

Smart Energy Monitoring System

Required Libraries

- Adafruit GFX Library
- Adafruit SSD1306
- Wire.h (for I2C communication)
- WiFi.h (for ESP32 Wi-Fi)

Features of This Code

- Real-time Energy Monitoring: Displays voltage, current, and power usage.
- Cloud Integration: Sends data to Firebase or ThingSpeak.
- Overload Detection: Alerts when power exceeds threshold.
- OLED Display: Shows real-time readings locally.

How to Use This Code

1. Install the required libraries in Arduino IDE.
2. Connect the components as per the wiring diagram.
3. Upload the code to the ESP32.
4. Monitor real-time energy data on OLED and cloud dashboard.

ESP32 Wiring Connections

ESP32 Pin	Component	Description
3.3V	ZMPT101B	Voltage Sensor Power
GND	ZMPT101B	Ground
34	ZMPT101B	Analog Output
5V	ACS712	Current Sensor Power
GND	ACS712	Ground

35	ACS712	Analog Output
5V	OLED	Display Power
GND	OLED	Display Ground
SDA	OLED (SDA)	I2C Data
SCL	OLED (SCL)	I2C Clock

Expected Output

- 1. OLED displays real-time voltage, current, and power.
- 2. Data is sent to the cloud dashboard.
- 3. Alerts trigger if power exceeds the threshold.
- 4. Users can monitor energy consumption remotely.