RootLog
Handwire Assembly Guide

Prototype Edition — Point-to-Point Wiring

This guide covers manual assembly of the RootLog using perfboard and hand wiring. It is intended for prototype validation and one-off builds before custom PCB availability.

Bill of Materials

1. ESP32-C3 SuperMini Microcontroller
2. Perfboard / Prototyping Board (≈4×6 cm)
3. BME280 Sensor Module
4. SGP30 Air Quality Sensor
5. DS3231 RTC Module
6. 0.91" OLED Display (I2C)
7. MicroSD Card Module (SPI)
8. Push Button (Tactile)
9. 2 × 4.7 kΩ Resistors (I2C Pull-ups)
10. 22–24 AWG Solid Core Wire (Color-coded)

Master Wiring Map

All connections follow a shared Power Bus (3.3 V), Ground Bus, I2C Data Bus, and a dedicated SPI bus for the MicroSD card. GPIO assignments must match firmware configuration.

Assembly Phases

Phase 1 — Placement: Position the ESP32 near the USB edge. Keep the BME280 distant from the ESP32 to minimize heat influence.
Phase 2 — Power Bus: Create shared 3.3 V and GND rails. Verify continuity across all modules.
Phase 3 — I2C Bus: Daisy-chain SDA and SCL, then add 4.7 kΩ pull-up resistors to 3.3 V.
Phase 4 — SPI (MicroSD): Wire CS, MOSI, MISO, and SCK directly to the ESP32 with short leads.
Phase 5 — Button: Connect GPIO 2 to GND using the tactile switch; rely on internal pull-up.

Final Verification & Power-Up

Before applying power, perform continuity checks between 3.3 V and GND. Any short must be corrected before connecting USB. A stable ESP32 LED indicates a safe power state.