Weather Station

September 25, 2025

Weather Station Parts List

- 1 - Raspberry Pi 4B
- 1 – Raspberry Pi heat sink with dual fan
  Amazon.com: Armor Case for Raspberry Pi 4 - Metal Case with Dual Fan Aluminium Alloy, Pi 4 Heatsink : Electronics
- **1** - ELEGOO 8 Channel DC 5V Relay Module with Optocoupler
  ELEGOO 8 Channel DC 5V Relay Module with Optocoupler Compatible with Arduino UNO R3 MEGA 1280 DSP ARM PIC AVR STM32 Raspberry Pi: Amazon.com: Industrial & Scientific
- 1 – PowerStream TPS-54560 5 Amp AC/DC voltage reducing converter
  24VAC to 5VDC converter, 5V 4A, 25 Watts output
  https://www.powerstream.com/24vac-5vdc.htm#:~:text=It%20is%20useful%20for%20powering%205V%20modems%2C,widespread%20because%20the%20low%20voltage%20is%20safe.

Weather Station Parts List (cont.)

- 1 – HiLetgo BMP280 (i2c)
  HiLetgo 5pcs High Precision BMP280-3.3 Atmospheric Pressure Sensor Replace BMP180/BMP186: Amazon.com: Industrial & Scientific
  https://www.amazon.com/dp/B07VNDZ6N4?ref_=ppx_hzsearch_conn_dt_b_fed_asin_title_1&th=1
- 1 – HiLetgo ADS1115 (i2c)
  HiLetgo ADS1115 16 Bit 16 Byte 4 Channel I2C IIC Analog-to-Digital ADC PGA Converter with Programmable Gain Amplifier High Precision ADC Converter Development Board for Arduino Raspberry Pi: Amazon.com: Industrial & Scientific
  https://www.amazon.com/dp/B01DLHKMO2?ref_=ppx_hzsearch_conn_dt_b_fed_asin_title_1
- 1 - AITRIP DHT22/AM2302 Digital Temp./Humidity Sensor Module
  AITRIP 2pcs DHT22/AM2302 Digital Temperature and Humidity Sensor Module Temperature Humidity Monitor Sensor Replace SHT11 SHT15 for Arduino Electronic Practice DIY: Amazon.com: Industrial & Scientific
  https://www.amazon.com/dp/B07WP4VZTH?ref_=ppx_hzsearch_conn_dt_b_fed_asin_title_1&th=1

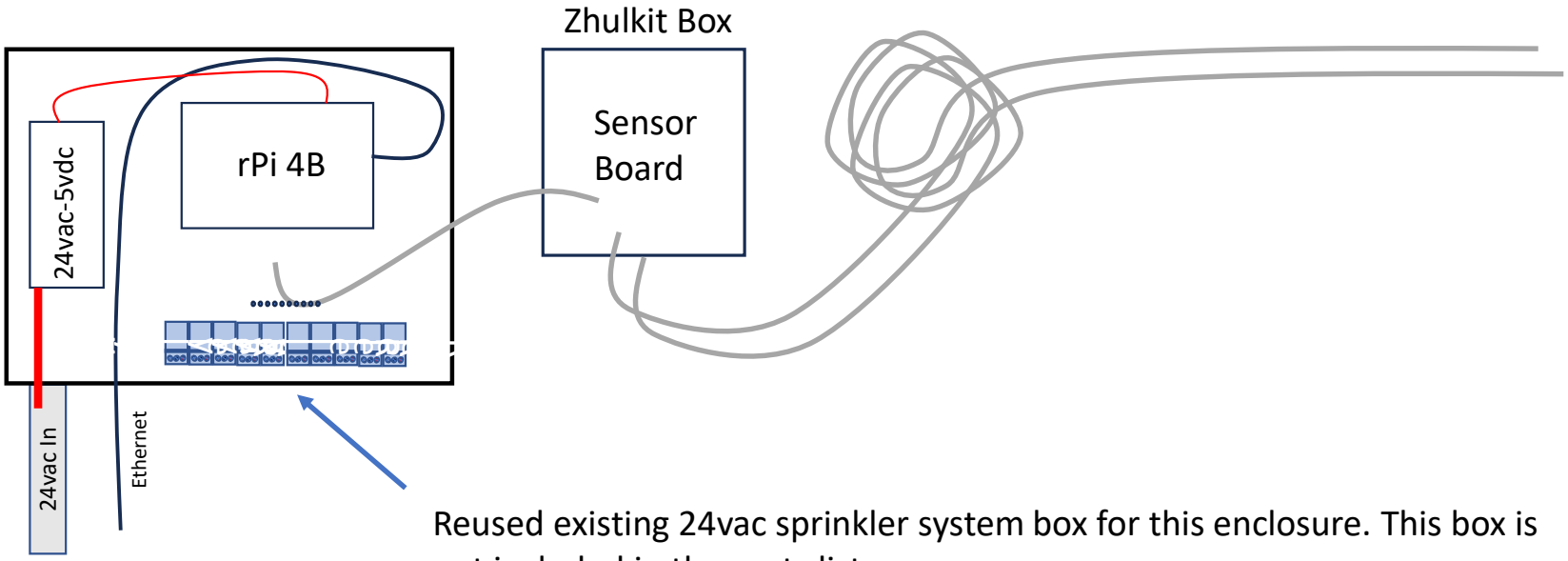
Weather Station Parts List (cont.)

- 1 – uxcell 4mm to 6mm Bore Rigid Coupling Set
  Amazon.com: uxcell 4mm to 6mm Bore Rigid Coupling Set Screw L20XD12 Aluminum Alloy,Shaft Coupler Connector for RC Airplane Boat, Motor Accessories,Red,2pcs : Industrial & Scientific
- 1 – 5/32"(4mm) Diameter 6061 Aluminum Rod (for WV shaft)
  Amazon.com: Feelers Aluminum Round Rod 5/32"(4mm) Diameter 6061 Aluminum Solid Stick for DIY Craft, 12" Length, 10 pcs : Industrial & Scientific
- 1 - 12-Bit Hall Angle Sensor, 0.088° Resolution, 360° Rotation
  12-Bit Hall Angle Sensor, 0.088° Resolution, 360° Rotation, Durable Full-Circle Measurement,0-5V Output: Amazon.com: Industrial & Scientific
- 1 - Weather Meter Kit
  Amazon.com: Weather Meter Kit - Station Includes Analog sensors Wind Vane Cup Anemometer Tipping Bucket rain Gauge RJ11 terminated Cables : Patio, Lawn & Garden

Weather Station Parts List (cont.)

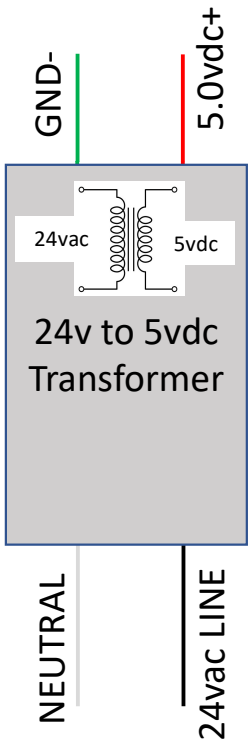
- 3 – 10k Ohm resistors – 2 Pull-Up resistors: 1 for Rain Gauge, 1 Voltage Divider for Weathervane
- 1 – 1k Ohm resistor (for CPU fan control transistor)
- 1 - 47uF 25v Capacitor for 5vdc power line
- Zulkit Project Box Grey 14.96 x 11.02 x 5.12 inch
  Zulkit Junction Box ABS Plastic Dustproof Waterproof IP67 Junction Boxes Universal Electrical Project Enclosure DIY Electronic Project Box Grey 14.96 x 11.02 x 5.12 inch (380 x 280 x 130 mm) - Amazon.com

External Connections

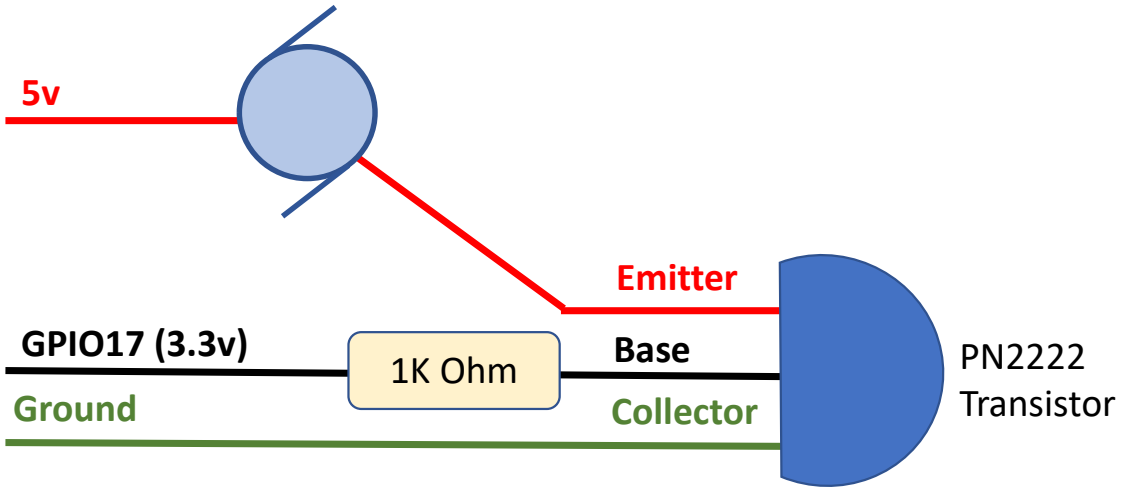


Reused existing 24vac sprinkler system box for this enclosure. This box is not included in the parts list

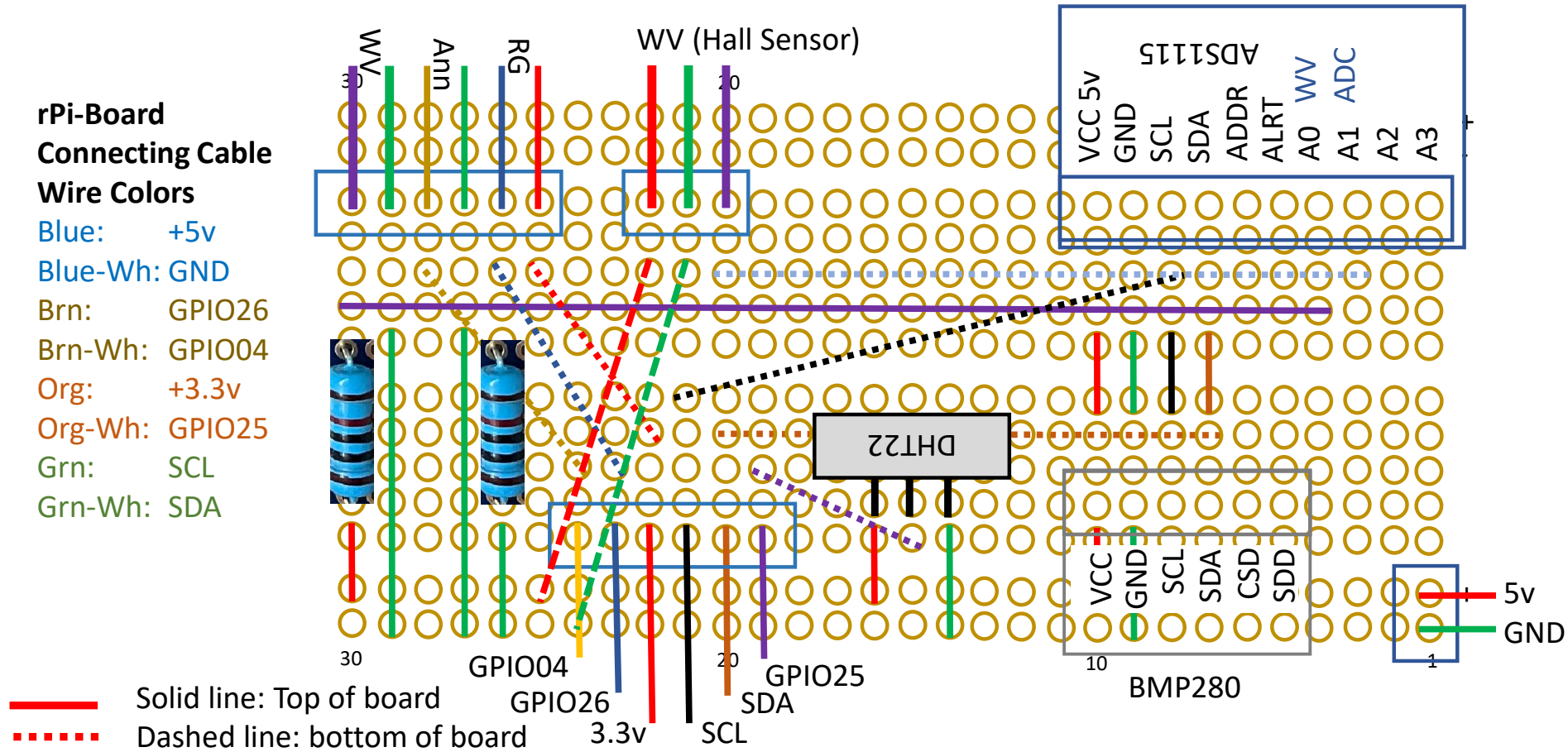
24vac to 5vdc Transformer



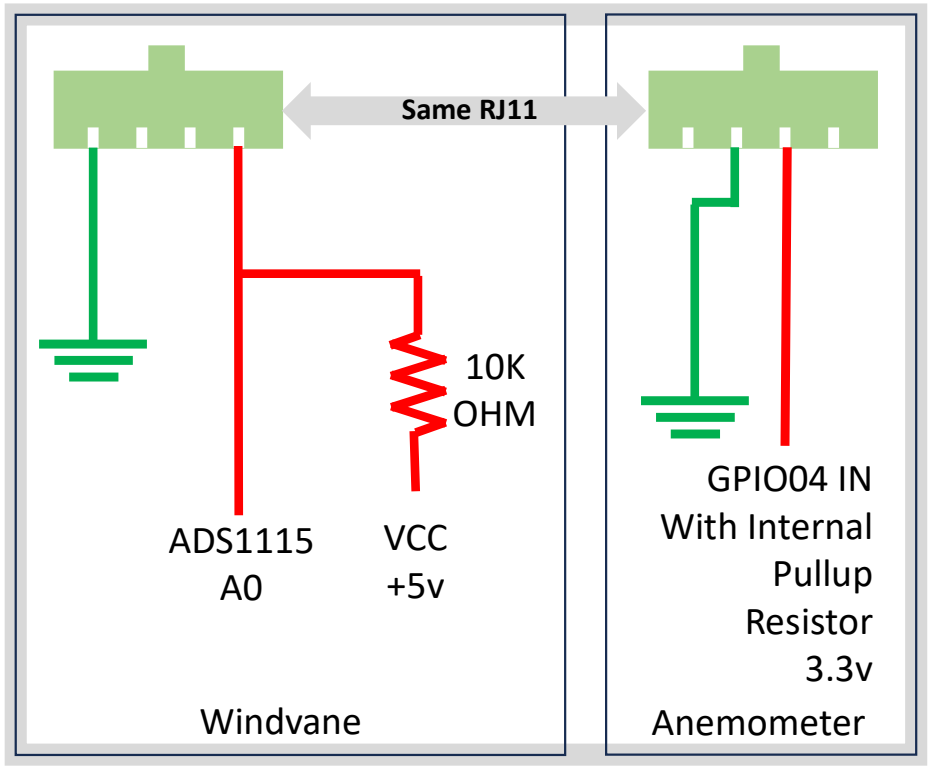
Transistor Based Fan Control For rPi

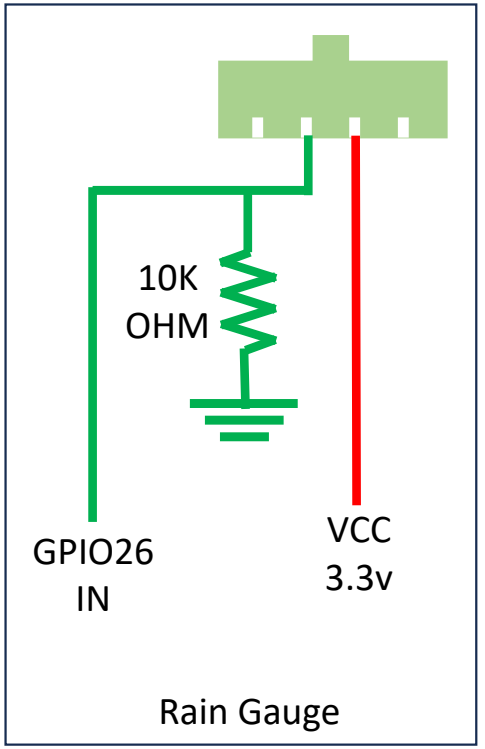


Weather Station Board Layout v3.5



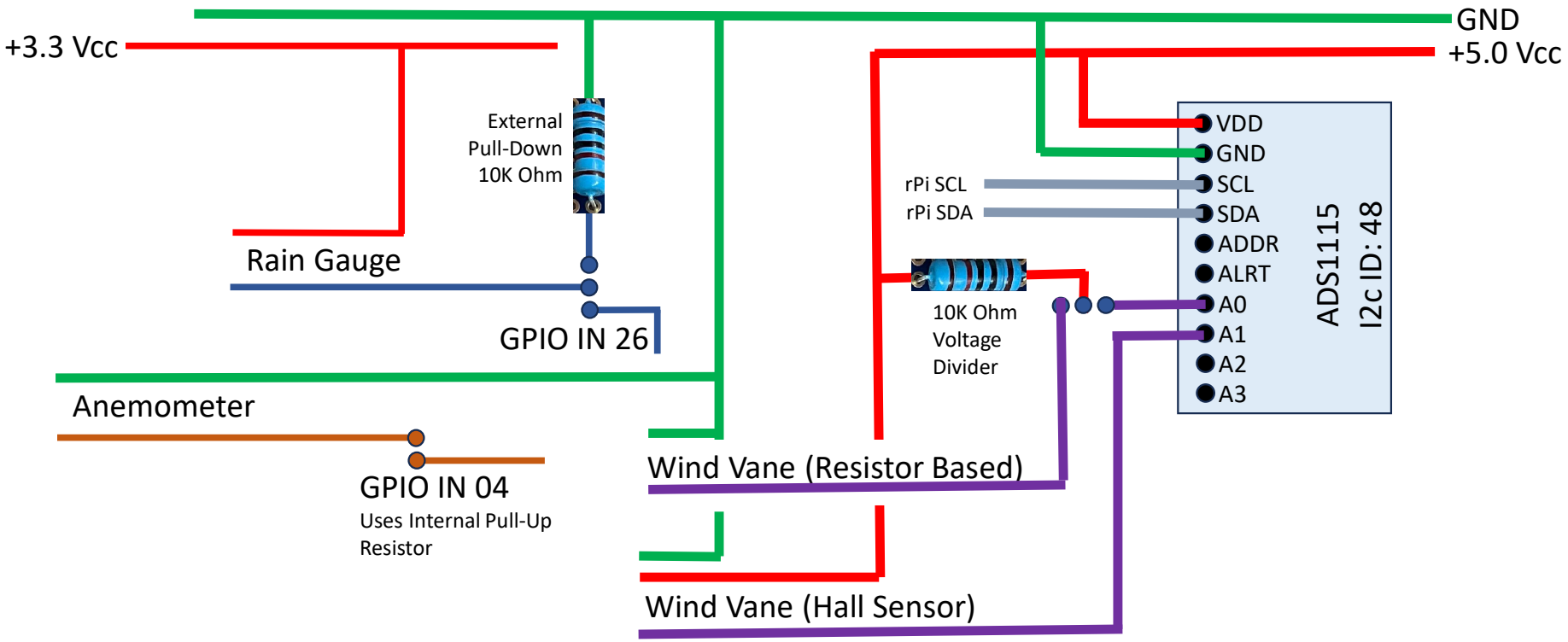
Rain Gauge, Anemometer, Windvane Circuits





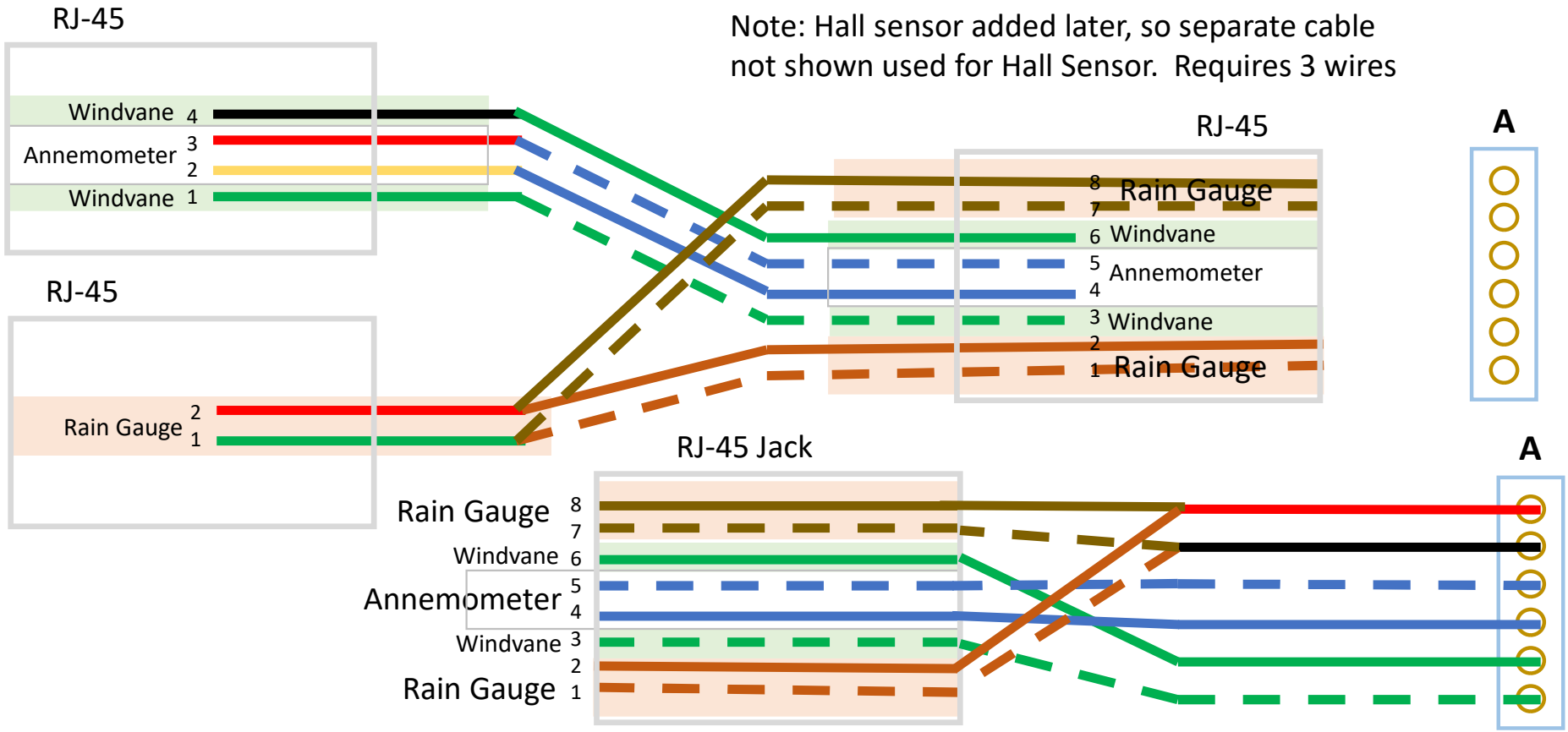
Weather Station: rPi/ADS1115ADS Wiring

Anemometer/Rain Gauge/Wind Vane



Windvane, Annomometer & Rain Gauge:

Y-Split Cable & Board Connections



Opto-relay pin use and rPi mapping

- GND: (Black) – shared with Fan Transistor
- IN1: GPIO18 (Green)
- IN2: GPIO22 (White)
- IN3: GPIO24 (Orange-White)
- IN4: GPIO05 (Brown-White)
- IN5: GPIO06 (Purple)
- IN6: GPIO13 (Yellow)
- IN7: Unused
- IN8: Unused
- VCC: +5vcc, Pin 2 (Red) – shared with Fan Transistor

- K1: Green: Back Yard
- K2: Red: Front Yard: Gladiolas/Raspberries
- K3: Blue: Front Yard: So. Glads/Orange Tree
- K4: Yellow: Front Yard: So. Planter by House
- K5: Black: Planter Box, Front Yard North
- K6: Brown: Front Porch Planter
- K7: Unused
- K8: Unused

GPIO Pins (1 of 3)

Pin	BCM	Description
01	DC Power 3.3v	Weathervane
03	GPIO02/SDA1 i2c	i2c SDA: BME280, ADS1115
05	GPIO03/SCL1 i2c	i2c SCL: BME280, ADS1115
07	GPIO04/GCLK	Anemometer
09	Ground	Fan Transistor, Opto-Relay
11	GPIO17	Fan Transistor
13	GPIO27	Unused
15	GPIO22	Opto-Relay IN2
17	DC Power 3.3v	Unused

Pin	BCM	Description
02	DC Power 5v	Fan, DHT22, BMP280
04	DC Power 5v	Opto-Relay VCC
06	Ground	Unused
08	GPIO14	Unused
10	GPIO15	Unused
12	GPIO18/SPI0 CS0, 1-wire	Opto-Relay IN1
14	Ground	Unused
16	GPIO23	Unused
18	GPIO24	Opto-Relay IN3

GPIO Pins (2 of 3)

Pin	BCM	Description
19	GPIO10/SPI0 MOSI	Unused
21	GPIO09/SPI0 MISO	Unused
23	GPIO11/SPI0 CLK	Unused
25	Ground	Unused
27	ID_SD/i2c EEPROM	Unused

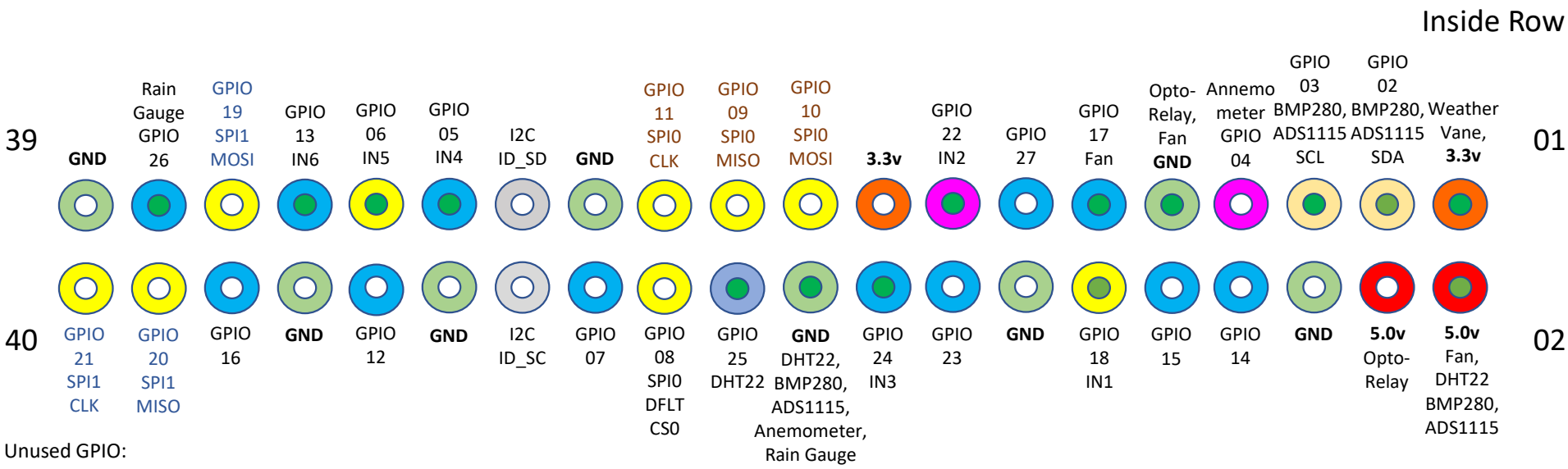
Pin	BCM	Description
20	Ground	Unused
22	GPIO25	DHT22
24	GPIO08/CE0	Unused
26	GPIO07/CE1	Unused
28	ID_SC/i2c EEPROM	Unused

GPIO Pins (3 of 3)

Pin	BCM	Description
29	GPIO05	Opto-Relay IN4
31	GPIO06/SPI1 CS0	Opto-Relay IN5
33	GPIO13	Opto-Relay IN6
35	GPIO19/SPI1 MOSI	Unused
37	GPIO26	Rain Gauge
39	Ground	Unused

Pin	BCM	Description
30	Ground	Unused
32	GPIO12	Unused
34	Ground	Unused
36	GPIO16	Unused
38	GPIO20/SPI1 MISO	Unused
40	GPIO21/SPI1 CLK	Unused

GPIO Header

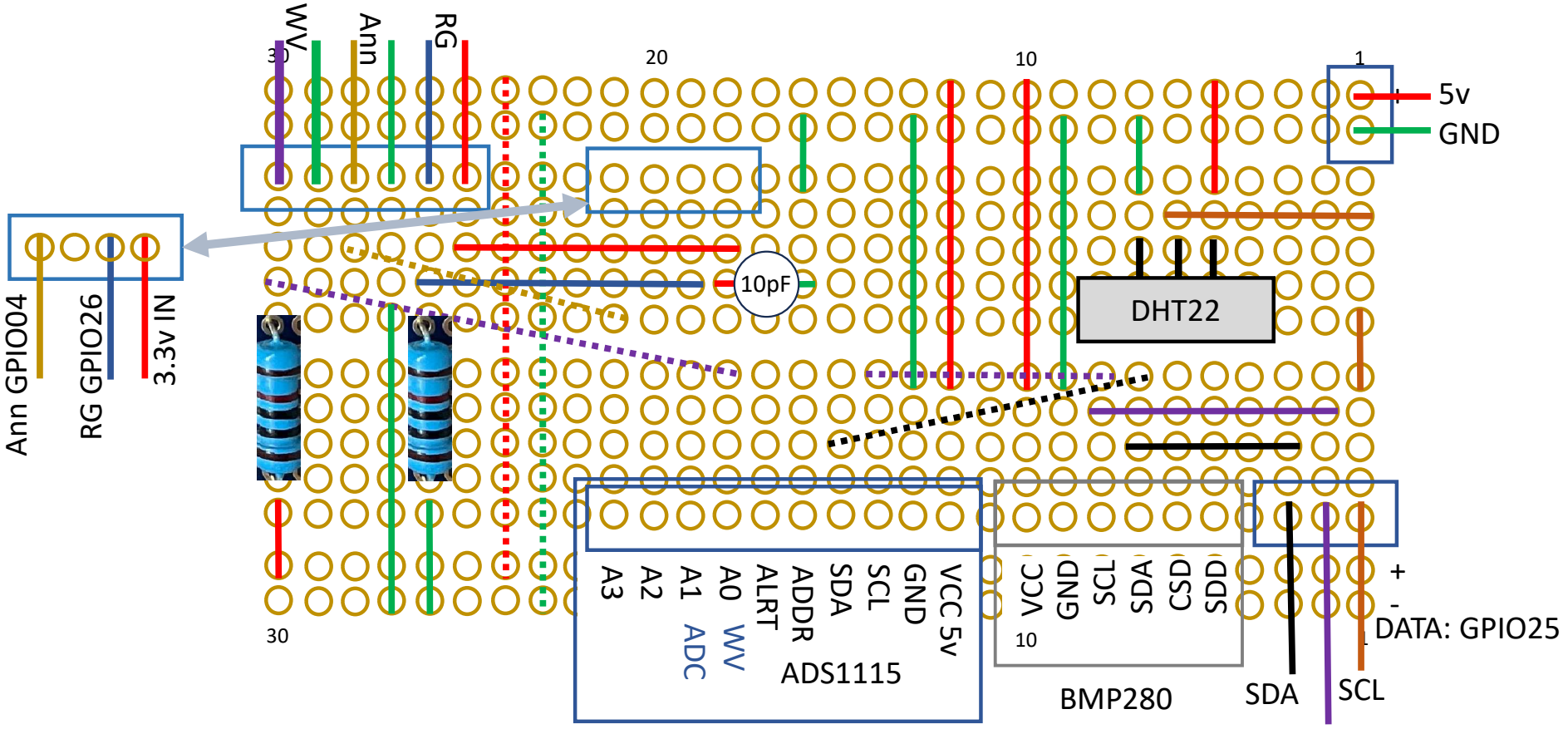


Unused GPIO:

- GPIO 07, 09, 10, 11, 12, 1 4, 15, 16, 19, 20, 21, 23
- GPIO 08 – Do not use, default SPI0 CS0

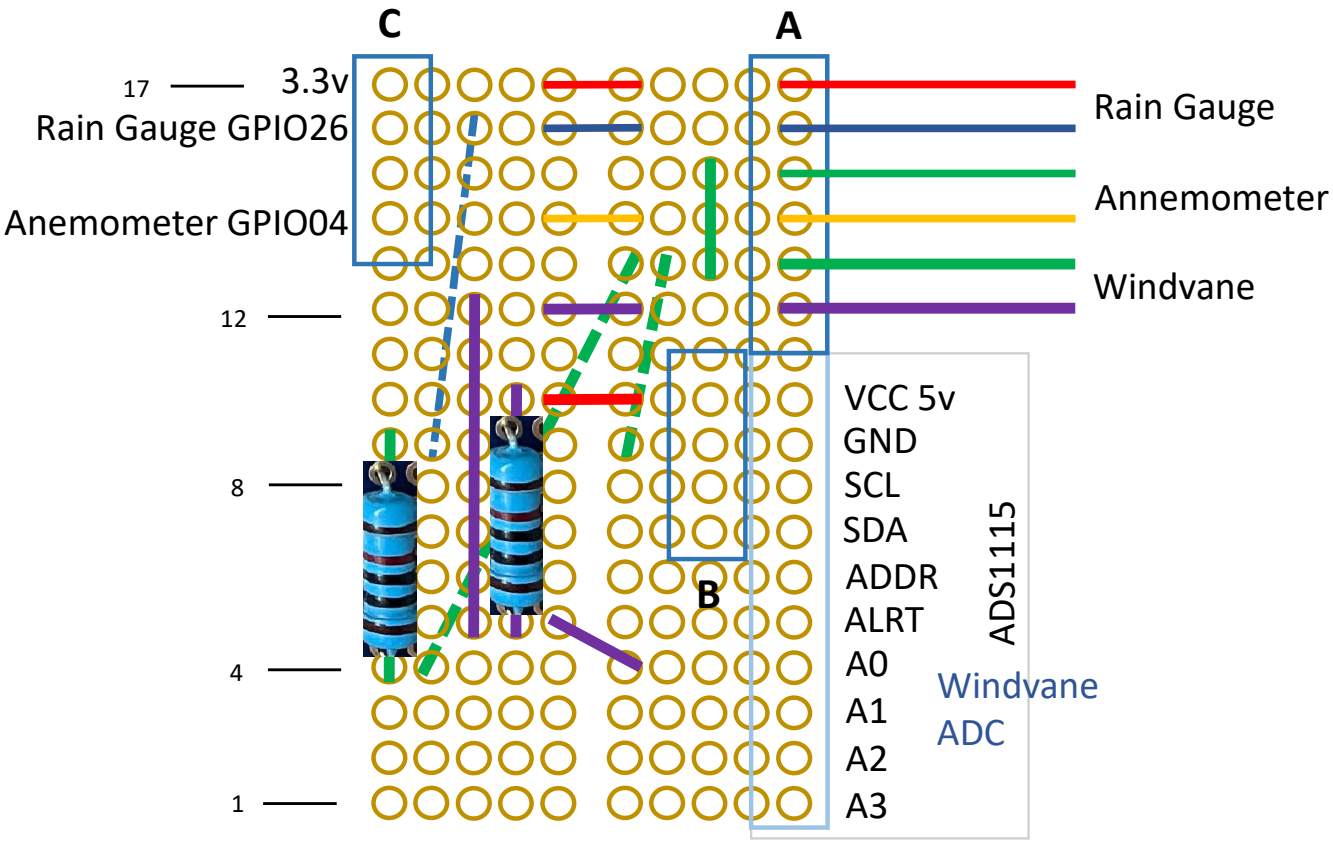
NOTE: spi0/1 use CircuitPython which allows use of CS pins other than what is specified by dtoverly (or default) in /boot/config.txt

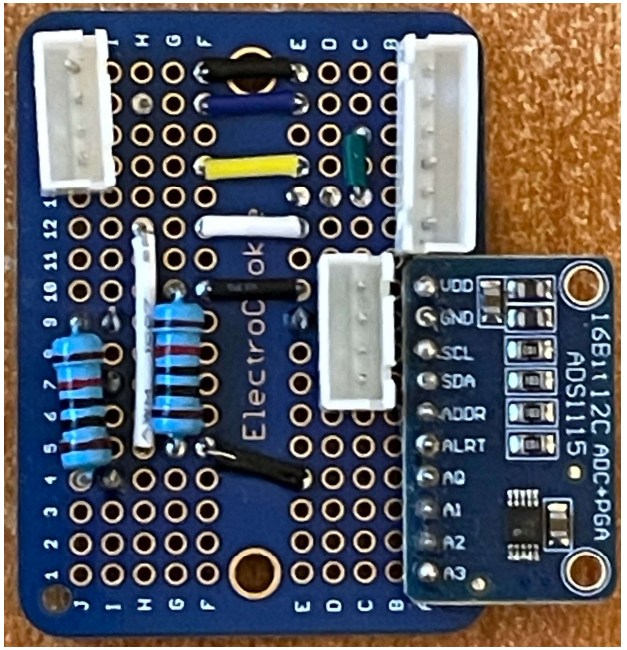
Weather Station Board Layout v2 (Obsolete)



Weather Station Board Wiring (Obsolete)

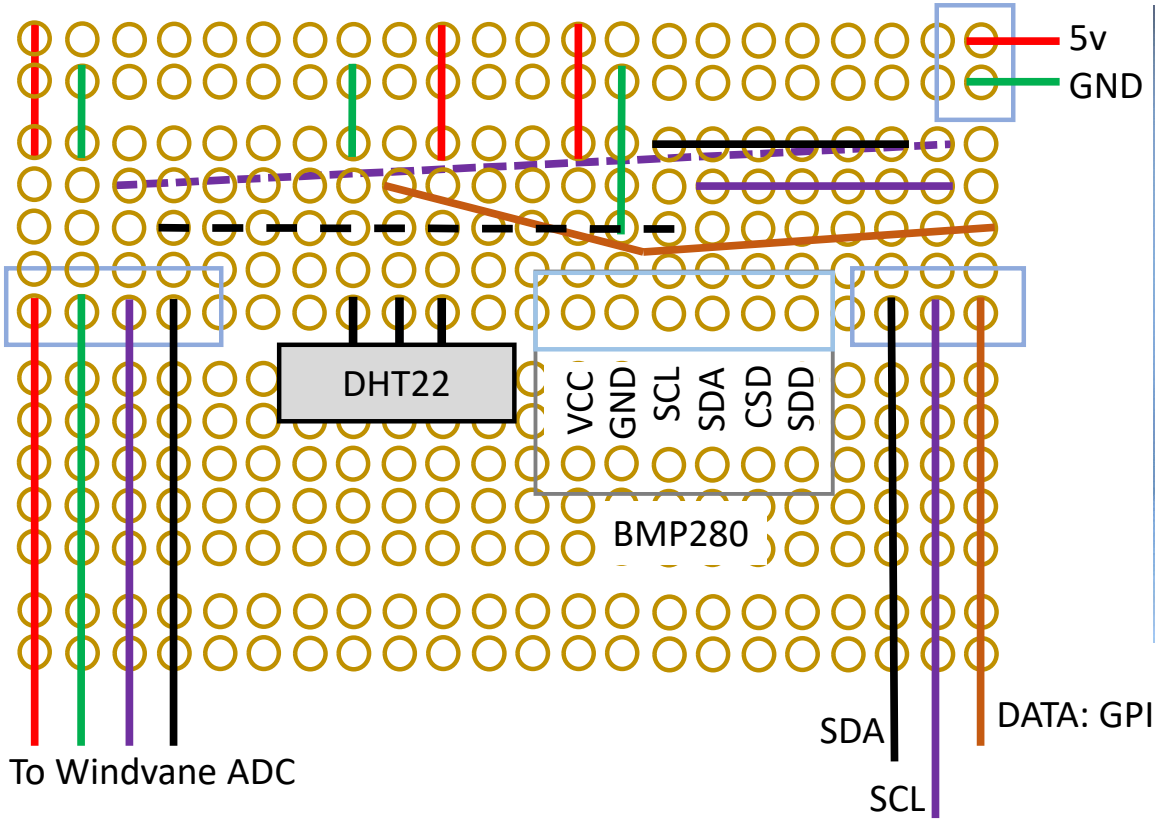
ADS1115

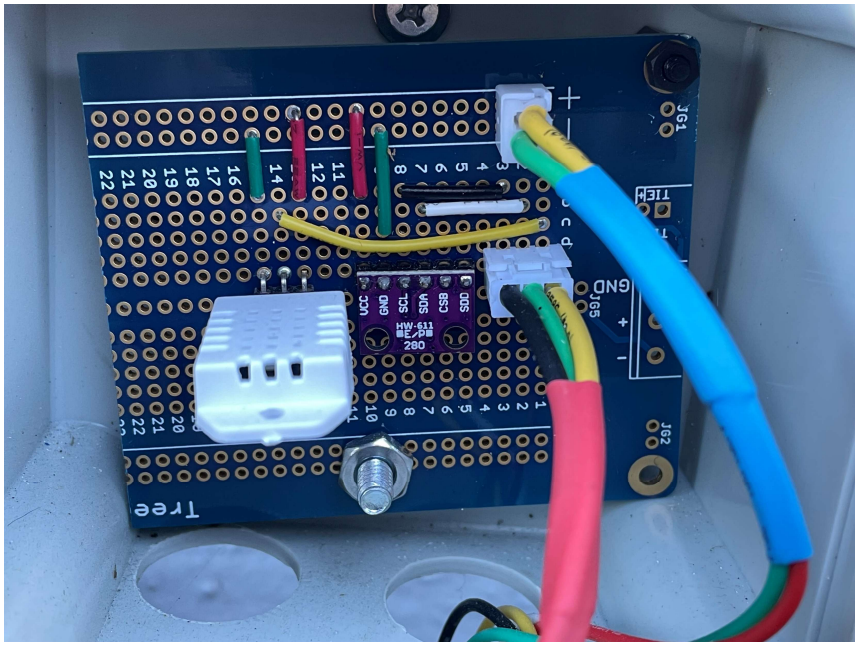




Temperature, Humidity & Pressure V2 (Obsolete)

DHT22 & BMP280

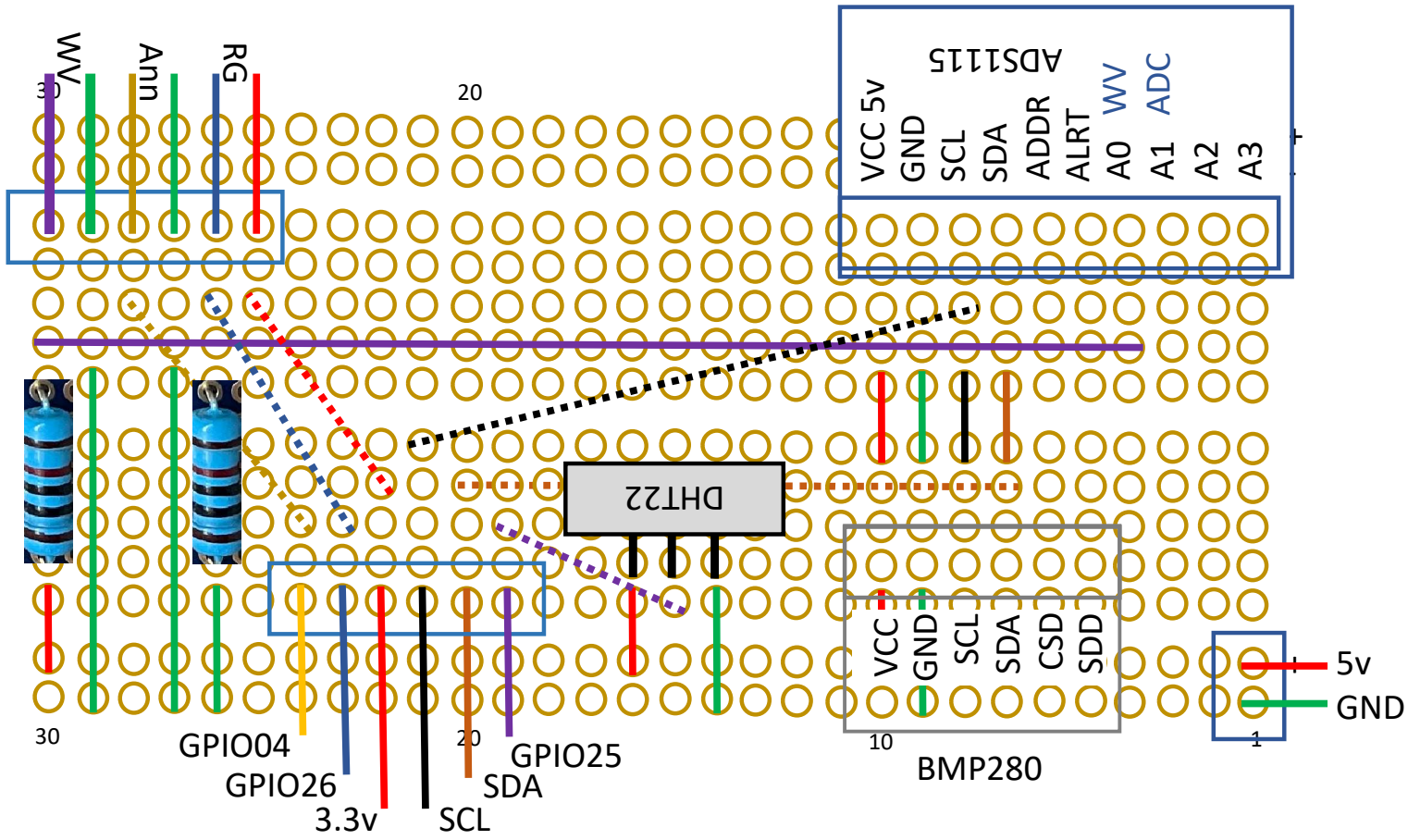




Weather Station Board Layout v3 (Obsolete)

rPi-Board Connecting Cable Wire Colors

Blue:	+5v
Blue-Wh:	GND
Brn:	GPIO26
Brn-Wh:	GPIO04
Org:	+3.3v
Org-Wh:	GPIO25
Grn:	SCL
Grn-Wh:	SDA



Weather Station Board Layout v4

Did not implement – Used v3.5 instead

rPi-Board Connecting Cable Wire Colors

Blue: +5v
Blue-Wh: GND
Brn: GPIO26
Brn-Wh: GPIO04
Org: +3.3v
Org-Wh: GPIO25
Grn: SCL
Grn-Wh: SDA