

BOARD BRING-UP: FIRST POWER

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Never trust a fresh board on the first plug. Bring-up is a fixed sequence: inspect it, check it cold for shorts, confirm orientation, then power it through a current limit and verify the rails before anything downstream. That order catches a solder bridge before it kills your board or your laptop's USB port.

INSPECT IT FIRST

Before any power, look the board over under good light and magnification. Scan every joint for bridges, especially between the close pins of the regulator and the microcontroller, and confirm no part is missing or lifted. Most first-power failures are visible if you look before you plug in.

THE COLD CONTINUITY CHECK

With the board unpowered and a multimeter in continuity mode, probe for shorts between the rails that should never touch: ground to 5 V, ground to 3.3 V, and 5 V to 3.3 V. A beep on any of those is a short to find and fix before power goes anywhere near the board. This one check catches the fault that most often destroys a fresh board.

CONFIRM POLARITY AND ORIENTATION

Check that the power connector's polarity is right and that every polarized part faces the way the silkscreen says: the diodes, the electrolytic capacitors, and any chip's pin 1. A part installed backwards can short the rail the instant you apply power, so this is the last check before the first plug.

FIRST POWER, CURRENT-LIMITED

Power the board from a current-limited bench supply set to a modest limit, not straight from USB, so a fault trips the limit instead of cooking a part. Bring the voltage up and watch the current: a healthy board draws a small, steady current, while a short pins the supply at its limit immediately. If it looks right, confirm each rail reads its target voltage before you trust anything the rails feed.

BRING-UP IN ORDER: INSPECT, CHECK COLD FOR SHORTS, CONFIRM ORIENTATION, THEN POWER CURRENT-LIMITED AND VERIFY THE RAILS.

1. Inspect the unpowered board under magnification for bridges, missing parts, and lifted pins.

2. Probe for shorts in continuity mode: ground to 5 V, ground to 3.3 V, and 5 V to 3.3 V. Any beep is a short to fix first.
3. Confirm connector polarity and that the diodes, electrolytic capacitors, and every chip's pin 1 face the way the silkscreen says.
4. Power from a current-limited supply, watch for a small steady current, and confirm each rail reads its target before trusting anything downstream.

A CURRENT LIMIT IS CHEAP INSURANCE

The first time a board sees power is when a hidden short does its damage. A bench supply with the current limit set low turns a board-killing short into a harmless trip you can diagnose. Bring up every new board this way before it ever meets your computer's USB port.

DEEP DIVE · READING THE FIRST-POWER CURRENT

The current a healthy board draws at idle tells you a lot. A board that should sip a few milliamps but instead jumps to hundreds has a short or a backwards part pulling it. A board that draws nothing at all may have an open in its power path, a missing regulator, or a cold joint on the input. Before chasing firmware, get the idle current to match what the design should draw; a wrong number here means a hardware fault to fix first.

CHECKPOINT

1. What is the first thing you do to a fresh board?

- a. Plug it straight into USB
- b. A cold continuity check for shorts, before power**
- c. Flash the firmware immediately

ANSWER · B

Inspect and check for shorts unpowered; power comes only after the board is proven safe.

2. During the cold check you probe for continuity between which points?

- a. Every pair of pads on the board
- b. Only the silkscreen labels
- c. The rails that should never touch: ground, 5 V, and 3.3 V**

ANSWER · C

A beep between ground, 5 V, and 3.3 V means a short to fix before power.

3. Why bring a new board up on a current-limited supply?

- a. A fault trips the limit instead of destroying a part**
- b. It charges the board faster
- c. It lets you skip the inspection step

ANSWER · A

A low current limit turns a board-killing short into a harmless trip you can diagnose.

- Prerequisite: reading a datasheet (the bring-up check)
- See it on a real board: the L1.01 build