Instructables: Moniduh

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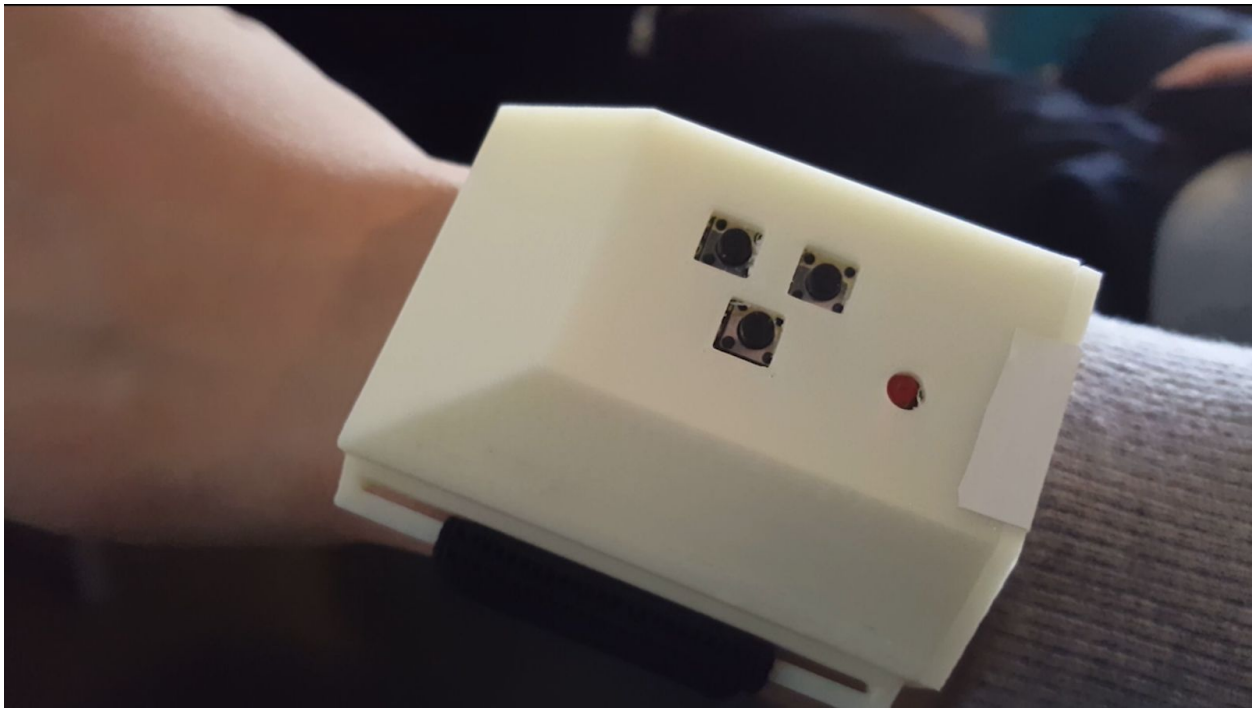


Fig 1: MoniDuh Final Product

MoniDuh (IoT Button) Overview:

An internet-connected wearable device with three buttons that can be used in various ways, like sending an SOS message to your friend with the push of a button or to order a pizza while you're working on an important project.

Green LED light on the device indicates if the message was sent or not by lighting up one time (message sent) or being lit constantly (message could not be sent). In order to for the message to be sent, you need to be connected to local WiFi or HotSpot on someone's phone. A basic wireless connection is a must for it to work.

Assemble Circuit:

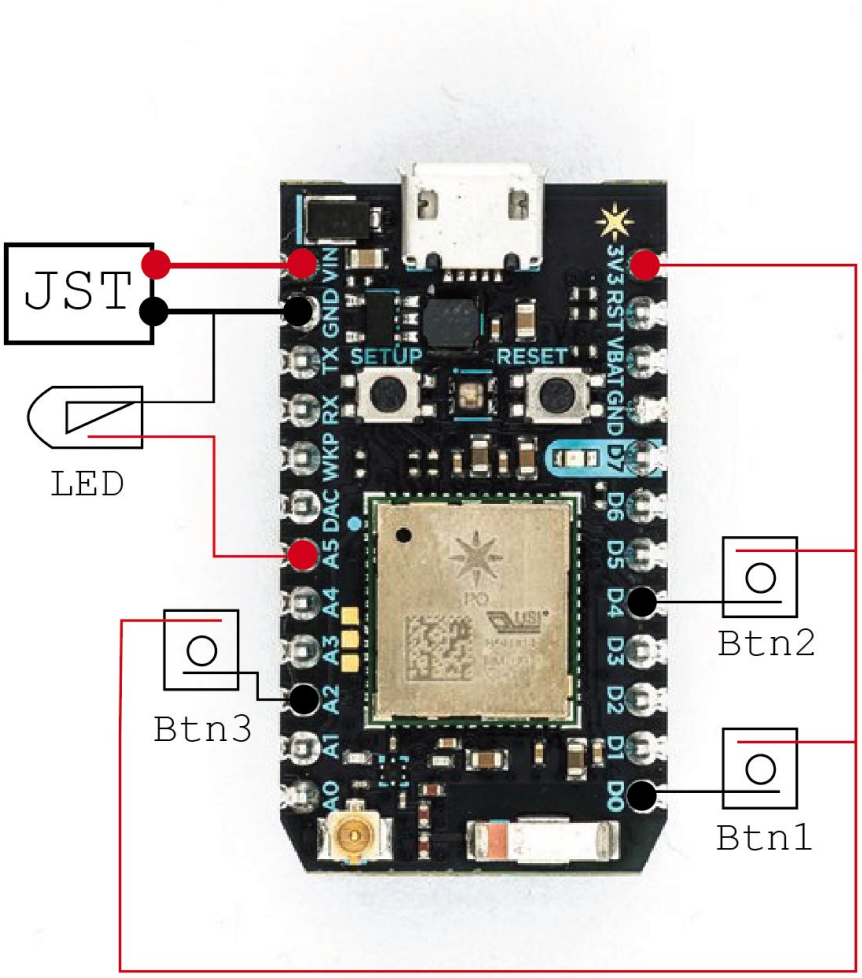


Fig 2: Circuit Diagram of this product

Code:

[Link to GitHub](https://github.com/RohitSattu/wearables/blob/master/internetButtons_particlePhotons)

Step 1: Buy materials needed

A Particle Photon board is about US $19 and shipping is extra. we live in Toronto, Canada so the total expense for a Particle Photon was around CA $44. Rest of the materials should be available at your local electronic store. Below are all the materials and tools we used to make this device.

Tools:

1. Helping Hands with Soldering Stand (Links to an external site.)
2. Soldering Iron (Links to an external site.)
3. Curved Tweezers (Links to an external site.)
4. Cutter (Links to an external site.)

Materials:

Part No.	Part Name	Supplier	Link	Cost/Unit	Quantity	Total
001	Photon	Particle	Particle Website	$19 + $25(Shipping)	1	$44
002	Prototype Board	Creatronics	Creatronics Website	$2.80+tax	1	$3.17
003	LED	Creatronics	Creatronics Website	$2.00+tax	1	$2.26
004	Button	Creatronics	Creatronics Website	$0.66+tax	3	$2.24
005	Solder	Creatronics	Creatronics Website	$13+tax	1	14.69
006	JST Connector	Creatronics	Creatronics Website	$1,70+tax	1	$1.92
007	Battery	Creatronics	Creatronics Website	$17.85+tax	1	$20.17
008	Elastic Band	Fabric Land	Fabricland Store	$4.69+tax	1	$5.3
009	3D Printing	RP Center	OCAD RPC	$25	1	$25
Total Cost for each product					$118.75	
Total Cost for 4 products (Save $61.45, when order 4)					$391.28	

Step 2: Small Hack! Bend a pin on tactile switch button

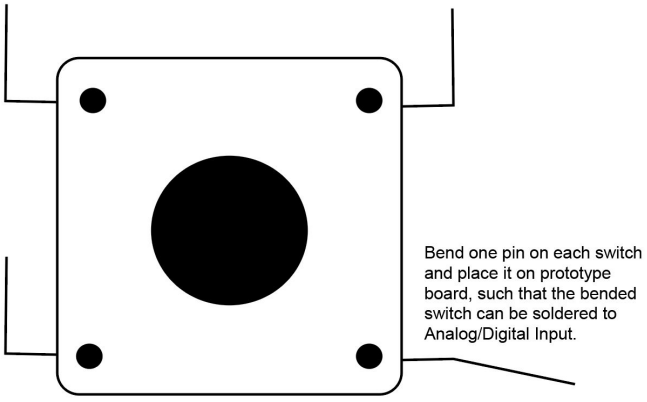


Fig 3: Skeleton diagram of a button with one of it's pin bent

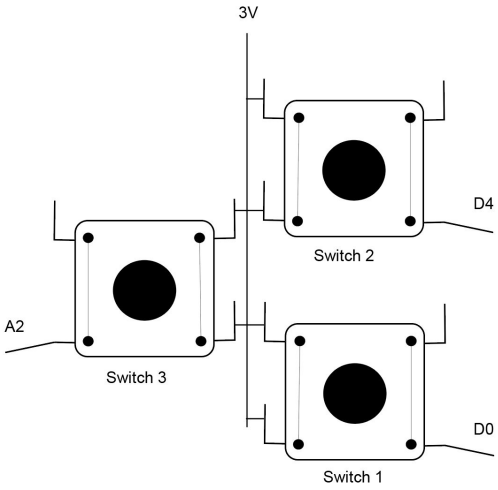
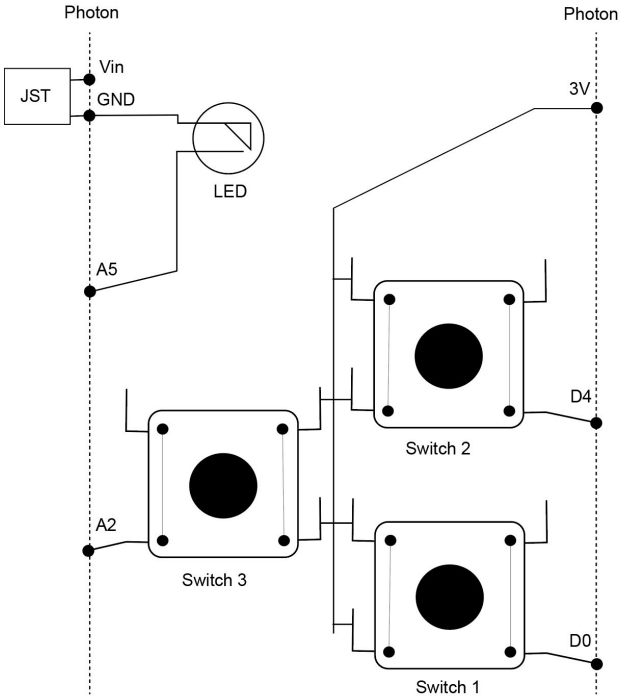


Fig 4: Skeleton diagram of buttons connecting to power and it's input ports

DO NOT SOLDER YET, this arrangement is an important step, as you have to make sure that you have enough space for LED and JST connector. Arrange Buttons such that all the bent switches are facing outside. This way we can have only one power line connecting all the buttons. Place switches on the prototype board so that you have all the bent pins at the exact position so it can connect to at least one Digital/Analog input. I placed it so that pins connect to D0, D4, and A2.

Step 3: Attach LED, Photon to Prototype Board & Solder Time!



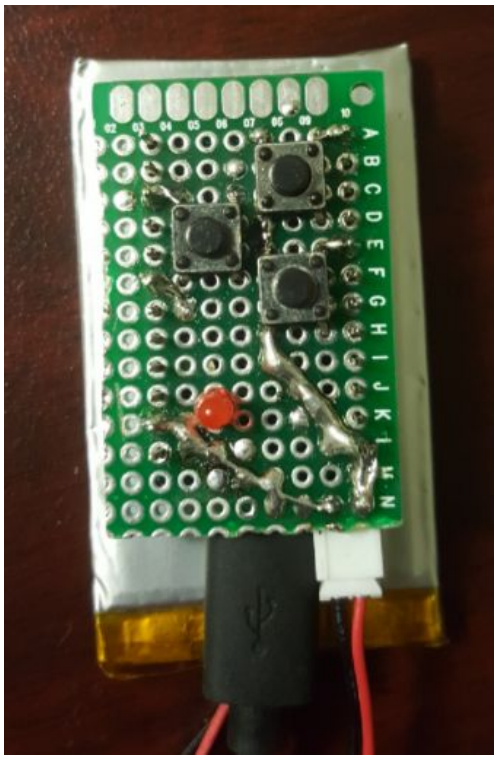


Fig 5: Skeleton diagram of the entire circuit after building the device
Fig 6: Circuit after soldering

This is a skeleton of the circuit I made on Prototype board. JST Connector goes to “Vin” and GND respective to +ve and -ve. LED’s +ve attaches to A5 and -ve to GND. A 3V wire extends and connects to all the +ve’s of the buttons/switches. Each button would connect to its respective pins, i.e, D0/D4/A2.

Once everything is in place, start by soldering buttons, then LED. After that, place Photon and make sure your connections are in place then solder them. At last, solder JST connectors to connect an external battery.

Step 4: Time to Code

To setup your device, Particle Photon Guide has amazing tutorials on how to setup your photon. Once you have it setup, copy code from here (https://github.com/RohitSattu/wearables/blob/master/internetButtons_particlePhotons) and paste it in Particle Photon IDE. Then, flash it to your Photon. Make sure everything is working, if not, verify your steps again. The code is written so that, D0 is button 1, D4 is button 2 and A2 is button 3. In this code, you will notice Particle.publish, this allows you to send messages to Particle Photon Cloud. To check the messages go to Logs and press the button (wait a few seconds).

Awesome! Now all we need to do is use IFTTT.com to send messages to your phone/email or anything that IFTTT.com will allow you to do. Firstly, you need to connect your Particle.io account to IFTTT account. Once it is connected, go to "My Applets" and click on "New Applet". You will see a screen like below:

Fig 7: Screenshot of creating a new applet in IFTTT.com

Click on "+ this", enter and select "Particle" from the search. Select "New Event Published" (Trigger for this model) and fill out the details. Click on "that" after you are done filling out the details, and select any option you like (message to phone, email or other).

Check out some of the example Particle Photon has partnering with IFTTT, here!

Step 5: Make 3D Modeling/Printing

If your circuit is working, cut the extras of your prototype board and take measurements of your final design. You can use a variety of software to 3D model the casing including Rhino, Blender and AutoCAD 3DS Max.

An example casing idea can be that of a watch form factor. The example below was modelled in Rhino. It is a minimalistic casing that neatly houses the main circuitry and battery while also allowing micro USB connection to the board without opening the case.

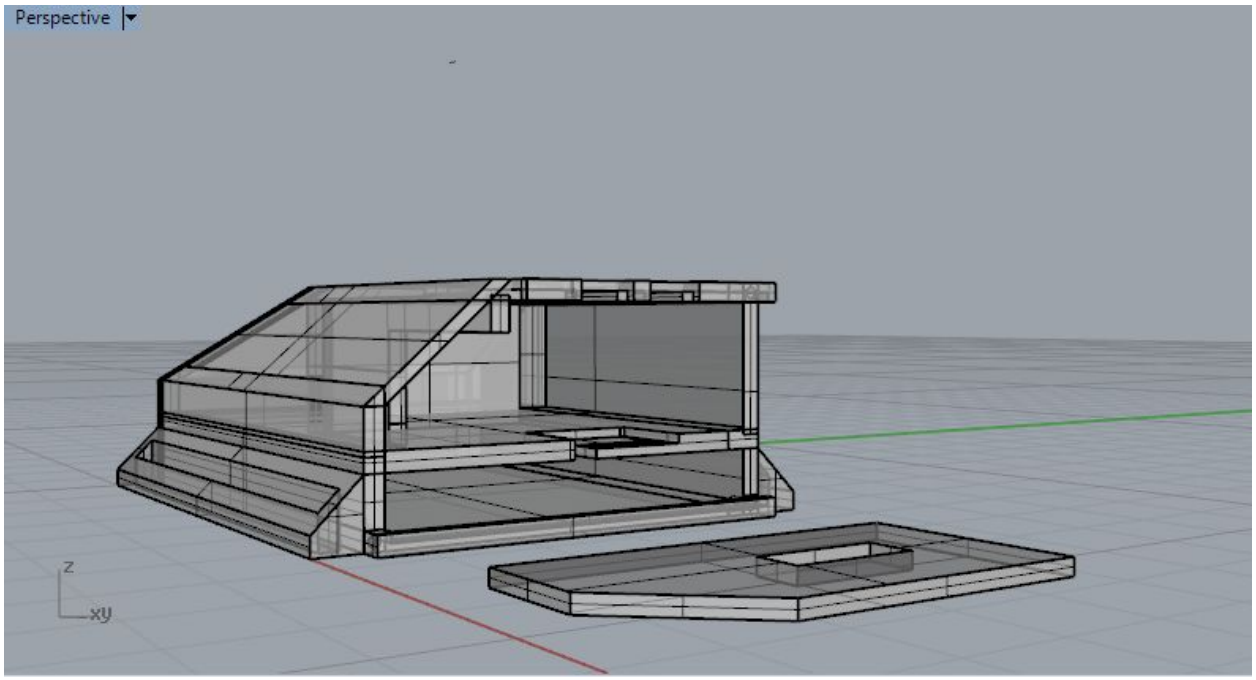


Fig 8: Screenshot of 3D Model to hold the device

Cut out holes for all the buttons and LED on the top of the casing. Add groves leading into the holes to avoid the buttons on the board from pressing on the case when inserting it in. Optionally, slope the sides to reduce the materials needed and cost when 3D printing. Recess the wall near the micro USB to allow extra space for connectors and a slit for the battery wires to come up and attach to the main board.

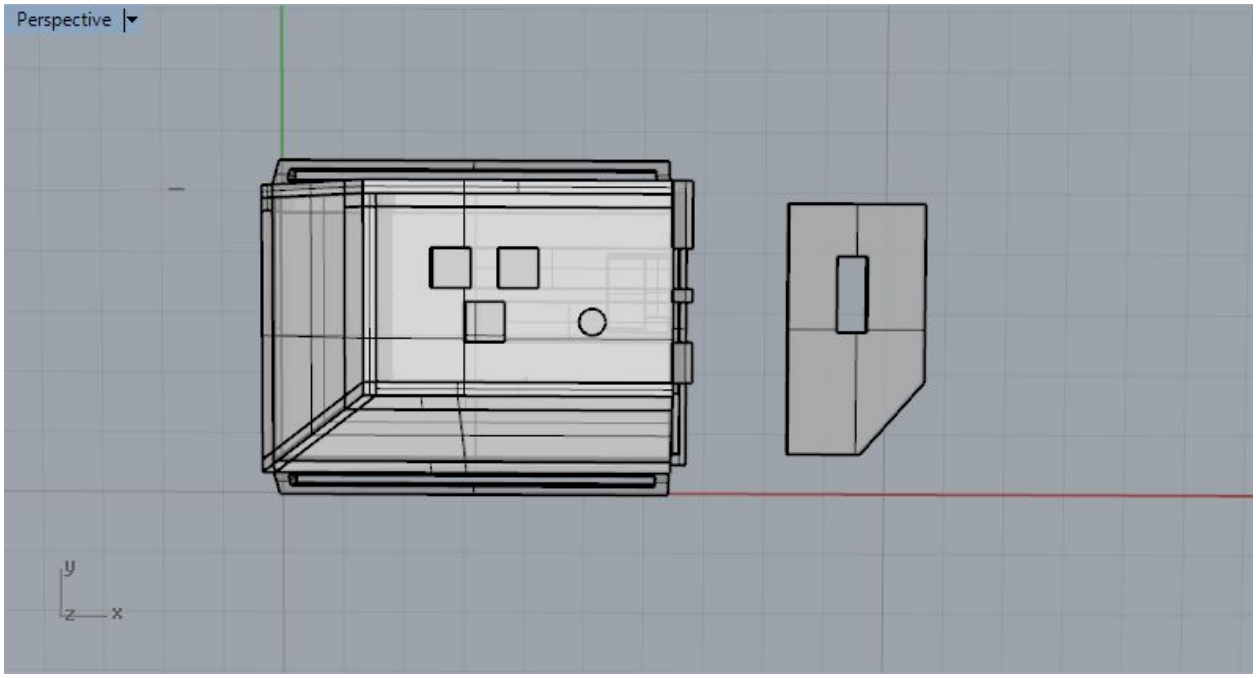


Fig 9: top view of 3D Model to hold the device

For lid ideas we suggest one that involves sliding the lid in place to close the casing. Using pins and holes runs the risk of the pins breaking off, given the scale of the casing. Lastly, add strap handles on the side to attach a band to the casing allowing you to wear it on your arm.

Step 6: Wear It!

Fig 10: top view of 3D Model to hold the device

Cut wristband to fit your hand. Attach the wristband you have to the 3D printed model with glue and wear it! If 3D printing is expensive, you can sew a small pocket to hold battery or use wood or cardboard. You can get creative with the designs. Below is our final product.

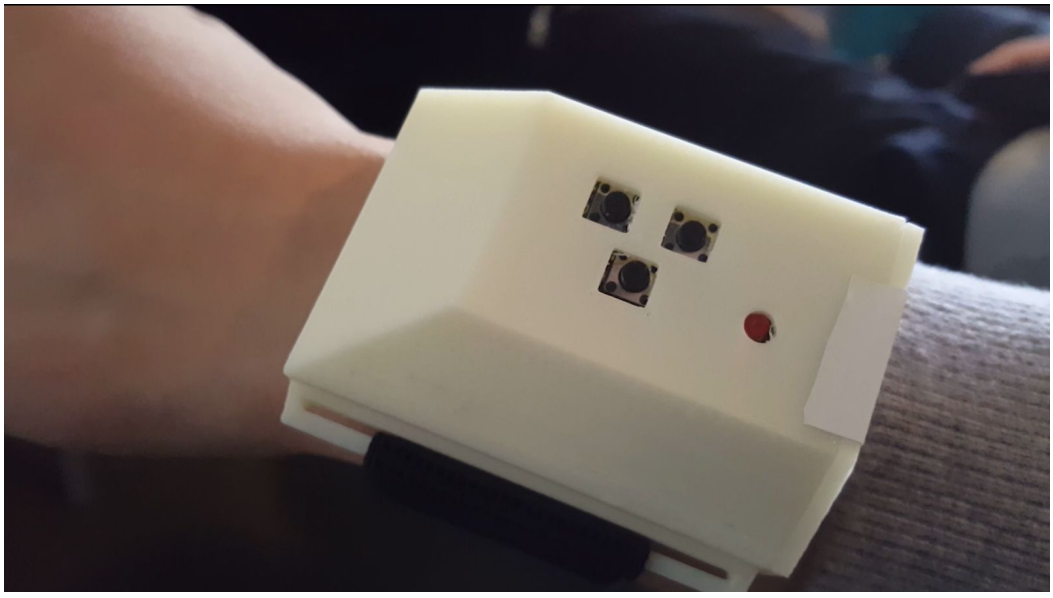


Fig 11: MoniDuh Final Product