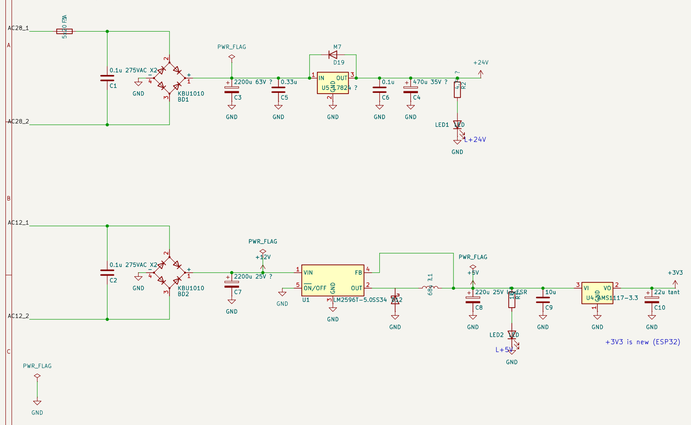
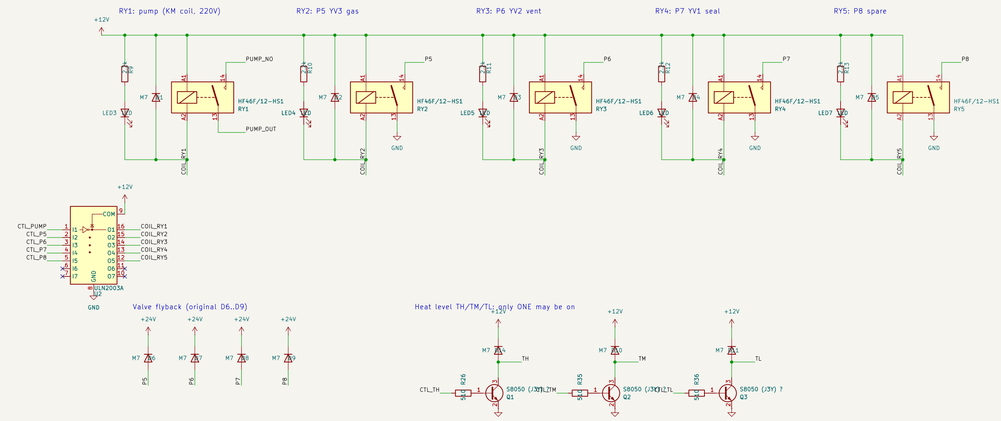
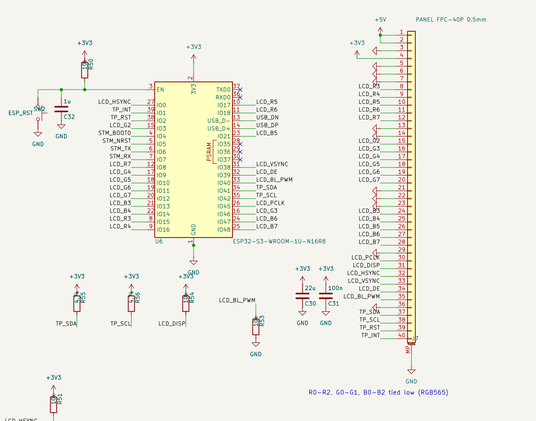
POWER (original: 2 secondaries, 2 bridges, U5 linear + U1 LM2596)



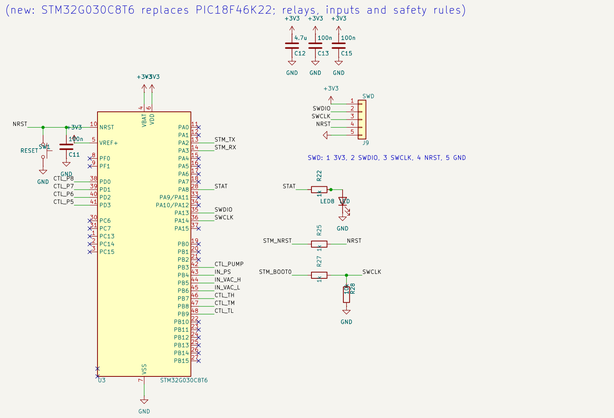
OUTPUTS (ULN2003A -> RY1..RY5, Q1..Q3 -> TH/TM/TL external KA coils)



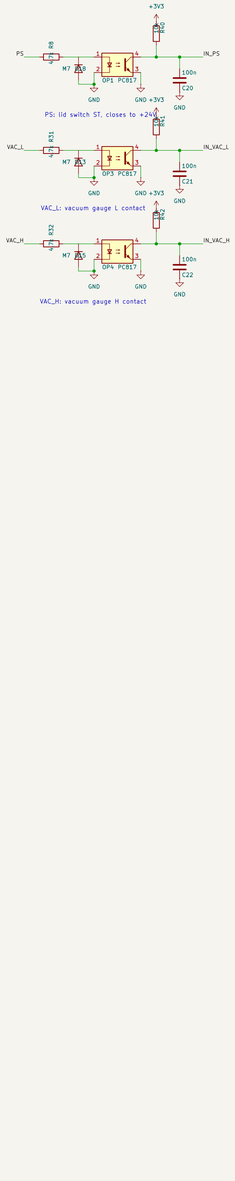
DISPLAY + BLE (new: ESP32-S3 drives the bare 7in RGB panel, BLE firmware update)



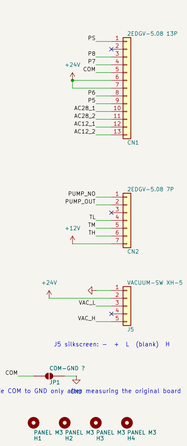
MCU (new: STM32G030C8T6 replaces PIC18F46K22; relays, inputs and safety rules)



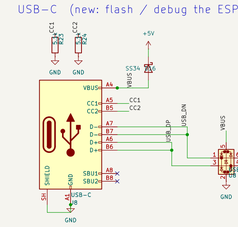
INPUTS (PC817, original R8/R31/R32 4.7k, D13/D15 reverse)



CONNECTORS (pin order unchanged)



USB-C (new: flash / debug the ESP32)



Read from the original board (photos): KBU1010 x2, TENTA X2 0.1u x2, LM2596T-5.0, HF46F/12-HS1 x5,
ULN2003A, PC817, M7 diodes (D1..D15), 2.2k relay LEDs, 4.7k input resistors, 510R transistor bases.

Assumed, verify before layout:

1. U5 marking (L7824 assumed). Which rail feeds U1 and which rail is unregulated.
2. Fuse1 position and rating, bulk capacitor values, L1 value, D12 type.
3. Q1..Q3 driving TH/TM/TL and relay/terminal mapping (from part placement only).
4. COM (CN1-5): JP1 open by default. J5 '+' voltage and pin 4.
5. Firmware: TH/TM/TL mutually exclusive; heater output must time out by itself (STM32 enforces it).
6. Panel FPC: 0.5 mm pitch and contact side to check against the panel's FFC (opposite-side contacts).

Datasheet limits: L7824 Vin max 40V (28VAC at high line rectifies to ~42V). HF46F coil max 15.6V
(unregulated 12VAC gives ~15V). LM2596 catch diode must be Schottky. ESP32 needs an external 2.4 GHz antenna on U.FL.
+3V3 now feeds ESP32-S3 + panel logic: AMS1117 drops 1.7V, up to ~1W at Wi-Fi TX peaks; give it copper.
STM32 update path: ESP32 holds STM_BOOT0 high, pulses STM_NRST, then talks to the ROM bootloader
on USART2 PA2/PA3 (AN2606 G03x). Program option bytes nBOOT_SEL=0, nBOOT1=1 once over SWD.

Values marked ? are not readable on the original board.
Original power and I/O circuit, STM32G030 + ESP32-S3 with a 7in RGB panel

zyx1121

Sheet: /		
File: vacuum-controller.kicad_sch		
Title: Vacuum sealer controller (DUA-019 replacement)		
Size: A1	Date: 2026-10-17	**Rev: 0.4**
KiCad E.D.A. 10.0.6		Id: 1/1