FH AACHEN
UNIVERSITY OF APPLIED SCIENCES

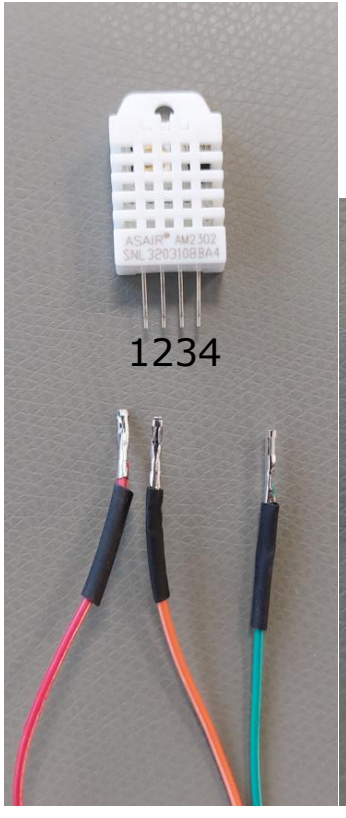
Bauanleitung für das Smart Meter

Benötigte Hardware/Software

- Software
  - Putty
  - Filezilla
  - Arduino DIE
  - Raspberry Pi Imager
- Hardware
  - Innensechskant Schraubendreher Größe 5.5

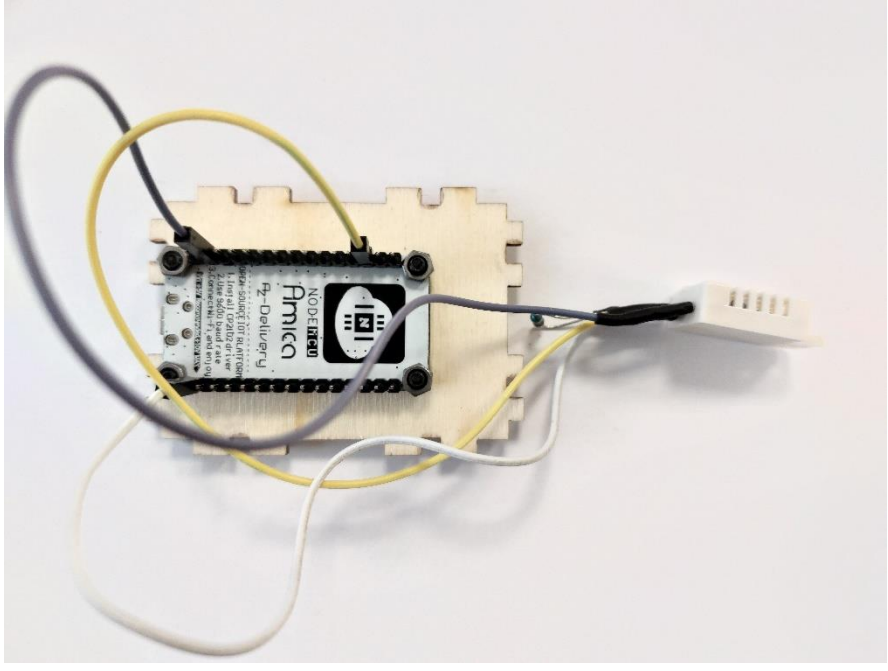
Löten und Verkabeln

- Kunststoffkappen von den Kabeln entfernen
- Schrumpfschlauch zuschneiden und Überziehen
- Kabel an die Pins anlöten
- An Pin 1 kommt die Spannungsversorgung
- An Pin 2 kommt das Signal Kabel
- Pin 3 wird ausgelassen
- An Pin 4 kommt GND



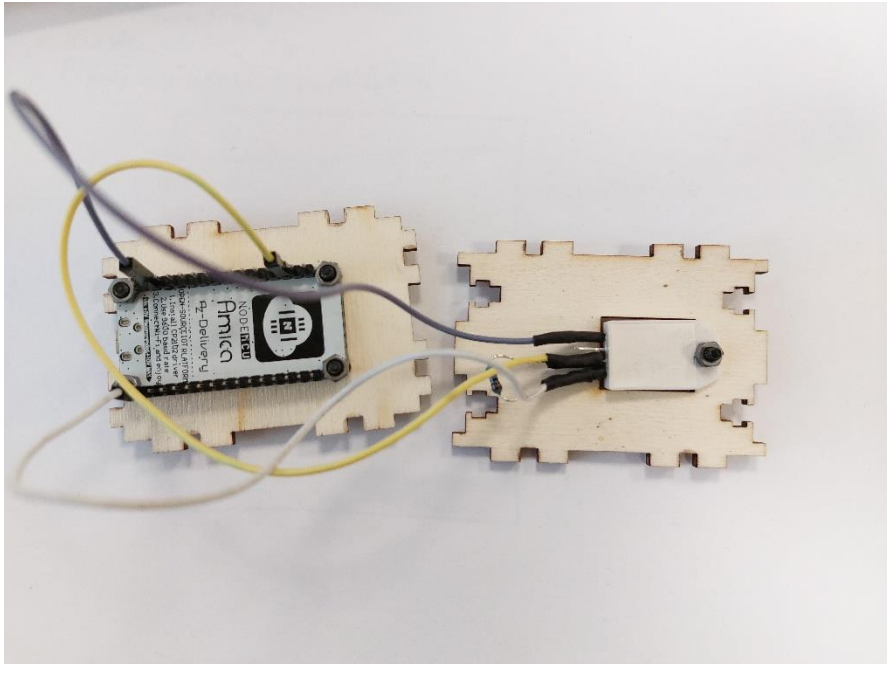
Bauanleitung

- Der Pin 1 des DHT wird mit dem Pin Vin des Mikrocontrollers verbunden
- Der Pin 2 des DHT wird mit dem Pin D2 des Mikrocontrollers verbunden
- Der Pin 4 des DHT wird mit dem Pin GND des Mikrocontrollers verbunden
- Den verkabelten Mikrocontroller richtig platzieren und verschrauben

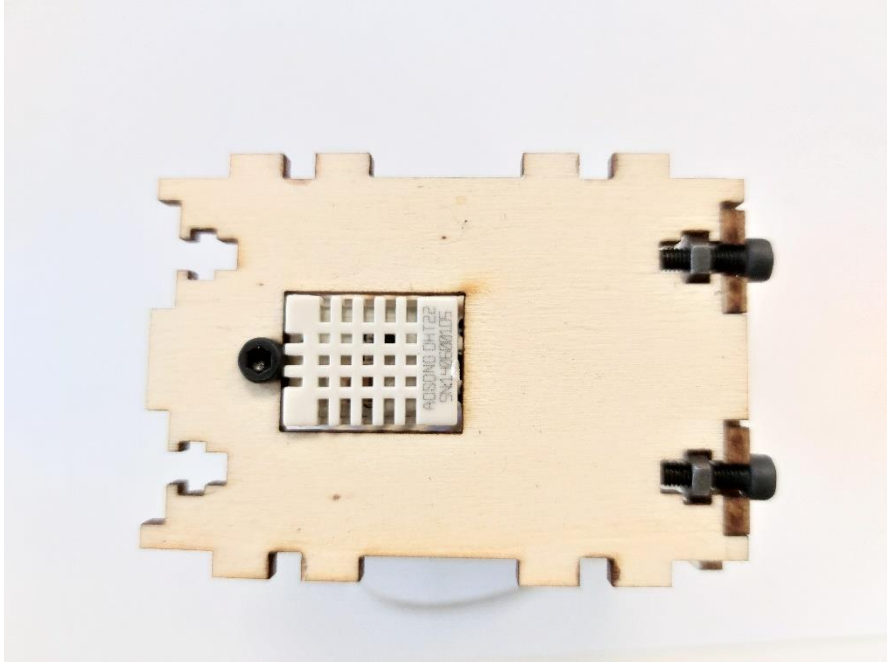


Bauanleitung

- Den DHT22 in das Seitenteil mit der passenden Aussparung platzieren und verschrauben

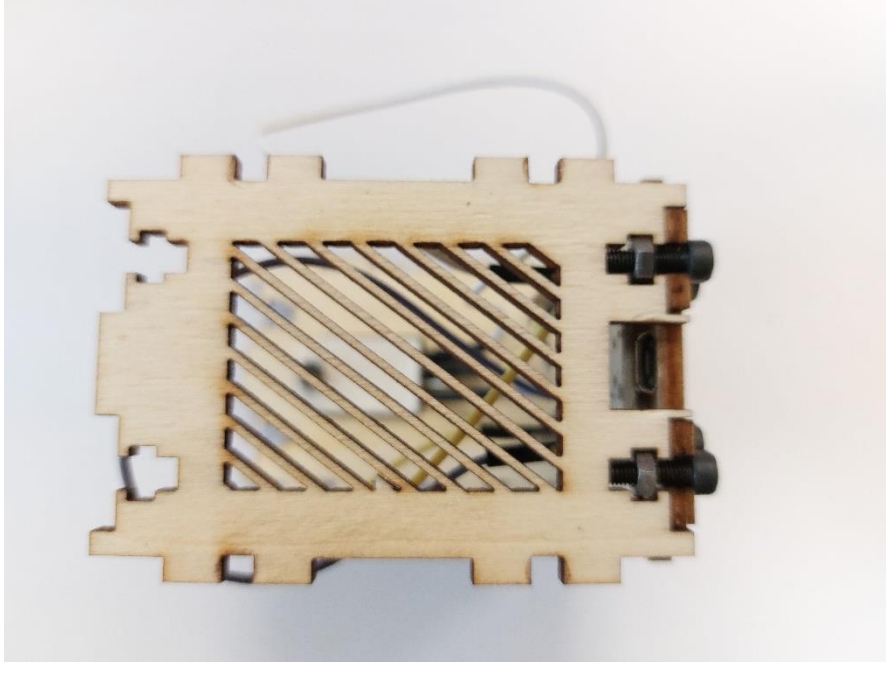


Bauanleitung



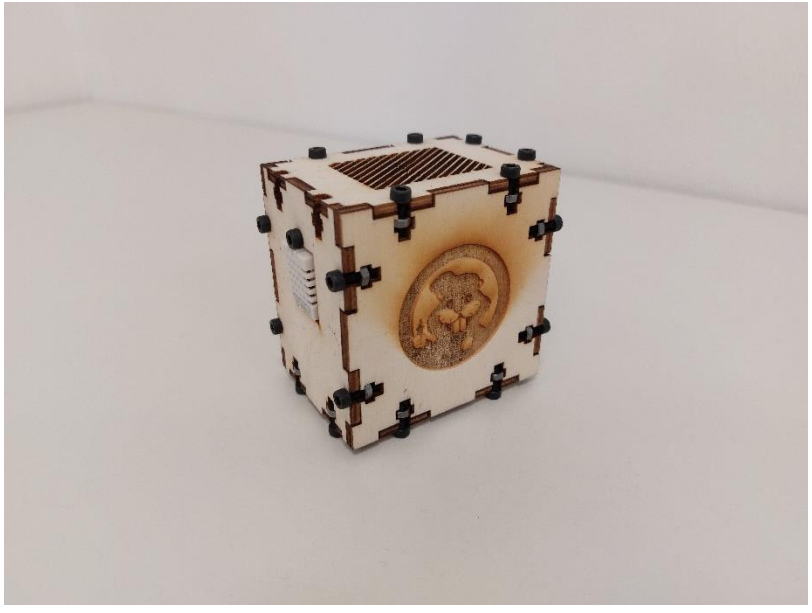
Bauanleitung

- Das gegenüberliegende Seitenteil verschrauben



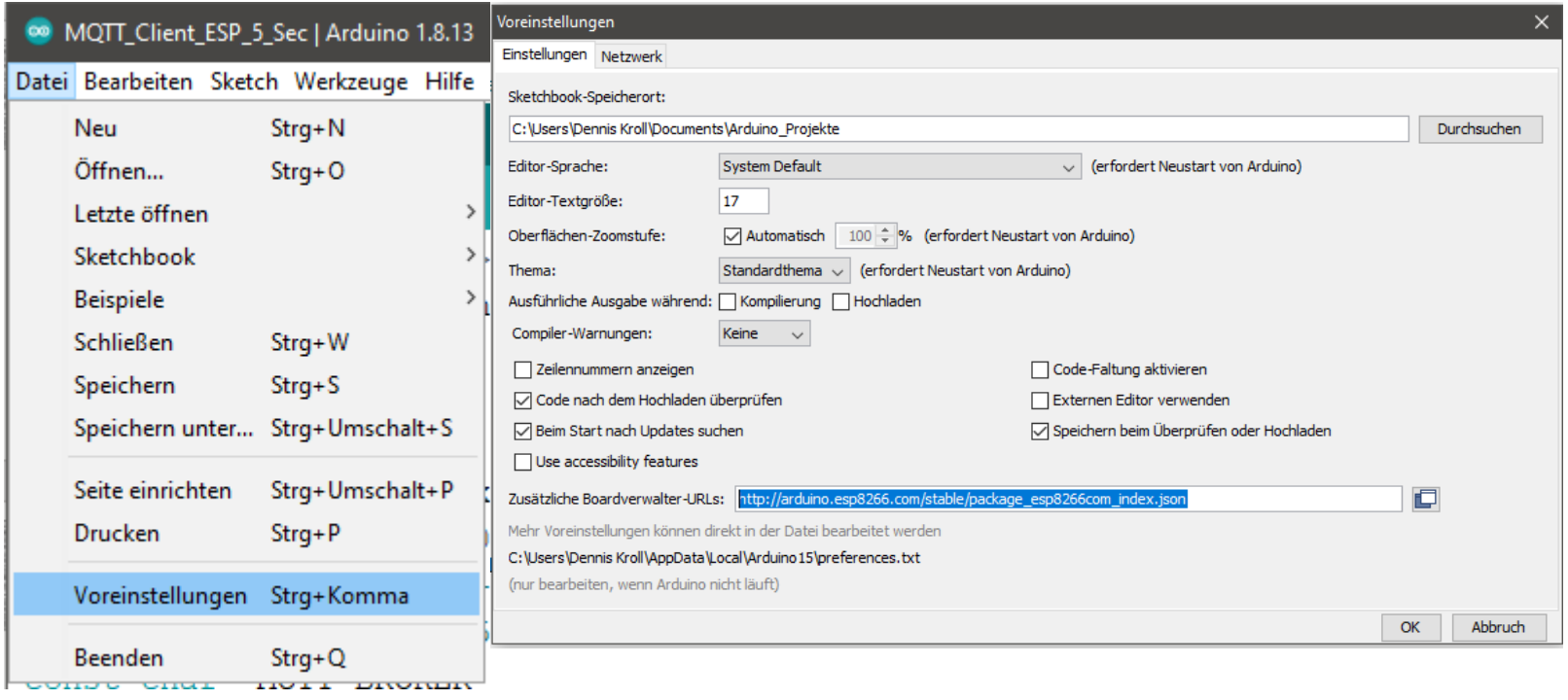
Bauanleitung

- Die restlichen Seiten montieren und verschrauben

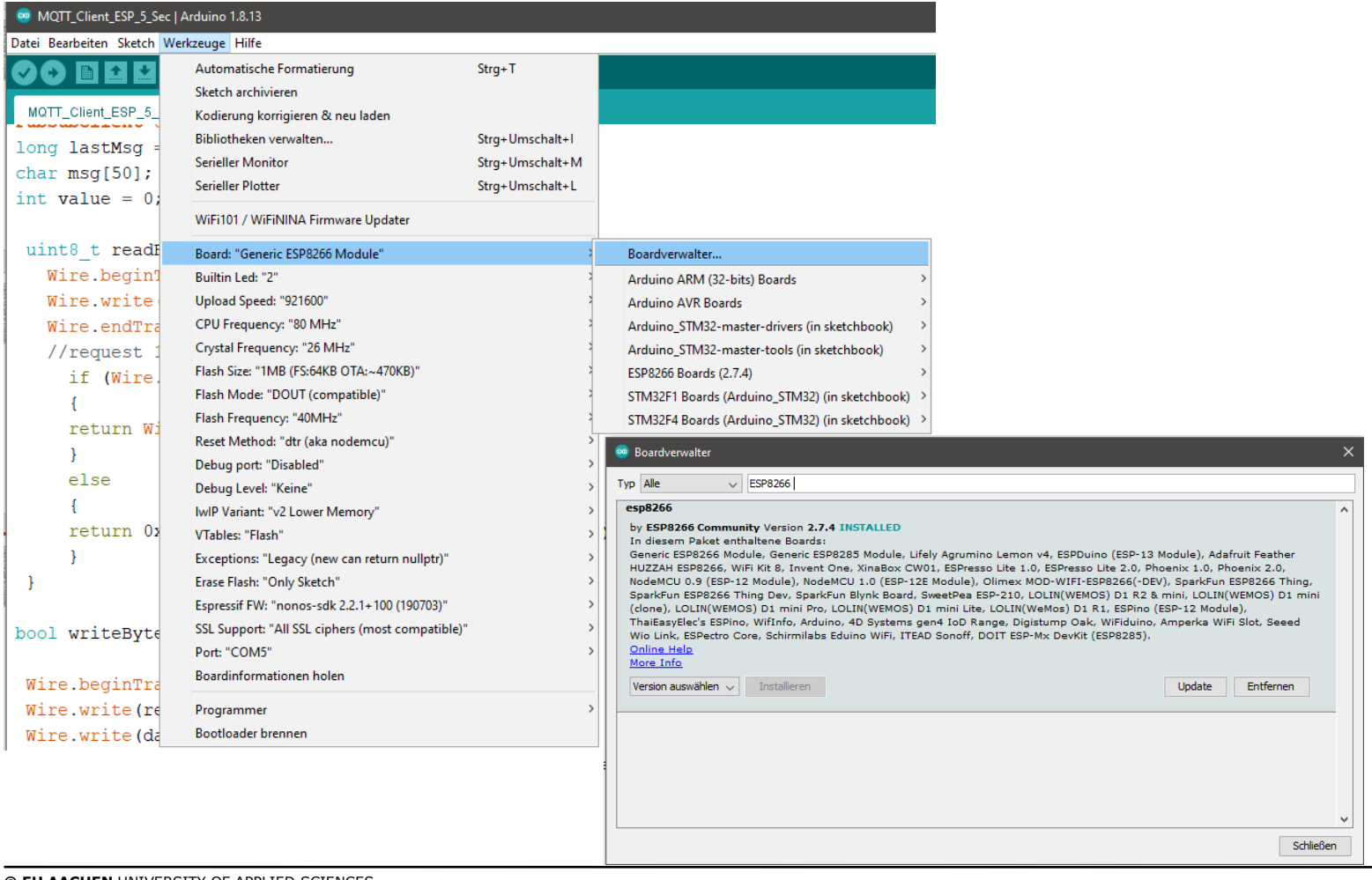


Software Installation ESP8266

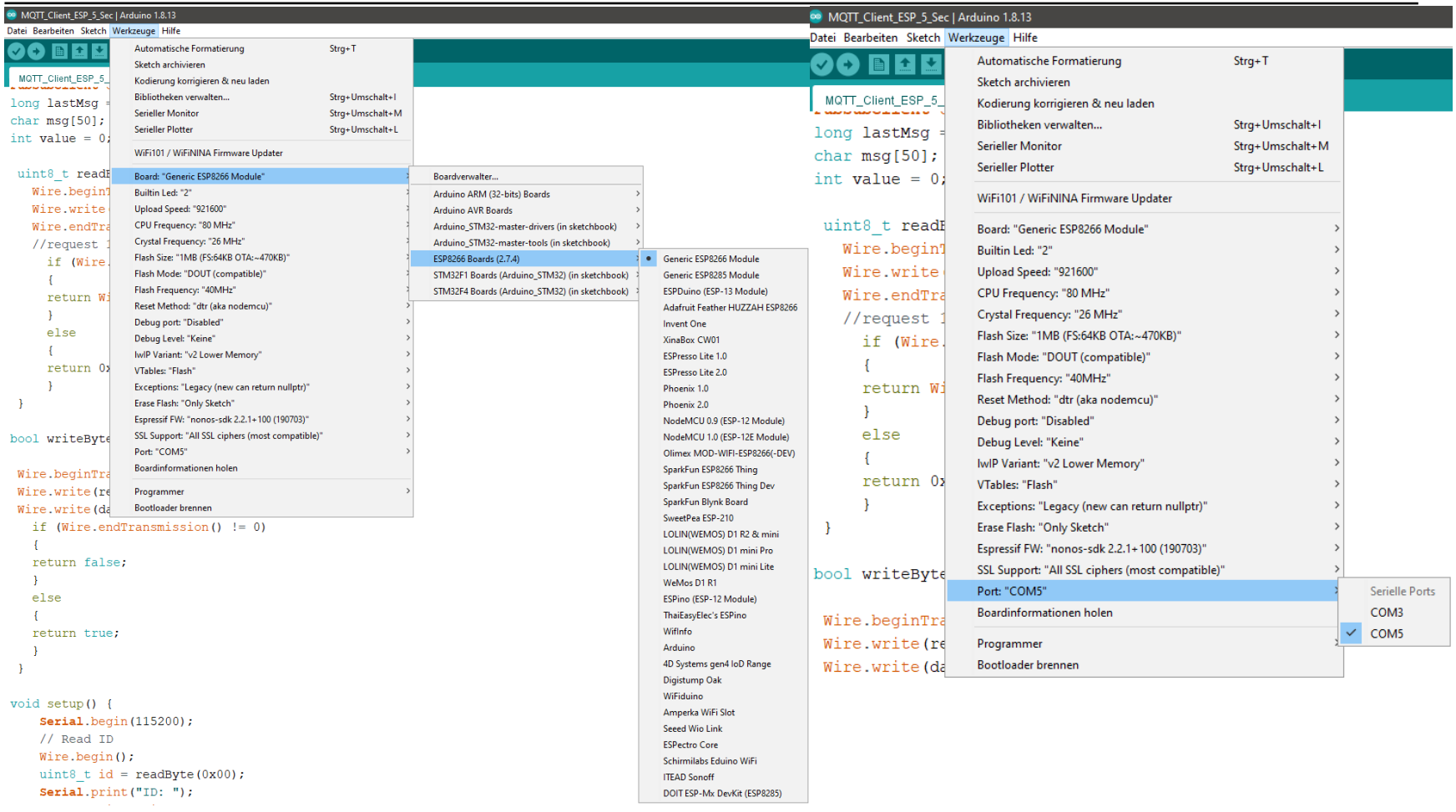
- Arduino IDE Starten
- ESP8266 Bibliothek installieren
- http://arduino.esp8266.com/stable/package_esp8266com_index.json



Software Installation ESP8266

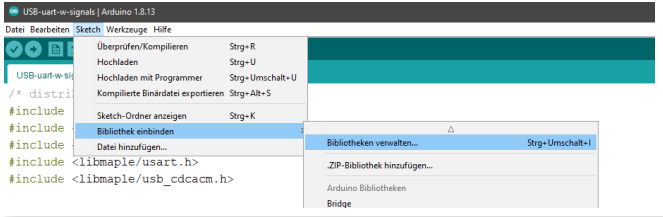


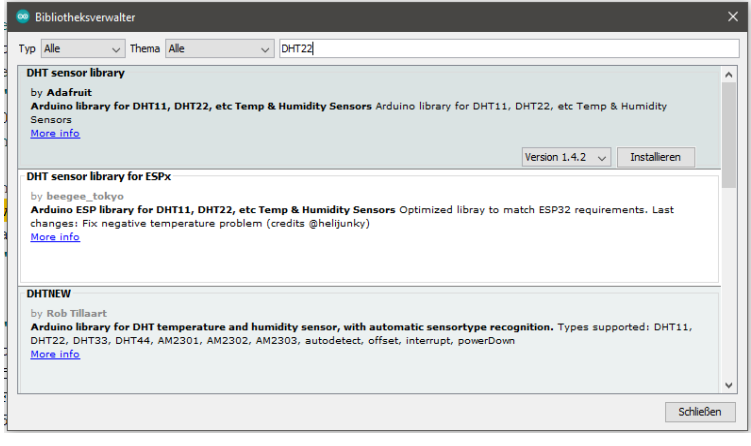
Software Installation ESP8266



Software Installation ESP8266

- Arduino IDE Starten
- Programmcode MQTT_Client_ESP_5_Sec reinladen
- Fehlende Bibliotheken installieren
  - PubSubClient
  - BME280
  - DHT sensor library (Abhänigkeiten mit installieren)
  - ~~Adafruit Unified Sensor~~
- Programm auf dem Mikrocontroller flashen

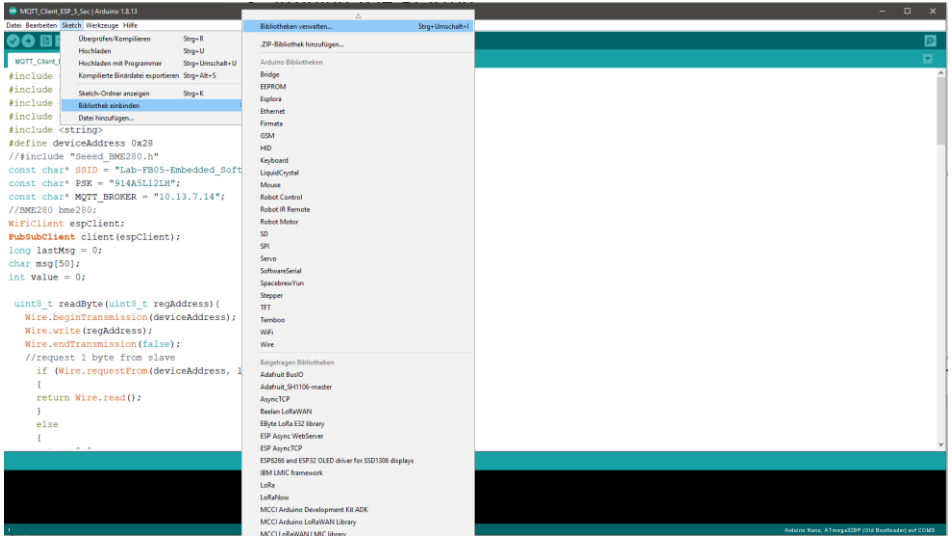




Software Installation ESP8266

- Arduino IDE Starten

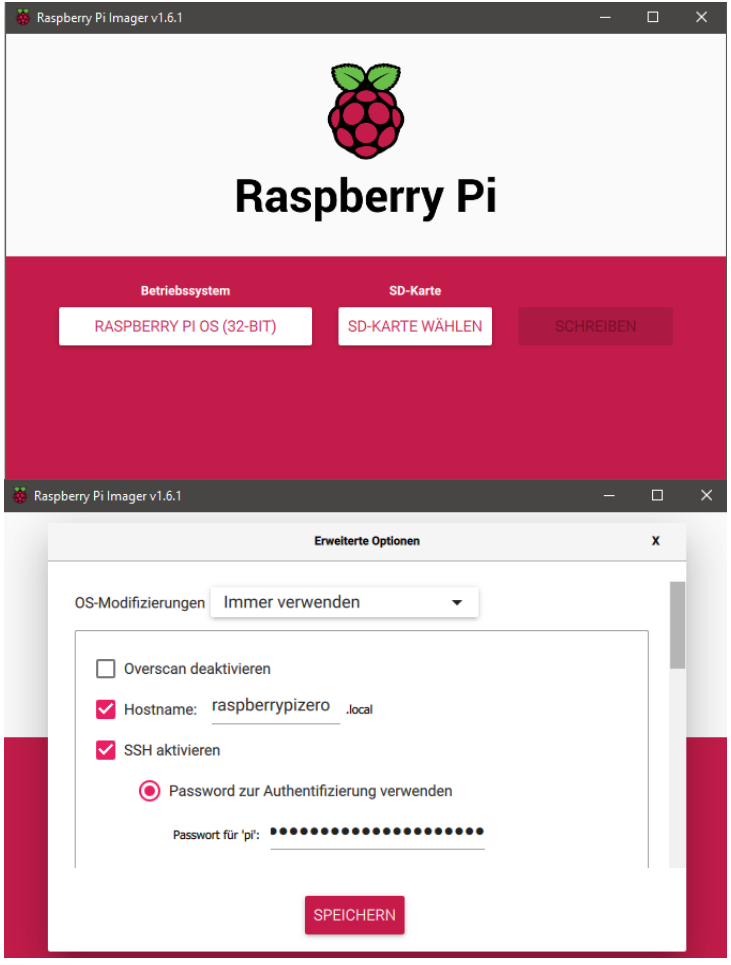
- Programmcode MQTT_Client_ESP_5_Sec reinladen
- Fehlende Bibliotheken installieren
  - PubSubClient
  - BME280



- Programm auf dem Mikrocontroller flashen

Rapberry Pi Installation

- Raspberry Pi Imager
  - Strg+Shift+x



Software Installation Raspberry Pi

- Putty ausführen
  - Ip des Raspberry Pi eingeben
  - Benutzer:pi
  - Password:(euer Passwort eingeben)
- MQTT Installation
  - sudo pip3 install paho-mqtt python-etcd
  - python3 -m pip install influxdb
  - sudo apt-get update
  - sudo apt-get upgrade –y
  - sudo apt-get install mosquitto mosquitto-clients –y
  - mosquitto_sub -d -t /home/

Software Installation Raspberry Pi

- Installation von InfluxDB
  - wget -qO- https://repos.influxdata.com/influxdb.key | sudo apt-key add
  - source /etc/os-release
  - echo "deb https://repos.influxdata.com/debian $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/influxdb.list
  - sudo apt update && sudo apt install -y influxdb
  - sudo systemctl unmask influxdb.service
  - sudo systemctl start influxdb
  - sudo systemctl enable influxdb.service

Software Installation Raspberry Pi

- Installation von InfluxDB
  - influx
  - create database home
  - use home
  - create user grafana with password '<123456>' with all privileges
  - grant all privileges on home to grafana
  - show users
  - Exit
  - sudo nano /etc/influxdb/influxdb.conf
  - -> unter [http] # enable = true kommentar entfernen zu enable = true
  - # bind -address = ":8086" Kommentar entfernen zu bind -address = ":8086"

Software Installation Raspberry Pi

- Installation von InfluxDB für den PI Zero
  - sudo apt-get install -y adduser libfontconfig1
  - wget https://dl.grafana.com/oss/release/grafana-rpi_7.5.4_armhf.deb
  - sudo dpkg -i grafana-rpi_7.5.4_armhf.deb
  - sudo /bin/systemctl daemon-reload
  - sudo /bin/systemctl enable grafana-server
  - sudo /bin/systemctl start grafana-server

Software Installation Raspberry Pi

- Installation von InfluxDB für den PI 4B/3B/2B
  - wget -q -O - https://packages.grafana.com/gpg.key | sudo apt-key add –
  - echo "deb https://packages.grafana.com/oss/deb stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list
  - sudo apt-get update
  - sudo apt-get install -y grafana
  - sudo /bin/systemctl enable grafana-server
  - sudo /bin/systemctl start grafana-server

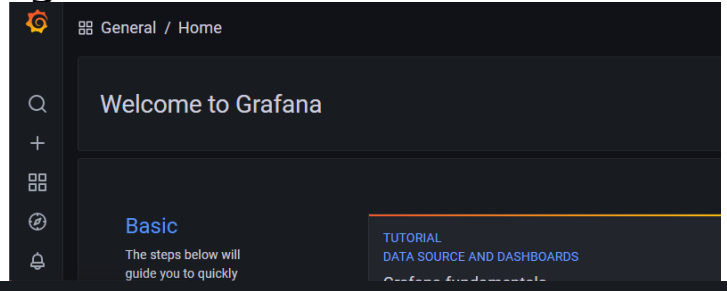
Software Installation Raspberry Pi

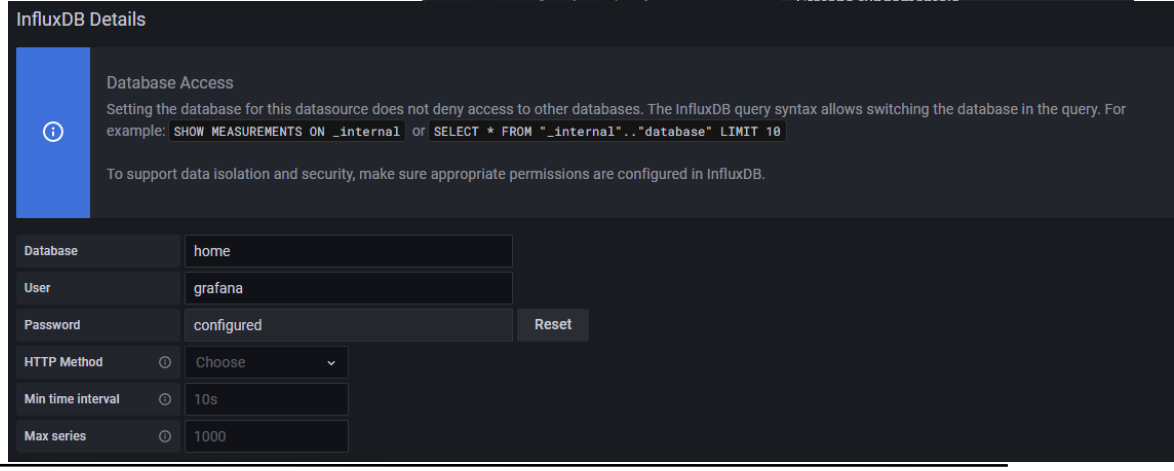
- Installation Data Bridge
  - Starten von Filezilla
  - Upload des Scripts Sensor_software_pi.py in den Ordner home/pi/
  - Starten des Scrips mit python3 /home/pi/Sensor_software_pi.py
- Script in den Startup Einfügen
  - crontab –e
  - Den ersten Reiter auswählen
  - In die letzte Zeile

  @reboot python3 /home/pi/Sensor_software_pi.py

Grafana einstellen

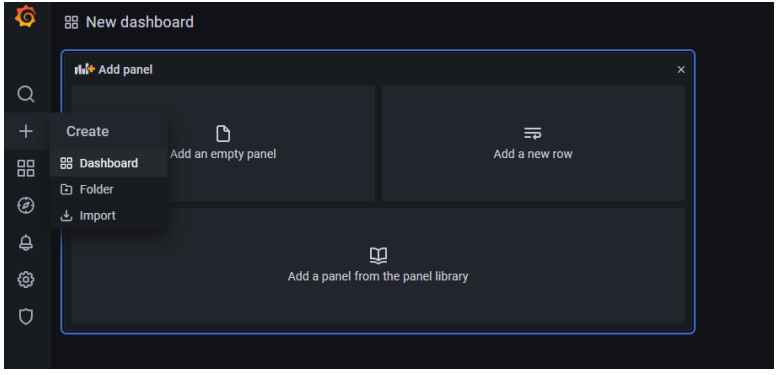
- Im Browser die IP eures Raspberry Pi eingeben und :3000/login anhängen
- Bei Benutzernamen und Passwort admin eingeben und neues Passwort erstellen
- Bei configuration auf Data sources klicken
- Add Data source und Influx DB auswählen
- Bei URL: http://localhost:8086 eingeben
- bzw. localhost:8086
- Database:home
- User:grafana
- Password:123456



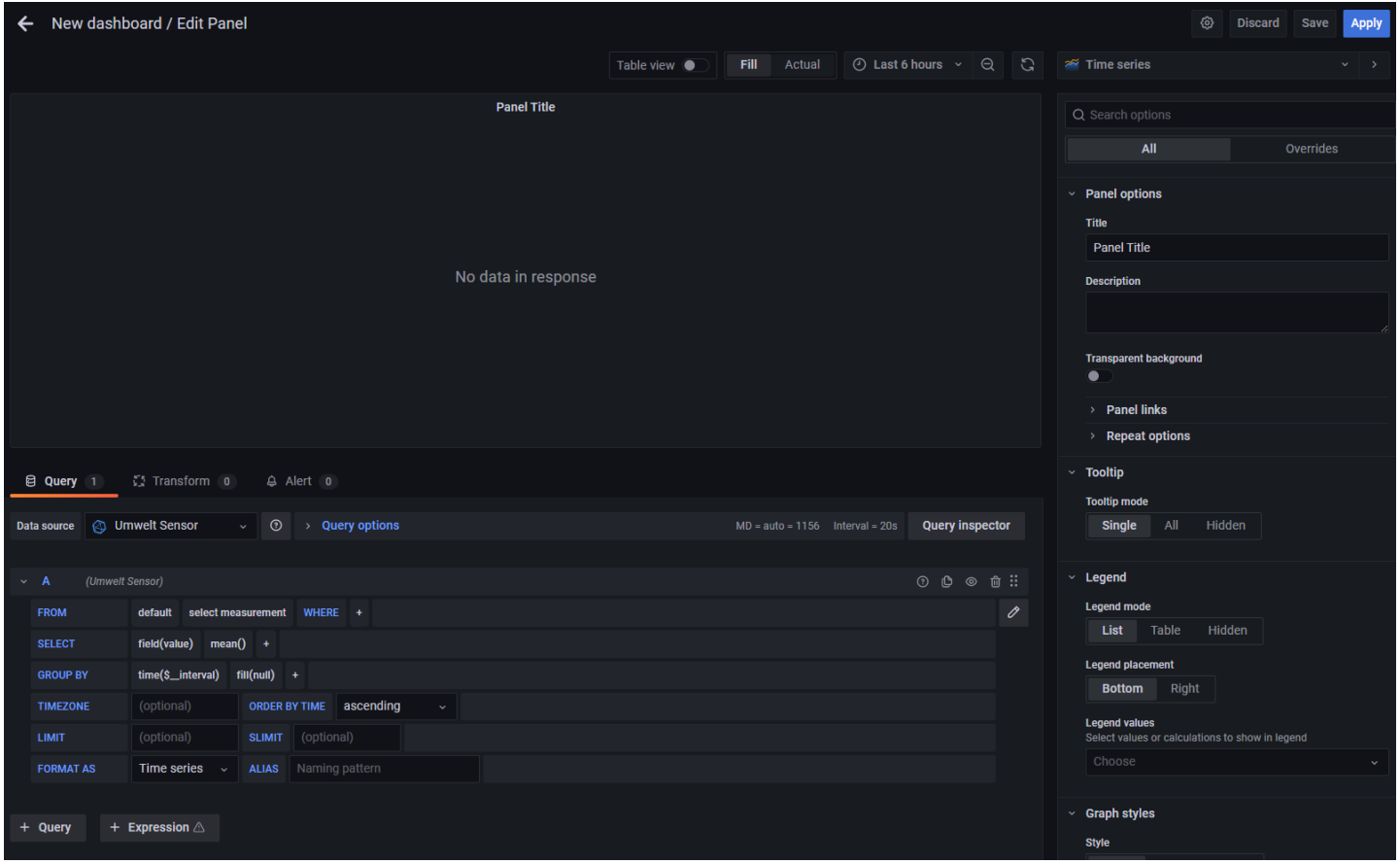


Grafana neues Dashbord hinzufügen

- Auf + Dashboard klicken
- Add an empty panel anklicken



Grafana neues Dashbord hinzufügen



Grafana Dashbord zugriff für alle

- sudo nano /etc/grafana/grafana.ini
  - Strg+w
    - auth.anonymous
    - enable = true
    - Strg+x
    - y
    - Sudo reboot now