**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 Cable external power | USB 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 | 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 |
| USB Micro Cable external power | USB 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 Cable external power | USB Connector | | | | | | | |

Sensor Platform Wiring Lists

| 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 Cable external power | USB Connector | | | | | |

| **Door/window connection to ESP32** | **ESP32 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 | 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** |
|---|---|---|
| 10k ohm pullup resistor A | 3V3 | Connect one end of pullup resistor to 3V3, the other end to GPIO34 |
| 10k 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 ohm, light resistance is 2K ohm |

| **Flood Sensor connection to ESP32** | **ESP32 Pin** | **Comments** |
|---|---|---|
| Hiletgo LM393 FC37 moisture monitor | | |
| Comparator Vcc | 3V3 | |
| Comparator Gnd | Gnd | |
| Comparator D0 | GPIO18 | Uses ESP32 internal pullup resistor |
| Comparator A0 | GPIO36 | Uses ESP32 ADC 0 |

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