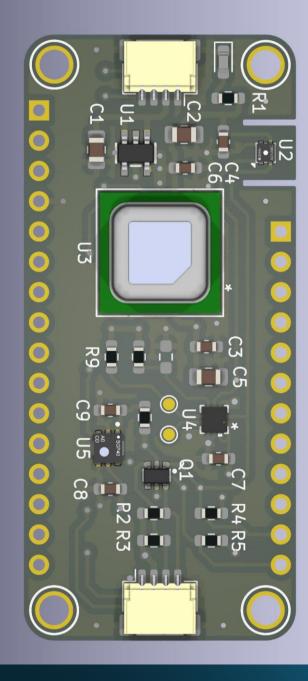


Feather Weather Wing

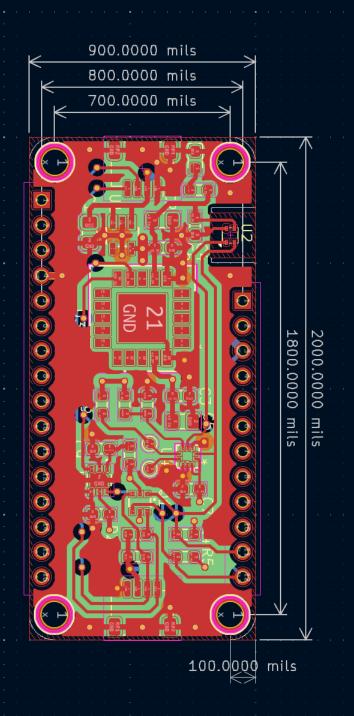
Feather Weather Wing: What is it?

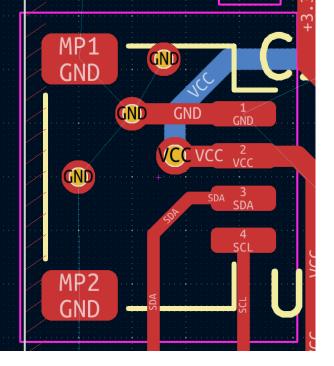
- It is a 0.9-inch x 2.0-inch circuit board that combines four environmental sensors in the Feather Wing form factor.
 - Sensirion SHT45 Humidity & Temperature
 - Sensirion SCD41 CO2, Temperature, & Humidity
 - · Benefits from an atmospheric air pressure input.
 - Sensirion SGP40 Indoor Air Quality
 - · Benefits from a humidity input.
 - Bosch BMP390 Atmospheric Air Pressure
- 4 Layer PCB
- Designed using KiCad 9.0
- PCB fabricated by OSHPARK

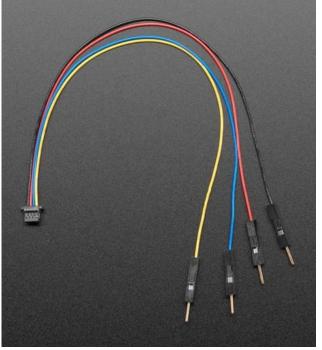


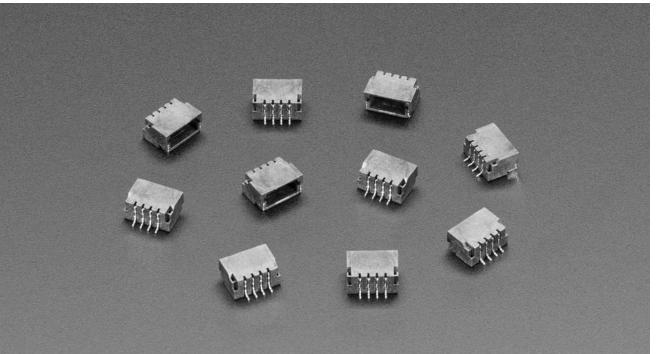
Feather Specification

- The classic size is 0.9-inch X 2.0-inch with a 0.1-inch hole in each corner.
- Created by Adafruit.
- Can be wider or longer.
- Feather Mainboards have a microcontroller.
- Accessory boards are called Feather Wings.
- Boards stack using a 1x16 header and a 1x12 header.
- Link: Feather Specification





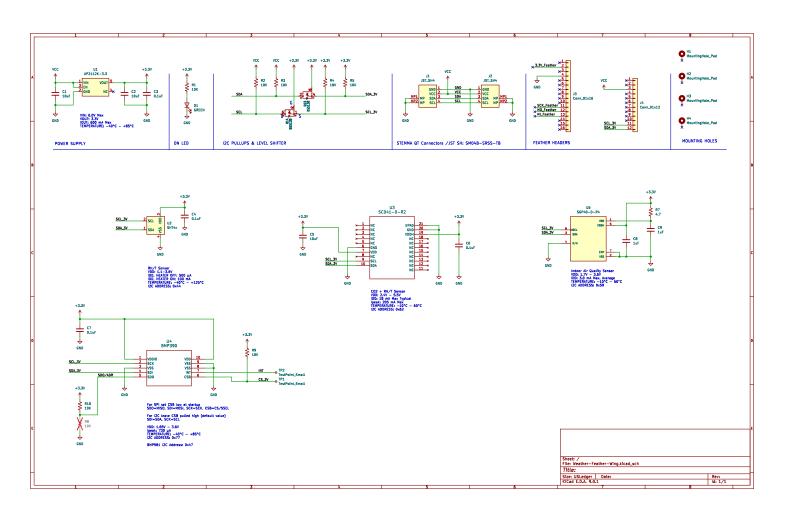




STEMMA QT

- 4-Pin 1.0mm pitch JST SH Connector: SM04B-SRSS-TB
 - 1. Black for GND
 - 2. Red for VCC
 - Blue for SDA
 - 4. Yellow for SCL
- VCC is 3V 5V
- Level shifting is used to accommodate 5V I2C logic.
- Created by Adafruit
- Very similar to the Sparkfun QWIIC system with the addition of level shifting and an LDO.
 - https://www.sparkfun.com/qwiic
- Adafruit STEMMA QT

Schematic





Bill Of Materials (BOM)

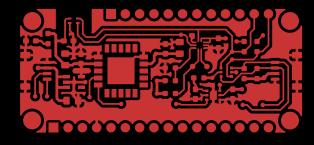
Index	Reference	Description	Manufacturer Part Number	Manufacturer Name	Quantity DNP
	1 C1,C2,C5	CAP CER 10UF 10V X7R 0805	C0805C106K8RACTU	KEMET	3
	2 C3,C4,C6,C7	CAP CER 0.1UF 10V X7R 0603	C0603C104K8RACTU	KEMET	4
	3 C8,C9	CAP CER 1UF 16V X7R 0603	C0603C105K4RACTU	KEMET	2
	4 D1	LED GREEN DIFFUSED 0603 SMD	KT EELP41.12-S2U1-25-2X4X- 5-R18	ams-OSRAM USA INC.	1
	5 J1,J2	CONN HEADER SMD R/A 4POS 1MM	SM04B-SRSS-TB	JST Sales America Inc.	2
	6 J3	Conn_01x16	-	-	0 DNP
	7 J4	Conn_01x12	-	-	0 DNP
	8 Q1	MOSFET 2N-CH 50V 0.2A SOT363	BSS138DWQ-7	Diodes Incorporated	1
	9 R1,R2,R3,R4,R5,R9,R10	RES SMD 10K OHM 1% 1/10W 0603	CRCW060310K0FKEA	Vishay Dale	7
1	LO R7	RES SMD 4.7 OHM 1% 1/10W 0603	CRCW06034R70FNEA	Vishay Dale	1
1	11 R8	RES SMD 10K OHM 1% 1/10W 0603	-	-	0 DNP
1	12 U1	IC REG LINEAR 3.3V 600MA SOT-25	AP2112K-3.3TRG1	Diodes Incorporated	1
1	13 U2	DIGITAL RH/TEMP W/FILTER	SHT45-AD1F-R2	Sensirion AG	1
1	14 U3	SENSOR AIR QUALITY I2C OUTPUT	SCD41-D-R2	Sensirion AG	1
1	L5 U4	SENSOR 18.13PSIA 10LGA	BMP390	Bosch Sensortec	1
1	16 U5	SENSOR AIR QUALITY I2C OUTPUT	SGP40-D-R4	Sensirion AG	1

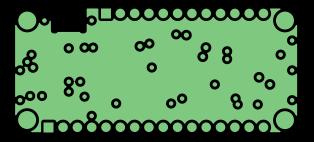
Top: Signal /PWR /GND

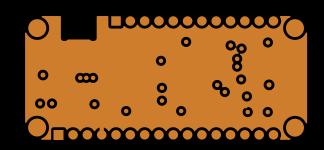
Inner 1: 3.3V PWR

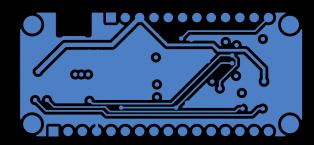
Inner 2: GND

Bottom: Signal /PWR /GND









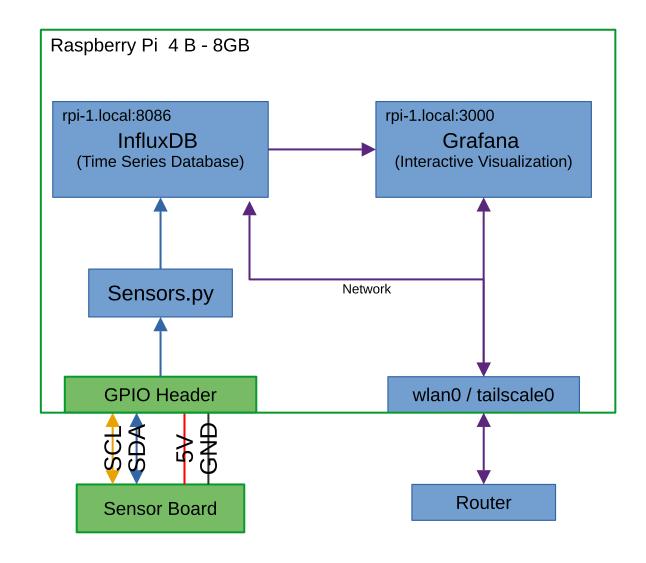


Stackup: Four Layer OSHPARK

Layer	Base CU / Plt	Thick	Type	Stackup	Subs	lm	пр	Material	Dk	Df
Silkscreen		0.00					Taiyo-SS - W	/hite	1.00	
Soldermask		0.60					Taiyo-SM - C	shPark Purple	3.90	0.033
Lyr1	0.5oz / Std	1.80	S	1	1,2	2,3				
Prepreg		7.87					FR408HR - 2	x2113_57%	3.61	0.009
Lyr2	0.5oz	0.60	Р							
Core		39.00					FR408HR - 3	9.0mils	3.87	0.009
Lyr3	0.5oz	0.60	Р							
Prepreg		7.86					FR408HR - 2	x2113_57%	3.61	0.009
Lyr4	0.5oz / Std	1.80	S	-						
Soldermask		0.60					Taiyo-SM - C	shPark Purple	3.90	0.033
Silkscreen		0.00					Taiyo-SS - W	/hite	1.00	

Data Logging and Visualization

- Sensor board is connected to the 40-pin expansion header on a Raspberry Pi
- Data is read every minute and stored in an InfluxDB time series database.
- The data can be queried and displayed using Grafana.
- Grafana dashboards are accessible from a web browser on any device on the same network.





Grafana Dashboard

Data visualization

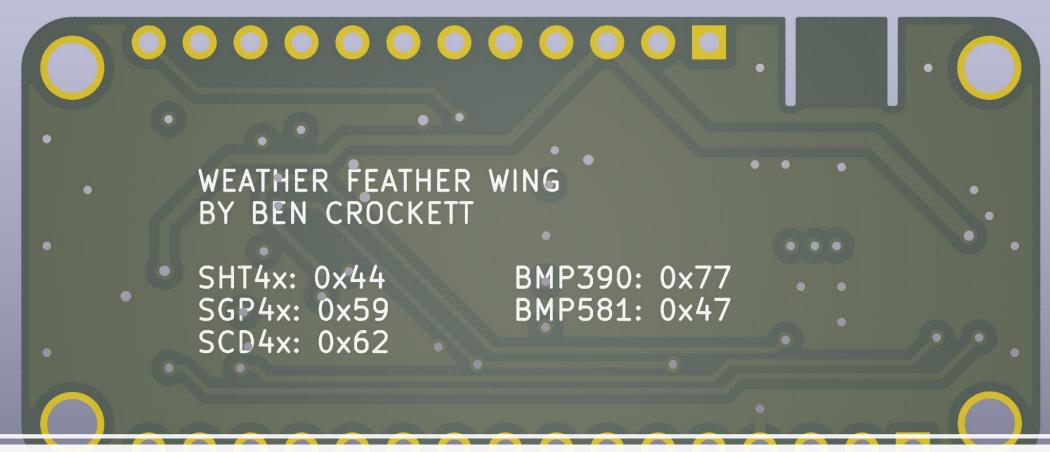




Grafana Dashboard

HUGE Hailstorm on April 27, 2023





THE END
Ben Crockett