Internet of Things Weather Station

IEEE Northern Virginia Section

Hands-On Professional Development Series

June 4, 2016

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Sketch 03 – Standalone Weather Station

6/6/2016
Monday

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Sensors

› HTU21D – Humidity / Temperature
  - Range: -40ºC to 75ºC ± 0.3ºC (-40ºF to 167ºF ±0.54ºF)
  - 0 to 100% Relative Humidity ±2%

› BMP180 – Barometric Pressure / Temperature / Altitude
  - Range: 300 to 1100 hPa ±0.12 hPa (8.9 to 33.5 inHg ±0.0035 inHg)
  - 9000m to -500m ±1m (29,500 to – 1,600 ft ±3ft)
  - -40ºC to 85ºC ± 2ºC (-40ºF to 185ºF ±3.6ºF)

- Photoresistor – uncalibrated analog device

Sensor Connections

› Turn off the regulator.

› Remove the MicroUSB connector.
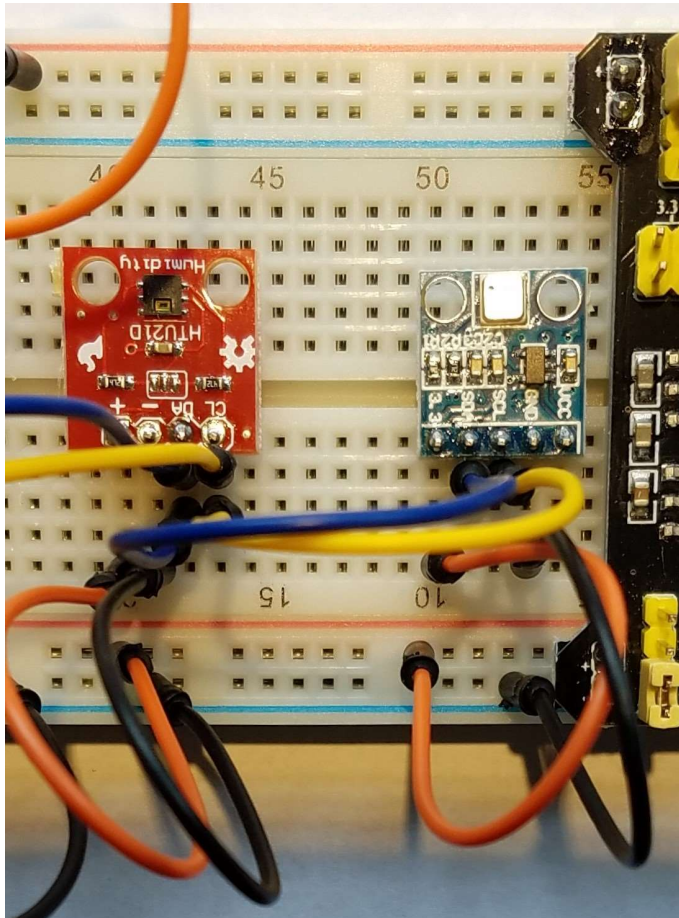
› Use 120mm jumpers to connect level shifter to sensors:

Signal	Color	Level Shifter	HTU21D	BMP180
SCL (3.3V)	Yellow	LV1	CL	SCL
SDA (3.3V)	Blue	LV2	DA	SDA
+3.3V	Red	(+3.3V Rail)	+	3.3
GND	Black	(- Rail)	-	GND

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Level Shifter to HTU21D
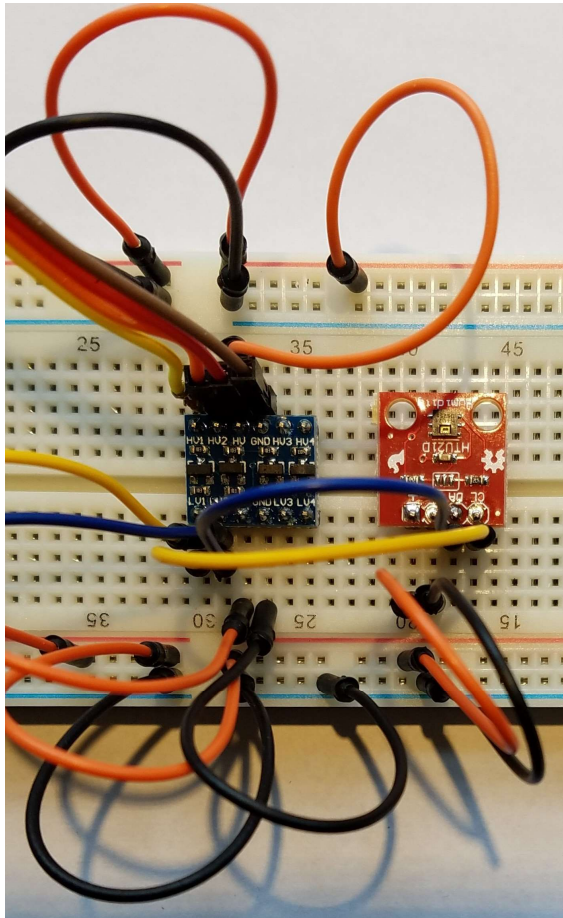
1. (- Rail) to (−)
2. (+ 3.3V Rail) to (+)
3. LV1 to CL
4. LV2 to DA

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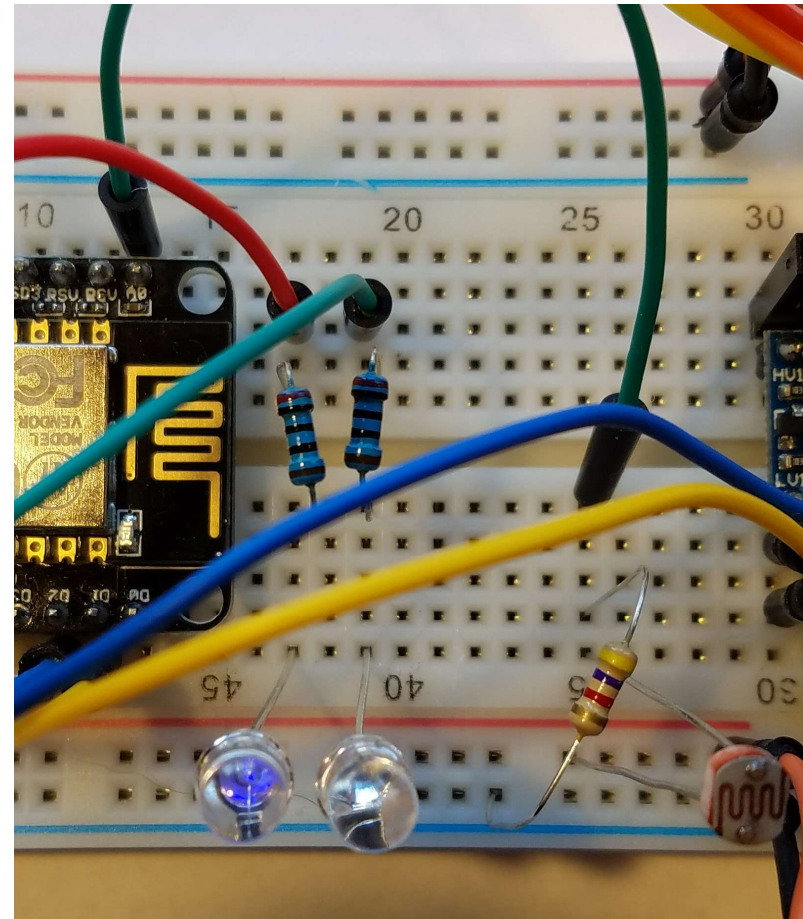Monday

HTU21D to BMP180

1. (- Rail) to GND
2. (+3.3V Rail) to 3.3
3. DA to SDA
4. CL to SCL

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Photoresistor connections

1. Carefully insert photoresistor from column 25 to + 3.3V rail.

2. Jumper from A0 to lower column 25.

3. 4.7K resistor (buff colored) (yellow/blue/red) from column 25 to (-rail).

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LED connections

› **Left LED**

 − Long leg in column 17

 − Short leg in (− rail)

 − 200Ω resistor spans middle gap at column 17

 − Jumper D6 (column 5) to column 17

› **Right LED**

 − Long leg in column 19

 − Short leg in (− rail)

 − 200Ω resistor spans middle gap at column 19

 − Jumper D5 (column 6) to column 19
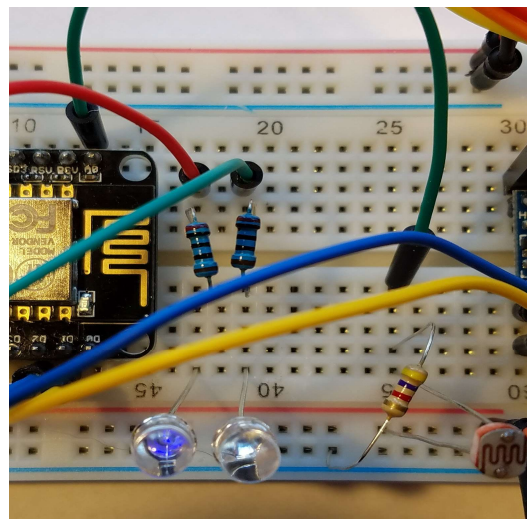
Standalone Weather Station

1. Open Arduino IDE and install two sensor libraries:
   1. Install **Adafruit_BMP085_Modified.zip**.
   2. Install **SparkFun_HTU21D_Breakout_Arduino_Library-master.zip**

2. File | Sketchbook | **IEEE_IoT_Sketch03_Standalone**

3. Verify and Upload.

4. Open Serial Monitor. (little magnifying glass in upper right)

5. Set Baud rate to **115,200**.

6. Observe flow of data on serial monitor and LCD.
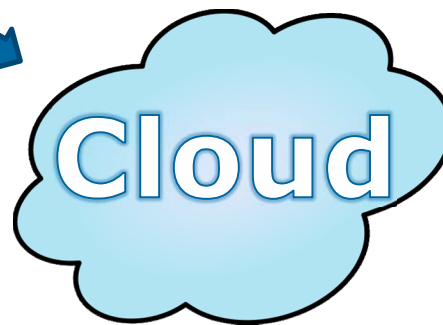
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Standalone Weather Station

› We now have a standalone weather station.

› It measures temperature, humidity, and barometric pressure.

› It displays measurements on a local display.

› It streams data to a serial port.

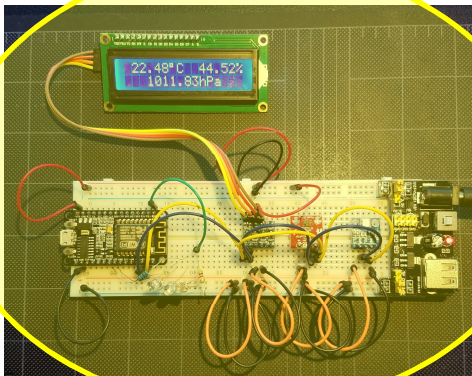› It will become an IoT device when connected to the Internet.

Personal Computer

ThingSpeak Server

Cloud

22.48°C 44.52%
1011.83hPa

Weather Station

Local Wi-Fi

Personal Computer

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Questions?

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