charlieplex_3x3_routed

Design Report

Rev 1 | 2026-06-16 | jlcpcb-tier1

kicad-tools 0.13.0

Board Summary

Property	Value
Layers	2 copper (F.Cu, B.Cu)
Footprints	14 (13 SMD, 1 THT, 0 other)
Nets	10
Traces	197 segments
Vias	24
Board Size	50.0 x 55.0 mm

Design Overview

Theory of Operation

Charlieplex LED Grid

3x3 LED matrix using charlieplexing technique

9 LEDs driven by 4 GPIO pins

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Power Architecture

Power Rails: GND, PWR_FLAG, VCC

Assembly Notes

9 polarized components

- **Polarized components**: 9 -- check orientation markings

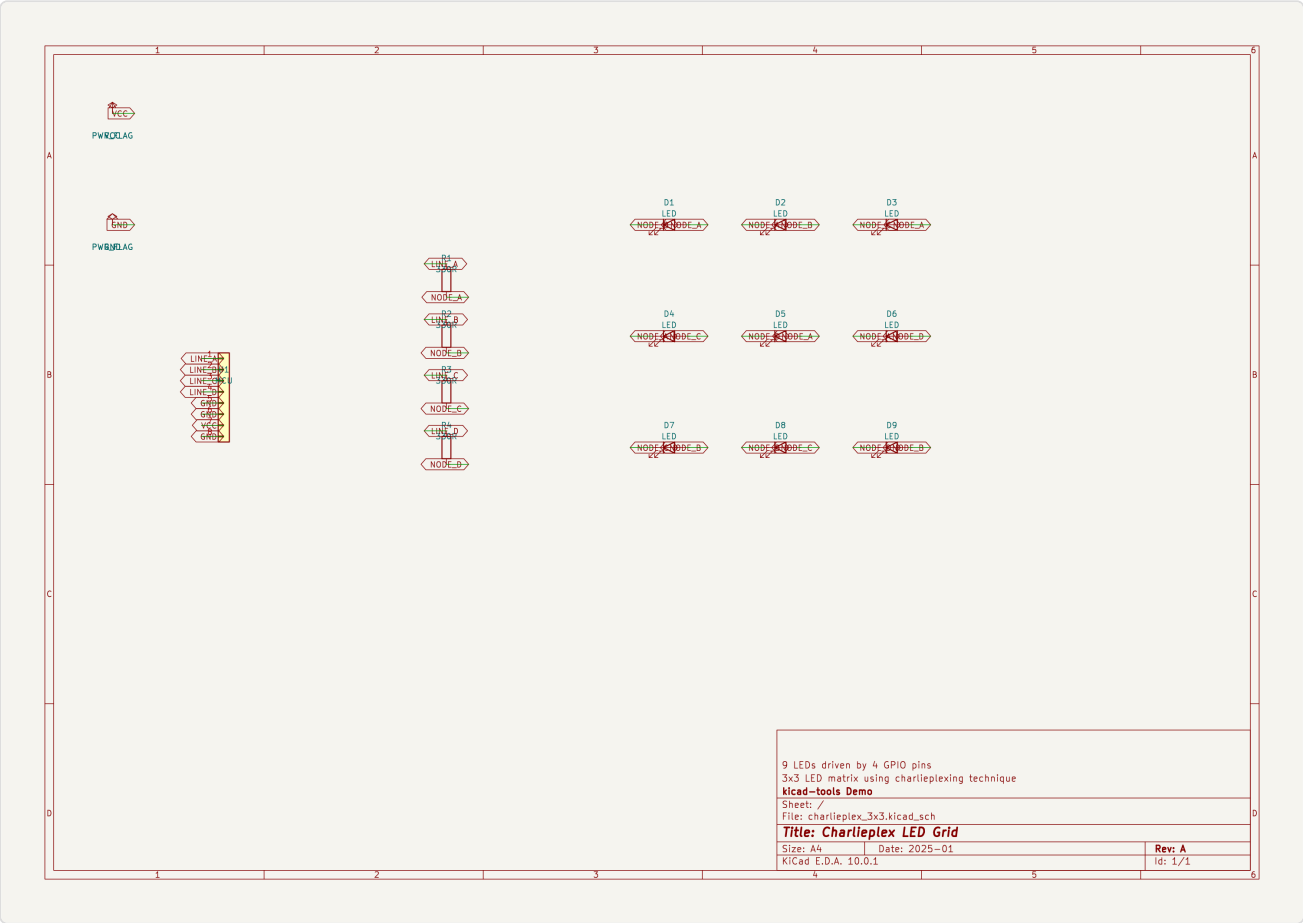
ERC Status

Metric	Count
Errors	0
Warnings	0

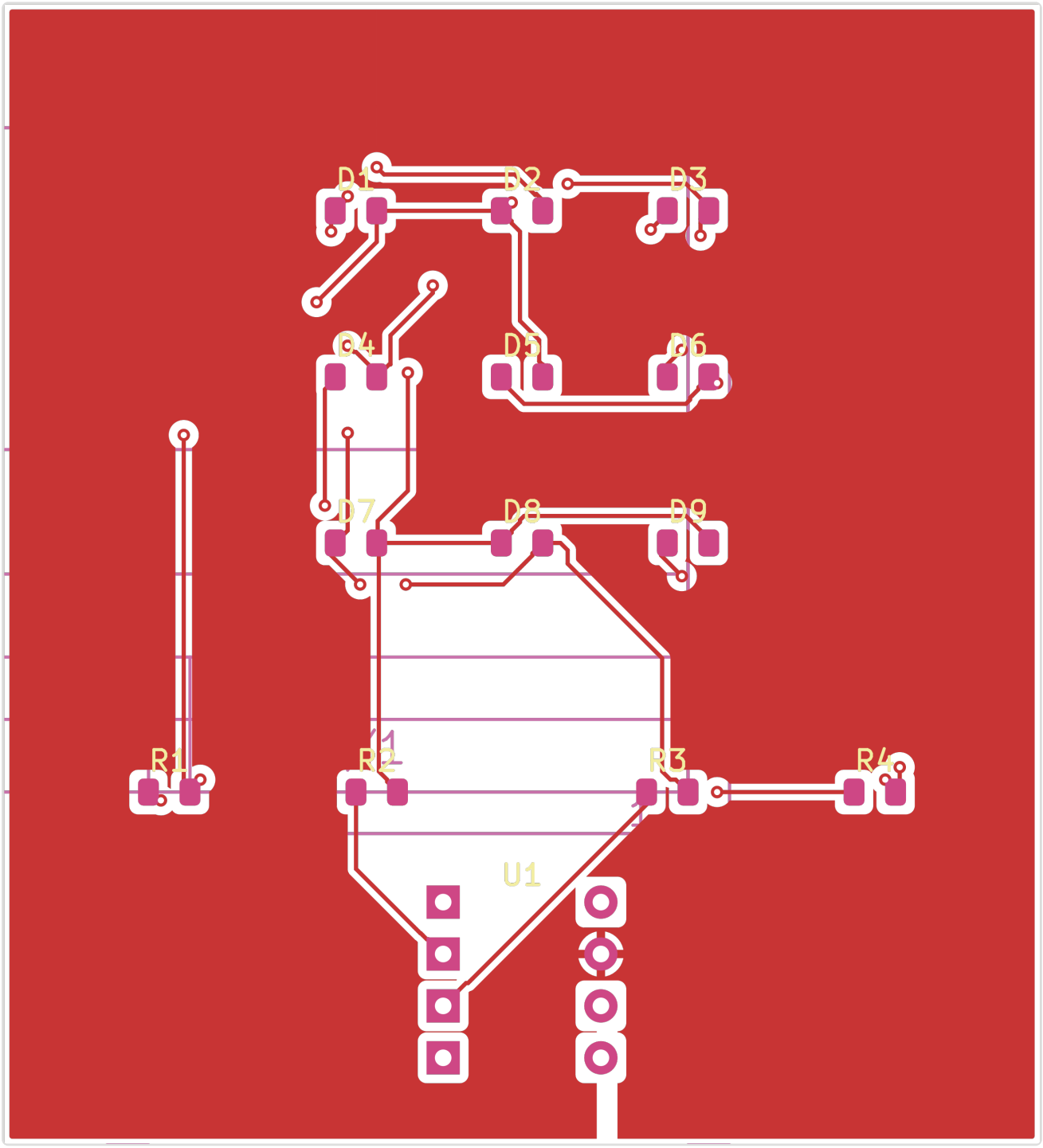
Status: SKIPPED -- ERC skipped by user request

Schematic Overview

Schematic: charlieplex_3x3



PCB Layout



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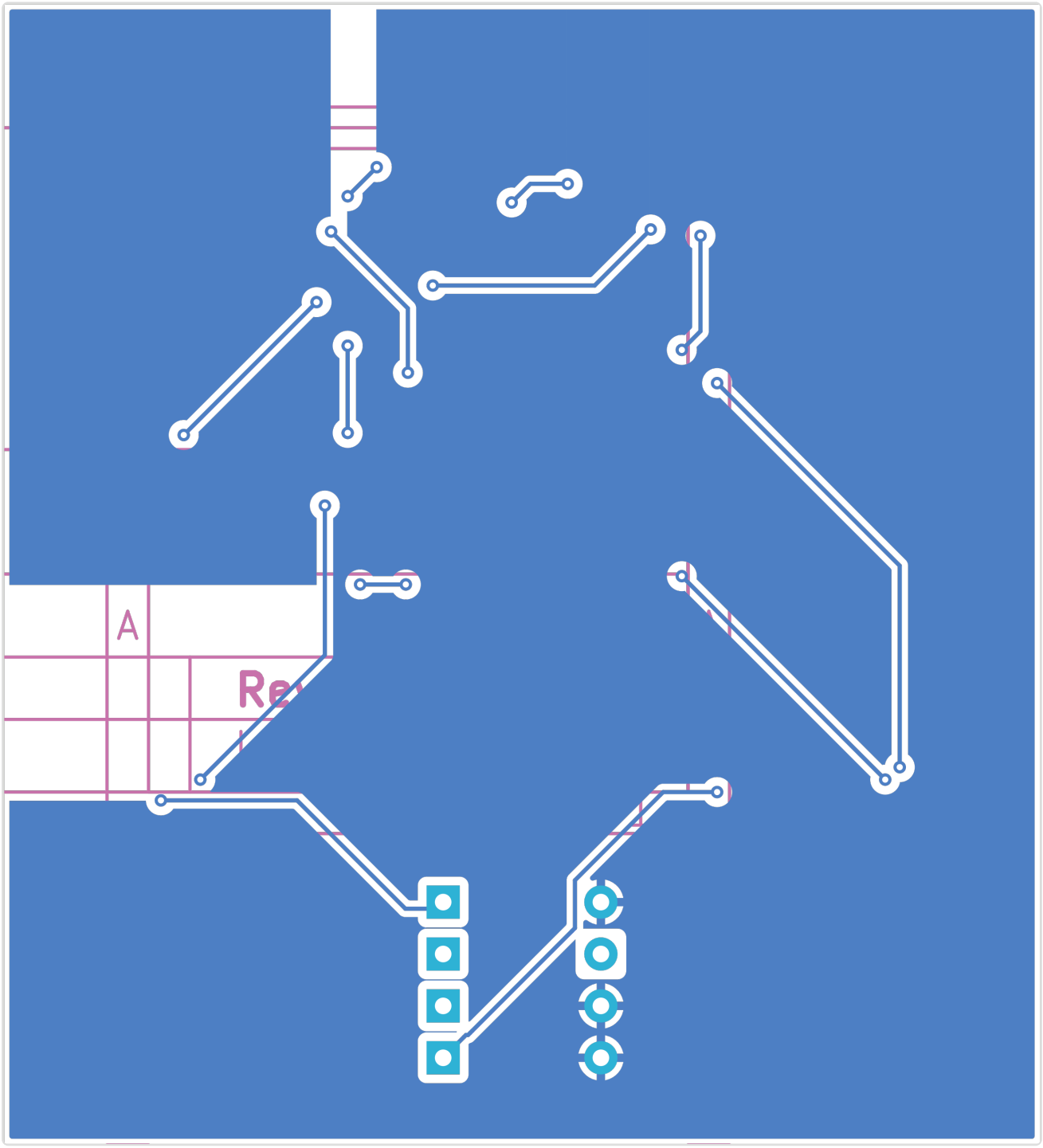
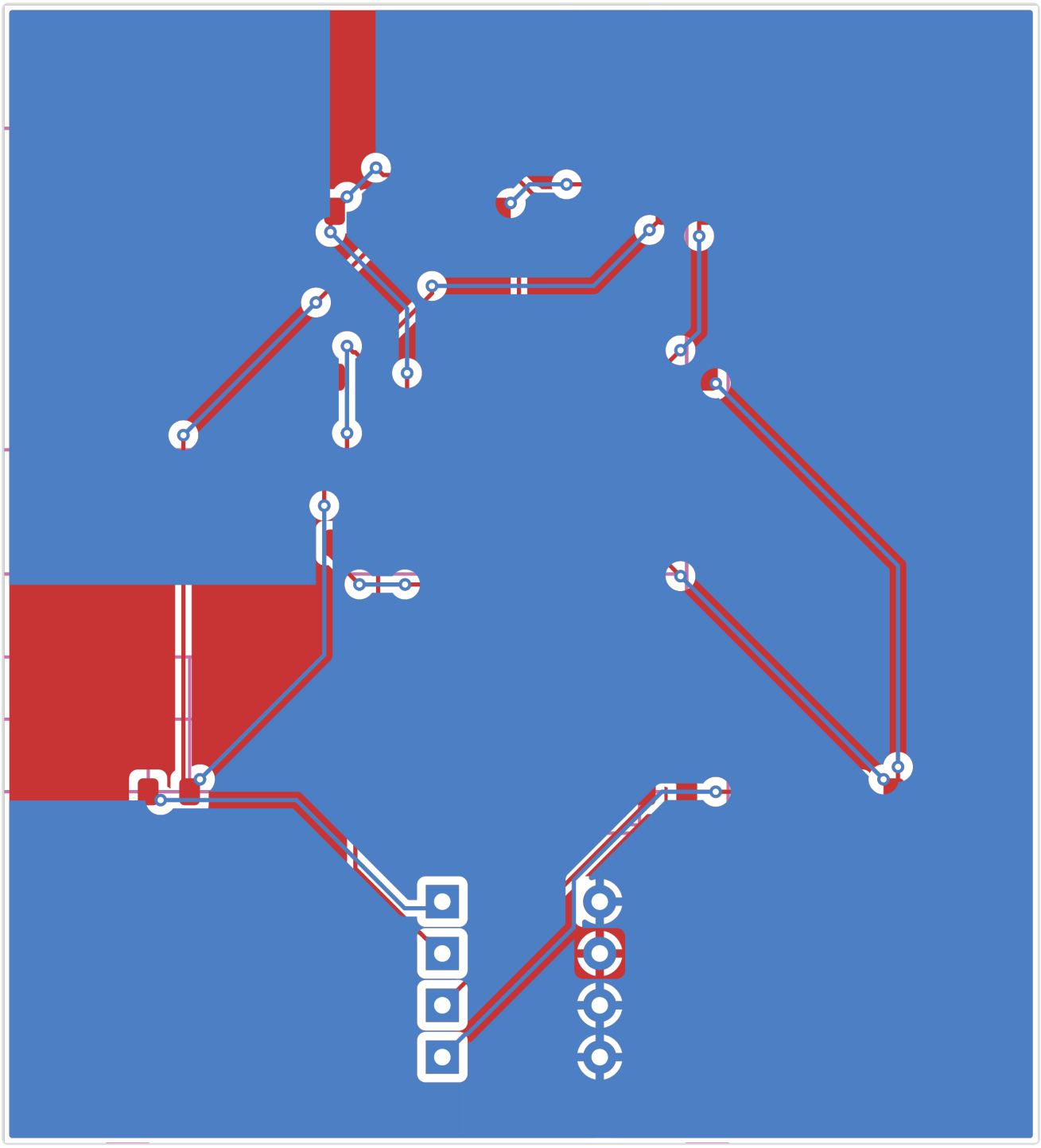
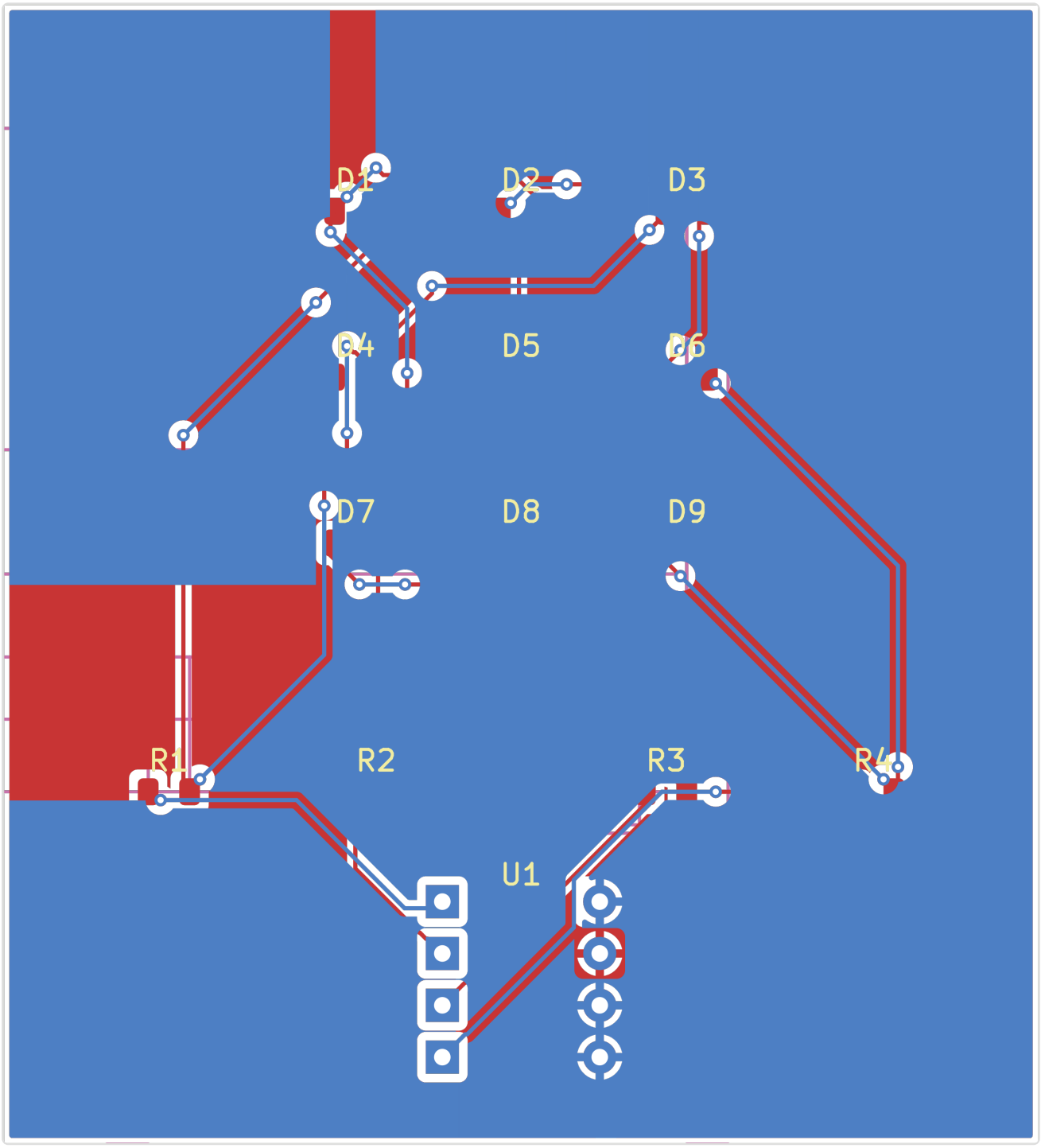


Copper

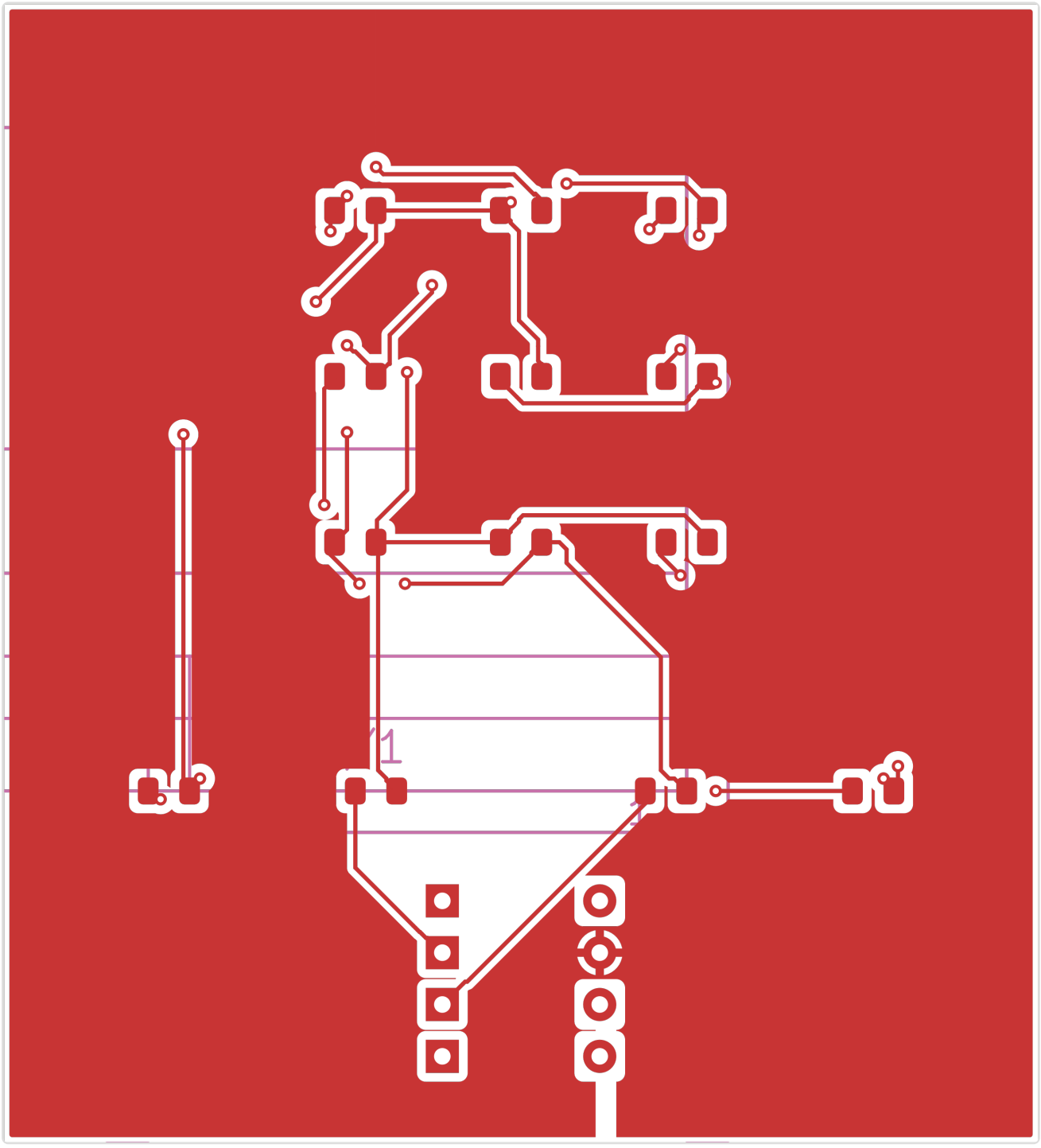


Assembly

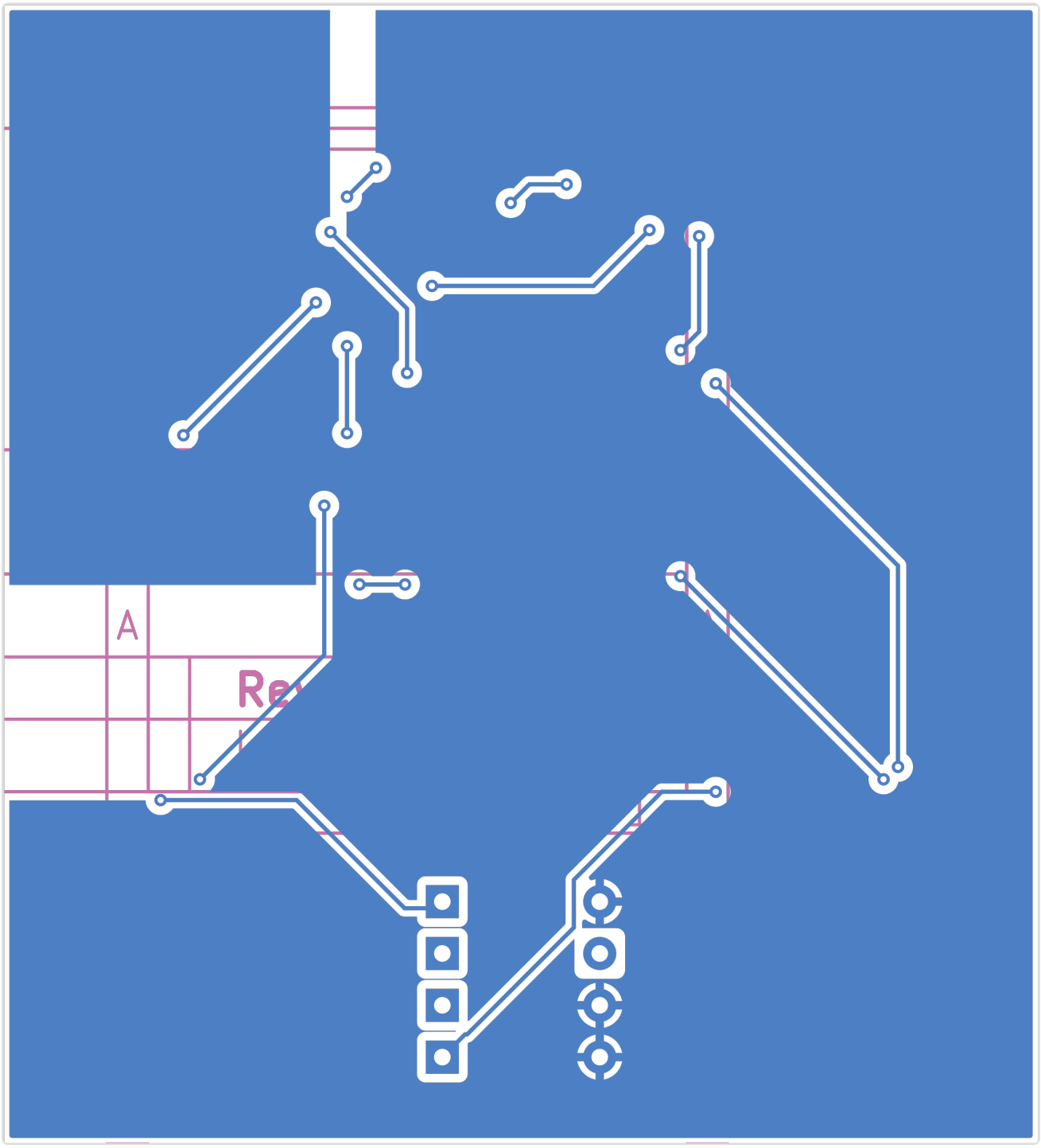


Copper Layers

F.Cu



B.Cu



Bill of Materials

Value	Package	Qty	References
LED	LED_0805_2012Metric	9	D1, D2, D3, D4, D5, D6, D7, D8, D9
330R	R_0805_2012Metric	4	R1, R2, R3, R4
MCU	DIP-8_W7.62mm	1	U1

DRC Status

Metric	Count
Errors	0
Warnings	0
Blocking	0

Status: PASS

Manufacturing Readiness

Verdict: READY

Action Items

- **[OPTIONAL]** Verify zone fill in KiCad for 1 zone-connected nets
- **[OPTIONAL]** Analog net: LINE_A — audio signal; keep short, away from digital/switching nets
- **[OPTIONAL]** Analog net: LINE_B — audio signal; keep short, away from digital/switching nets
- **[OPTIONAL]** Analog net: LINE_C — audio signal; keep short, away from digital/switching nets
- **[OPTIONAL]** Analog net: LINE_D — audio signal; keep short, away from digital/switching nets

Routing Status

Metric	Value
Signal Net Completion	100.0% (8/8)
Overall Completion	100.0%
Complete Nets	10 / 10
Zone-Connected Nets	2
Single-Pad Nets	1 (no routing needed)
Incomplete Nets	0
Unconnected Pads	0

Zone-Connected Nets

- GND
- VCC

Single-Pad Nets

1 single-pad net (no routing needed) -- not listed individually.

Cost Estimate

Metric	Per Board (estimated)
PCB Fabrication	~0.95 USD
Components (estimated)	~0.56 USD
Assembly (estimated)	~2.01 USD
Total (estimated)	**~3.52 USD**
Batch Quantity	5
Batch Total (estimated)	~17.62 USD