Heltec V4 Setup Guide

⚠ **ANTENNA SAFETY:** Always connect a proper 915 MHz antenna (or a 50-ohm dummy load) **before** transmitting. The V4 has a high-power front-end module (PA/FEM) that **can be permanently damaged** by transmitting into no antenna or a bad impedance mismatch — never key this board without a load. (On plain SX1262 boards without a PA the radio clamps its own power and is more tolerant, but on the V4 the front-end module is genuinely at risk.)

Heltec V4 (WiFi LoRa 32 V4) - Setup Guide

The Heltec V4 offers higher TX power than the V3 (the high-power variant is rated ~28 dBm vs the V3's 21 dBm; a low-power 22 dBm variant also exists) and includes a built-in solar charging interface, making it well-suited for permanent outdoor installations. *Note: the "Heltec V4" (WiFi LoRa 32 V4) is a distinct product from the Heltec Vision Master series (e.g. T190) — they share the ESP32-S3 + SX1262 platform but are different boards with different form factors and separate flasher entries. This page covers the WiFi LoRa 32 V4 only.*

Specifications

Attribute	Value
MCU	ESP32-S3
Radio	SX1262
Max TX Power	~28 dBm conducted (~630 mW) on the high-power variant, via the onboard front-end module (PA); a low-power variant is ~22 dBm. The SX1262 itself is +22 dBm max — the extra gain comes from the FEM, so actual output and EIRP must account for the FEM plus any filter/coax loss.
Solar	Built-in solar charging interface
USB	USB-C (native ESP32-S3 USB)
Price	$25 - 35 (as of 2026-06-08; prices vary by seller and tariff)
Strengths	Higher TX power than V3, solar interface, good for permanent installs

⚠ **FCC / RF EXPOSURE:** 28 dBm conducted is within the FCC Part 15 limit (30 dBm / 1 W max conducted). But if you pair the V4 with an antenna above 6 dBi, you must reduce TX power 1 dB for each dB of antenna gain above 6 dBi to stay within the EIRP limit (36 dBm EIRP ceiling). On a higher-power board feeding an external gain antenna on a rooftop or mast, also maintain an RF-exposure keep-away distance from people. For battery/solar use, fit a charge controller with a low-temperature charge cutoff and never charge lithium below 0°C.

Driver Installation

The Heltec V4 **removed the external USB-serial bridge chip** (the CP2102 used on the V3 is gone). It uses the ESP32-S3's **native USB CDC**, so it generally needs **no separate USB-serial driver** on any modern operating system.

- **Windows:** Modern Windows enumerates the V4's native USB CDC automatically and assigns a COM port — no CH340/CP210x driver download is required.
- **macOS:** Native USB CDC enumerates automatically; no WCH/CH34x or CP210x driver needed.
- **Linux:** The kernel enumerates the V4's native USB CDC automatically — no driver needed.

⚠ **If the device does not appear:** Because the V4 uses native USB CDC, a missing serial-bridge driver is not the cause. Try a different (data-capable) USB-C cable, a different USB port, and confirm the board enters bootloader mode (see below) before flashing.

Entering Bootloader / DFU Mode

Method 1 - From powered-off state (recommended):

1. Disconnect the USB cable.
2. Hold the **BOOT** button.
3. Connect the USB cable while continuing to hold BOOT.
4. Hold for 1 - 2 seconds after connecting, then release BOOT.

Method 2 - From powered-on state:

1. Hold the **BOOT** button.
2. Briefly press and release the **RST** button while holding BOOT.
3. Release the BOOT button.

Firmware Flashing

1. Enter bootloader mode (see above).
2. Open Chrome or Edge and navigate to:
   - **MeshCore:** flasher.meshcore.io
   - **Meshtastic:** flasher.meshtastic.org
3. Select the **Heltec V4** variant from the device list.
4. Click **Flash** and grant serial port access when prompted.
5. Wait for completion. Device reboots automatically.

Post-Flash Configuration

1. Connect via Bluetooth app.
2. Set **region to US**.
3. Select the appropriate channel preset (MeshCore: USA/Canada; Meshtastic: US region).
4. Configure solar charging settings if using a solar panel.

Known Quirks & Fixes

FEM (Front End Module) Self-Interference: The V4's high-power front end module can cause RF self-interference. Recommended mitigations:

- **Do not wrap the PCB in aluminum foil.** An ungrounded foil wrap is not a Faraday shield — it can detune the antenna matching and the BLE/Wi-Fi antennas, short exposed pads or pins, and parasitically couple into the front end, often making self-interference worse. Proper shielding uses a grounded board-level shield can soldered over the RF section only, keeping the antenna connector and feed clear.
- Add a 915 MHz bandpass filter (JMT or Baymesh) on the antenna line — this is usually the most effective single fix.

> **rxgain on V4.3 (MeshCore, as of 2026-06-08):** On some MeshCore firmware versions (reported around v1.15.0), `rxgain` is enabled by default on V4.3 hardware. This improves receive sensitivity but adds ~0.5 mA idle draw. If the device is power-critical (e.g., solar with a limited panel), you can disable it via serial or Bluetooth. Verify the exact command and the default behavior against your firmware version's MeshCore release notes before relying on it — syntax can change between versions:
> `set radio.rxgain off`

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