Circuit Documentation

Summary

This circuit is designed to integrate various sensors and communication modules with an Arduino Nano 33 BLE Sense Rev 2. The circuit includes a GPS module, a radio communication module, a particulate matter sensor, a CO_2 sensor, and an SD card module for data storage. Power is supplied by a 3.7V LiPo battery. The circuit is designed to collect environmental data and transmit it wirelessly while storing the data locally on an SD card.

Component List

1. **Arduino Nano 33 BLE Sense Rev 2**
   - Description: A compact microcontroller board with Bluetooth Low Energy capabilities, suitable for IoT applications.
   - Pins: D0, D1, RESET, GND, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, 3V3, AREF, A0, A1, A2, A3, A4, A5, A6, A7, 5V, VIN
2. **GPS atgm336H**
   - Description: A GPS module for receiving location data.
   - Pins: VCC, GND, TX, RX
3. **APC220**
   - Description: A radio communication module for wireless data transmission.
   - Pins: GND, VCC, EN, RXD, TXD, AUX, SET
4. **HM3301**
   - Description: A particulate matter sensor for measuring air quality.
   - Pins: SCL, SDA, VCC, GND
5. **Sensirion SCD40 CO_2 Sensor Breakout Board**
   - Description: A sensor module for measuring CO_2 concentration.
   - Pins: GND, VDD, SDA, SCL
6. **SD SDHC**
   - Description: An SD card module for data storage.
   - Pins: 3V3, CS, MOSI, CLK, MISO, GND
7. **3.7V 5000mAh LiPo Battery**
   - Description: A rechargeable lithium polymer battery for powering the circuit.
   - Pins: +, -

Wiring Details

Arduino Nano 33 BLE Sense Rev 2

- **D2** is connected to **TXD** of the APC220.
- **D3** is connected to **RXD** of the APC220.
- **D4** is connected to **TX** of the GPS atgm336H.
- **D5** is connected to **RX** of the GPS atgm336H.

- **D10** is connected to **CS** of the SD SDHC.
- **D11** is connected to **MISO** of the SD SDHC.
- **D12** is connected to **MOSI** of the SD SDHC.
- **D13** is connected to **CLK** of the SD SDHC.
- **A4** is connected to **SDA** of both the HM3301 and the Sensirion SCD40 CO_2 sensor.
- **A5** is connected to **SCL** of both the HM3301 and the Sensirion SCD40 CO_2 sensor.
- **3V3** is connected to **VDD** of the Sensirion SCD40 CO_2 sensor, **VCC** of the HM3301, **VCC** of the GPS atgm336H, **VCC** of the APC220, and **3V3** of the SD SDHC.
- **GND** is connected to **GND** of the Sensirion SCD40 CO_2 sensor, **GND** of the HM3301, **GND** of the GPS atgm336H, **GND** of the APC220, **GND** of the SD SDHC, and **+** of the LiPo Battery.
- **VIN** is connected to **-** of the LiPo Battery.

GPS atgm336H

- **TX** is connected to **D4** of the Arduino Nano 33 BLE Sense Rev 2.
- **RX** is connected to **D5** of the Arduino Nano 33 BLE Sense Rev 2.
- **VCC** is connected to **3V3** of the Arduino Nano 33 BLE Sense Rev 2.
- **GND** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.

APC220

- **TXD** is connected to **D2** of the Arduino Nano 33 BLE Sense Rev 2.
- **RXD** is connected to **D3** of the Arduino Nano 33 BLE Sense Rev 2.
- **VCC** is connected to **3V3** of the Arduino Nano 33 BLE Sense Rev 2.
- **GND** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.

HM3301

- **SDA** is connected to **A4** of the Arduino Nano 33 BLE Sense Rev 2.
- **SCL** is connected to **A5** of the Arduino Nano 33 BLE Sense Rev 2.
- **VCC** is connected to **3V3** of the Arduino Nano 33 BLE Sense Rev 2.
- **GND** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.

Sensirion SCD40 CO_2 Sensor Breakout Board

- **SDA** is connected to **A4** of the Arduino Nano 33 BLE Sense Rev 2.
- **SCL** is connected to **A5** of the Arduino Nano 33 BLE Sense Rev 2.
- **VDD** is connected to **3V3** of the Arduino Nano 33 BLE Sense Rev 2.
- **GND** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.

SD SDHC

- **CS** is connected to **D10** of the Arduino Nano 33 BLE Sense Rev 2.
- **MISO** is connected to **D11** of the Arduino Nano 33 BLE Sense Rev 2.
- **MOSI** is connected to **D12** of the Arduino Nano 33 BLE Sense Rev 2.
- **CLK** is connected to **D13** of the Arduino Nano 33 BLE Sense Rev 2.
- **3V3** is connected to **3V3** of the Arduino Nano 33 BLE Sense Rev 2.

- **GND** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.

3.7V 5000mAh LiPo Battery

- **+** is connected to **GND** of the Arduino Nano 33 BLE Sense Rev 2.
- **-** is connected to **VIN** of the Arduino Nano 33 BLE Sense Rev 2.