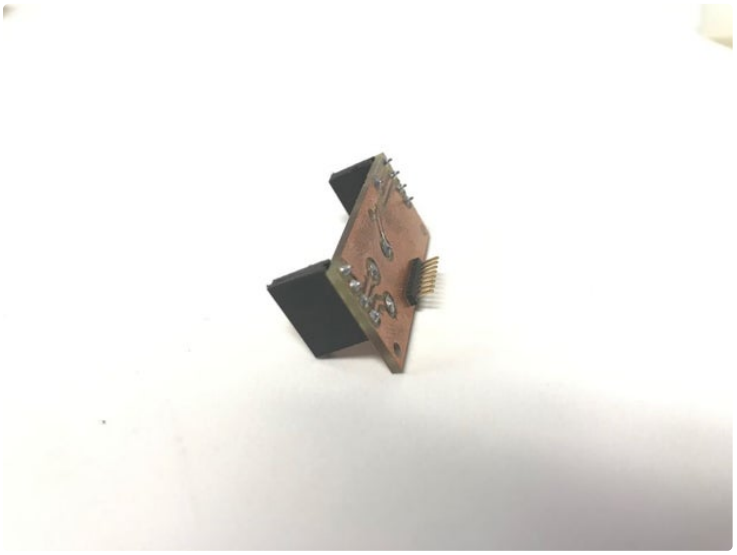
Go to the Google Drive folder and download "OpenMV v3 Manutacturing.fzz" file. There are many companies that can manufacture PCBs for you. Find the one that is nearby.

OR,

If you have access to a makerspace and you can use Desktop PCB Milling Machine by Bantam Tool download "OpenMV v2 Othermill.fzz" file and print them.

OR,

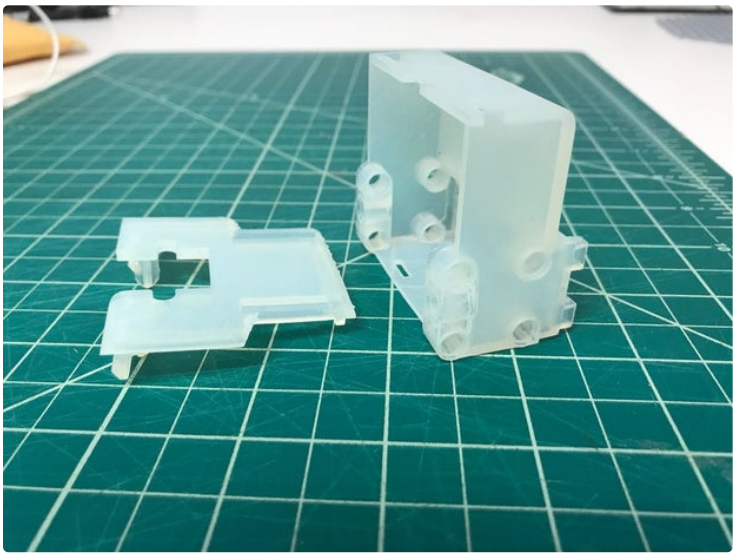
You can do it at your home. Follow the instructions here. https://www.instructables.com/id/DIY-PCB-Etching.... If you want to open the file go to and download/install Fritzing on your computer and open the design on your computer.



Step 2: 3D Printing the Case

3D Print "backpack OpenMV lid v1.0.stl" and "backpack OpenMV v1.0.stl".

Our prints were made using Form 2 Printer. You may need to adjust the dimension based on your printer and you may need to sand down the sides to press fit.



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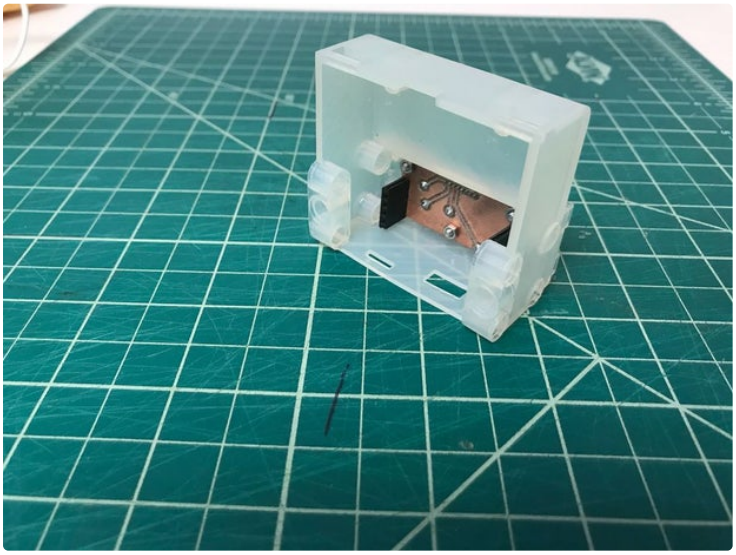
Step 3: Soldering Header Pins

Solder 2 - 1x8 Female header pins (long pins) to the OpenMV camera.

Also, solder 1x4 Female header pins and 1x8 Male 1.27 header pins to the Connector PCB.

Step 4: Inserting Connector PCB Inside the Case

Secure the PCB inside the 3D printed case using M2 nuts and bolts.

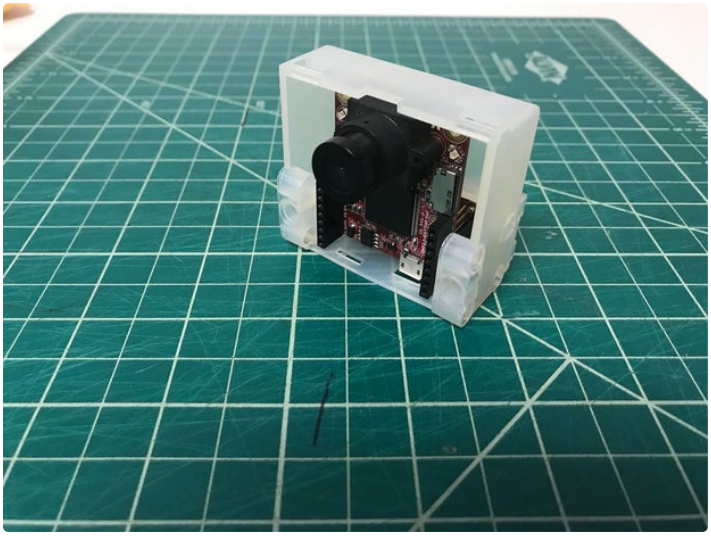


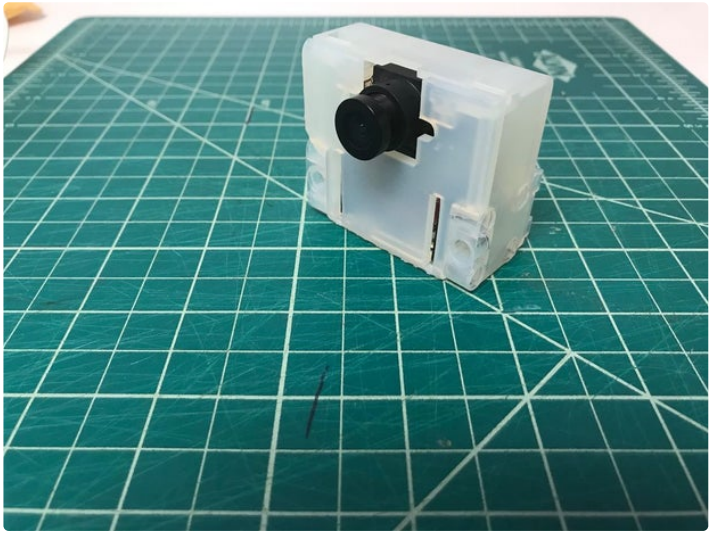
Step 5: Placing the OpenMV Inside the 3D Printed Case

Place the OpenMV camera over the connector PCB inside the case.

Close the 3D printed case with the 3D printed lid.

Note: Clip the long pins of the top four legs if they hit the bolt.



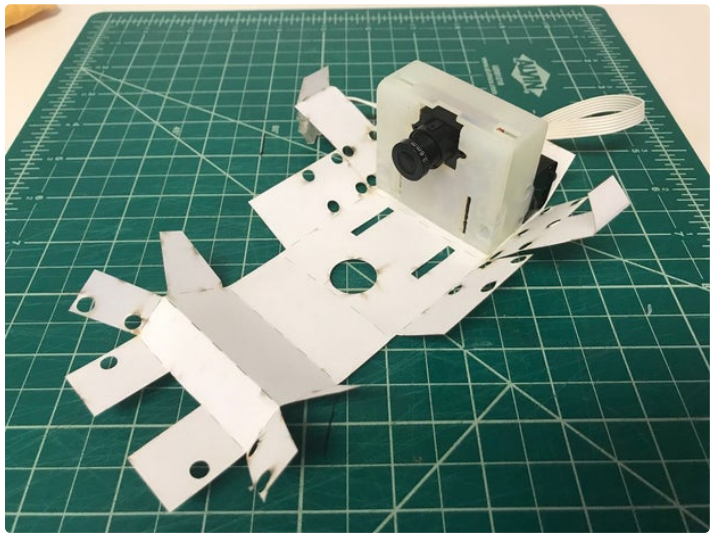
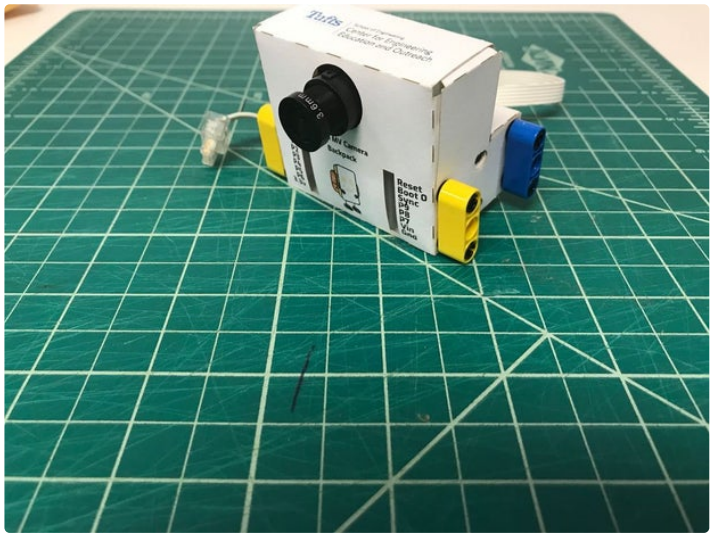


Step 6: Connecting the Backpack to Distance Sensor Connector

Unscrew and take out the connector from the LEGO SPIKE Prime Distance Sensor and plug it to the backpack. The headers are small, so be careful while plugging it in.

Step 7: Encasing the Backpack in Paper Cover

Download the paper cover design from our Google Drive Folder. Print it in color if have access to color printer. B/W printer will work as well.

If you have access to a laser cutter then use laser cutter to cut the design. If not, use scissors to cut them or use X-acto knives.

Fold them and wrap them around the 3D printed case. Use beams and pegs to secure the paper on the case.