

Cellular IoT Monitor Wiring Lists

Cellular HUB Option 1

Botletics SIM7000 LTE_CAT-M1/NB-IoT + GPS Arduino Shield Kit Adapted to ESP32

AmbientHUB Using ESP32 Microcontroller, Botletics Cellular modem, BME280 Temp/Hum sensor, and SSD1306 OLED display								
		<u>BME280</u>		<u>SSD1306</u>				
		<u>ESP</u>	<u>Temp /Hum</u>	<u>BME 280</u>	<u>OLED Display</u>	<u>SSD1306</u>	<u>Botletics SIM 7000</u>	
<u>Description</u>	<u>ESP32 Pin</u>	<u>Descr</u>	<u>Pin</u>	<u>Descr</u>	<u>Pin</u>	<u>Descr</u>	<u>Connector/Pin</u>	<u>Botletics Description</u>
I2C - SCL	GPIO22	I2C Clock	SCL	I2C Clock	SCL	I2C Clock	SCL	Botletics on-board temp sensor
I2C -SDA	GPIO21	I2C Data	SDA	I2C Data	SDA	I2C Data	SDA	Botletics on-board temp sensor
3.3 Volts supplied by ESP32	3V3	3.3v	Vcc	3.3v	Vcc	3.3v	5v	Logic Voltage
Common ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
Data ESP32 to Botletics	GPIO17	TX2					11	RX2
Data Botletics to ESP32	GPIO16	RX2					10	TX2
Botletics Power ON / OFF	GPIO18						6	Power ON / OFF
Botletics Jumper 5V to VBAT	-						5V - VBAT	Botletics Jumper 5V to VBAT
USB Micro B Cable external power	USB B Connector							

Cellular HUB Option 2

LILLYGO ESP32-WROVER-B TTGO T-SIM7000G Chip w/ Battery Holder Solar Charge Development Board

AmbientHUB Using LILLYGO Cellular modem Board, BME280 Temp/Hum sensor, and SSD1306 OLED display								
			<u>BME280</u>			<u>SSD1306</u>		
	<u>On-Board</u>	<u>ESP</u>	<u>Temp /Hum</u>	<u>BME 280</u>	<u>OLED Display</u>	<u>SSD1306</u>	<u>Botletics SIM 7000</u>	
<u>Description</u>	<u>ESP32 Pin</u>	<u>Descr</u>	<u>Pin</u>	<u>Descr</u>	<u>Pin</u>	<u>Descr</u>	<u>Connector/Pin</u>	<u>LILLYGO Description</u>
I2C - SCL	GPIO22	I2C Clock	SCL	I2C Clock	SCL	I2C Clock	SCL	I2C-SCL
I2C -SDA	GPIO21	I2C Data	SDA	I2C Data	SDA	I2C Data	SDA	I2C-SDA
3.3 Volts supplied by ESP32	3V3	3.3v	Vcc	3.3v	Vcc	3.3v	5v	Logic Voltage
Common ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
USB C Cable external power	USB C Connector							
18650 Battery Power (optional)	Battery Holder							

Cellular HUB Option 3

And-Global BK-SIM7000 Development Board w External ESP32

AmbientHUB Using ESP32 Microcontroller, And-Global Cellular modem, BME280 Temp/Hum sensor, and SSD1306 OLED display								
		BME280		SSD1306				
		ESP	Temp /Hum	BME 280	OLED Display	SSD1306	SIM 7000 Module	And-Global SIM7000 Module
Description	ESP32 Pin	Descr	Pin	Descr	Pin	Descr	Connector/Pin	Description
I2C - SCL	GPIO22	I2C Clock	SCL	I2C Clock	SCL	I2C Clock	-	-
I2C -SDA	GPIO21	I2C Data	SDA	I2C Data	SDA	I2C Data	-	-
3.3 Volts supplied by ESP32	3V3	3.3v	Vcc	3.3v	Vcc	3.3v	V	Logic Voltage
Common ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd	G	Gnd
Data ESP32 to SIM7000 Module	GPIO17	TX2					R	Rxd
Data ESP32 to SIM7000 Module	GPIO16	RX2					T	Txd
Module Power ON / OFF	GPIO18						S	Power ON / OFF
USB Micro B Cable external power	USB B Connector							

Sensor Platform Wiring Lists - ESP32 (Preferred)

AmbientAP Sensor using ESP32, BME280 Temp/Hum sensor, and SSD1306 OLED Display						
<u>Description</u>	<u>ESP32 Pin</u>	<u>ESP</u>	<u>BME280 Pin</u>	<u>BME Descr</u>	<u>SSD1306 Pin</u>	<u>SSD1306</u>
		<u>Descr</u>				<u>Descr</u>
I2C - SCL	GPIO22	I2C Clock	SCL	I2C Clock	SCL	I2C Clock
I2C -SDA	GPIO21	I2C Data	SDA	I2C Data	SDA	I2C Data
3.3 Volts supplied by ESP32	3V3	3.3v	Vcc	3.3v	Vcc	3.3v
Common ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
USB Micro B Cable external power	USB B Connector					

Door/window connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO35
GPIO35	
GPIO35	The NO terminal will be open when the door is shut, resulting in a logical "1" at GPIO35
Gnd	Connect the common terminal to ground

PhotoResister connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO34
GPIO34	
GPIO34	Connect one end of photresistor to Gnd, the other end to GPIO34
Gnd	Photoresistor dark resistance is 20K ohm, light resistance is 2K ohm

Flood Sensor connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
	Hiletgo LM393 FC37 moisture monitor
3V3	Comparator Vcc
Gnd	Comparator Gnd
GPIO18	Comparator D0
GPIO36	Comparator A0
	Uses ESP32 internal pullup resistor
	Uses ESP32 ADC 0

DHTxx Temp/Hum Sensor Connect

<u>ESP32 Pin</u>	<u>Comments</u>
	DHT11, DHT21, DHT22, etc
3V3	Vcc
Gnd	Gnd
GPIO5	Data
	Temp/Hum sensor alternative to BME280

PIR connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
3V3	OPTION - Connect one end of pullup resistor to 3V3, the other end to GPIO39
GPIO39	testing revealed pullup may notbe necessary;
GPIO39	the data terminal will output 1 when motion is detected
Gnd	Connect the common terminal to ground
Vin	5v

Sensor Platform Wiring Lists - D1 Mini ESP8266 Option (Reduced Functionality)

AmbientAP Sensor using D1 Mini ESP8266, BME280 Temp/Hum sensor, and SSD1306 OLED Display						
<u>Description</u>	<u>D1 Mini</u>		<u>BME280 Pin</u>	<u>BME Descr</u>	<u>SSD1306 Pin</u>	<u>SSD1306 Descr</u>
	<u>D1 Mini Pin</u>	<u>Descr</u>				
I2C - SCL	GPIO5 (D1)	I2C Clock	SCL	I2C Clock	SCL	I2C Clock
I2C -SDA	GPIO4 (D2)	I2C Data	SDA	I2C Data	SDA	I2C Data
3.3 Volts supplied by ESP32	3V3	3.3v	Vcc	3.3v	Vcc	3.3v
Common ground	Gnd	Gnd	Gnd	Gnd	Gnd	Gnd
USB Micro Cable external power	USB Connector					

Door/window connection

<u>D1 Mini Pin</u>	<u>Comments</u>
3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO35
GPIO14 (D5)	
GPIO14 (D5)	The NO terminal will be open when the door is shut, resulting in a logical "1" at GPIO14
Gnd	Connect the common terminal to ground

PhotoResister connection

<u>D1 Mini Pin</u>	<u>Comments</u>
3V3	Connect one end of pullup resistor to 3V3, the other end to A0
A0	
A0	Connect one end of photresistor to Gnd, the other end to A0
Gnd	Photoresistor dark resistance is 20K ohm, light resistance is 2K ohm

Flood Sensor connection

<u>D1 Mini Pin</u>	<u>Comments</u>
	Hiletgo LM393 FC37 moisture monitor
3V3	Comparator Vcc
Gnd	Comparator Gnd
GPIO13 (D7)	Add 10K pullup resistor D7 to 3V3
-	Comparator D0
	Comparator A0

DHTxx Temp/Hum Sensor Connect

<u>D1 Mini Pin</u>	<u>Comments</u>
	DHT11, DHT21, DHT22, etc
3V3	Temp/Hum sensor alternative to BME280
Gnd	Vcc
GPIO12 (D6)	Data