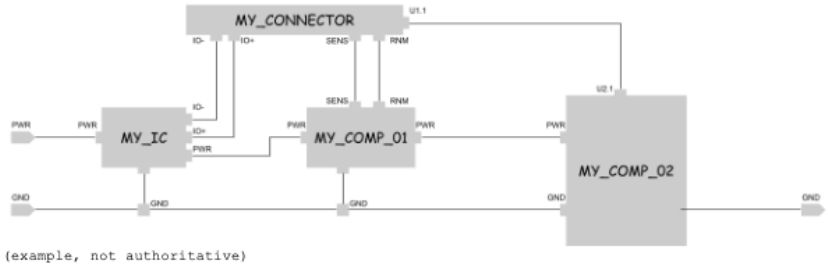
Quilter Backend Engineer Code Challenge

PCB Board Renderer



(example, not authoritative)

Parse the ECAD JSON files and generate a visual representation of a PCB layout using any programming language or OS (preferably Python and MacOS). All files are valid JSON files.

Task

1. Board Boundary

    - Draw the board outline from `boundary.coordinates`
    - This forms the outer edge of the PCB
2. Components
    - Draw component outlines at their transformed positions
    - Show component reference designators (R1, C1, U1)
    - Handle rotation correctly
3. Traces
    - Draw traces as lines/paths with their specified `width`
    - Use different colors for different layers
4. Vias
    - Draw vias as circles at their `center` positions
    - Diameter from `diameter` field
5. Keepout Regions
    - Draw keepout areas with a distinct pattern or color
    - Mark them as restricted areas
6. Return an error if the board cannot be parsed.
    - Return a message of the failure. 14 of the invalid boards should be detected through validation of the data content (missing fields, invalid references, bad geometry, etc.).

Requirements

- Render a board as a SVG, PNG, or PDF
- Board renders correctly and is easy readable
- Solution can be reviewed and verified within 20 minutes
- Includes unit testing and proper code commenting

Usage of LLMs is encouraged