ESP32 Data Logger Hardware Configuration

Microcontroller

- **Board:** ESP32 Dev Board

Libraries Needed (Arduino Library Manager)

ArduinoJson Adafruit BME280 LoRa by Sandeep Mistry SD.h SQLite_Arduino

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BME280 Sensor (Temperature, Humidity, Pressure)

Interface: I2C
Voltage: 3.3V

BME280 Pin	ESP32 Connection
VIN	3.3V
GND	GND
SDA	GPIO21
SCL	GPIO22

LoRa Module (Receiving Radiation Data)

Module Type: SX1276/SX1278
Interface: SPI
Voltage: 3.3V

LoRa Pin	ESP32 Connection
VCC	3.3V
GND	GND
SCK	GPIO5
MISO	GPIO19
MOSI	GPIO27
NSS/CS	GPIO18
RESET	GPIO14
DIO0	GPIO26

Boost Module (MOSFET-Switched Power Control)

Controlled by: N-channel logic-level MOSFET (e.g., IRLZ34N, AO3400)

ESP32 → MOSFET	Boost Module Connection
GPIO23 → Gate	-
GND → Source	GND of Boost Module
Drain →	GND of Boost Module
Power Source	VIN of Boost Module

Notes:

- Add a 10kΩ pull-down resistor between Gate and Source

SD Card Module

Interface: SPI
Voltage: 3.3V (or 5V with logic level shifting)

SD Module Pin	ESP32 Connection
VCC	3.3V or 5V
GND	GND
CS	GPIO4
MOSI	GPIO23
MISO	GPIO19
SCK	GPIO18

Note: If using both SD and LoRa (SPI), ensure separate CS pins and manage selection in code.

Serial Connection to Raspberry Pi

Interface: UART
Baud Rate: 9600
Voltage Logic: 3.3V (direct connection safe)

ESP32 Pin	Raspberry Pi Connection
GPIO17 (TX)	GPIO15 (RXD)
GND	GND

Note: Do not connect ESP32 RX to Pi TX unless bidirectional communication is required.
