

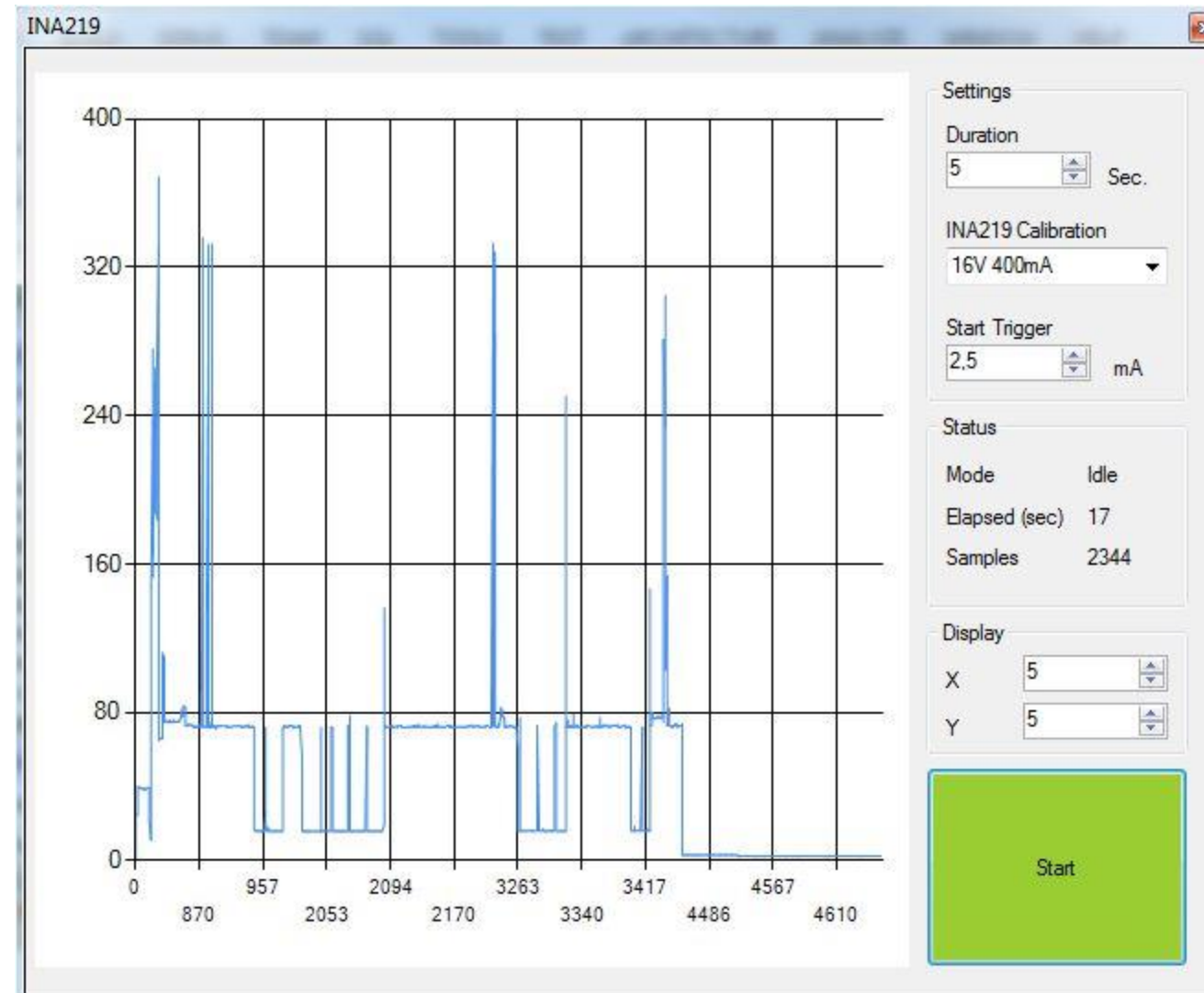
IoT @ FMI

Lecture 5

22.03.2017

Power Consumption

- ESP8266 (2.9-4.2v)
 - Active: 30-300 ma
 - Sleep: 0.1 – 10 ma
- Arduino (Atmega328p)
 - Active: 4-20 ma
 - Sleep: 0.001 – 0.01 ma
- Raspberry Pi
 - Active: 80-240 ma
- BLE/Zigbee modules
 - 0.02ma (BLE), 0.05ma (Zigbee)



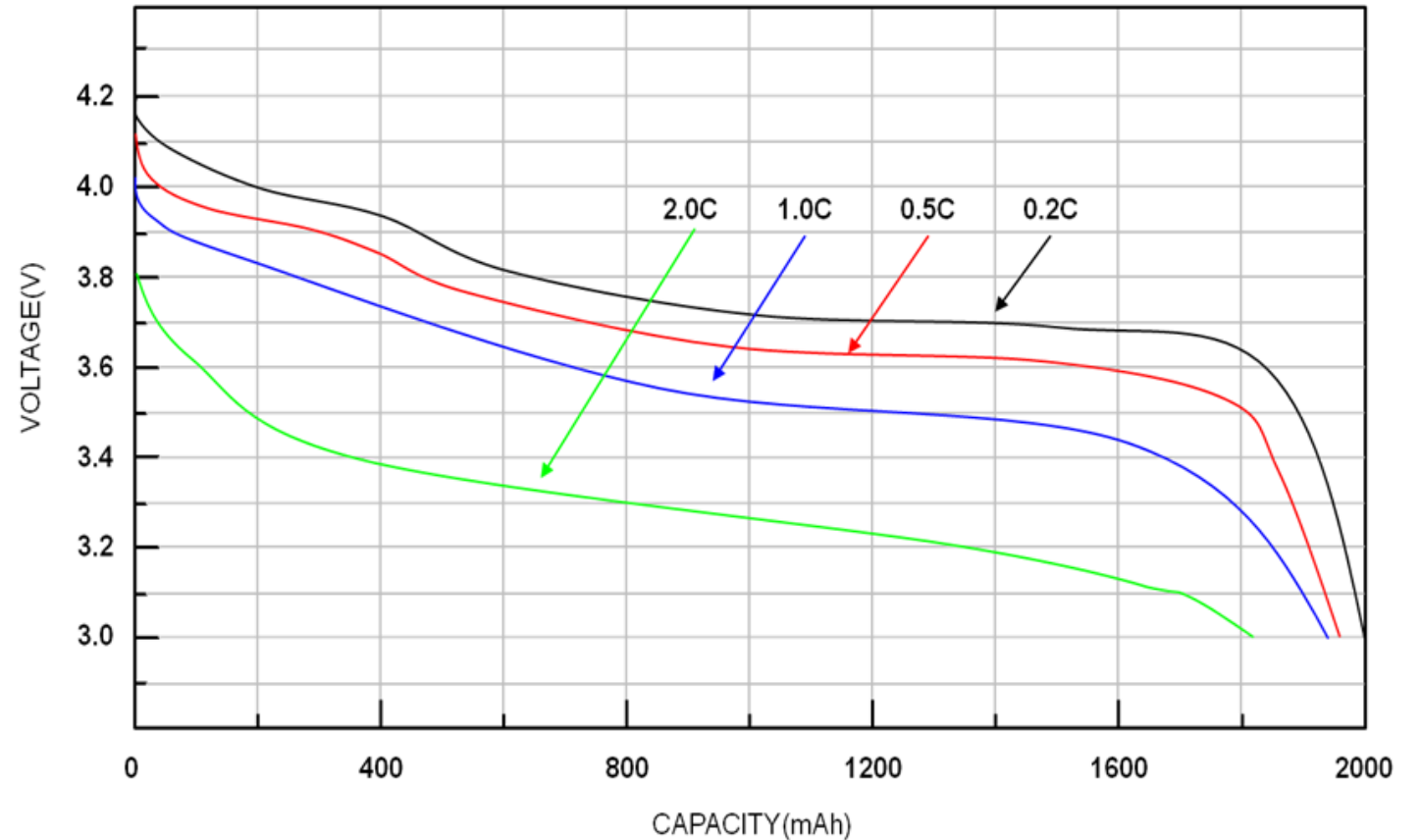
Types of Batteries

Type	Voltage (V)	Capacity (mAh)	Resistance	Self Discharge
Coin Cell 2032	3.00	200	High	Low
AAA/AA/C/D (Alkaline)	1.2 – 1.5	1000/2000/5000/10000	Medium	Low
AAA/AA/C/D (NiMh)	0.2 – 1.3	same	Medium	Med/Low
AAA/AA/C/D (Ni-Zn)	1.3 – 1.6	Same	>	?
LiPo (Generic)	3.3 – 4.2 (3.7)	10 – 5000	Low	Low
LiPo - 16850	Same	1000 – 5000		
LiPo – 14500	Same	500 – 1000	Low	Low



Battery Discharge Curve

- Internal Resistance increases with decreased capacity
- 1 ohm @ 300 ma = 0.3v voltage Drop



ESP8266 – DeepSleep

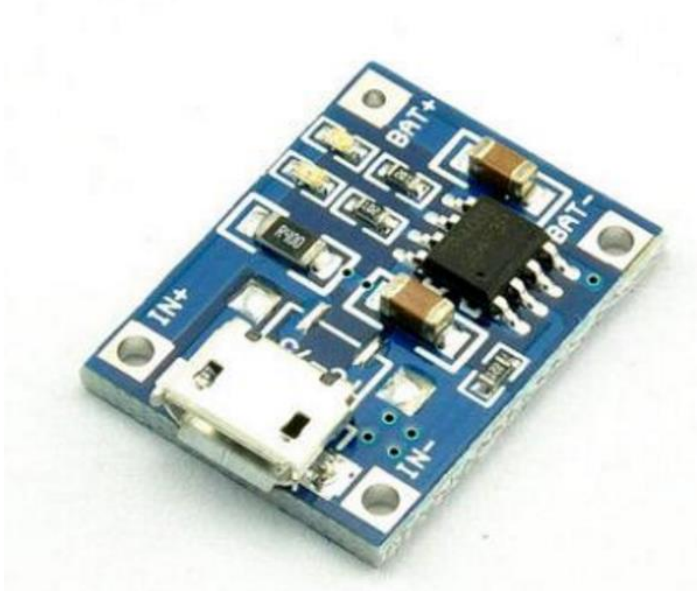
- Sleep current in DeepSleep is 0.08 ma
- Connect D0 and RST with a jumper wire
- Call `ESP.deepSleep(time); delay(1000);`
- ESP will go to deep sleep and reset after “time”
- Time is in us (1,000,000 us = 1,000 ms = 1 sec)
- RTC Memory can be used to store data between iterations
- After wake up it takes ~300 ms to boot and ~3-10 sec to connect to WiFi
- All GPIOs are set to INPUT during sleep
- http://www.espressif.com/sites/default/files/9b-esp8266-low_power_solutions_en_0.pdf

ESP8266 – LIGHT and MODEM sleep

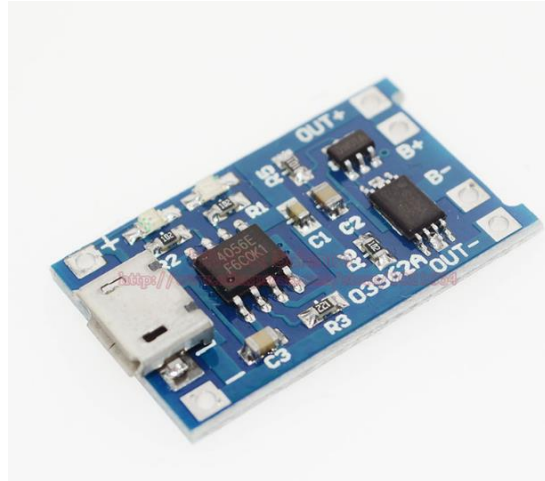
- Modem Sleep: ~15 ma. Just use delay(xxx)
- Light Sleep: ~0.5 ma
 - Details: <https://github.com/esp8266/Arduino/issues/1381#issuecomment-279117473>

LiPo Chargers

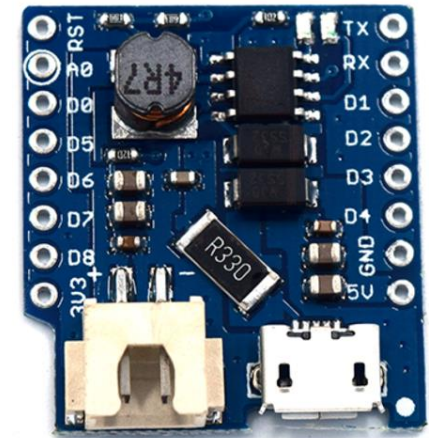
- Only Charge



- + battery protection



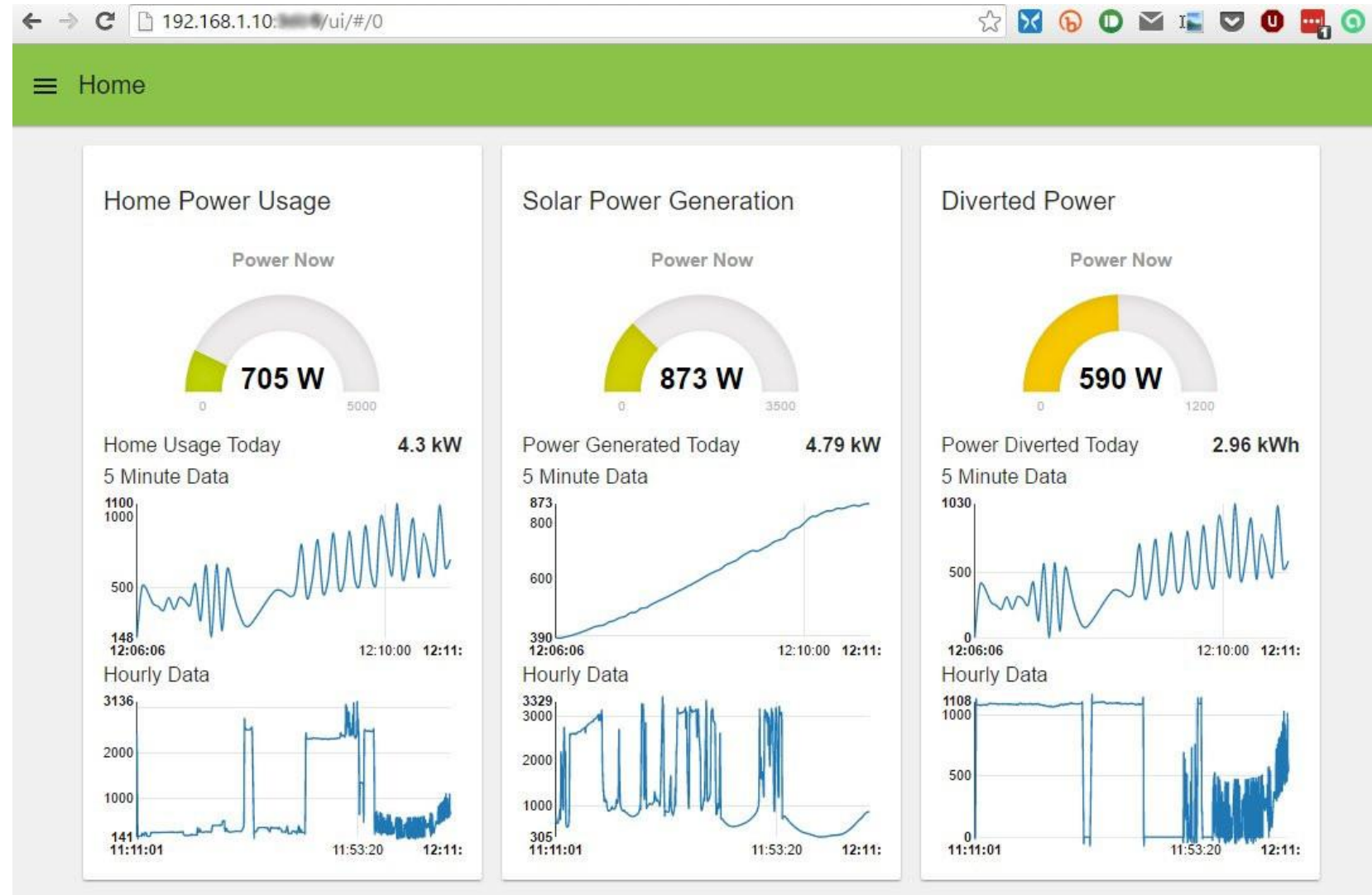
- Wemos Battery Shield
 - + battery protection
 - + 5v Boost

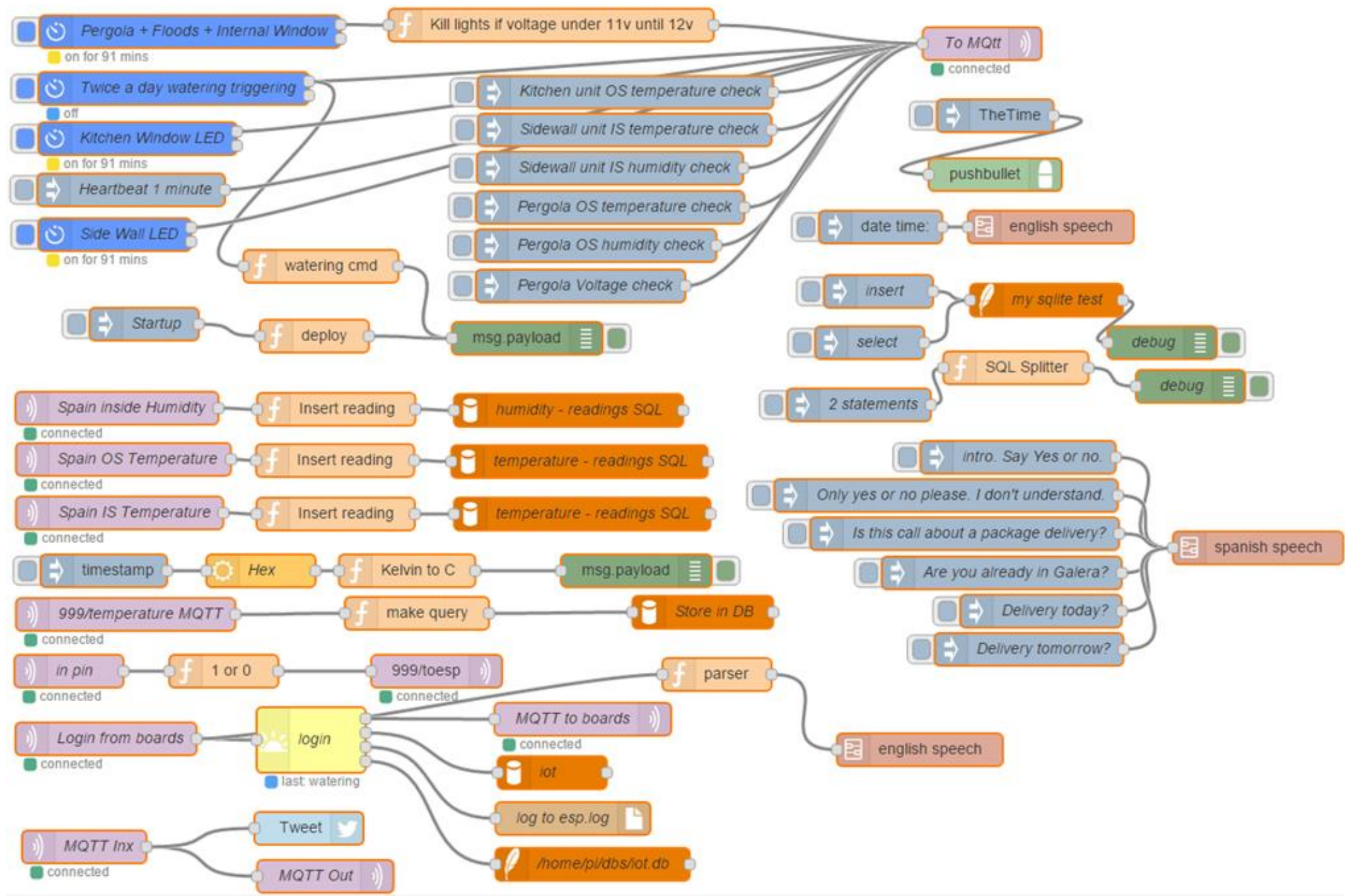


Popular Software

NodeRED

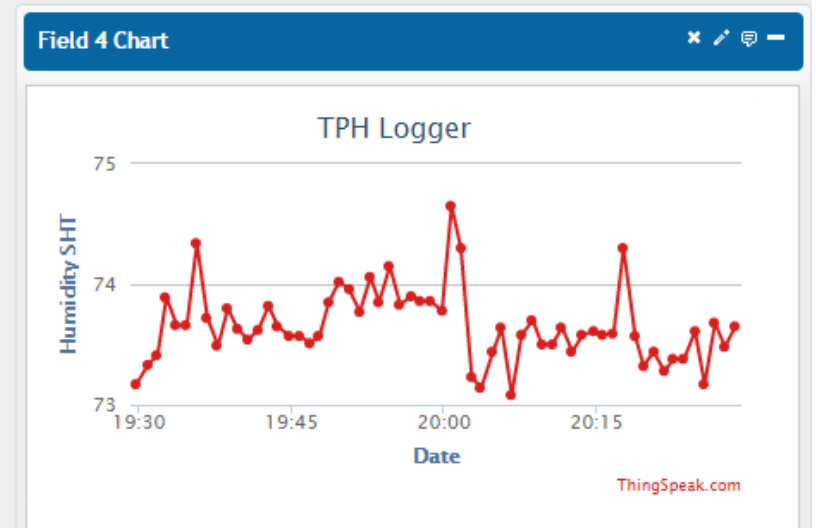
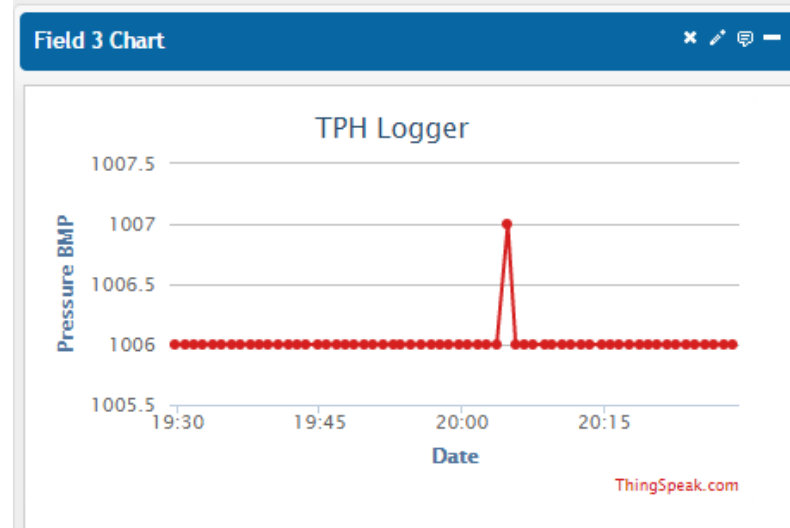
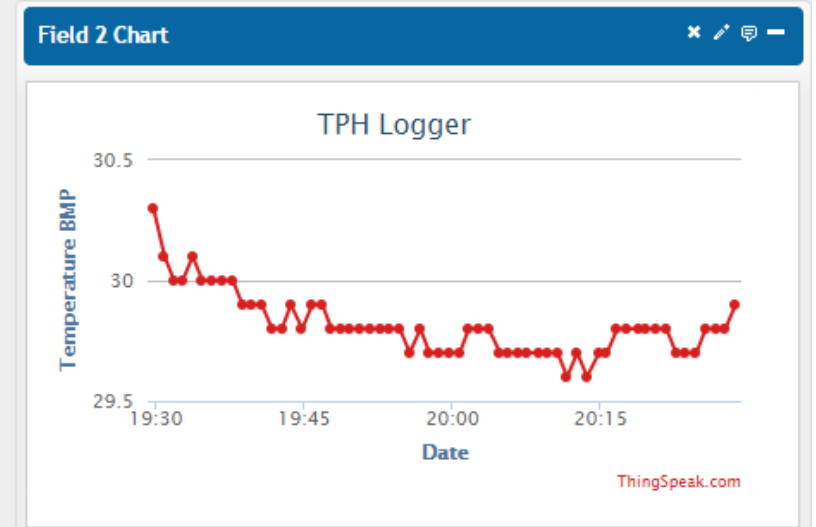
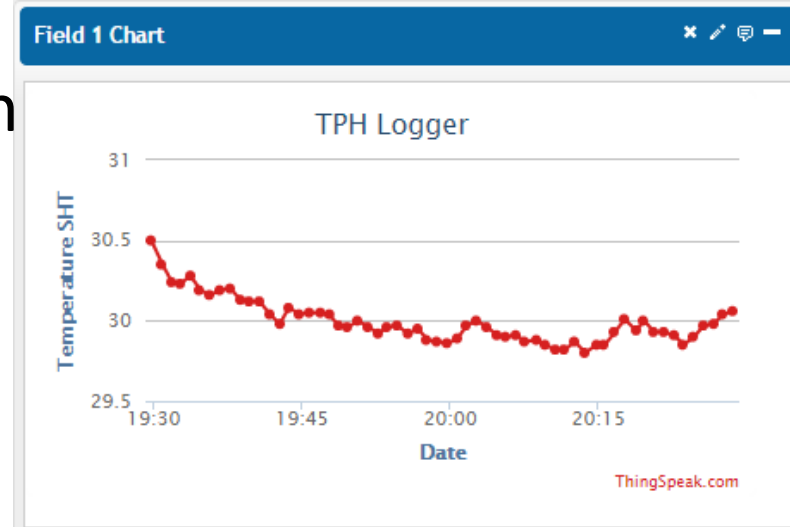
- Design flows
- Java Script
- Dashboards





Thingspeak

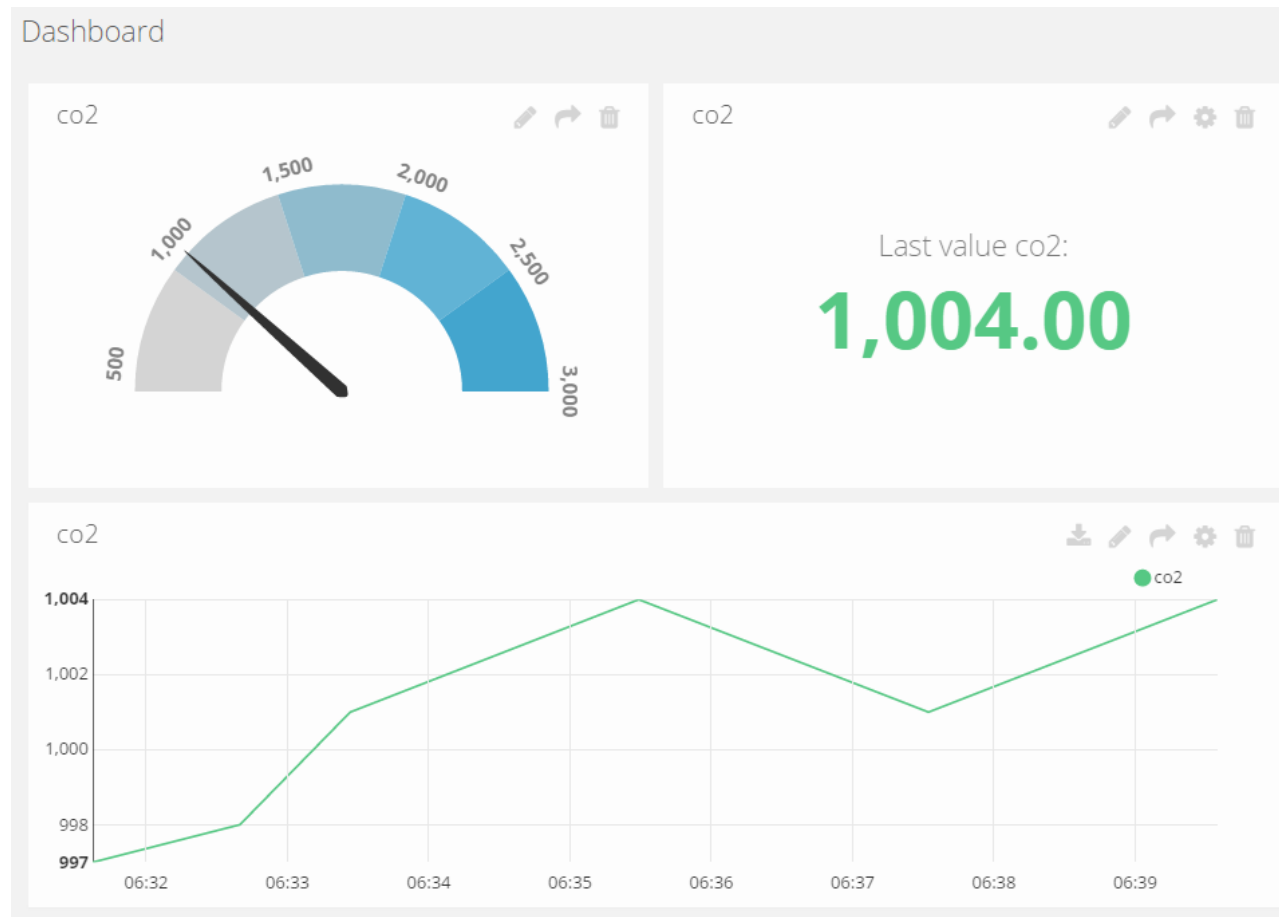
- Easy integration
- Lots of display options



Blynk – Arduino to Mobile



Ubidots – IoT Dashboards



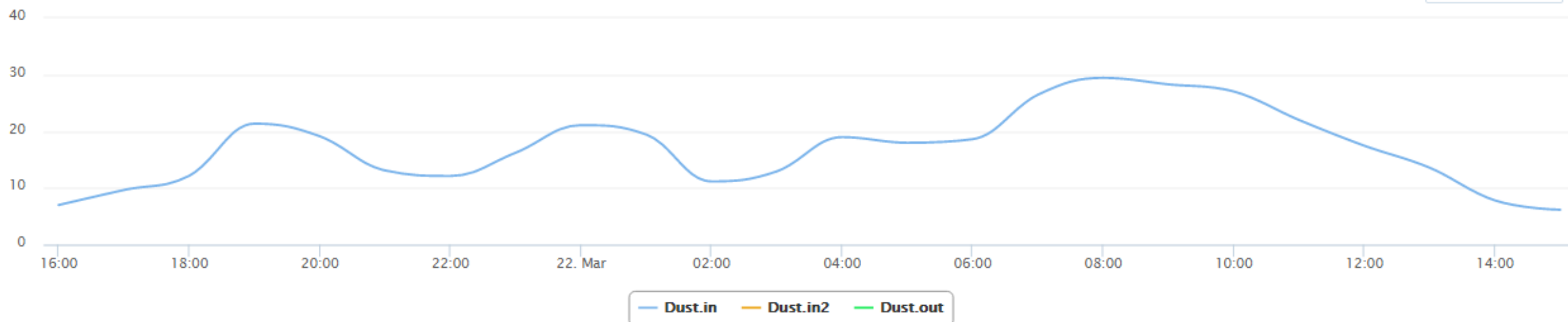


BeeBotte



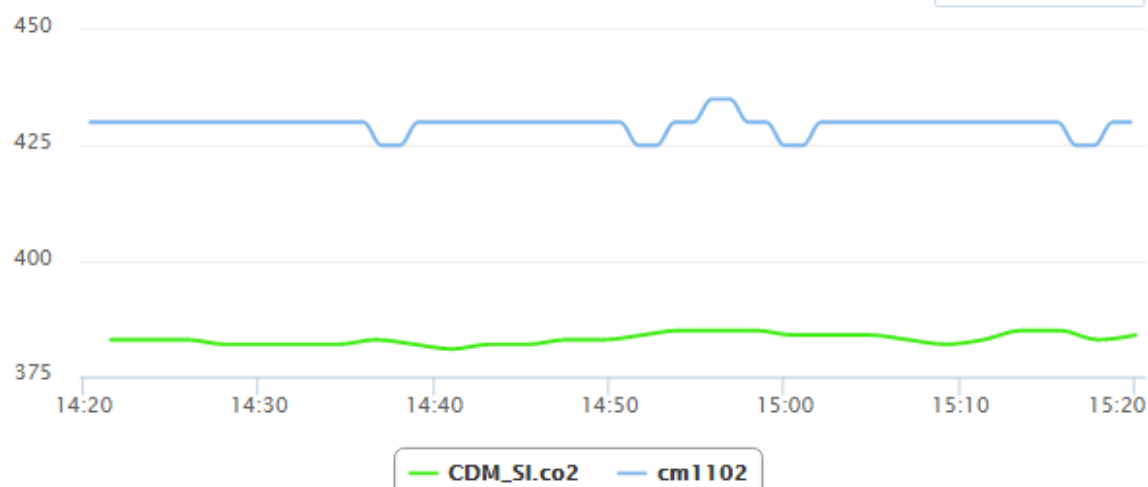
My multiline chart

Period: Last 24 Hours ▾



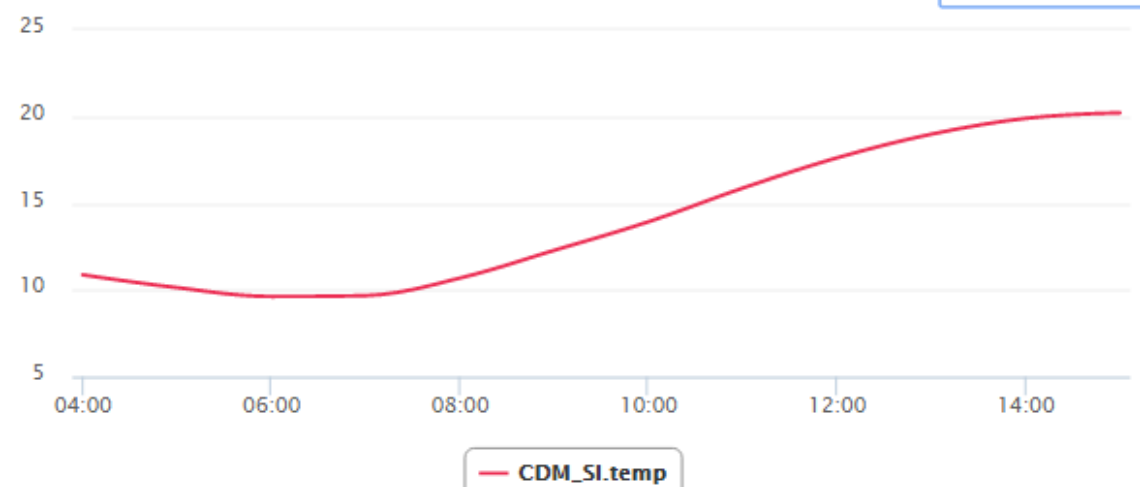
CO2

Period: Last Hour ▾



My multiline chart

Period: Last 12 Hours ▾



Popular Hardware

Sonoff

- <https://www.itead.cc/search/result/?cat=&q=sonoff>

SHARP GP2Y1010AU0F-Dust Sensor

1. Low consumption current (Icc: MAX. 20 mA)
2. Working Temperature: -10~65°C
3. The presence of dust can be detected by the photometry of only one pulse
4. Enable to distinguish smoke from house dust
5. Lead-free and RoHS directive compliant



DHT11 Humidity & Temperature Sensor

1. Humidity measuring range: 20% ~ 90% RH
2. Temperature measuring range: 0 ~ +100°C
3. High reliability
4. Optimized long-term stability
5. Ultra-low consumption



GM55 Serie Photoconductive resistance-GM5528

1. Epoxy encapsulated
2. Quick response
3. Small size
4. High sensitivity
5. Reliable performance
6. Good characteristic of spectrum



Electret Condenser Microphone

1. Wide frequency band
2. Great sound quality
3. Low noise
4. Low power consumption
5. High sensitivity



Broadlink

Touch the future
TC2 Fire-new updating



The image shows three white Broadlink TC2 smart switches. Below them, a hand holds a smartphone displaying the Broadlink app interface. The app has a 'Home' screen with a 'TC2' section containing 'All On', 'Template info+', 'Create shortcut', 'Timer', and 'Black' options. Below these are 'ON' and 'OFF' buttons. To the right of the phone, there are icons for Wi-Fi, a cloud, and a light bulb. Below these icons is a single Broadlink TC2 switch. The text 'Smartphone/Panel Control & One-button Configuration' and 'TC2 makes light controlling easier and more user-friendly.' is displayed.

Smartphone/Panel Control & One-button Configuration
TC2 makes light controlling easier and more user-friendly.

Contros

Wi-Fi Smart Plug/Timer

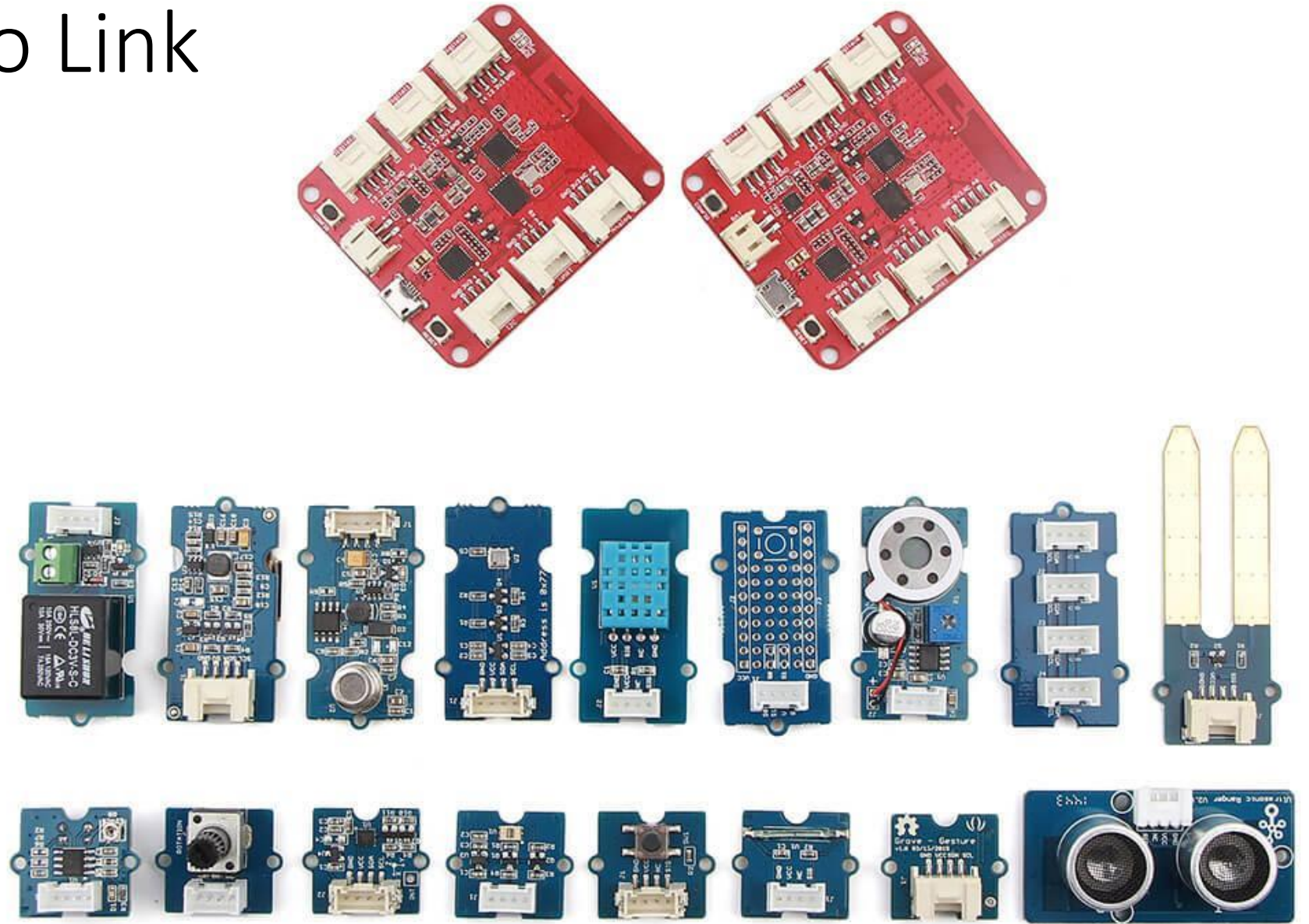
Smarter, but smaller!



The image shows a white Contros Wi-Fi Smart Plug/Timer. To its left, a hand holds a smartphone displaying the Contros app interface. The app has a 'Lamp' section with 'On/Off' and 'Time' options. Below these is a large 'ON' button. At the bottom, there is a 'History Status' section. To the right of the phone, there is a Wi-Fi icon and the text 'Contros is a Wi-Fi timer that enables you to set timer and turn on/off your home appliances by iOS/Android phone anytime from anywhere.' Below this text is a single Contros smart plug. The background is a blurred indoor setting.

Contros is a Wi-Fi timer that enables you to set timer and turn on/off your home appliances by iOS/Android phone anytime from anywhere.

Grove / Wio Link



Xiaomi

