



CHECKLIST PDF

ENCLOSURE DECISIONS YOU MUST MAKE BEFORE FINISHING YOUR PCB

Enclosure Decisions Checklist

7 decisions to lock in before you finalize your PCB layout

Predictable Designs

Your PCB layout is making enclosure decisions for you right now, whether you realize it or not. These seven constraints directly control how your board needs to be laid out, so lock them in **before** you finalize component placement and routing. Every unchecked box below represents a potential respin, a tooling change, or an ugly compromise that ships in production.

1 Off-the-Shelf or Custom Enclosure?

This is the master decision, because it determines who has to conform to whom.

- ☐ Go shopping for stock enclosures from companies like Polycase, Hammond, and Bud Industries before you commit to a board outline.
- ☐ If you go off-the-shelf, download the manufacturer's drawing and design your board to match it exactly.
- ☐ If you need a custom look on a budget, have custom openings machined into a stock enclosure for a small fee instead of paying for a mold.
- ☐ If you go fully custom, plan for multiple 3D printed or urethane cast iterations before you pay for any injection mold tooling.
- ☐ Base the call on three factors: your expected sales volume, how much appearance matters, and your dust and water protection needs.

LOCKS IN ON YOUR PCB: This decision fixes your board outline, your mounting hole positions, and every wall opening. If you find a stock enclosure that works, you skip the entire custom path.

2 How Your PCB Mounts

You have three options for holding the board: screw bosses, snap fits, or card slots. Pick one before you route.

- ☐ Choose your mounting method: screw bosses, snap fits, or card slots.
- ☐ Fix the number, the exact position, and the diameter of every mounting hole.
- ☐ Decide between plated and non-plated holes, because plated holes with metal screws and standoffs often become part of your grounding strategy.
- ☐ Define the keep-out zone around each hole, along with your edge clearances.
- ☐ If you use snap fits, verify the clips in molded plastic and not just in 3D prints, because printed plastic does not flex the same way.

LOCKS IN ON YOUR PCB: This decision fixes your hole count, hole positions, and keep-outs. Adding mounting holes to a routed board means ripping up finished copper, which is a classic cause of a full respin.

3 Connector and Port Placement

Every cable enters through a specific wall, so settle those entry points before you route the board.

- ☐ For each connector, decide which wall it exits, how high it sits above the board, and whether it is a right-angle or vertical part.
- ☐ Decide whether each connector mounts directly on the PCB or on the panel with a pigtail running back to the board.
- ☐ Design in real clearance based on worst-case tolerances, and never assume every part lands on its ideal dimension.
- ☐ Remember that board-mounted connectors feed every plug and unplug force straight into their solder joints, while panel-mount versions take that stress off your PCB completely.

LOCKS IN ON YOUR PCB: This decision fixes your board outline, your exact connector part numbers, and the tolerance stack between the connector face and the enclosure opening. Decided too late, it becomes the USB port that sits 1 mm too deep and never quite clicks in.

4 Maximum Component Heights

Your enclosure hands you a fixed interior height budget, and every part on the board has to live inside it.

- ☐ Calculate the real interior height by subtracting wall thickness and any internal ribs.
- ☐ List your tallest parts, including electrolytic capacitors, inductors, connectors, shields, and any board-to-board stacking.
- ☐ Lock the battery position and format early, because it is the biggest space claim, and switching from a cylindrical cell to a pouch cell late changes everything around it.
- ☐ Budget the thermal path for anything that runs hot, whether that is a heatsink, a thermal pad pressing against the wall, or clearance for air to move.
- ☐ Export the 3D board model and check it against the enclosure model from your very first placement pass onward.

LOCKS IN ON YOUR PCB: This decision determines which components you can even select, which zones of the board they are allowed in, and which side of the board they go on. A 2 mm surprise on one part forces either a taller enclosure, which means a tooling change, or a re-layout.

5 User Interface Positions

Buttons, LEDs, and displays belong where they make sense for the user, not where routing happens to be easy.

- ☐ Mark every button, LED, and display position on a printed mockup before you place a single part. It takes about an hour.
- ☐ Decide for each LED whether it mounts right at the wall or shines through a light pipe.
- ☐ Nail down your tact switch heights and button actuators.
- ☐ Treat displays as the strictest case, because the viewing window, the mounting, and the connector routing all have to align within a fraction of a mm.

LOCKS IN ON YOUR PCB: This decision fixes the position of every part sitting behind the front panel. Skip it and you end up with an LED patched with a light pipe snaking across the enclosure, or a power button on the bottom of the product.

6 Ingress Protection (IP) Rating

Pick your target IP rating before layout. Even if the answer is that you need no sealing at all, make that call on purpose.

- ☐ Set your target rating early. As a reference point, IP65 means dust-tight and able to handle water jets.
- ☐ Select sealed connectors now rather than at certification time, because they have different footprints and cost more.
- ☐ Reserve space for gasket channels around the board edge.
- ☐ Plan for sealed buttons, which usually means membrane switches instead of through-wall tact switches.
- ☐ Plan vent membranes into the walls so air pressure can equalize while water stays out.

LOCKS IN ON YOUR PCB: This decision fixes your connector selection and footprints, your board-edge space, and your entire button architecture. An IP65 requirement that shows up after layout restarts the mechanical design from scratch.

7 Enclosure Material and Your Antenna

This is the most expensive decision on the list to learn about late, and it is nearly impossible to fix once the board is routed.

- ☐ If your product is wireless, remember that a metal enclosure kills your internal antenna. Plan a plastic enclosure, a plastic window or end cap, or an external antenna.
- ☐ Pull the antenna keep-out dimensions from your module vendor's datasheet.
- ☐ Enforce the keep-out on **every layer**, meaning no copper under or around the antenna, including your ground pours.
- ☐ Place the antenna near the correct wall of the product.
- ☐ Tune the antenna with the enclosure in place instead of on a bare board sitting on your bench.
- ☐ Avoid metallic paint over the antenna area, because it can choke the signal almost as much as a metal wall.

LOCKS IN ON YOUR PCB: This decision fixes your antenna placement and the copper on every layer around it. Get it wrong and you ship wireless range problems that no firmware update will ever fix.