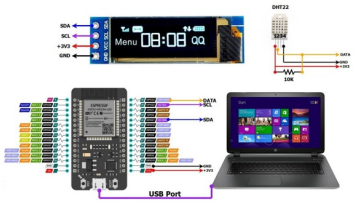

instructables DHT22 Environment Monitor Instruction Manual

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DHT22 Environment Monitor Instruction Manual

Contents

DHT22 Environment Monitor

by taste_the_code

I started exploring Home Assistant and in order to be able to start creating some automation, I needed to have the current temperature and humidity values from my living room inside so I can act upon them.

There are commercial solutions available for this but I wanted to build my own so I can better learn how Home Assistant works and how to set up custom devices with it and ESPHome.
The entire project is built on a custom-made PCB that I designed as a project platform for NodeMCU and was then manufactured by my friends at PCBWay. You can order this board for yourself and have 10 pieces manufactured for just $5 at: **https://www.pcbway.com/project/shareproject/NodeMCU_Project_Platform_ce3fb24a.html**

Supplies:
Project PCB: **https://www.pcbway.com/project/shareproject/NodeMCU_Project_Platform_ce3fb24a.html**
NodeMCU development board – **https://s.click.aliexpress.com/e/_DmOegTZ**
DHT22 Sensor – **https://s.click.aliexpress.com/e/_Dlu7uqJ**
HLK-PM01 5V power supply – **https://s.click.aliexpress.com/e/_DeVps2f**
5mm pitch PCB screw terminals – **https://s.click.aliexpress.com/e/_DDMFJBz**
Pin headers – **https://s.click.aliexpress.com/e/_De6d2Yb**
Soldering kit – **https://s.click.aliexpress.com/e/_DepYUbt**
Wire snips – **https://s.click.aliexpress.com/e/_DmvHe2J**
Rosin core solder – **https://s.click.aliexpress.com/e/_DmvHe2J**
Junction box – **https://s.click.aliexpress.com/e/_DCNx1Np**
Multimeter – **https://s.click.aliexpress.com/e/_DcJuhOL**
Soldering helping hand – **https://s.click.aliexpress.com/e/_DnKGsQf**

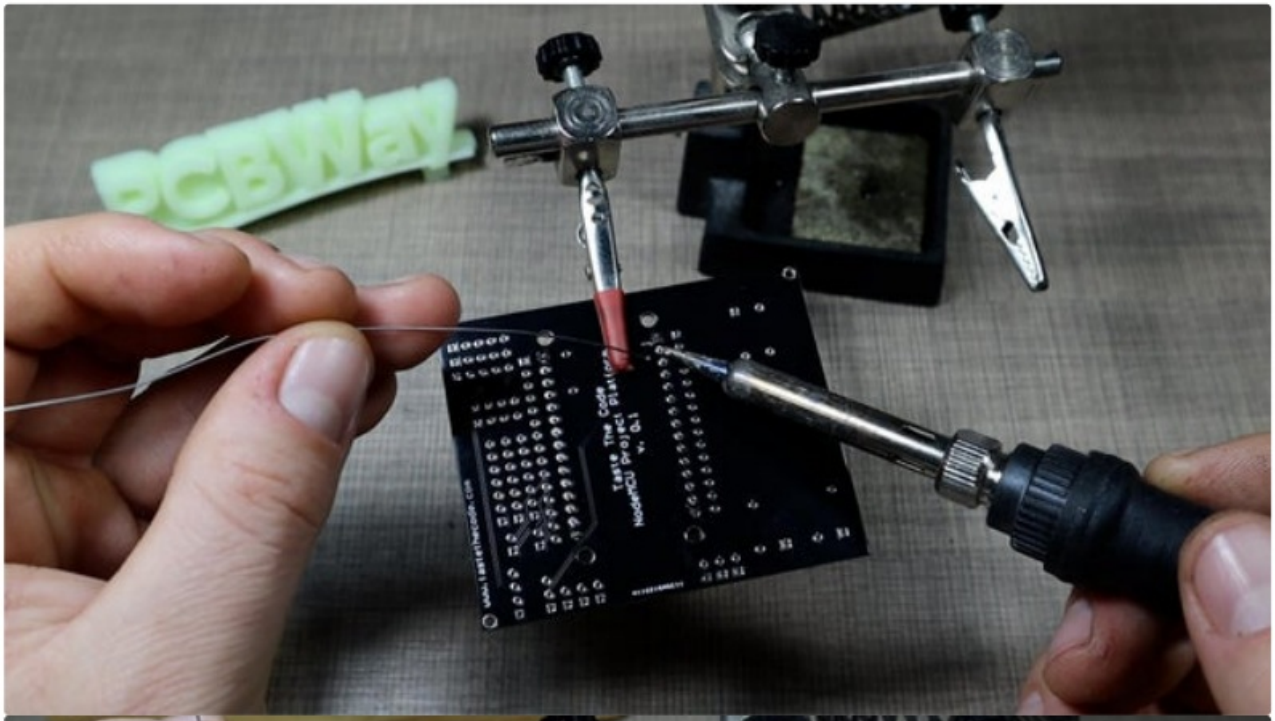
Step 1: The Custom PCB

I designed this PCB to serve as a project platform after spending so much time soldering custom NodeMCU projects on prototyping PCBs.
The PCB has a position for NodeMCU, I2C devices, SPI devices, relays, a DHT22 sensor as well as UART and an HLK-PM01 power supply that can then power the project from AC mains.

You can check a video of the design and ordering process on my YT channel.

Step 2: Solder the Components

Since I don’t want to solder the NodeMCU directly to the PCB, I used female pin headers and soldered them first so I can then plug the Node MCU into them.
After the headers, I soldered the screw terminals for the AC input as well as for 5V and 3.3V outputs.
I also soldered a header for the DHT22 sensor and the HLK-PM01 power supply.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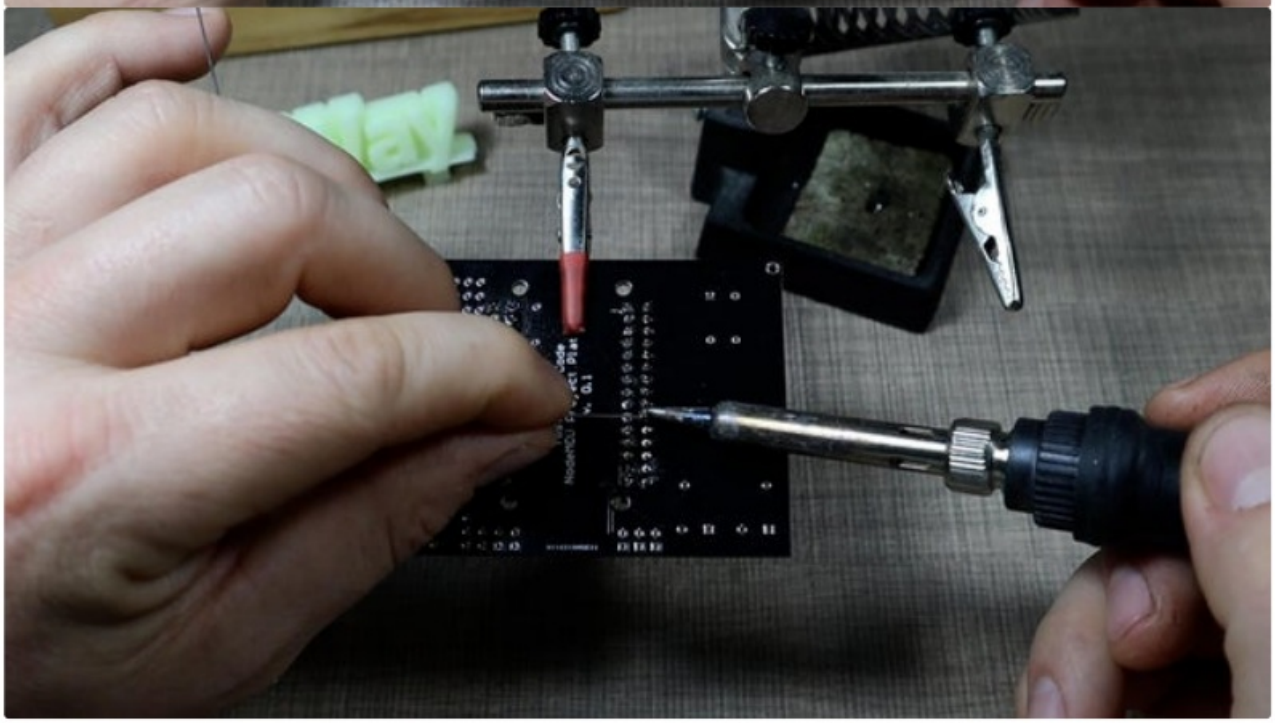

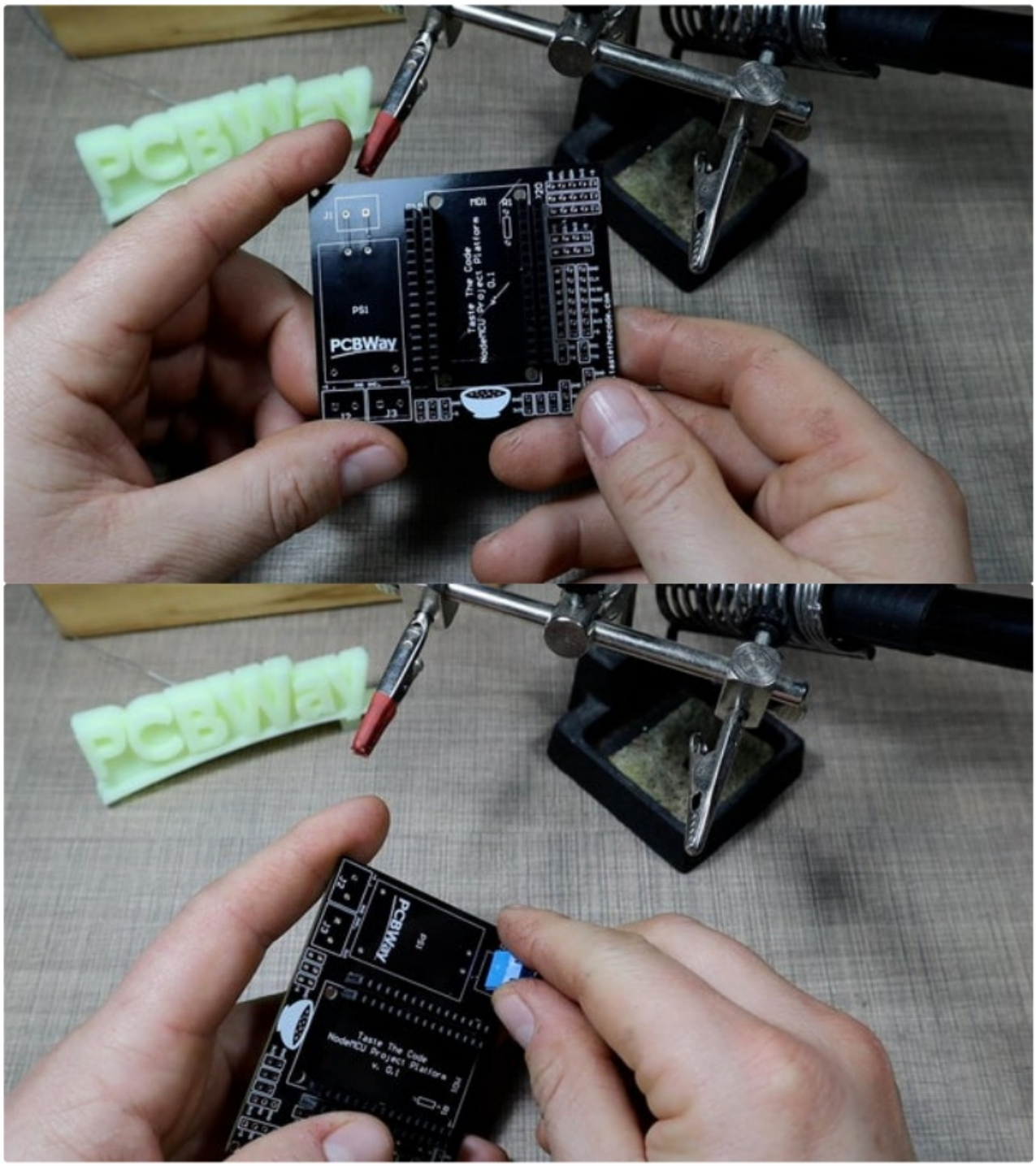
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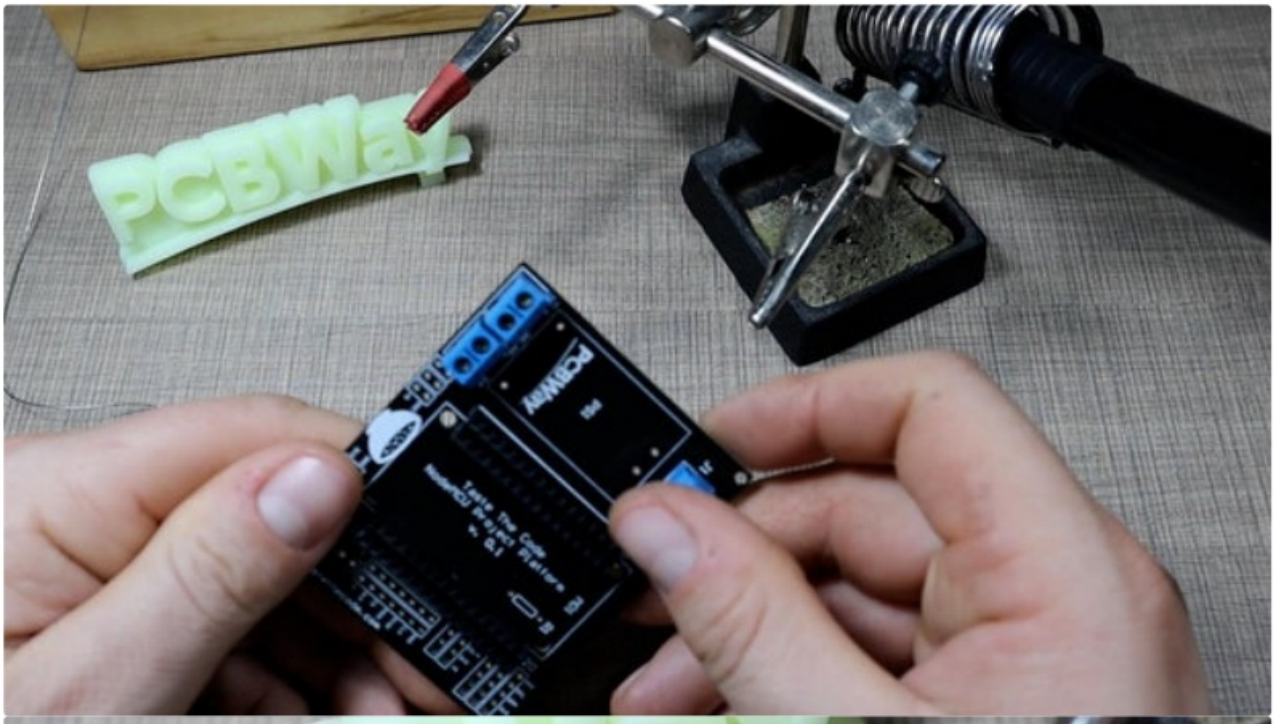
Taste The Code
NodeMCU Project Platform
v. 0.1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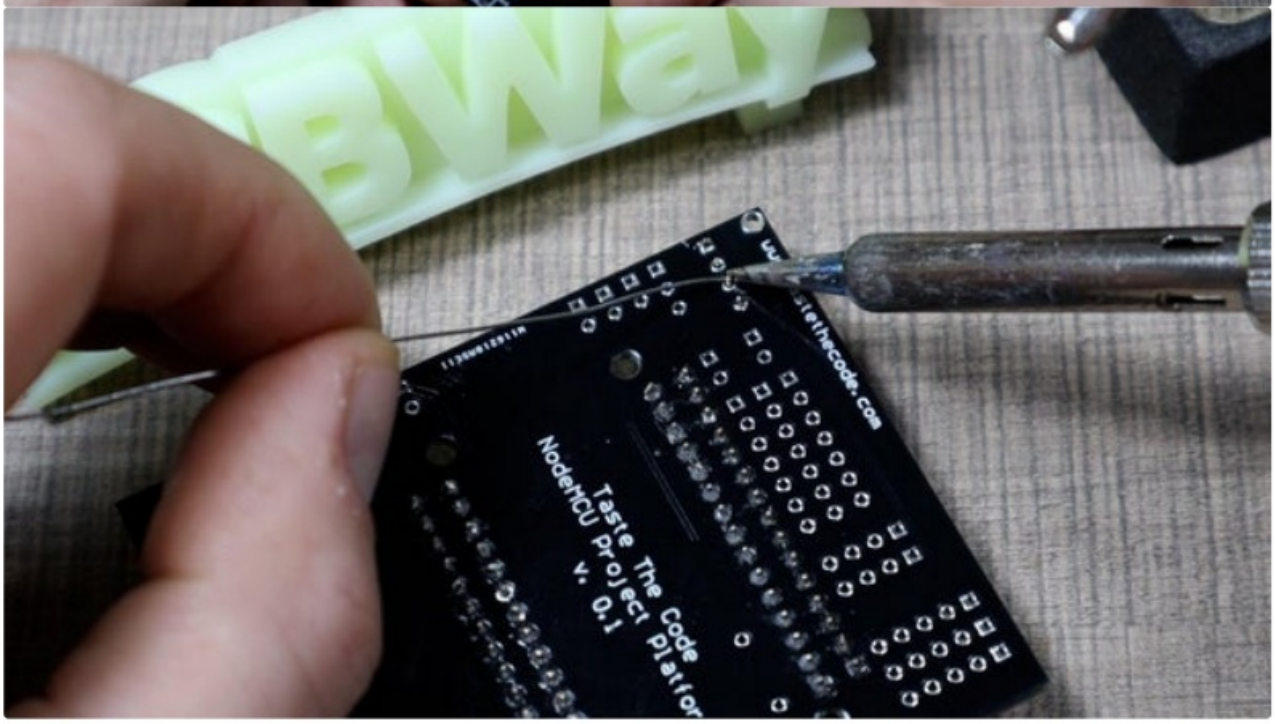
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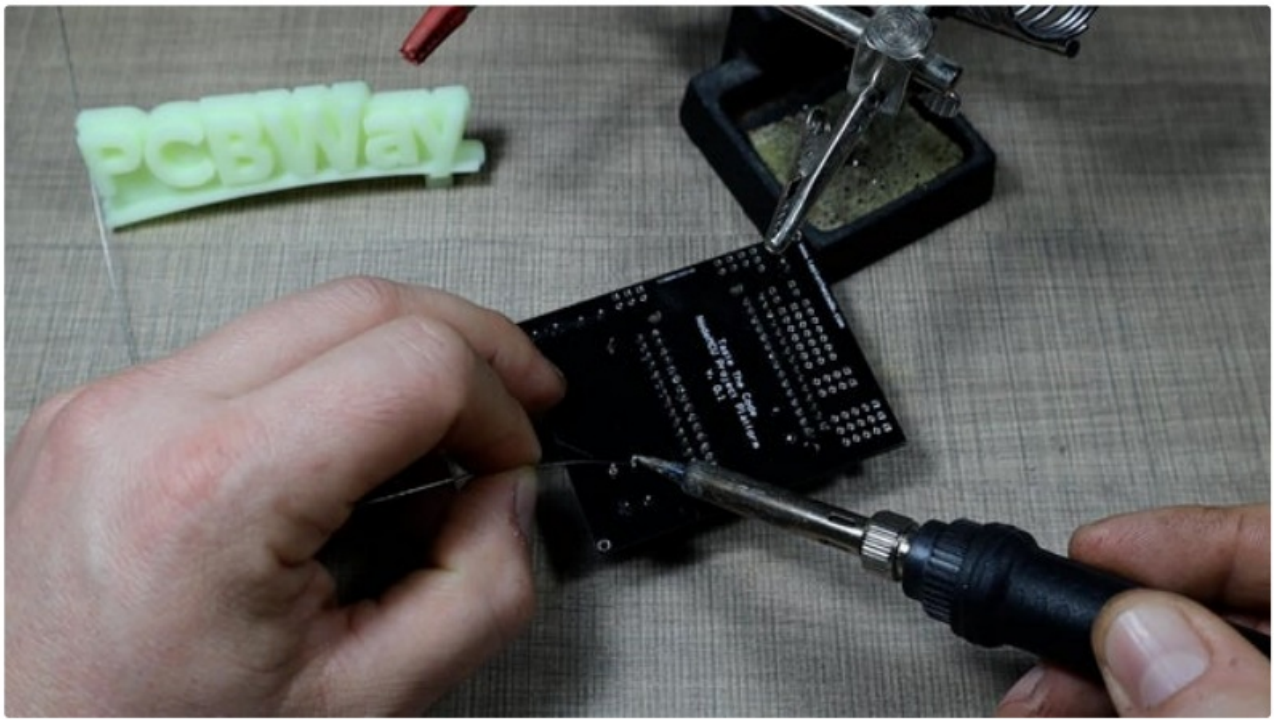
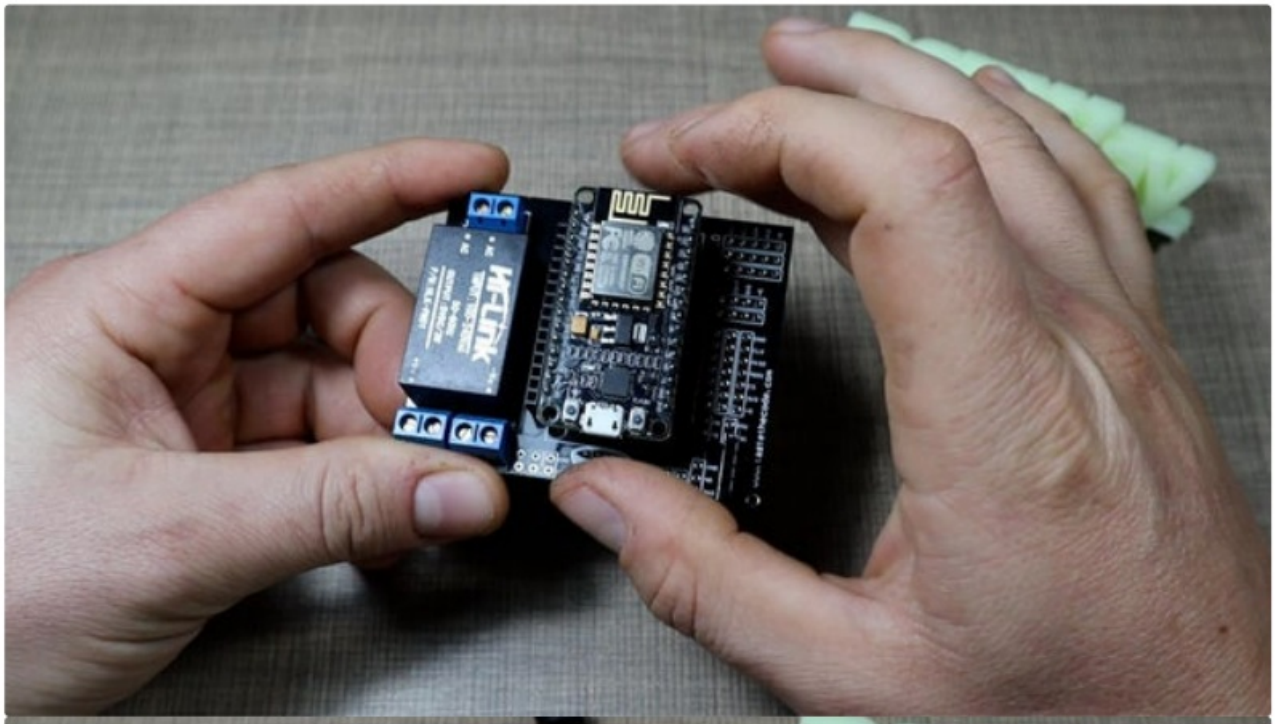
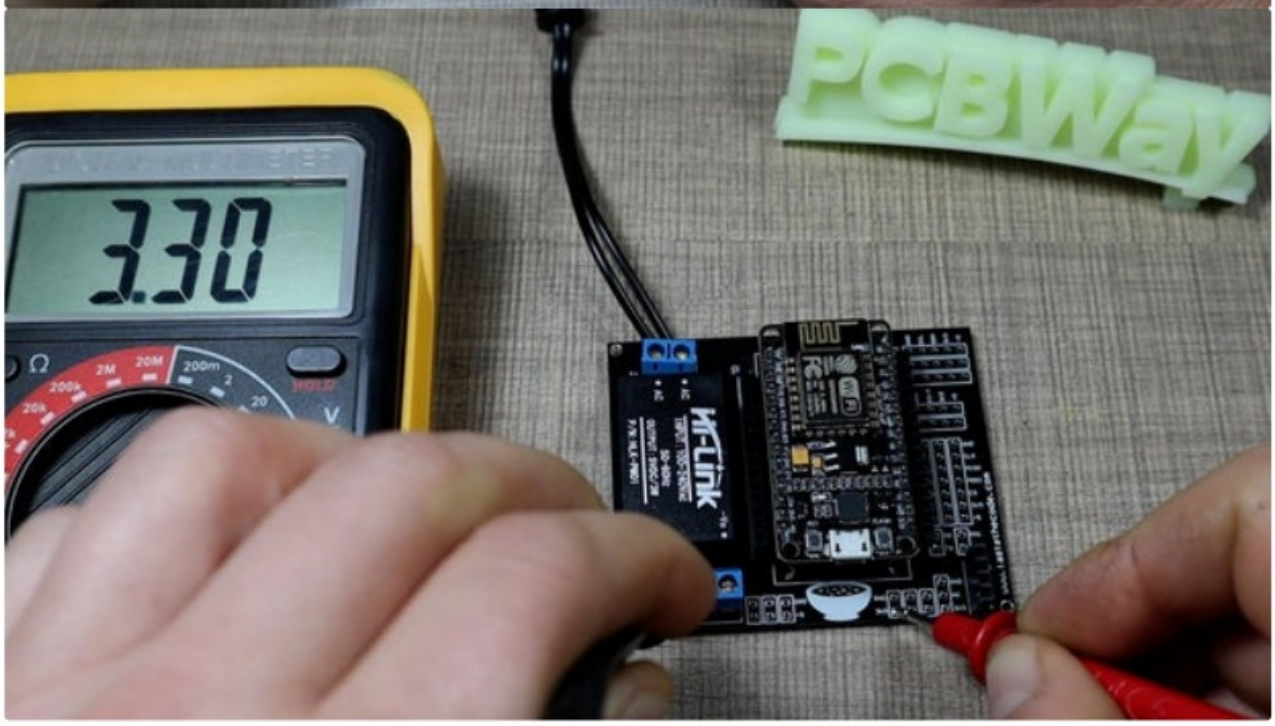
NodeMCU Project Platform
v. 0.1



Step 3: Test Out the Voltages and Sensor

Since this is the first time that I use this PCB for a project, I wanted to make sure that I haven't messed up something so before connecting the Node MCU. I wanted to test out the board voltages that everything is OK. After rst testing out the 5V rail without the Node MCU plugged in, I plugged in the Node MCU to make sure that it was getting the 5V and also that it was providing the 3.3V from its onboard regulator. As a final test, I uploaded a sample sketch for the DHT22 sensor from the DHT Stable library so I could verify that the DHT22 works properly and that I can successfully read out the temperature and humidity.

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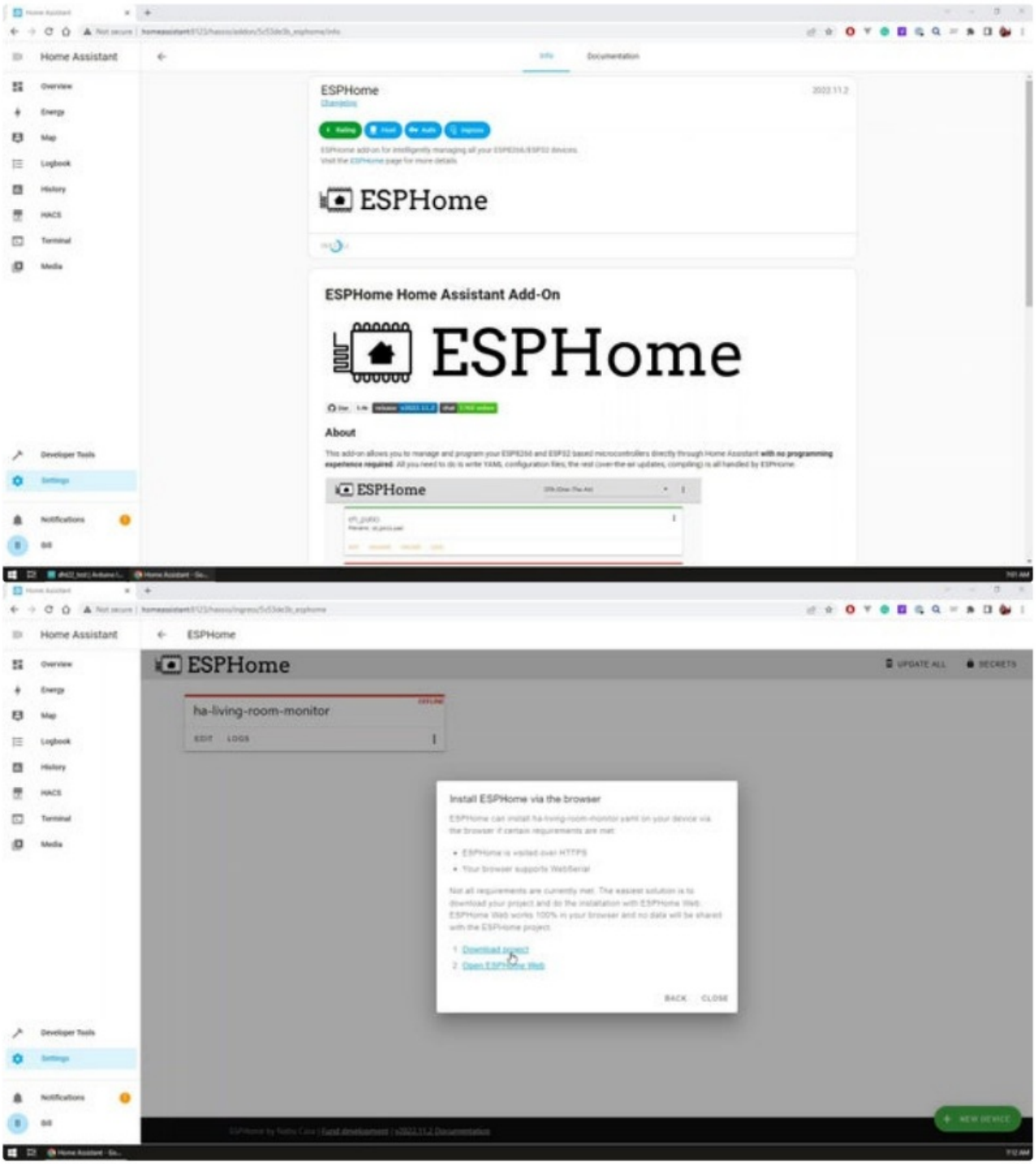
Step 4: Add the Device to Home Assistant

Since everything worked as expected, I then proceeded to install ESPHome to my Home Assistant setup and I've used it to create a new device and upload the provided firmware to the NodeMCU. I had some trouble using the web upload from ESPHome to ash the provided firmware but in the end, I downloaded the ESPHome Flasher and I was able to upload the firmware using that.
Once the initial firmware was added to the device, I modified the .yamlle for it to add the DHT22 handling section and re-uploaded the firmware, now using the over-the-air update from ESPHome.
This went without a hitch and as soon as it was done, the device showed the temperature and humidity values in the dashboard.


Home Assistant
Overview
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Notifications
Bill
ESPHome
Documentation
ESPHome
ESPHome Home Assistant Add-On
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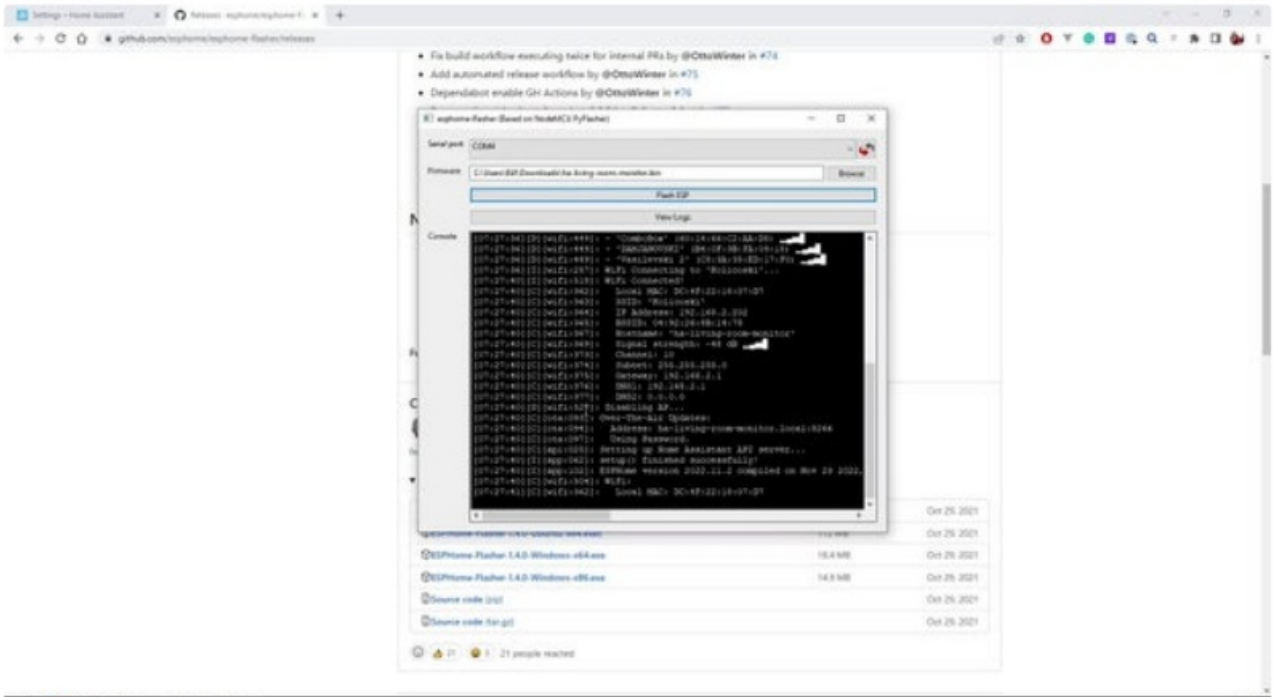
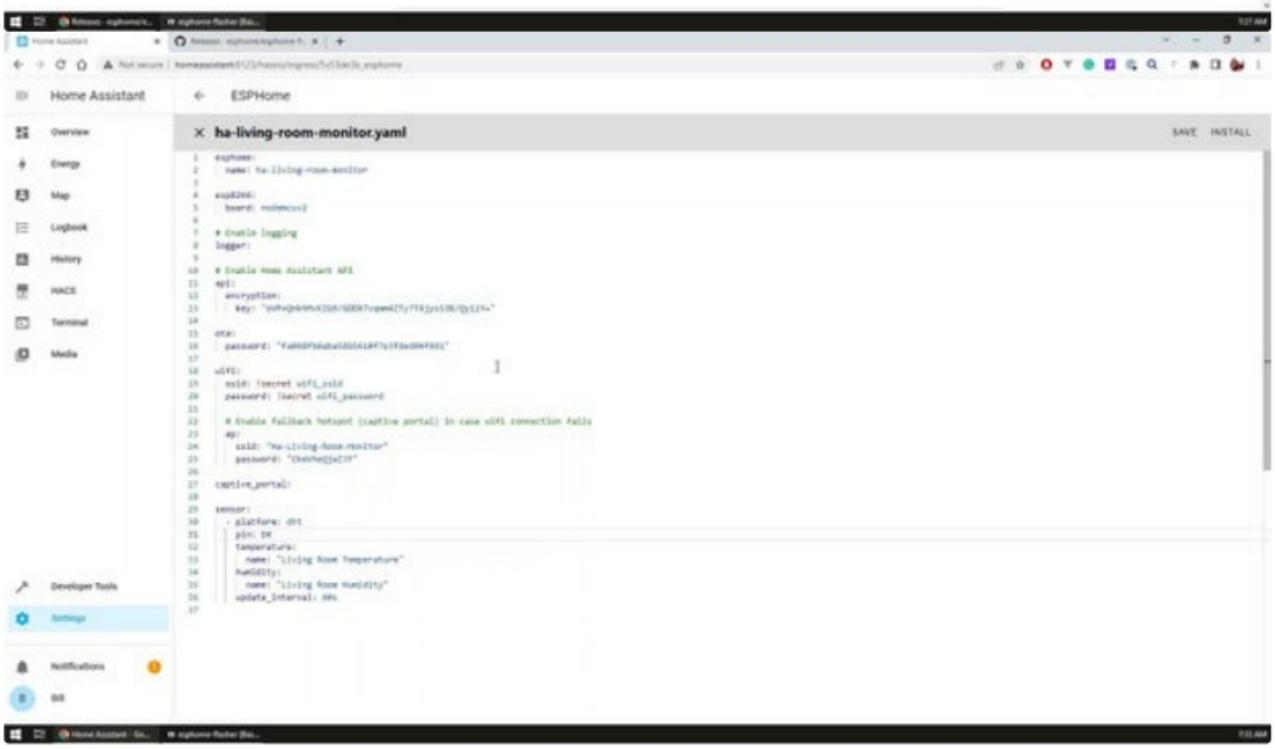
LOGS
Install ESPHome via the browser
BACK
CLOSE
NEW DEVICE


Fix build workflow executing twice for internal PRs by @OttoWinter in #74
Add automated release workflow by @OttoWinter in #75
Dependabot enable GH Actions by @OttoWinter in #76
esphome-flasher (based on NodeMCU PyFlasher)
Serial port
COM4
Firmware
Browse...
Flash ESP
View Logs
Console
ESPHome-Flasher-1.4.0-Windows-x64.exe
15.4 MB
Oct 29, 2021
ESPHome-Flasher-1.4.0-Windows-x86.exe
14.9 MB
Oct 29, 2021
Source code (zip)
Oct 29, 2021
Source code (tar.gz)
Oct 29, 2021
21 people reacted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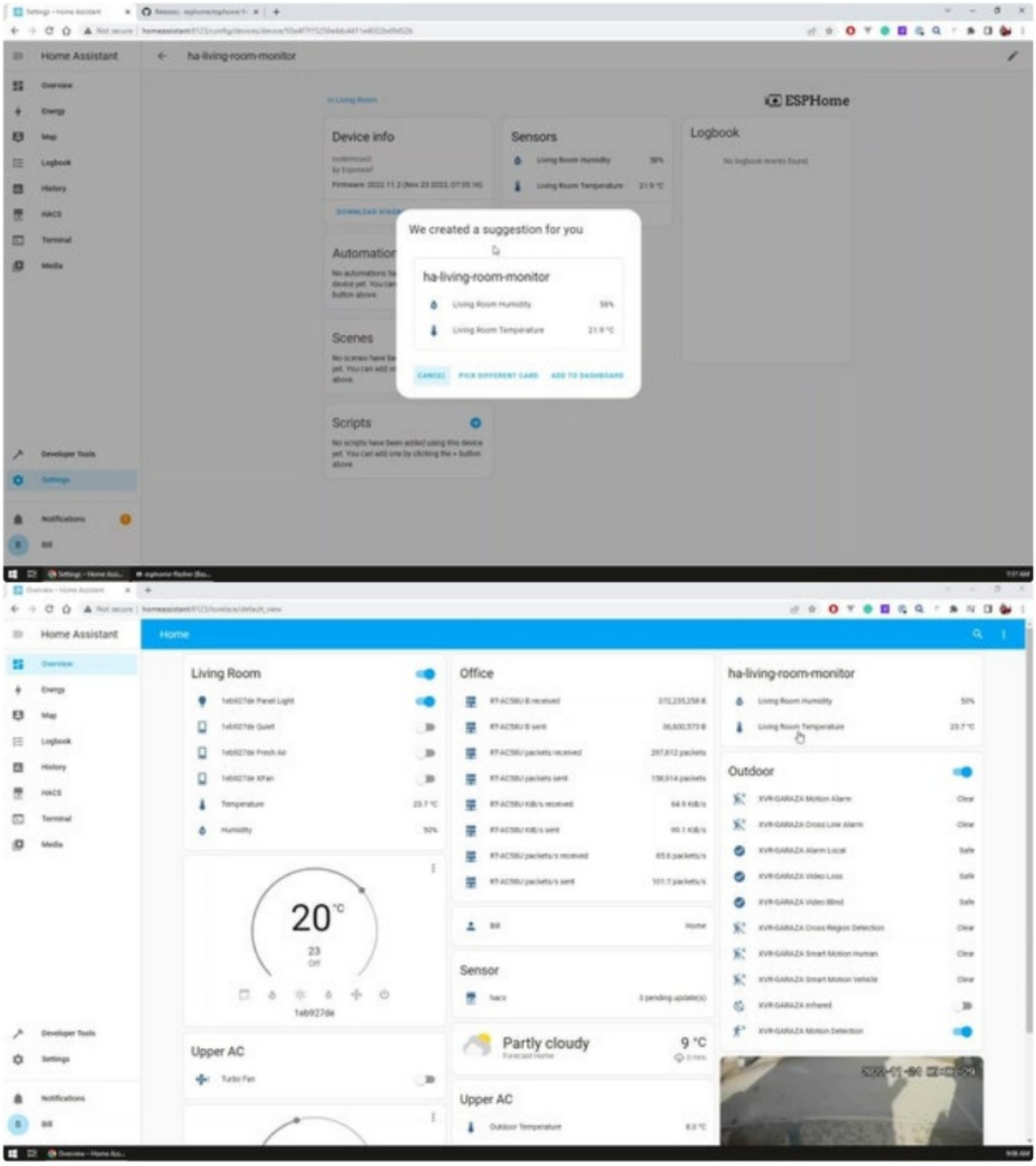
ha-living-room-monitor.yaml
SAVE
INSTALL
esphome:
name: ha-living-room-monitor
esp8266:
board: nodemcuv2
Enable logging
logger:
Enable Home Assistant API
api:
encryption:
key: "
ota:
password: "
wifi:
ssid: !secret wifi_ssid
password: !secret wifi_password
Enable fallback hotspot (captive portal) in case wifi connection fails
ap:
ssid: "Ha-Living-Room-Monitor"
password: "
captive_portal:
sensor:
- platform: dht
pin: D4
temperature:
name: "Living Room Temperature"
humidity:
name: "Living Room Humidity"
update_interval: 60s



Step 5: Make a Permanent Enclosure

I wanted this monitor to be mounted next to my current thermostat that I have in my home for the pellet stove so I used an electrical junction box to make an enclosure. The DHT22 sensor is mounted in a hole made in the electrical box so it can monitor the conditions on the outside of the box and not be a affected by any heat coming out from the power supply.

To prevent any heat build-up in the box, I also made two holes on the bottom and top of the electrical box so air can circulate through it and release any heat.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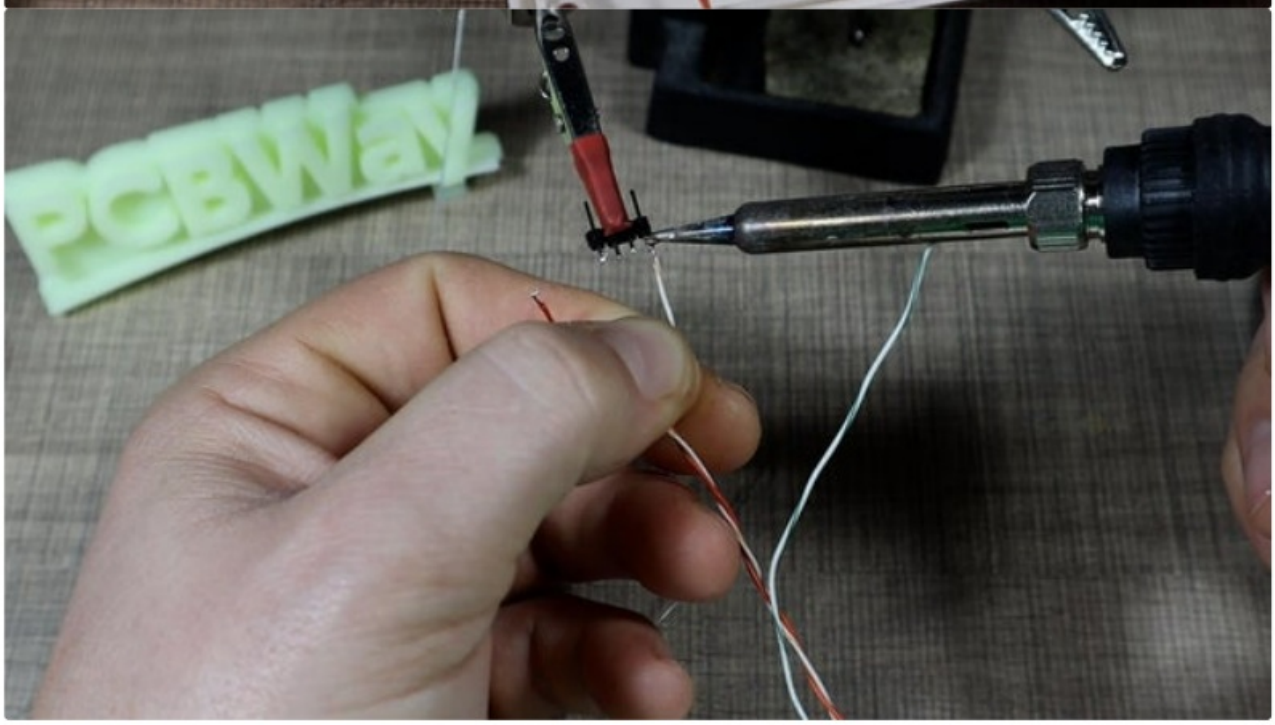
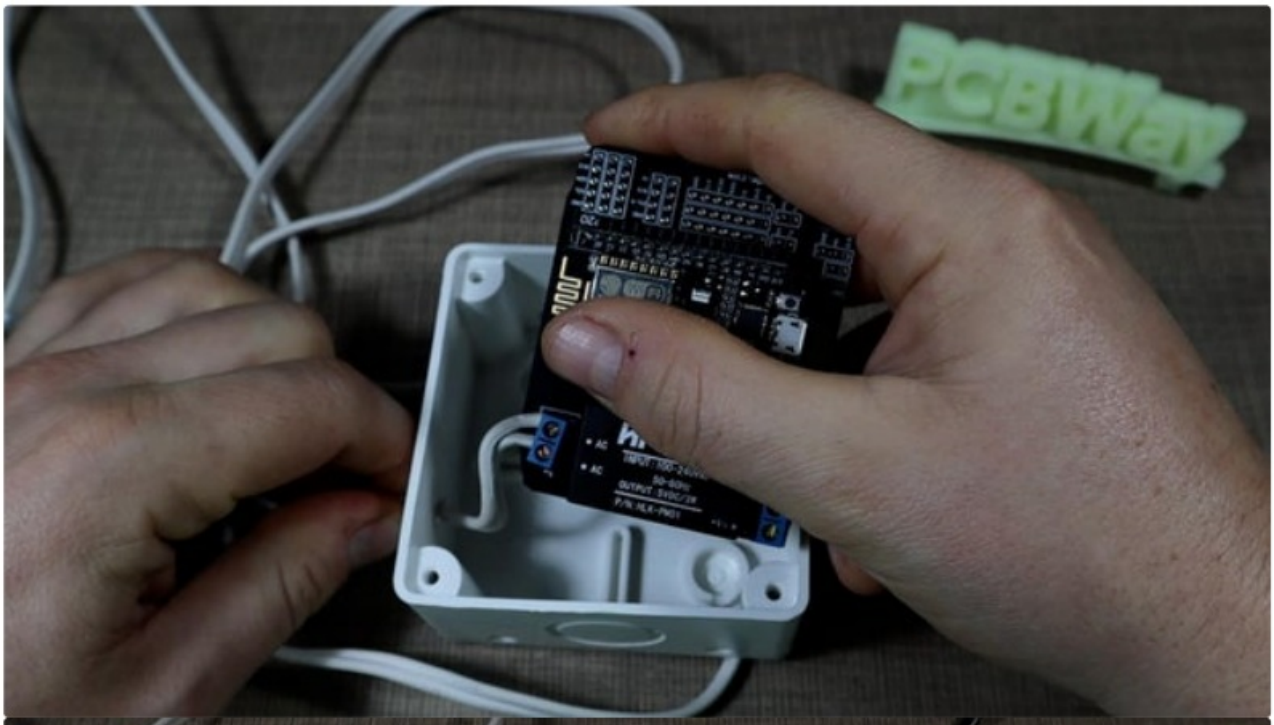

PCBWay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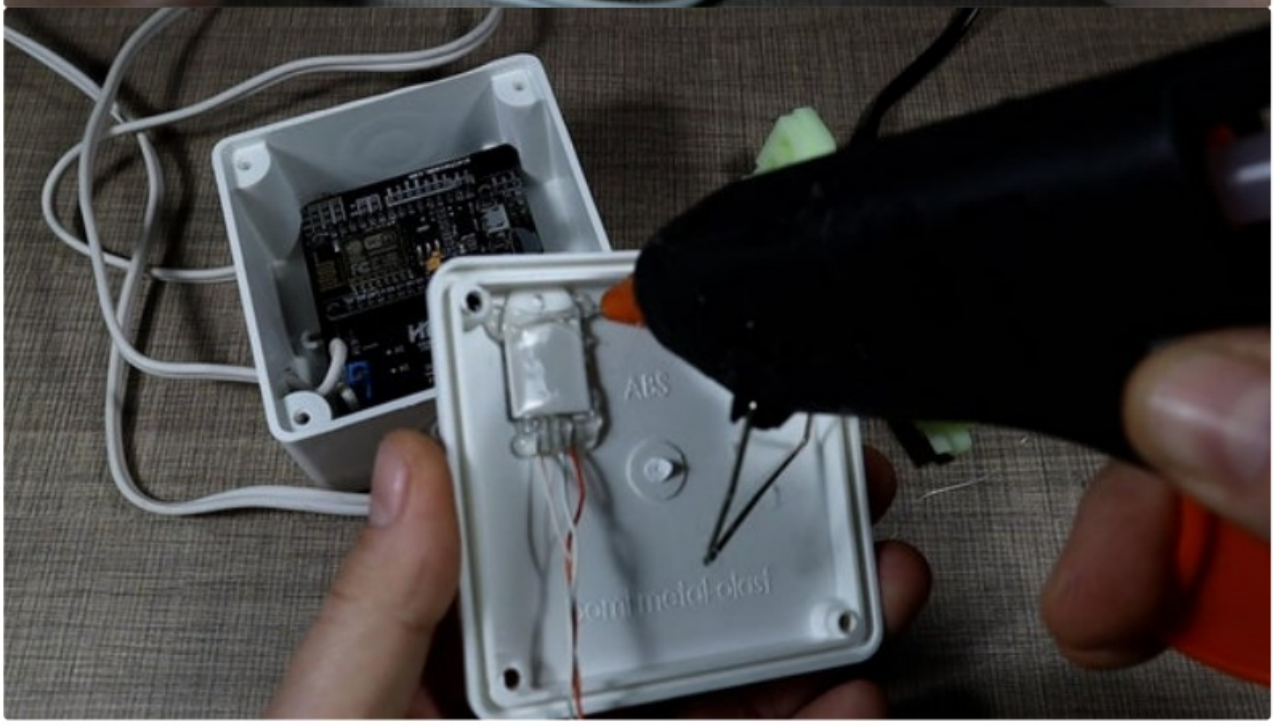
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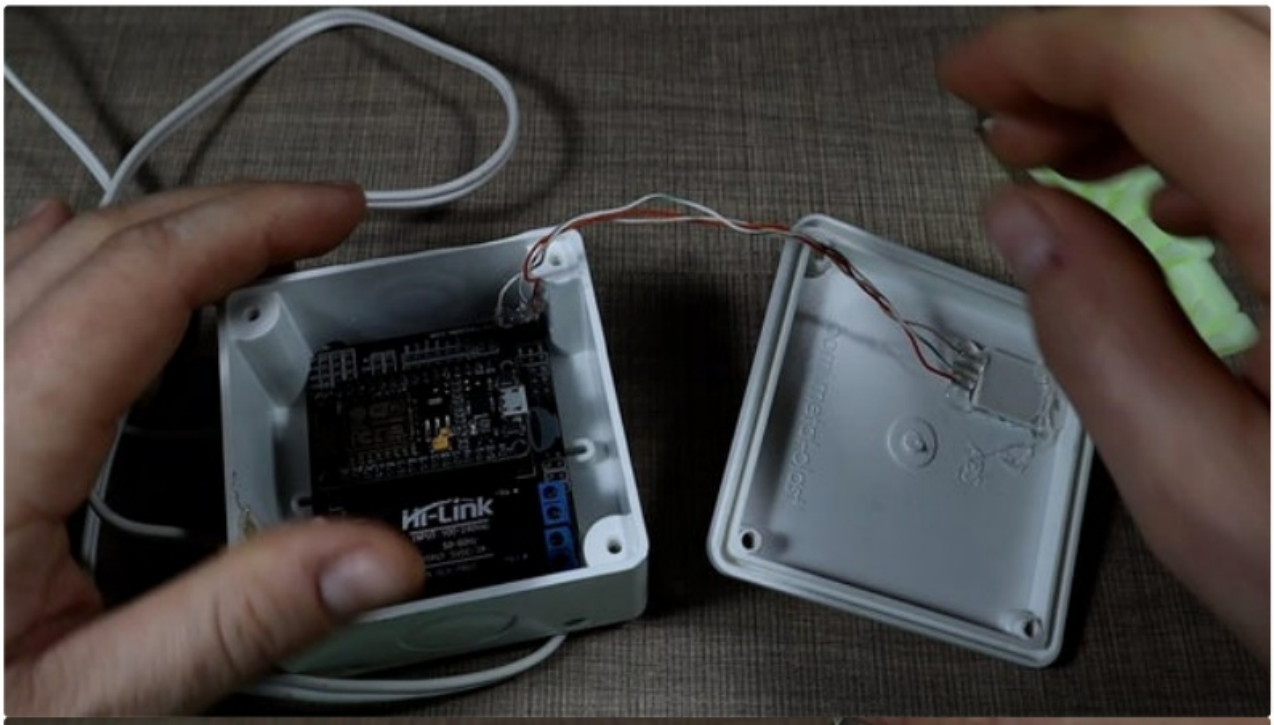
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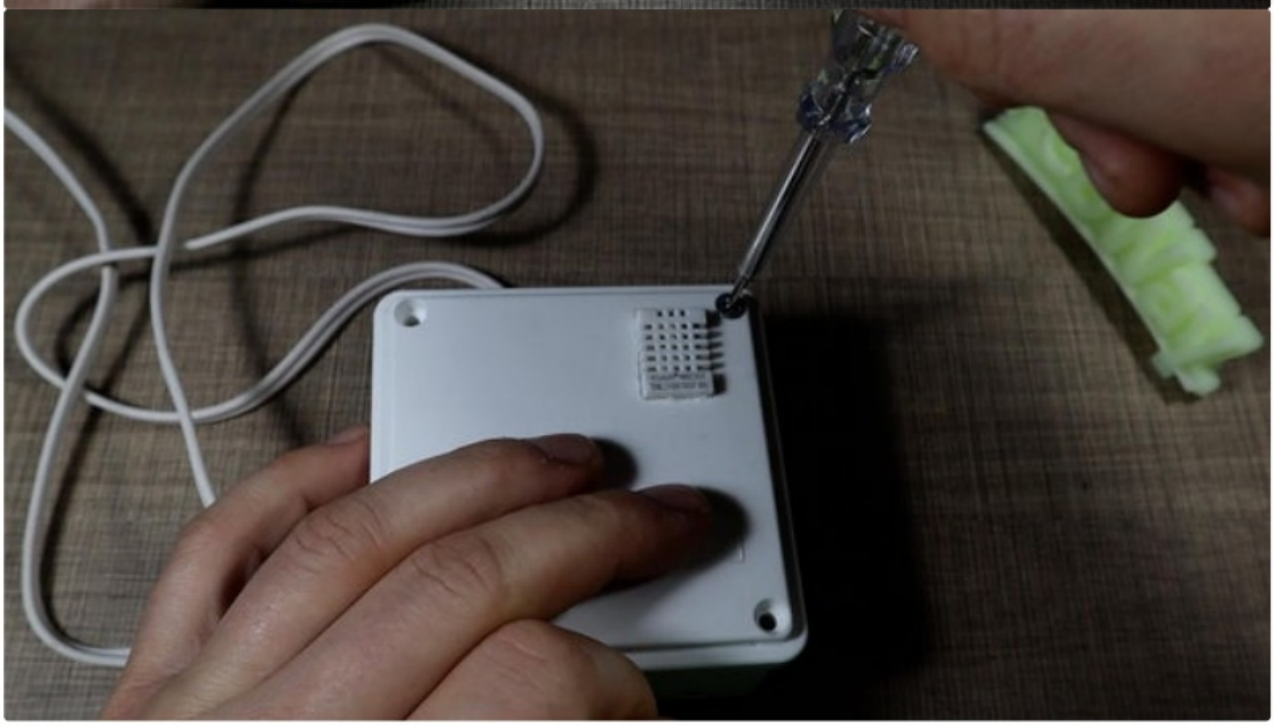


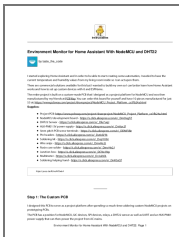
Step 6: Mount in My Living Room

To mount the electrical box, I used double-sided tape to stick the box to the wall and to the thermostat next to it. For now, this is only a test and I might decide that I want to change this location so I did not want to make any new holes in the wall.

Step 7: Next Steps

If everything goes well, I might upgrade this project to act as a thermostat for my pellet stove so I could entirely ditch the commercial one. It all depends on how Home Assistant will work out for me in the long run but we'll have to wait to see that.
In the meantime, if you liked this project, be sure to also check my other ones on Instructables as well as my YouTube channel. I have many others coming in so please consider subscribing as well.

Documents / Resources

	instructables DHT22 Environment Monitor [pdf] Instruction Manual DHT22 Environment Monitor, Environment Monitor, DHT22 Monitor, Monitor, DHT22

References

- Yours for the making - Instructables
- Environment Monitor for Home Assistant With NodeMCU and DHT22 : 7 Steps - Instructables
- Taste_the_code's Profile - Instructables
- GitHub - esphome/esphome-flasher: Simple GUI tool to flash ESPs over USB
- GitHub - RobTillaart/DHTstable: Arduino Library for the DHT temperature and humidity sensor.
- Taste_the_code's Projects - Instructables
- NodeMCU Project Platform - Share Project - PCBWay
- China PCB Prototype & Fabrication Manufacturer - PCB Prototype the Easy Way