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MEDICAL · USA

# Standalone Portable Medical Treatment Device

Custom Hardware Design | Embedded Firmware | Precision Power Control | Secure Access Control | Self-Diagnostics

## CLIENT

A US-based medical device company.

## THE PROBLEM

Not every setting for the client's electrical treatment process needed (or could justify the cost of) the full networked, screen-based version of their device. They needed a smaller, lower-cost variant that did the same core job — precise electrical treatment — but stripped down to standalone operation: no screen, no network, working with refillable components, and still able to check itself for problems and refuse to run with unauthorized parts.

## WHAT WE BUILT

We designed this as a genuinely standalone unit from the ground up, not a cut-down version of the networked device. The treatment output itself needed the same precision as the larger system — smooth and free of glitches that could affect the process — so that part of the design carried over in spirit even though the surrounding system was much simpler. Without a screen, the device needed another way to tell the user what was going on, so we built status communication entirely through onboard light indicators — patterns that convey normal operation, warnings, and faults without any text or display. We built in self-diagnostic routines that run automatically, and tied the device's refillable components to secure hardware keys, so the device checks on its own that genuine, authorized parts are fitted before it will operate.

## WHAT IT DOES

- ✓ Delivers precisely controlled, glitch-free electrical treatment output, matching the precision needs of the application
- ✓ Communicates status, warnings, and faults to the user entirely through onboard light indicator patterns — no screen required
- ✓ Runs built-in self-diagnostic checks automatically, without user intervention
- ✓ Checks refillable components against secure hardware keys before operating, refusing to run with unauthorized parts
- ✓ Operates as a fully standalone unit — no screen, network connection, or external system required at any point

## OUTCOME

The client gained a lower-cost product variant for customers who didn't need network connectivity or a screen, without giving up the precision of the treatment process or the security checks that prevent the device running with unauthorized components.

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