**1. Part Placement**

* Verify that all components are placed according to the schematic.
* Ensure adequate spacing between components for soldering and testing.
* Place decoupling capacitors as close as possible to the power pins of the ICs.
* Position the crystal/oscillator close to the microcontroller to minimize trace length.
* Avoid placing high thermal dissipation components near sensitive or small components.
* Ensure placement optimizes for short trace lengths, especially for high-speed or critical signals.

**2. Routing (Signal/Power; Analog/Digital)**

* Separate analog and digital ground planes if needed and connect them at a single point.
* Ensure high-speed signal traces are as short and direct as possible.
* Route power traces with sufficient width to handle the current.
* Check differential pair routing for close proximity and equal length (if applicable).
* Minimize crosstalk by ensuring proper spacing between signal traces.
* Use appropriate trace widths for signal and power routing based on the current requirements.

**3. Mechanical (Dimensions/Mounting)**

* Confirm the board dimensions meet the specified size limits.
* Verify the placement of mounting holes and ensure there is clearance around them.
* If an enclosure is used, check for any potential interference between components and the enclosure.
* Confirm that fiducial markers are present for automated assembly.

**4. Electromagnetic Compatibility (EMC)**

* Add filter components, such as capacitors or ferrite beads, where necessary for EMC compliance.
* Minimize loop areas for high-speed circuits to reduce radiated noise.
* Shield noisy components or separate them from sensitive analog circuits.
* Ensure all high-speed traces run over a solid ground plane.

**5. Production Readiness**

* Verify that all design rule checks (DRCs) pass without errors.
* Make sure the board has a complete silkscreen with component labels and orientation markers.
* Ensure copper layer specifications (thickness, type) meet the fabrication requirements.
* Check that the Bill of Materials (BOM) includes all necessary details, such as component values, packages, and voltage ratings.
* Confirm there is at least one unbroken ground plane for stability.

**6. Bill of Materials (BOM)**

* List all components with correct part numbers, values, and package types.
* Specify power and voltage ratings for components.
* Include prices and sources for each component to estimate the total cost.

**7. Review Feedback Integration**

* Incorporate feedback from peer review to improve the layout.
* Update the checklist and to-do list based on review findings to refine the design.