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

Description	ESP32 Pin	ESP Descr	BME280 Temp /Hum Pin	BME 280 Descr	SSD1306 OLED Display Pin	SSD1306 Descr	Botletics SIM 7000 Connector/Pin	Botletics Description
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

Description	On-Board ESP32 Pin	ESP Descr	BME280 Temp /Hum Pin	BME 280 Descr	SSD1306 OLED Display Pin	SSD1306 Descr	Botletics SIM 7000 Connector/Pin	LILLYGO Description
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

Description	ESP32 Pin	ESP Descr	BME280 Temp /Hum Pin	BME 280 Descr	SSD1306 OLED Display Pin	SSD1306 Descr	SIM 7000 Module Connector/Pin	And-Global SIM7000 Module 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						
Description	ESP32 Pin	ESP Descr	BME280 Pin	BME Descr	SSD1306 Pin	SSD1306 Descr
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	**ESP32 Pin**	**Comments**
1K ohm pullup resistor A	3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO35
1K ohm pullup resistor B	GPIO35	
Door Reed Switch NO terminal	GPIO35	The NO terminal will be open when the door is shut, resulting in a logical "1" at GPIO35
Door Reed Switch C terminal	Gnd	Connect the common terminal to ground

PhotoResister connection to ESP32	**ESP32 Pin**	**Comments**
100k ohm pullup resistor A	3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO34
100k ohm pullup resistor B	GPIO34	
Photoresistor GL5516 A	GPIO34	Connect one end of photresistor to Gnd, the other end to GPIO34
Photoresistor GL5516 B	Gnd	Photoresistor dark resistance is 20K-30K ohm, light resistance is 2K ohm

Flood Sensor connection to ESP32	**ESP32 Pin**	**Comments**
Hiletgo LM393 FC37 moisture monitor		Use moisture sensor, do not use accomanying circuit board
Sensor terminal 1	GPIO32	Use touch sensor to detect moisture
Sensor terminal 2	Gnd	

DHTxx Temp/Hum Sensor Connectic	**ESP32 Pin**	**Comments**
DHT11, DHT21, DHT22, etc		Temp/Hum sensor alternative to BME280
Vcc	3V3	
Gnd	Gnd	
Data	GPIO5	

PIR HC-SR501 connection to ESP32	**ESP32 Pin**	**Comments**
10k - 100K ohm pullup resistor A	3V3	OPTION - Connect one end of pullup resistor to 3V3, the other end to GPIO39
10k - 100K ohm pullup resistor B	GPIO39	testing revealed pullup may notbe necessary;
PIR data terminal	GPIO39	the data terminal will output 1 when motion is detected
PIR Gnd Terminal	Gnd	Connect the common terminal to ground
PIR Vcc Terminal	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						
Description	D1 Mini Pin	D1 Mini Descr	BME280 Pin	BME Descr	SSD1306 Pin	SSD1306 Descr
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	**D1 Mini Pin**	**Comments**
10k - 100K ohm pullup resistor A	3V3	Connect one end of pullup resistor to 3V3, the other end to GPIO35
10k - 100K ohm pullup resistor B	GPIO14 (D5)	
Door Reed Switch NO terminal	GPIO14 (D5)	The NO terminal will be open when the door is shut, resulting in a logical "1" at GPIO14
Door Reed Switch C terminal	Gnd	Connect the common terminal to ground

PhotoResister connection	**D1 Mini Pin**	**Comments**
10k ohm pullup resistor A	3V3	Connect one end of pullup resistor to 3V3, the other end to A0
10k ohm pullup resistor B	A0	
Photoresistor GL5516 A	A0	Connect one end of photresistor to Gnd, the other end to A0
Photoresistor GL5516 B	Gnd	Photoresistor dark resistance is 20K ohm, light resistance is 2K ohm

Flood Sensor connection	**D1 Mini Pin**	**Comments**
Hiletgo LM393 FC37 moisture monitor		
Comparator Vcc	3V3	
Comparator Gnd	Gnd	
Comparator D0	GPIO13 (D7)	Add 10K pullup resistor D7 to 3V3
Comparator A0	-	

DHTxx Temp/Hum Sensor Connectic	**D1 Mini Pin**	**Comments**
DHT11, DHT21, DHT22, etc		Temp/Hum sensor alternative to BME280
Vcc	3V3	
Gnd	Gnd	
Data	GPIO12 (D6)	