

Embedded Linux WS2812 Driver Board – Improved Version

Board made during 2 weekends (first for schematics update – second PCB layout).

This board is an improved and significantly redesigned version of the previous Embedded Linux WS2812 Driver Board, with substantially reworked PCB layout, more compact components placement and improved power and signal routing.

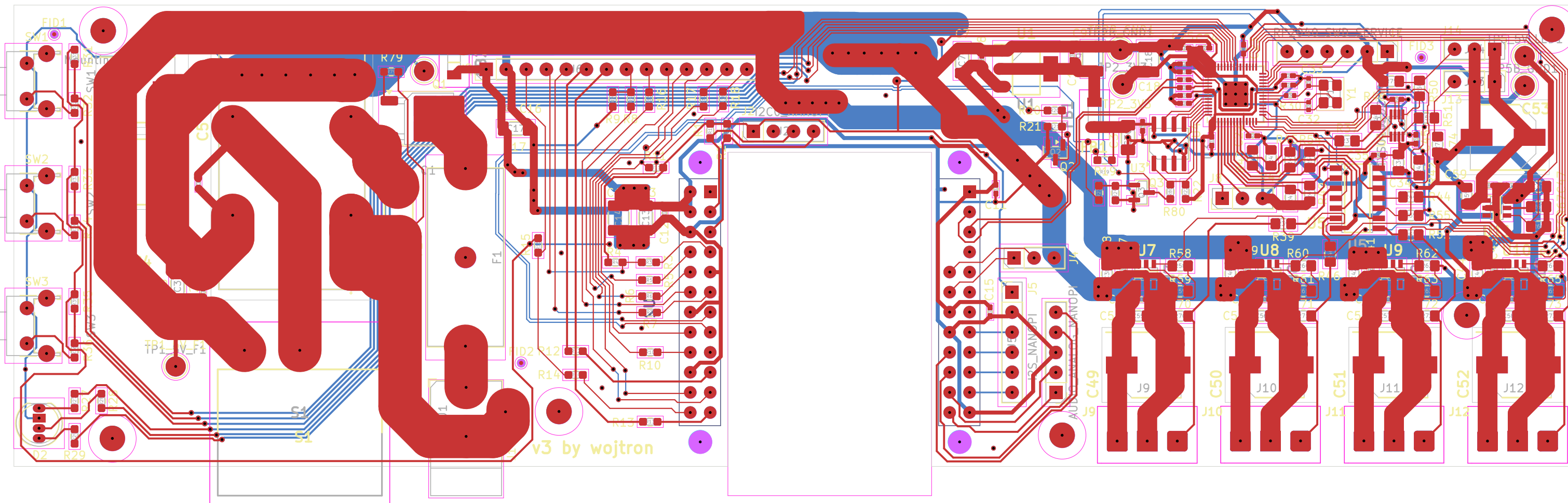
Board consists of **NanoPi NEO v1.4 embedded Linux module** and **RP2040**, creating a Linux + real-time controller architecture. RP2040 handles 6 WS2812 LED channels, using 74HCT125 and TXS0102 level shifters and AP22615 load switches for controlled LED power distribution.

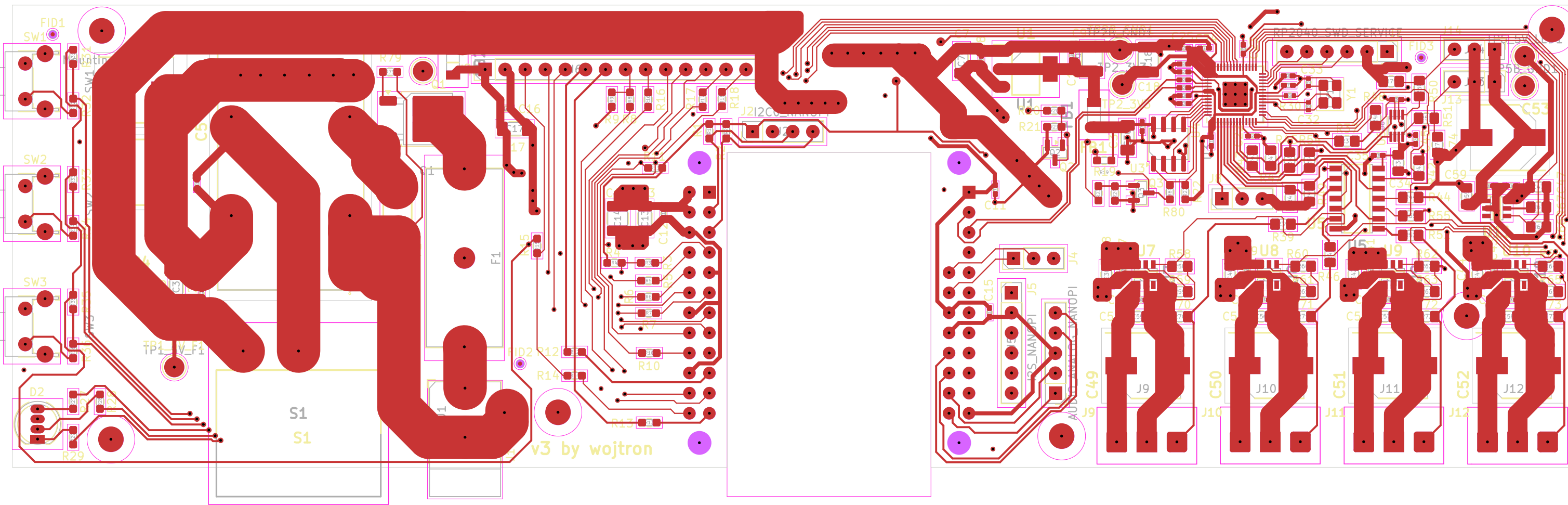
The BOM contains **170 electrical components**. Power input contains 5 A fuse, **TVS protection**, **reverse-polarity MOSFET**, **common-mode choke** and bulk filtering, with **wide high-current power paths** and **optimized components placement for low impedance** and **good EMC performance**. The revised layout was **significantly** compacted compared with the previous version, with clearer separation between power, logic and LED output sections.

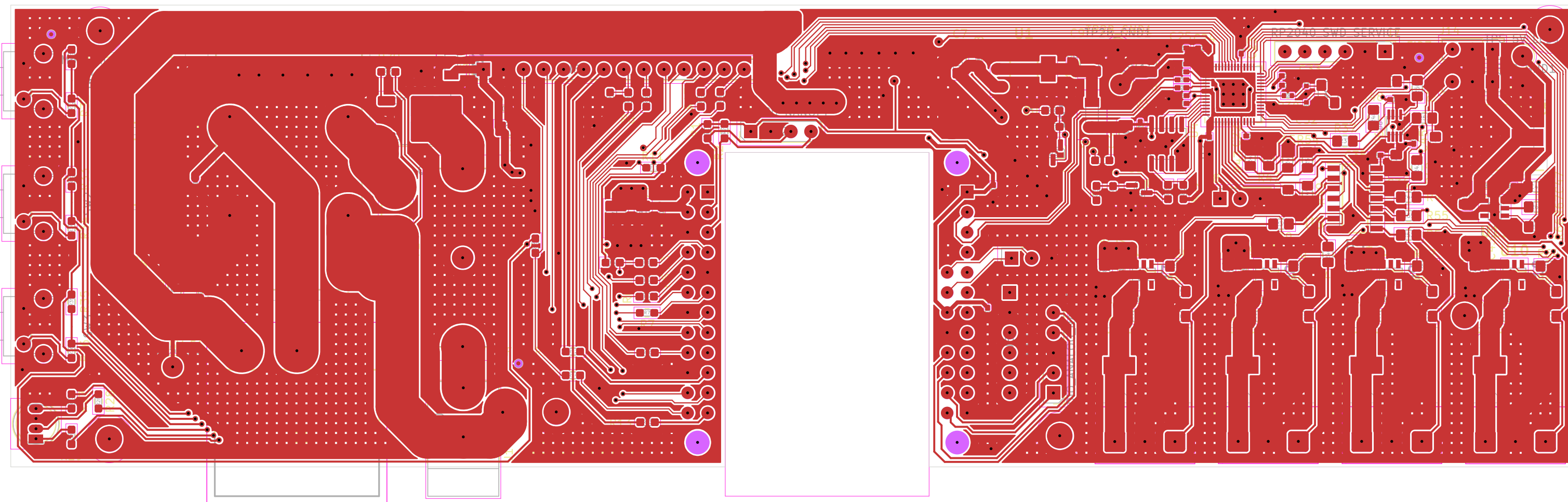
Board uses 2-layer, 1.6 mm stackup, where:

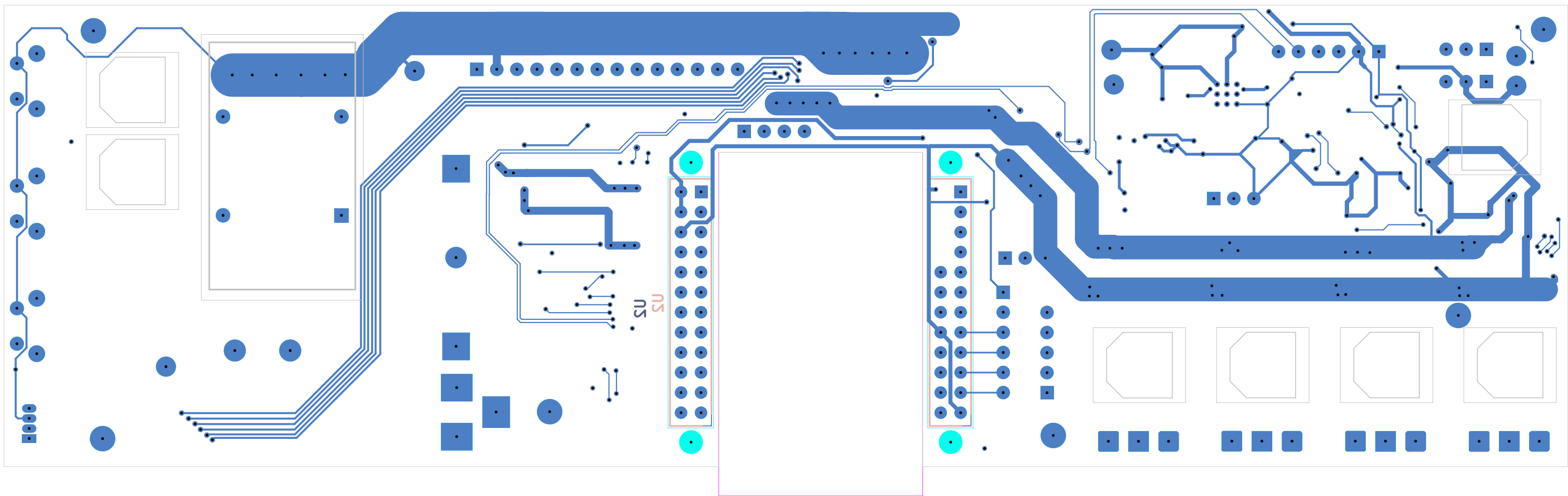
- 1 – TOP is components, signals and high-current power routing mixed with GND copper
- 2 – BOTTOM is signals mixed with large GND copper areas for low-inductance return currents and improved EMC

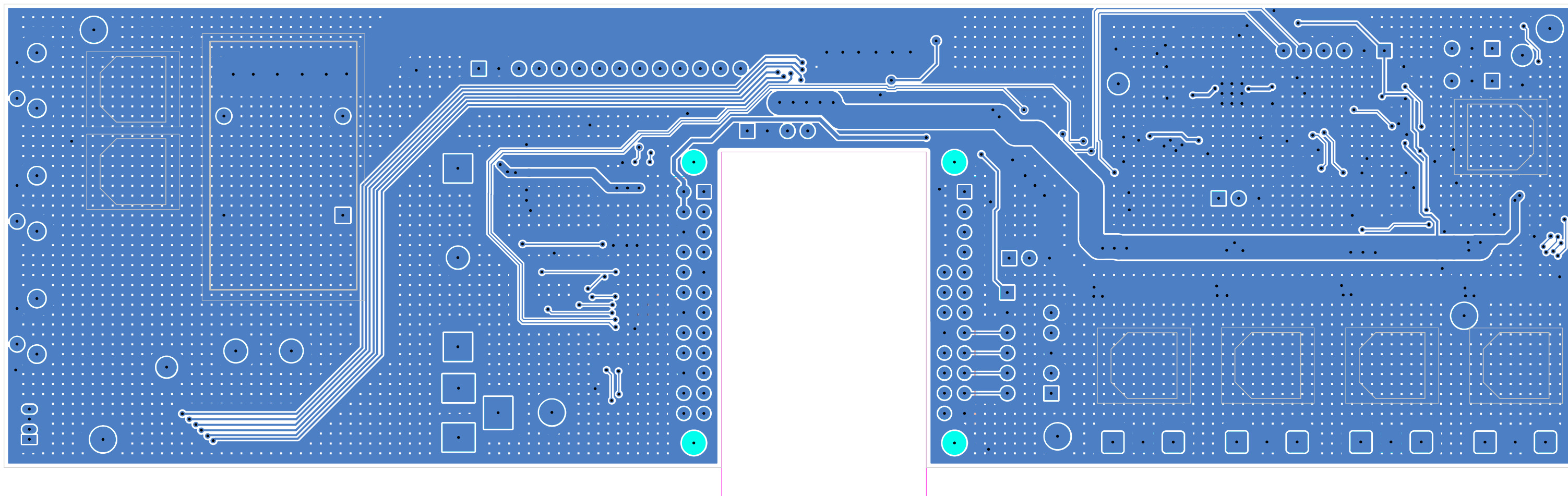
Decision to use 2 layer PCB was based on economical aspects, also it wasn't too hard to fit it all on 2L

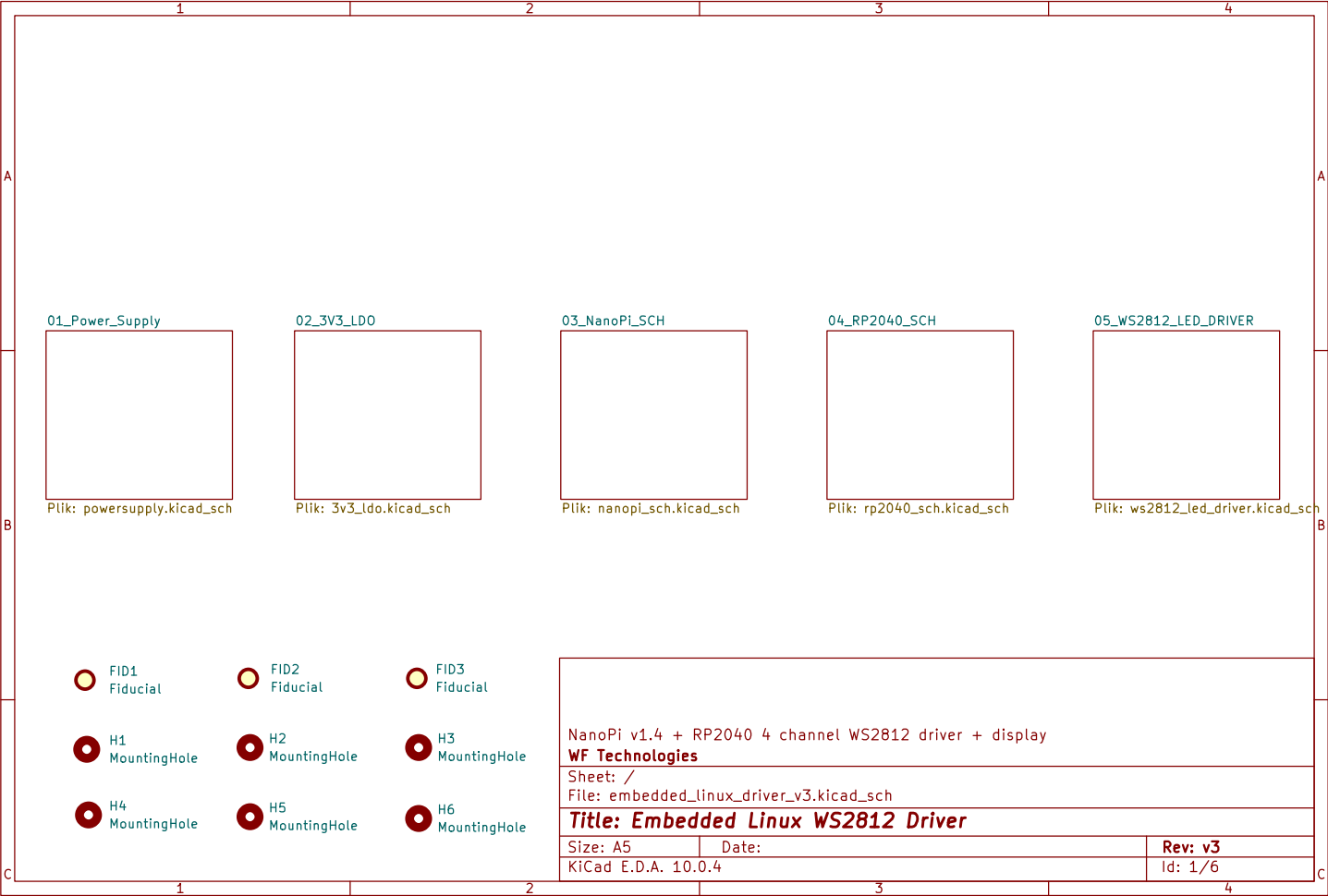


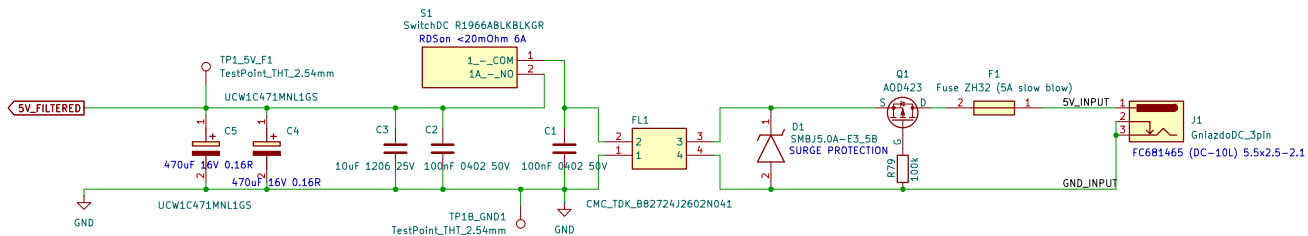












NanoPi v1.4 + RP2040 4 channel WS2812 driver + display

WF Technologies

Sheet: /01_Power_Supply/

File: powersupply.kicad_sch

Title: Power Supply SCH

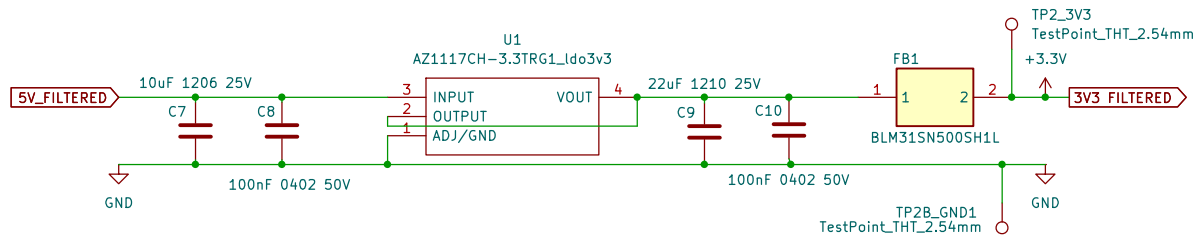
Size: A4

Date:

Rev: v3

KiCad E.D.A. 10.0.4

Id: 2/6



NanoPi v1.4 + RP2040 4 channel WS2812 driver + display

WF Technologies

Sheet: /02_3V3_LDO/

File: 3v3_ldo.kicad_sch

Title: 3V3 LDO Schematic

Size: A5

Date:

KiCad E.D.A. 10.0.4

Rev: v3

Id: 3/6

