1 Watt Ikoka Box Build

The Ikoka Box is a high-mounted infrastructure repeater design intended for fixed installations - rooftops, towers, and elevated structures. It uses the Ikoka Stick radio module (available in 0.15W, 1W, and 2W variants) paired with a purpose-built solar power system housed in a weatherproof QILIPSU enclosure. This is a more capable and more expensive build than the JadeNode, intended for sites where reliability and output power matter.

Parts List

Component	Approx. Cost	Notes
Ikoka Stick (0.15W, 1W, or 2W variant)	Varies	Choose 1W or 2W for infrastructure sites
Voltset 20W solar panel	$30	-
Renogy Wanderer 10A solar charge controller	$26	-
DROK 12V → 5V USB buck converter	$10	Steps down from 12V battery to 5V for Ikoka Stick
Nermak 12V 10Ah LiFePO4 battery	$30	LiFePO4 chemistry preferred for longevity in outdoor thermal cycling
QILIPSU IP67 outdoor enclosure 11.4×7.5×5.5"	$30	IP67 rated - fully dustproof and immersion-resistant
Optional: Baymesh 910 MHz cavity filter	$90	For very noisy deployment locations

Power System Design

Unlike the JadeNode and Raccoon Tree Node (which use 5V direct solar charging), the Ikoka Box uses a conventional 12V solar system:

1. **Solar panel** charges a 12V LiFePO4 battery via the Renogy Wanderer charge controller.
2. **DROK buck converter** steps the 12V battery voltage down to regulated 5V USB output for the Ikoka Stick.
3. **LiFePO4 chemistry** is chosen over standard lithium for better cycle life, improved cold-weather performance (important in PNW winters), and inherent safety.

The 10Ah battery at 12V provides 120 Wh of storage - sufficient for several days of autonomous operation without solar input at typical repeater power draws.

The Ikoka Stick Radio Module

The Ikoka Stick is available in three output power variants:

- **0.15W:** Low power, suitable for portable or battery-constrained applications
- **1W:** Standard infrastructure variant - recommended for most fixed sites
- **2W:** High-power variant for maximum range or challenging link budgets

For most CascadiaMesh infrastructure deployments, the 1W variant provides a good balance of range and power consumption.

Optional: Baymesh 910 MHz Cavity Filter

In high-RF-noise environments (urban rooftops, sites near cellular infrastructure, etc.), the Baymesh 910 MHz cavity filter ($90) can be installed inline between the radio and antenna. A cavity filter provides significantly better out-of-band rejection than the JMT bandpass filter used in the Raccoon Tree Node, at higher cost. Use when signal noise is causing receiver desensitization or elevated noise floor on the channel.

Enclosure

The QILIPSU IP67 enclosure (11.4×7.5×5.5") is large enough to house the Ikoka Stick, charge controller, buck converter, and battery connections in a single weatherproof package. IP67 rating provides full dust ingress protection and resistance to temporary immersion.

Firmware Configuration

Flash MeshCore Repeater firmware and configure for CascadiaMesh:

- Frequency: 910.525 MHz / BW: 62.5 kHz / SF7 / CR 4/5
- Zero Hop Interval: 0 / Flood Advert Interval: 48 hours
- Do not include "Repeater" in the node name

Community Build Variations

- **Scott's Node:** Heltec V4 + Waveshare MPPT solar board + 10,000 mAh pancake Li battery + Zivif 10W panel + 5.8 dBi antenna. A compact high-capacity single-unit design.
- **mcarper's 10x Heltec V4 Build (~$81 each):** Heltec V4.3.1 from Rokland + 4 dBi antennas + IP65 ABS boxes + 18650 battery packs (4 - 8 cells) + EasySkyMesh PowerSaving firmware. Achieves ~5.5 mA idle current. Optimized for low-cost bulk deployment across a coverage area.

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