

## 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>Description</u>	<u>ESP32 Pin</u>	<u>BME280</u>		<u>SSD1306</u>		<u>Botletics SIM 7000</u>		<u>Botletics Description</u>
		<u>ESP</u>	<u>Temp /Hum</u>	<u>BME 280</u>	<u>OLED Display</u>	<u>SSD1306</u>	<u>Connector/Pin</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>Description</u>	<u>On-Board</u>	<u>BME280</u>		<u>SSD1306</u>		<u>Botletics SIM 7000</u>		<u>LILLYGO Description</u>
	<u>ESP32 Pin</u>	<u>ESP</u>	<u>Temp /Hum</u>	<u>BME 280</u>	<u>OLED Display</u>	<u>SSD1306</u>	<u>Connector/Pin</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								
<u>Description</u>	<u>ESP32 Pin</u>	<u>BME280</u>		<u>SSD1306</u>		<u>SIM 7000 Module</u>		<u>And-Global SIM7000 Module</u>
		<u>ESP</u>	<u>Temp /Hum</u>	<u>BME 280</u>	<u>OLED Display</u>	<u>SSD1306</u>	<u>Connector/Pin</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	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>
1K ohm pullup resistor A	3V3
1K ohm pullup resistor B	GPIO35
Door Reed Switch NO terminal	GPIO35
Door Reed Switch C terminal	Gnd

### PhotoResister connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
100k ohm pullup resistor A	3V3
100k ohm pullup resistor B	GPIO34
Photoresistor GL5516 A	GPIO34
Photoresistor GL5516 B	Gnd

### Flood Sensor connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
Hiletgo LM393 FC37 moisture monitor	
Comparator Vcc	3V3
Comparator Gnd	Gnd
Comparator D0	GPIO19
Comparator A0	GPIO36

### DHTxx Temp/Hum Sensor Connectic

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

### PIR HC-SR501 connection to ESP32

<u>ESP32 Pin</u>	<u>Comments</u>
10k - 100K ohm pullup resistor A	3V3
10k - 100K ohm pullup resistor B	GPIO39
PIR data terminal	GPIO39
PIR Gnd Terminal	Gnd
PIR Vcc Terminal	Vin

## 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 Pin</u>	<u>D1 Mini</u>	<u>BME280 Pin</u>	<u>BME Descr</u>	<u>SSD1306 Pin</u>	<u>SSD1306</u>
		<u>Descr</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 photoresistor 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 A0

### DHTxx Temp/Hum Sensor Connectic

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