



CHECKLIST

THE 5 GAPS FROM PROTOTYPE TO PRODUCTION

GAP #1

Can it be manufactured consistently?

Ensuring your design works in automated factory production

- ☐ Design PCB layout for automated assembly equipment
- ☐ Verify all components are available in production quantities
- ☐ Identify second sources for critical components and check end-of-life status
- ☐ Add design margin to account for component tolerances
- ☐ Test units at tolerance extremes, not just typical values
- ☐ Document every design change and revision
- ☐ Remove all hand-tuning requirements from the build process

! WATCH OUT

A design with no margin can work perfectly on the one board you hand-tuned, then fail on 5% of units in production. On a 5,000-unit run, that's 250 dead boards you pay to build, diagnose, and scrap.

! WATCH OUT

Undocumented hand-fixes are silent killers. Every tweak, reflowed joint, or jumper wire that never makes it into your design files becomes a defect the factory builds in at scale.

GAP #2

Can it be tested at scale?

Building testability into your product from day one

- ☐ Add test points for key signals on the board
- ☐ Define clear pass/fail criteria for each test
- ☐ Design for Testability (DFT) from the start
- ☐ Budget for custom test fixture development
- ☐ Verify per-unit test time meets your cost targets
- ☐ Create documented test procedure for factory

! WATCH OUT

A custom test fixture can cost thousands of dollars to design and build. If you don't plan for it, it shows up as a surprise expense right when you're trying to start production.

! WATCH OUT

Skip testability and you're left with two bad options: ship units that were never properly tested and eat the returns, or pay people to slowly hand-test every unit and watch your margin disappear.

GAP #3

Will it survive the real world?

Designing for reliability in harsh operating conditions

- ☐ Conduct environmental stress testing (heat, cold, humidity)
- ☐ Test battery performance across temperature range
- ☐ Perform vibration and cycle testing on solder joints
- ☐ Run drop testing on finished enclosure
- ☐ Verify long-term reliability under continuous use
- ☐ Test in conditions matching your target use environments

! WATCH OUT

A battery that behaves fine at room temperature can lose a large part of its capacity in the cold, and solder joints that look perfect can slowly crack from months of vibration.

! WATCH OUT

Reliability failures almost never show up on your bench while you're babying the product. They show up months later, in your customers' hands, which is the most expensive time possible to find them.

GAP #4

Can it pass certification?

Meeting FCC, CE, UL, and other regulatory requirements

- ☐ Research certification requirements for your target markets
- ☐ Design PCB layout to minimize EMI/EMC emissions
- ☐ Ensure proper electrical isolation and safety spacing
- ☐ Use pre-certified modules where possible
- ☐ Follow certification guidelines during initial design
- ☐ Budget for certification testing, including a possible retest

! WATCH OUT

A single failed certification attempt can mean a new PCB layout, a board re-spin, fresh prototypes, and another round of expensive lab testing. That adds months and tens of thousands of dollars.

! WATCH OUT

A pre-certified module won't save you if your own PCB layout or enclosure causes the problem. The rest of the product still has to be designed with testing in mind.

GAP #5

Can you manufacture it at a profit?

Designing to cost from the beginning

- ☐ Calculate total landed cost per unit (not just parts)
- ☐ Work backward from target selling price to manufacturing cost
- ☐ Design toward your cost target from day one
- ☐ Optimize component selection for cost and availability
- ☐ Evaluate enclosure design for manufacturing efficiency
- ☐ Factor in scrap rate, duties, and shipping in your cost model

! WATCH OUT

Most of your product's cost is locked in at the design stage, in the parts you picked and the way you chose to build it. By the time you're in production, the cheapest changes are off the table.

! WATCH OUT

If the math doesn't work in production, both options are ugly: redesign a product you already paid to tool, or ship something that barely breaks even or loses money on every unit.