

usb_joystick_routed

Design Report

kicad-tools 0.14.0

Rev 1 | 2026-07-09 | jlcpcb-tier1

Board Summary

Property	Value
Layers	2 copper (F.Cu, B.Cu)
Footprints	19 (17 SMD, 2 THT, 0 other)
Nets	16
Traces	570 segments
Vias	19
Board Size	80.0 x 60.0 mm

Design Overview

Theory of Operation

USB Joystick Controller

USB game controller with analog joystick

Demonstrates autolayout functionality

Communication Interfaces

Protocol	Signals
USB	USB_D+, USB_D-, VBUS

Power Architecture

Power Rails: GND, PWR_FLAG, VCC

Assembly Notes

1 fine-pitch component

- **Fine-pitch components:** 1 (U1)

Hand-Solder (THT) Components

The following 1 through-hole component is **excluded from the SMT pick-and-place file** and must be hand-soldered (or wave/selective-soldered) after SMT assembly. It appears in the BOM for sourcing.

Value	Package	Qty	References
Joystick	Joystick_Analog	1	J2

ERC Status

Metric	Count
Errors	0
Warnings	0

Status: SKIPPED – ERC skipped by user request

Schematic: usb_joystick

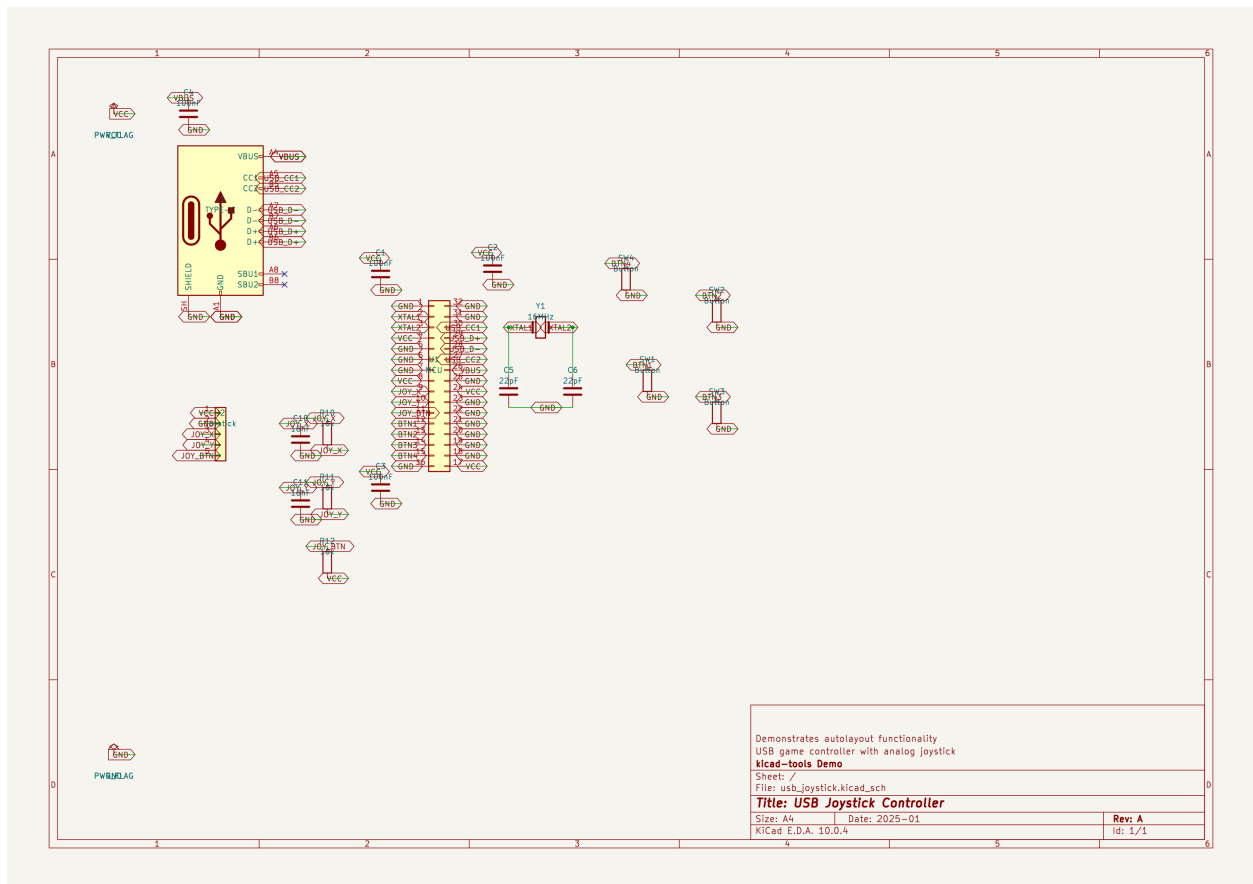


Figure 1: Schematic: usb_joystick

PCB Layout

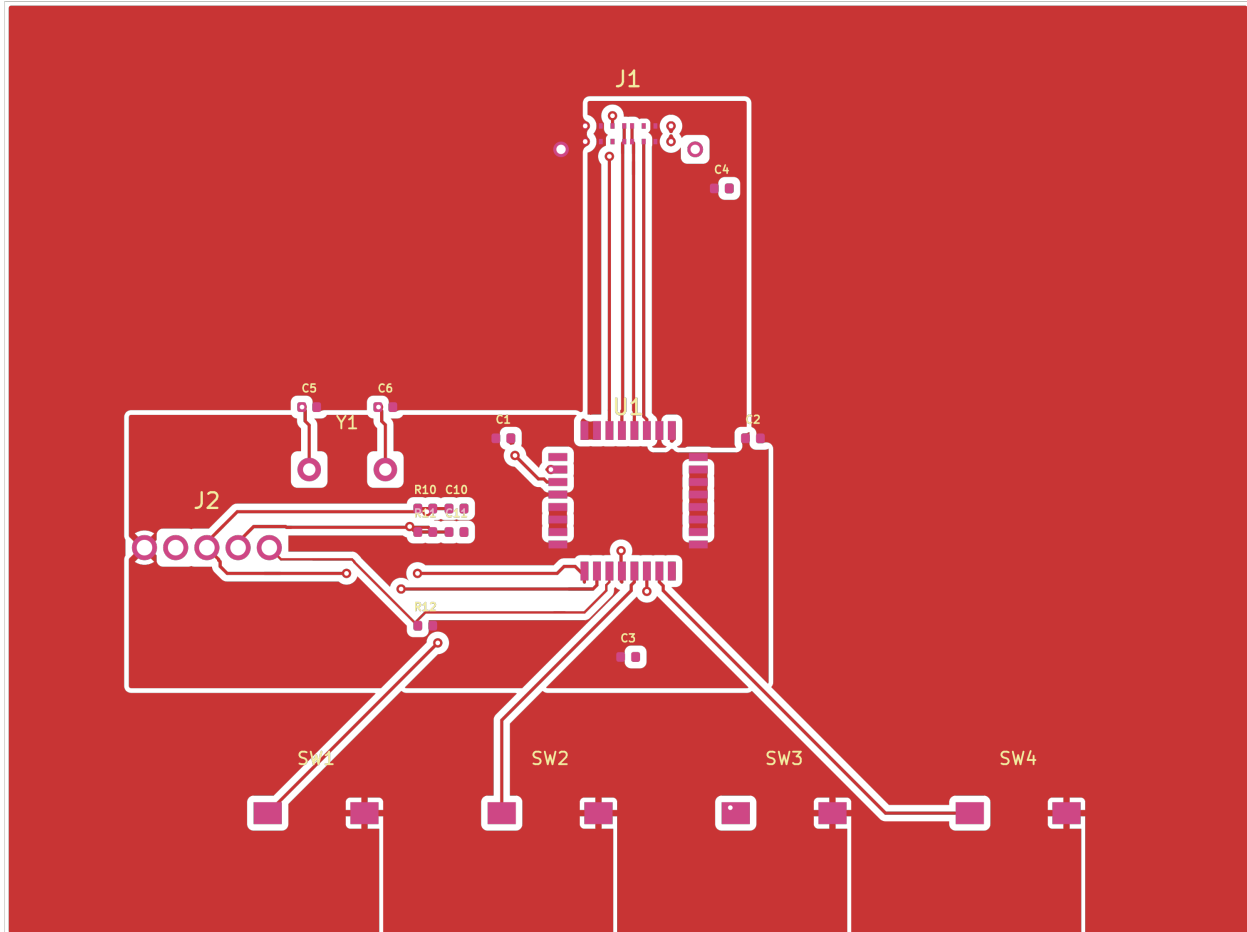


Figure 2: PCB Front

Copper Assembly

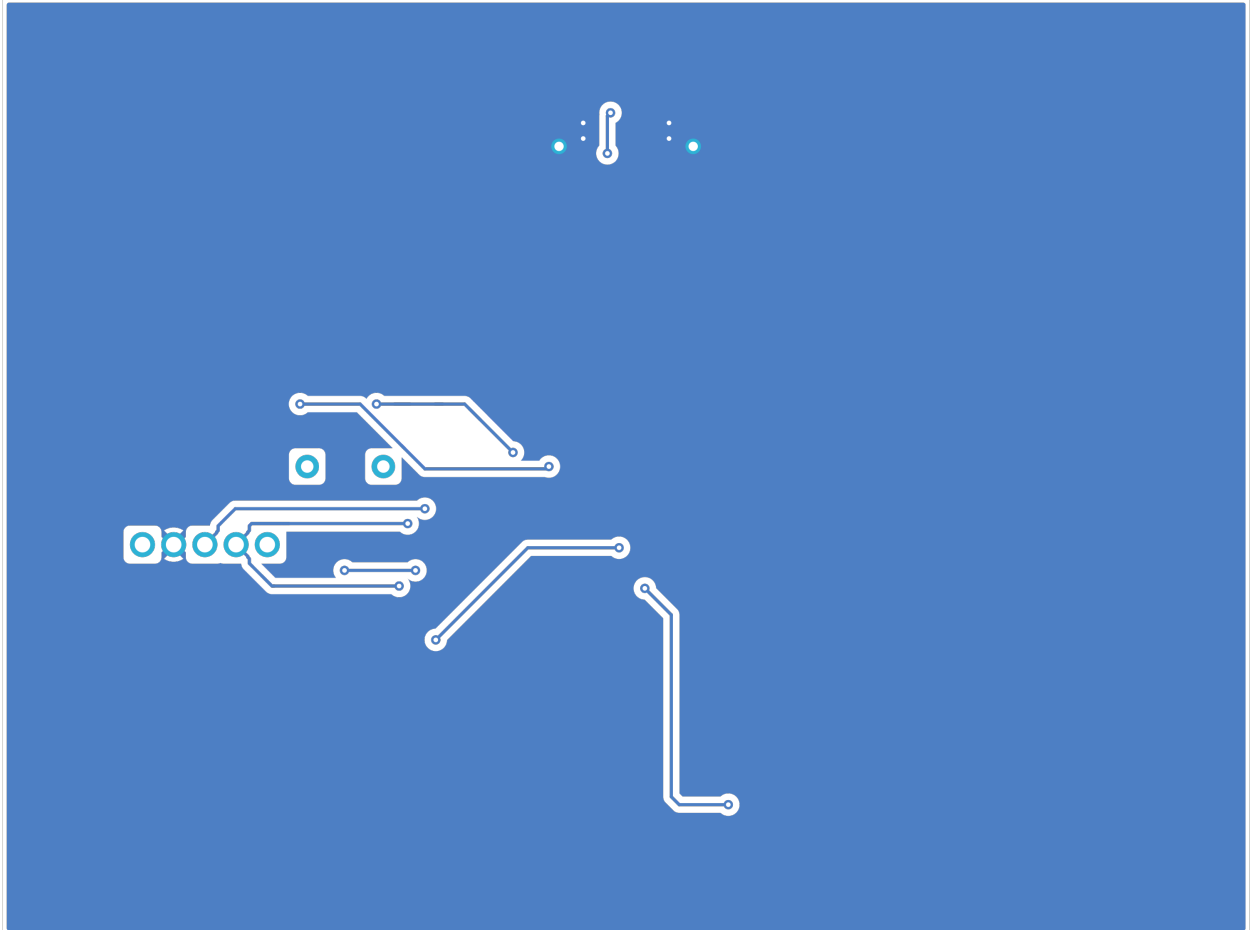


Figure 3: PCB Back

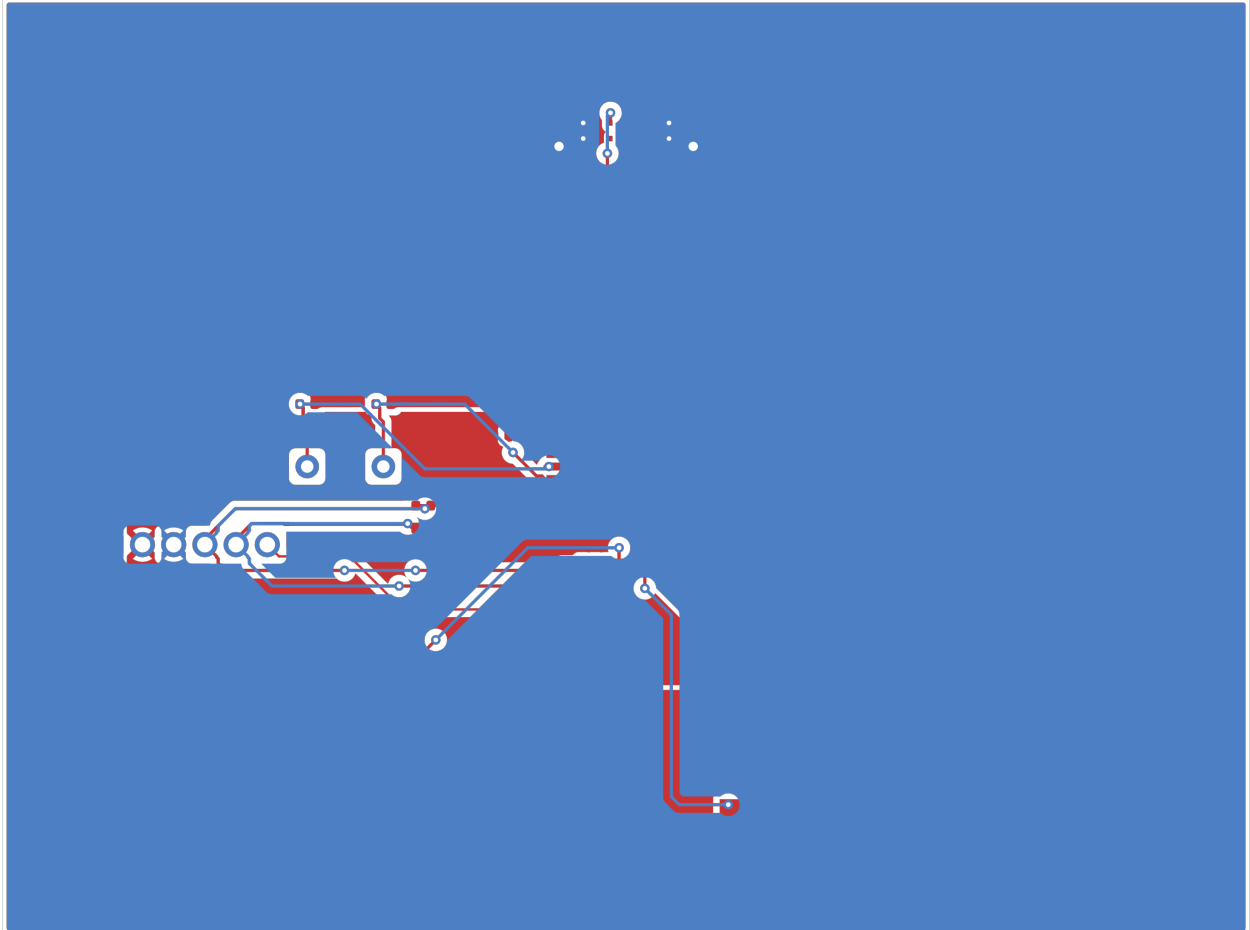


Figure 4: PCB Copper

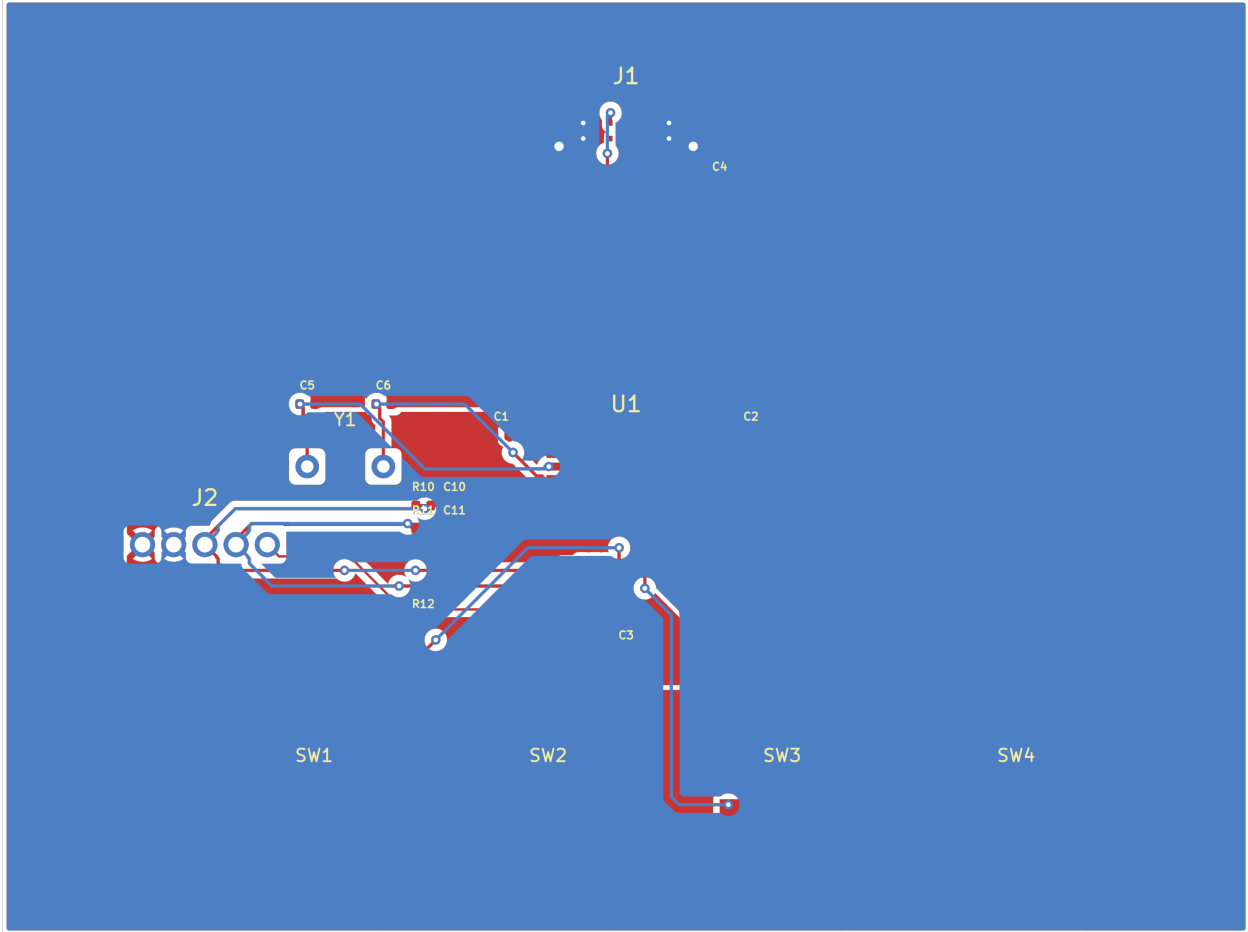


Figure 5: Assembly

Copper Layers

F.Cu

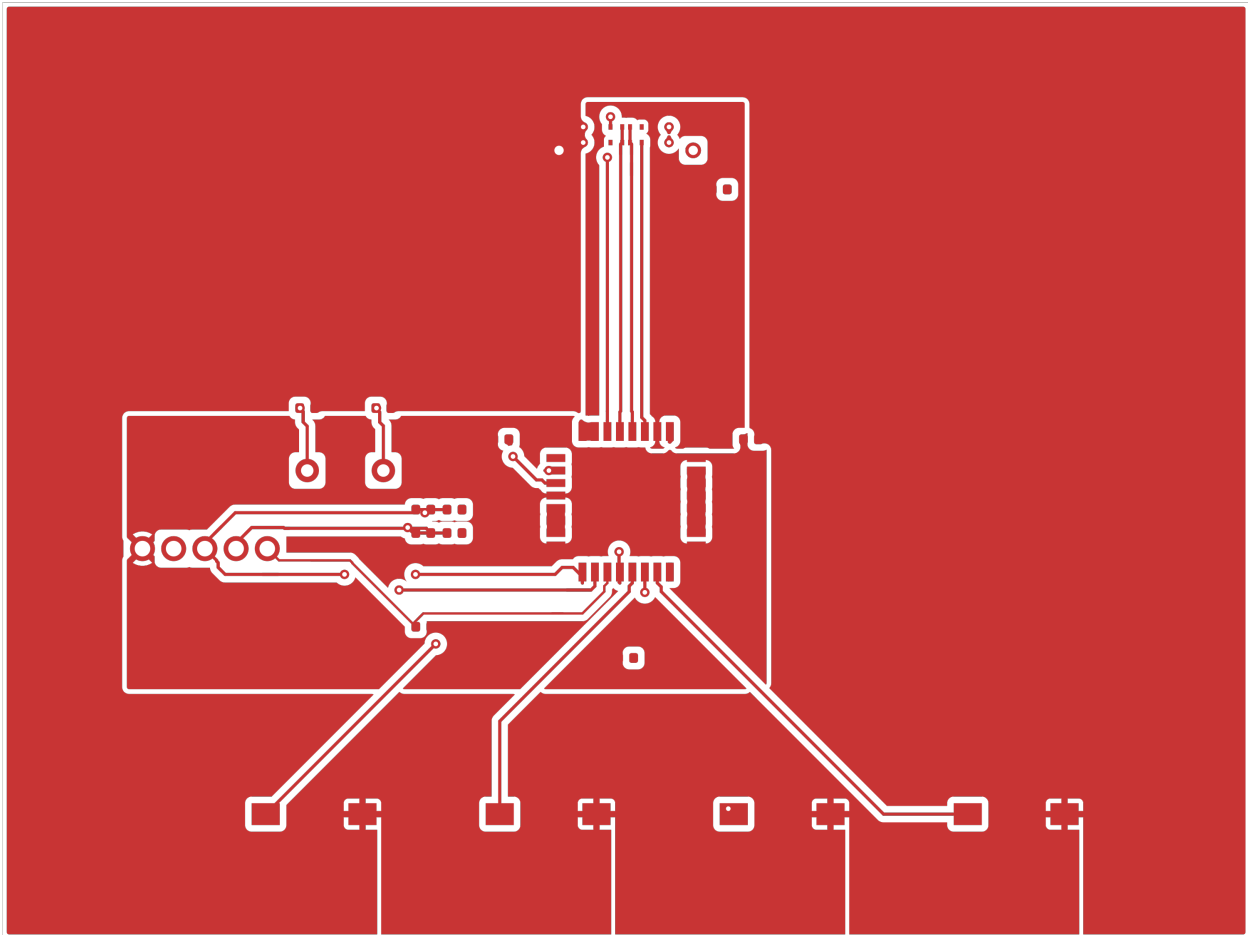


Figure 6: F.Cu

B.Cu

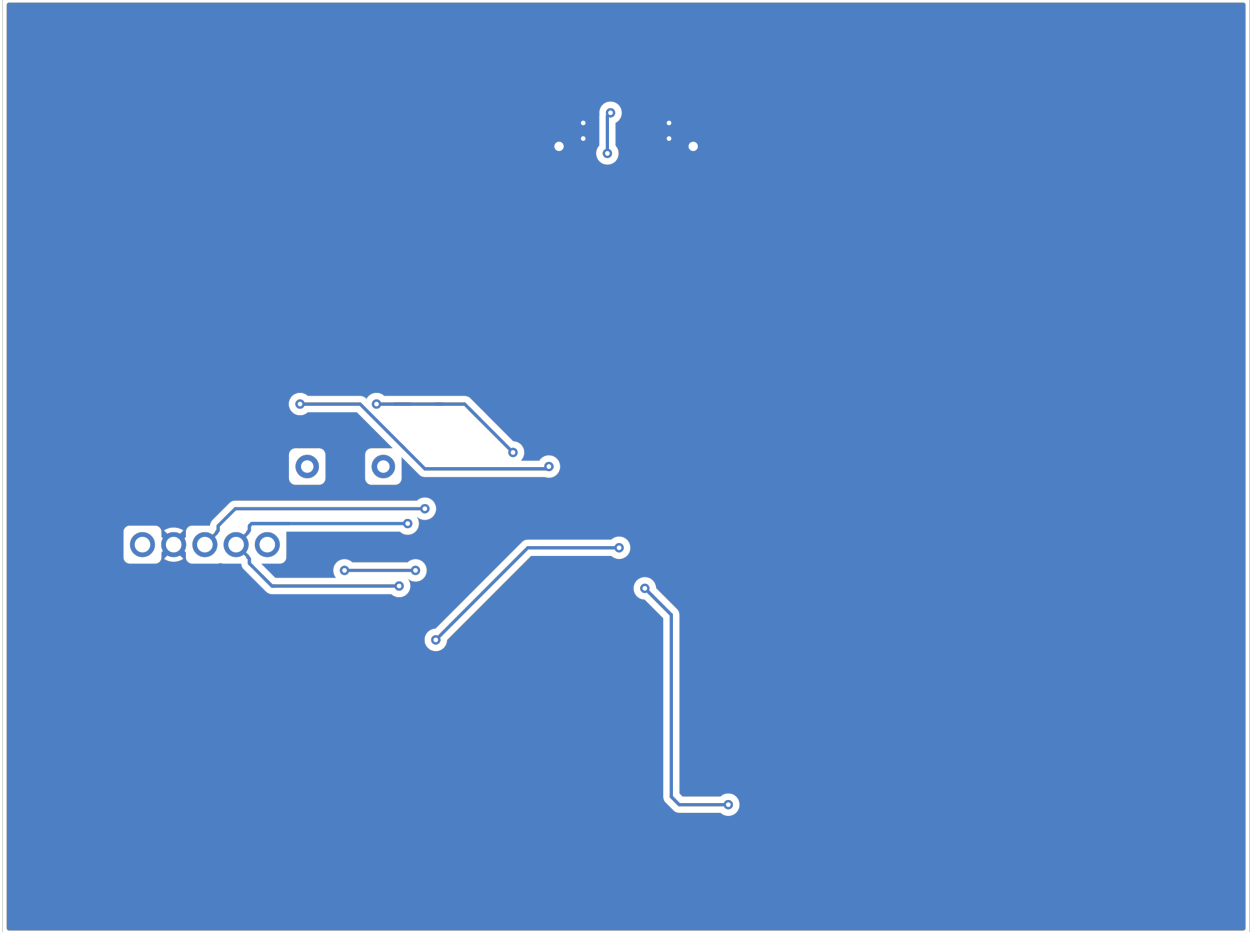


Figure 7: B.Cu

Bill of Materials

Value	Package	Qty	References
100nF	C_0402_1005Metric	4	C1, C2, C3, C4
16nF	C_0402_1005Metric	2	C10, C11
22pF	C_0402_1005Metric	2	C5, C6
Joystick	Joystick_Analog	1	J2
TYPE-C	USB_C_Receptacle_GCT_USB4105	1	J1
10k	R_0402_1005Metric	3	R10, R11, R12
Button	SW_SPST_TL3342	4	SW1, SW2, SW3, SW4
MCU	TQFP-32_7x7mm_P0.8mm	1	U1
16MHz	Crystal_HC49-U_Vertical	1	Y1

DRC Status

Metric	Count
Errors	0
Warnings	20
Blocking	0

Status: PASS ### Violations by Type

Violation Type	Count
silkscreen_text_height	16
copper_sliver	2
silk_over_copper	2

Manufacturing Readiness

Verdict: WARNING

Action Items

- **[OPTIONAL]** Verify zone fill in KiCad for 3 zone-connected nets
- **[OPTIONAL]** Review 20 DRC warnings

Routing Status

Metric	Value
Signal Net Completion	100.0% (13/13)
Overall Completion	100.0%
Complete Nets	16 / 16
Zone-Connected Nets	3
Incomplete Nets	0
Unconnected Pads	0

Zone-Connected Nets

- GND
- VBUS
- VCC

Cost Estimate

Metric	Per Board (estimated)
PCB Fabrication	~1.36 USD
Components (estimated)	~1.33 USD
Assembly (estimated)	~2.03 USD
Total (estimated)	~4.72 USD
Batch Quantity	5
Batch Total (estimated)	~23.61 USD