# Proposed soil nutrient sensor ciruit

Introduction

A 7-in-1 soil nutrient sensor is a versatile device designed to assess various crucial aspects of soil composition. It actively measures parameters such as humidity, temperature, nitrogen content, oxygen levels, pH value, soil electrical conductivity, potassium content, and phosphorus content.

These measured parameters collectively offer valuable insights into the soil's fertility, moisture status, and nutrient composition. By understanding these factors, farmers and gardeners gain essential information to make informed decisions about their agricultural practices. This data aids in optimizing the conditions for planned crop growth, allowing for more effective and sustainable farming or gardening practices. In essence, the 7-in-1 soil nutrient sensor serves as a valuable tool for improving agricultural efficiency and ensuring healthier plant development.

Components used:

1. ESP32 sensor.
2. DHT11 sensor.
3. DC to DC convertor.
4. Rs-485 module.
5. 7-in-1 soil sensor.
6. 0PCB.
7. Power supply.(3.3V,12V,4.7V).
8. Wires.

Component analysis:

1) ESP32 Sensor: The ESP32 sensor is a versatile device that integrates WiFi and Bluetooth capabilities, commonly used for collecting and transmitting data in IoT applications, offering a wide range of functionalities for various projects.

2) DHT11 Sensor: The DHT11 sensor is a cost-effective and reliable component for measuring temperature and humidity. Widely used in weather stations and home automation systems, it provides accurate environmental data in a compact package.

3) DC to DC Converter: The DC to DC converter is an electronic circuit that efficiently transforms one voltage level to another. Utilized in various electronic devices, it ensures a stable power supply by converting DC power, facilitating compatibility between different components.

4) RS-485 Module: The RS-485 module is a communication interface commonly used for serial communication over long distances. With its balanced differential signaling, it enables reliable data transfer in industrial automation and other applications, making it suitable for robust and noise-resistant communication.

Working of circuit

1. Hardware connection
2. Connect the Vin(3V3) pin of the esp32 sensor with Vcc pin of rs485 module.
3. Connect pin 14(IO12),pin 16(IO13), pin 15(GND) of esp32 with DI pin, RO pin, GND pin of rs485 module.
4. Connect pin37(IO23), pin 36(IO22) of esp32 with DE, RE of rs485 module.
5. Connect pin 31(IO19) of esp32 with data pin 2 of DHT11. Ground the pin 3 GND of DHT 11.Provide 3.3V Vcc to Vcc pin 1 of DHT 11.
6. Connect pin 4(OUT-) of DC2DC convertor with GND pin of rs485 and provide 4.7V DC power supply. Connect pin 3(OUT+) of DC2DC to pin VCC of rs485
7. Connect pin 2 (IN-) , pin 1(IN+) of DC2DC with GND, Vcc terminal of soil sensor instrument. Provide 12V power supply across IN- terminal.
8. Connect pin A and pin B of rs 485 module with pin A and pin B of soil sensor instrument.
9. Software synchronization
10. We need Arduino IDE to write the working code for the sensor.( Available at:)
11. Create a firebase account -> make a database ->enable realtime nalytics.
12. Copy firebase host id and paste in code.
13. Got to project settings->service accounts->database secrets.
14. Copy authentication key and paste in program.
15. Select board and upload it
16. Create an android app by MIT apps website.
17. Fill firebase token, firebase url in necessary fields.
18. Scan barcode of the app and download it.

C.Final word

a. connect power supply .

b. press reset button.

c. place sensor probe in soil.

d.The phone will show update data.