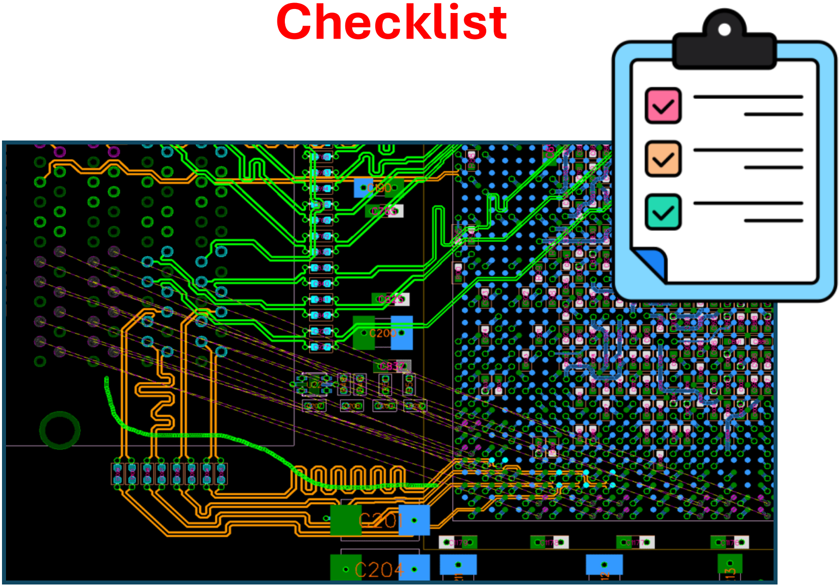
First-Time-Right (FTR) PCB Design Checklist



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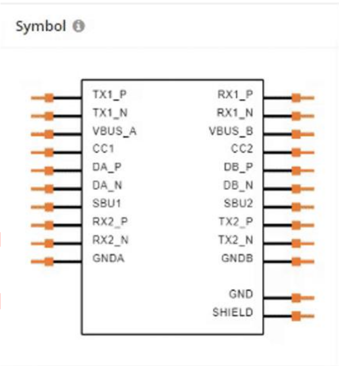
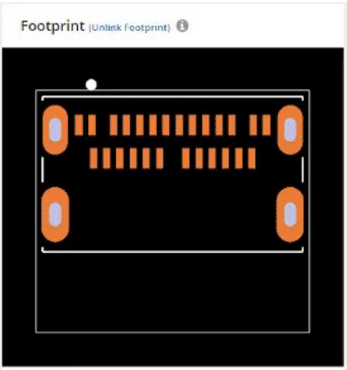
Why First-Time-Right PCB Matters?

- Each hardware iteration can cost 6-8 weeks and several thousand $ in dev and manufacturing
- Getting PCB right the first time saves you this time and associated costs
- Following are the key points to get your PCB right the first time

Step 1: Symbol and Footprint Verification

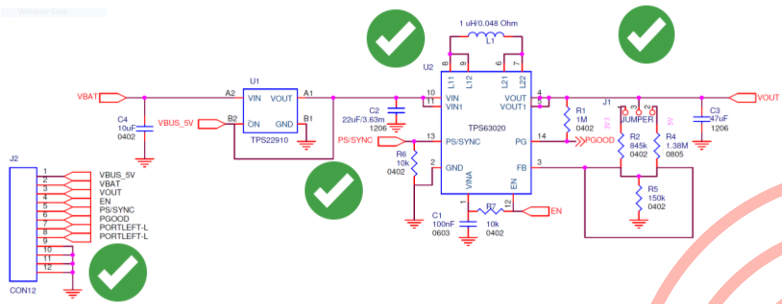
1. Use verified symbols and standard naming conventions
2. Ensure correct, updated part numbers
3. Cross-check footprints with datasheets
   a) Validate pin orientation, pad size, pitch (and optional 3D models)
   b) Confirm mechanical outlines, courtyards, and keepouts





Step 2: Schematic Verification

1. Verify all power rails and ground references
2. Ensure proper decoupling and filtering
3. Validate signal flow, logic levels, and pin mapping
4. Confirm pull-ups, ESD protection, and level shifters
5. Simulate critical analog/mixed-signal blocks (if necessary)
6. Add test points for key signals and rails



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Step 3: Stack-up & Placement

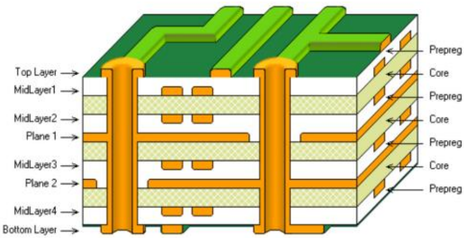
1. Decide which manufacturer will produce your PCBs to know your stack-up and DRC limits.

2. Define layer stack-up and design rules

3. Match impedance layers, copper weight, via size

4. Place analog, digital, and high-speed parts in a way to minimize interference

5. Consider mechanical constraints and verify compatibility with housing



Pic Credit: ALLPCB.com

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Step 3: Routing & Power Distribution

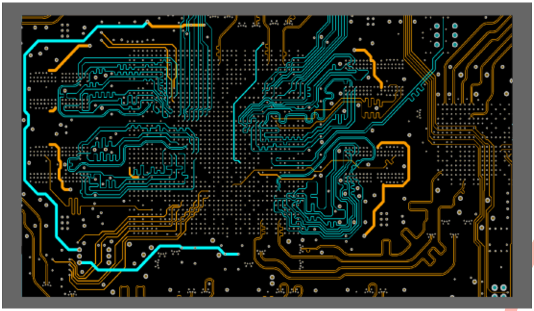
1. Use correct trace widths (consider trace impedance and power where necessary)

2. Match differential pair lengths

3. Avoid stubs

4. Provide solid ground planes (dedicate one or more layers)

5. Ensure decoupling and bulk capacitors are placed right



Step 4: DRC, DFM & Output Files

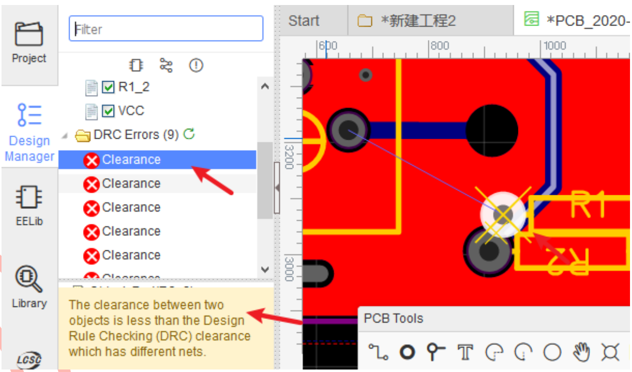
1. Run DRC & ERC to clear all violations

2. Prevent silkscreen/pad overlaps, solder mask issues

3. Generate accurate Gerbers, BOM, Pick-and-Place

4. Include polarity marks, fiducials, and assembly drawings

5. Confirm component availability



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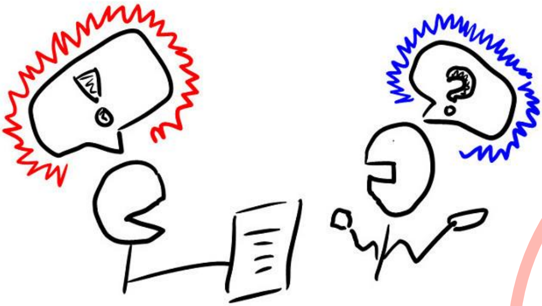
Step 5: Final Review, Peer Validation & Design Sign-off

1. Conduct thorough peer design reviews

2. Verify schematic, layout, and documentation consistency

3. Share design package with manufacturer for last feedback

4. Freeze the final design version after full approval



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