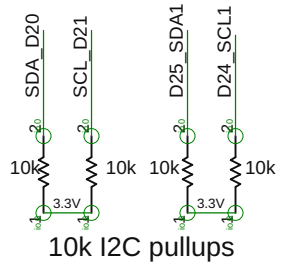
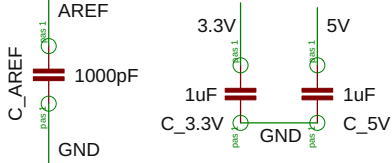


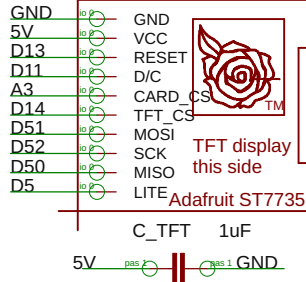
Put these close to the GCM4



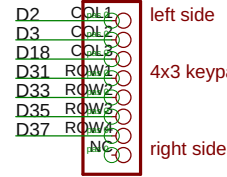
10k I2C pullups



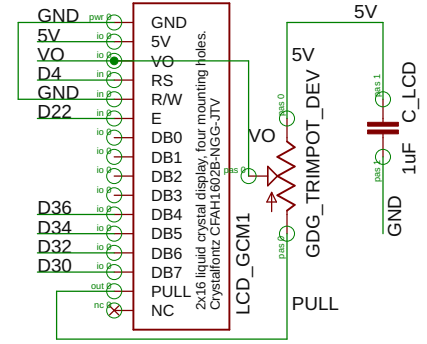
128 x 160 TFT display



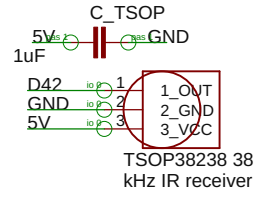
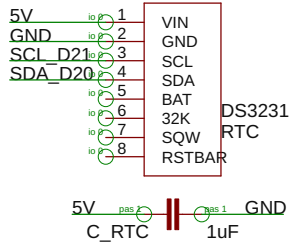
keypad



2 x 16 LCD

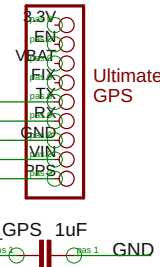


real time clock

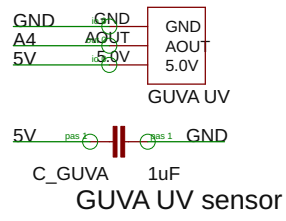
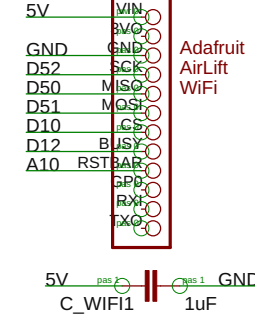


IR remote control

GPS

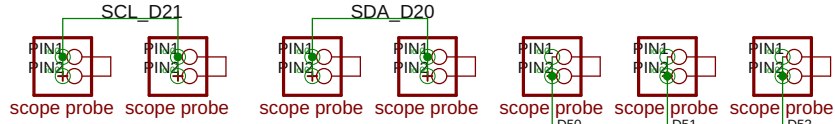
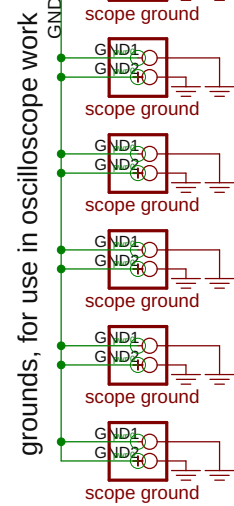
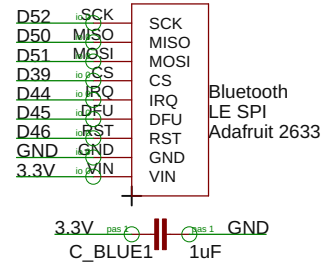


WiFi coprocessor

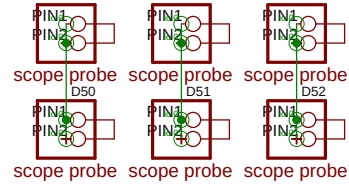


GUAUV UV sensor

Bluetooth communication module



GCM4 I2C clock and data lines

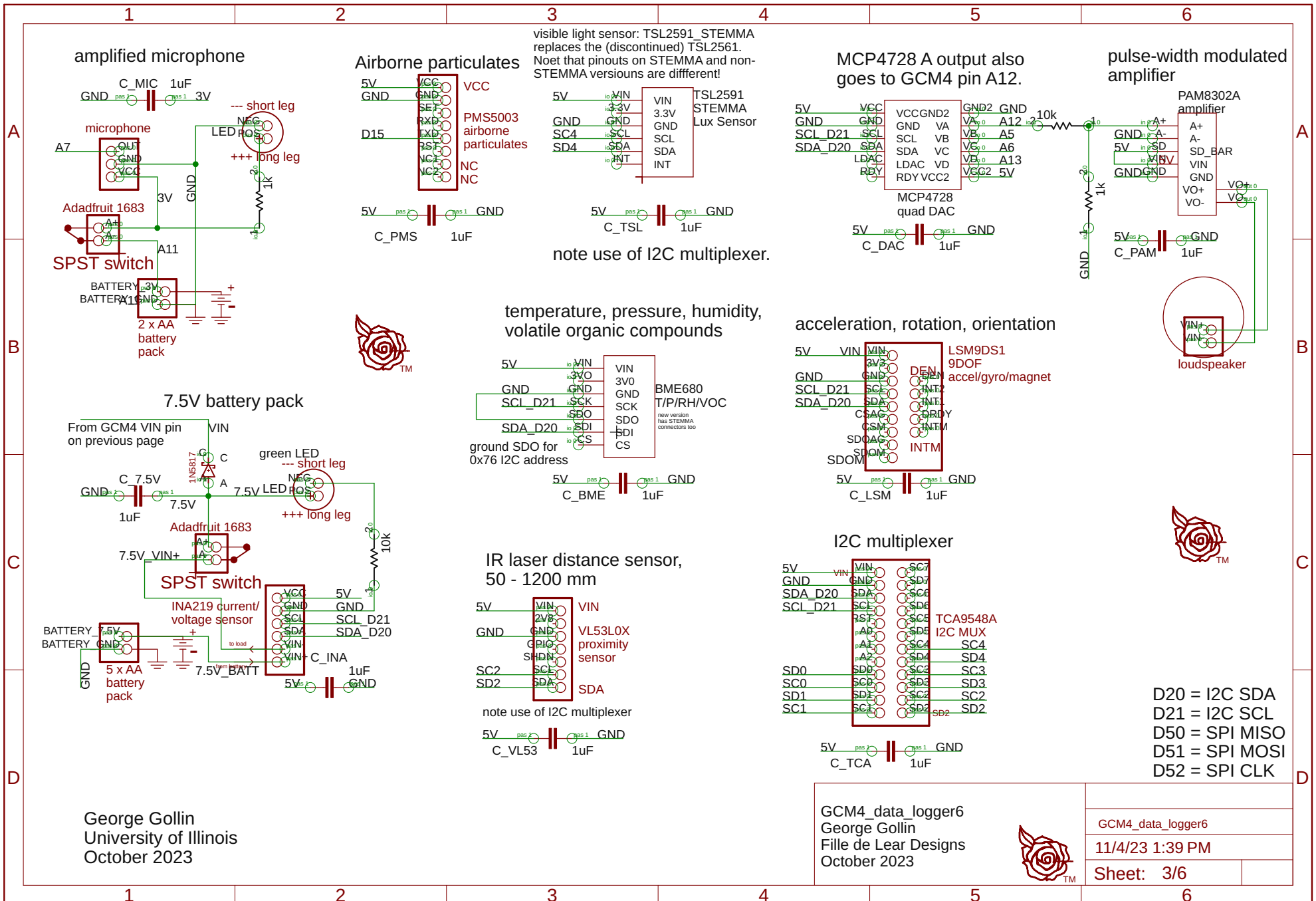


GCM4 SPI lines

- D20 = I2C SDA
- D21 = I2C SCL
- D50 = SPI MISO
- D51 = SPI MOSI
- D52 = SPI CLK

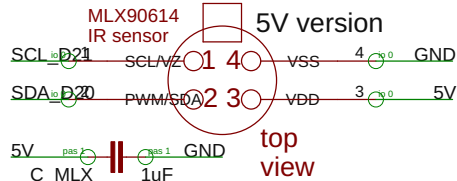


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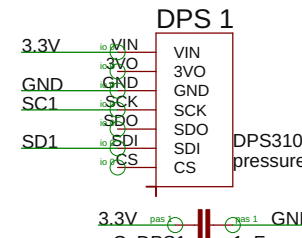
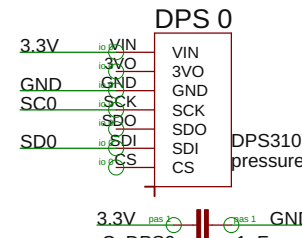
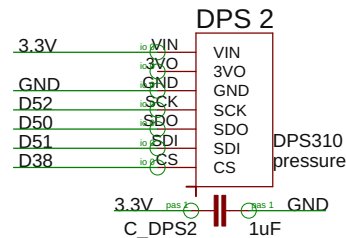




non-contact IR thermometer



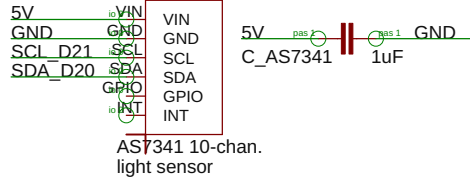
barometric pressure sensor, 0.2Pa noise. Use SPI here, for I2C - SPI speed comparisons with other DPS310s.



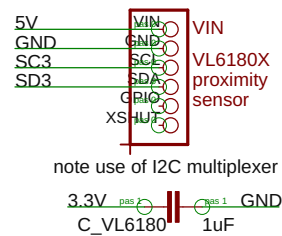
D20 = I2C SDA
 D21 = I2C SCL
 D50 = SPI MISO
 D51 = SPI MOSI
 D52 = SPI CLK

note use of I2C multiplexer

10 band visible + NIR spectrometer

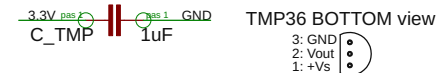
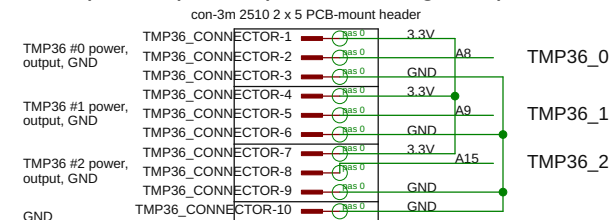


proximity sensor: 5 - 100 mm

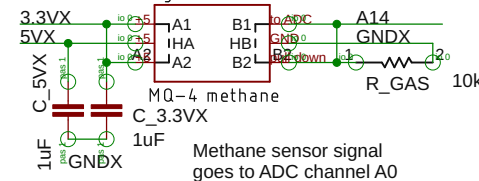


ribbon cable to TMP36 temperature sensors.

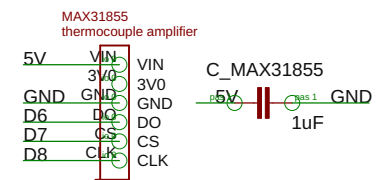
TMP36: pin 1 = power; pin 2 = analog out; pin 3 = GND.



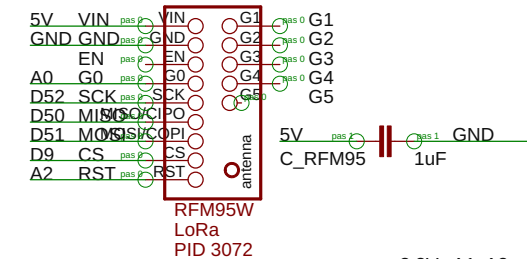
methane sensor, possibly off-board gas sensor



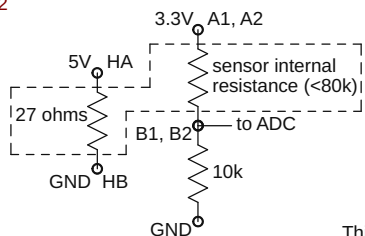
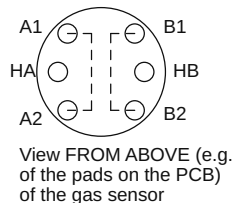
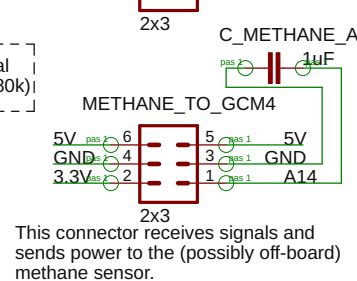
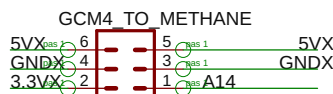
attach a type K thermocouple to the breakout's screw terminals



915 MHz LoRa radio transceiver for GCM4.



This connector sends signals and receives power.



Pins HA and HB drive current through the 27 ohm "heating" resistor. Pins A1 and A2 are internally connected. Pins B1 and B2 are also internally connected. In the absence of methane, the resistance between the A and B pins is about 80 k. This resistance DECREASES in the presence of methane. So the way we use the sensor is to run a few hundred mA through the heater, then determine the sensor resistance (between the A pins and the B pins) by putting it into a voltage divider with a 10k resistor in series. We feed 3.3V into the A pins, then attach the "top" of the 10k resistor to the B pins, and the bottom to ground. If, for example, the sensor resistance drops all the way to 10k, we'll measure the voltage at the B pins to be 1.65 V.

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1

2

3

4

5

6

A

A

B

B

C

C

D

D

1

2

3

4

5

6



D20 = I2C SDA
 D21 = I2C SCL
 D50 = SPI MISO
 D51 = SPI MOSI
 D52 = SPI CLK

device	GCM4 lines	device pin
Airlift WiFi	D12	BUSY
Airlift WiFi	D10	CS
Airlift WiFi	D50	MISO
Airlift WiFi	D51	MOSI
Airlift WiFi	A10	RSTBAR
Airlift WiFi	D52	SCK
AS7341 spectrometer	SCL_D21	SCL
AS7341 spectrometer	SDA_D20	SDA
Bluetooth LE	D39	CS
Bluetooth LE	D45	DFU
Bluetooth LE	D44	IRQ
Bluetooth LE	D50	MISO
Bluetooth LE	D51	MOSI
Bluetooth LE	D46	RST
Bluetooth LE	D52	SCK
Bluetooth LE	SCL_D21	SCK
BME680 T/P/RH/OC	SDA_D20	SDI
DPS310_0 barometric pressure	SC0	SCK
DPS310_0 barometric pressure	SD0	SDI
DPS310_1 barometric pressure	SC1	SCK
DPS310_1 barometric pressure	SD1	SDI
DPS310_2 barometric pressure	D38	SDI
DPS310_2 barometric pressure	D52	CS (DPS310_2_CS)
DPS310_2 barometric pressure	D51	SCK (SPI_CLOCK)
DPS310_2 barometric pressure	D50	SDI (SPI_MOSI)
DPS310_2 barometric pressure	D50	SDO (SPI_MISO)
DS3231 RTC	SCL_D21	SCL
DS3231 RTC	SDA_D20	SDA
GPS	D43	PPS
GPS	D16	RX
GPS	D17	TX
GUVA UV sensor	A04	AOUT
INA219 current sensor	SCL_D21	SCL
INA219 current sensor	SDA_D20	SDA
keypad	D02	COL1
keypad	D03	COL2
keypad	D18	COL3
keypad	D31	ROW1
keypad	D33	ROW2
keypad	D35	ROW3
keypad	D37	ROW4
LCD	D36	DB4
LCD	D34	DB5
LCD	D32	DB6
LCD	D30	DB7
LCD	D22	E
LCD	D04	RS
LSM9DS1 9 axis accelerometer	SCL_D21	SCL
LSM9DS1 9 axis accelerometer	SDA_D20	SDA
CLK	D08	CLK
MAX31855 thermocouple amplifier	D06	DO
MAX31855 thermocouple amplifier	D07	CS
MCP4728 quad DAC	SCL_D21	SCL
MCP4728 quad DAC	SDA_D20	SDA
MCP4728 quad DAC	A12	VA
MCP4728 quad DAC	A05	VB
MCP4728 quad DAC	A06	VC
MCP4728 quad DAC	A13	VD
METHANE detector	A14	A14/Methane_AX
microphone	A07	OUT
MLX90614 IR thermometer	SDA_D20	SDA
MLX90614 IR thermometer	SCL_D21	SCL
PMS5003 particulates sensor	D15	TXD
RFM95W 915 MHz LoRa radio	D09	CS
RFM95W 915 MHz LoRa radio	A00	G0
RFM95W 915 MHz LoRa radio	D50	MISO/CIPO
RFM95W 915 MHz LoRa radio	D51	MOSI/COPI
RFM95W 915 MHz LoRa radio	A02	RST
RFM95W 915 MHz LoRa radio	D52	SCK
RFM95W 915 MHz LoRa radio	SCL_D21	SCL
TCA9548 I2C MUX	SDA_D20	SDA
TCA9548 I2C MUX	A03	CARD_CS
TFT display	D11	D/C
TFT display	D05	LITE
TFT display	D50	MISO
TFT display	D51	MOSI
TFT display	D13	RESET
TFT display	D13	SCK
TFT display	D52	TFT_CS
TFT display	D14	VOUT
TMP36_0 analog temperature	A08	VOUT
TMP36_1 analog temperature	A09	VOUT
TMP36_2 analog temperature	A15	VOUT
TSL2591 LUX sensor	SC4	SCL
TSL2591 LUX sensor	SD4	SDA
TSOP38238 IR remote control sensor	D42	L_OUT
VL53LOX 50 - 1200 mm proximity	SC2	SCL
VL53LOX 50 - 1200 mm proximity	SD2	SDA
VL6180X 5- 100 mm proximity	SC3	SCL
VL6180X 5- 100 mm proximity	SD3	SDA

Sorted by device

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D20 = I2C SDA
 D21 = I2C SCL
 D50 = SPI MISO
 D51 = SPI MOSI
 D52 = SPI CLK

device	GCM4 lines	device pin
RFM95W 915 MHz LoRa radio	A00	G0
RFM95W 915 MHz LoRa radio	A02	RST
TFT display	A03	CARD_CS
GUVVA UV sensor	A04	AOUT
MCP4728 quad DAC	A05	VB
MCP4728 quad DAC	A06	VC
microphone	A07	OUT
TMP36_0 analog temperature	A08	VOUT
TMP36_1 analog temperature	A09	VOUT
Airift WiFi	A10	RSTBAR
MCP4728 quad DAC	A12	VA
MCP4728 quad DAC	A13	VD
METHANE detector	A14	A14/Methane_AX
TMP36_2 analog temperature	A15	VOUT
keypad	D02	COL1
keypad	D03	COL2
LCD	D04	RS
TFT display	D05	LITE
MAX31855 thermocouple amplifier	D06	DO
MAX31855 thermocouple amplifier	D07	CS
MAX31855 thermocouple amplifier	D08	CLK
RFM95W 915 MHz LoRa radio	D09	CS
Airift WiFi	D10	CS
TFT display	D11	D/C
Airift WiFi	D12	BUSY
TFT display	D13	RESET
TFT display	D14	TFT_CS
PMS5003 particulates sensor	D15	TXD_CS
GPS	D16	RX
GPS	D17	TX
keypad	D18	COL3
LCD	D22	E
LCD	D30	DB7
keypad	D31	ROW1
LCD	D32	DB6
keypad	D33	ROW2
LCD	D34	DB5
keypad	D35	ROW3
LCD	D36	DB4
keypad	D37	ROW4
DPS310_2 barometric pressure	D38	CS (DPS310_2_CS)
Bluetooth LE	D39	CS
TSOP38238 IR remote control sensor	D42	1_OUT
GPS	D43	PPS
Bluetooth LE	D44	IRQ
Bluetooth LE	D45	DFU
Bluetooth LE	D46	RST
Airift WiFi	D50	MISO
Bluetooth LE	D50	MISO
DPS310_2 barometric pressure	D50	SDO (SPI_MISO)
RFM95W 915 MHz LoRa radio	D50	MISO/CiPO
TFT display	D50	MISO
Airift WiFi	D51	MOSI
Bluetooth LE	D51	MOSI
DPS310_2 barometric pressure	D51	SDI (SPI_MOSI)
RFM95W 915 MHz LoRa radio	D51	MOSI/COPI
TFT display	D51	MOSI
Airift WiFi	D52	SCK
Bluetooth LE	D52	SCK
DPS310_2 barometric pressure	D52	SCK (SPI_CLOCK)
RFM95W 915 MHz LoRa radio	D52	SCK
TFT display	D52	SCK
DPS310_0 barometric pressure	SC0	SCK
DPS310_1 barometric pressure	SC1	SCK
VL53L0X 50 - 1200 mm proximity	SC2	SCL
VL6180X 5 - 100 mm proximity	SC3	SCL
TSL2591 LUX sensor	SC4	SCL
AS7341 spectrometer	SCL_D21	SCL
BME680 T/P/RH/VOC	SCL_D21	SCL
DS2321 RTC	SCL_D21	SCL
INA219 current sensor	SCL_D21	SCL
LSM9DS1 9 axis accelerometer	SCL_D21	SCL
MCP4728 quad DAC	SCL_D21	SCL
MLX90614 IR thermometer	SCL_D21	SCL
TCA9548 I2C MUX	SCL_D21	SCL
DPS310_0 barometric pressure	SD0	SDI
DPS310_1 barometric pressure	SD1	SDI
VL53L0X 50 - 1200 mm proximity	SD2	SDA
VL6180X 5 - 100 mm proximity	SD3	SDA
TSL2591 LUX sensor	SD4	SDA
AS7341 spectrometer	SDA_D20	SDA
BME680 T/P/RH/VOC	SDA_D20	SDA
DS2321 RTC	SDA_D20	SDA
INA219 current sensor	SDA_D20	SDA
LSM9DS1 9 axis accelerometer	SDA_D20	SDA
MCP4728 quad DAC	SDA_D20	SDA
MLX90614 IR thermometer	SDA_D20	SDA
TCA9548 I2C MUX	SDA_D20	SDA

Sorted by microcontroller pin

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