ESPurr headband — joined test assembly

USB and 3.3V power

File: usb-power.kicad_sch

Controller and controls

File: controller.kicad_sch

Left sensors and interfaces

File: left-interfaces.kicad_sch

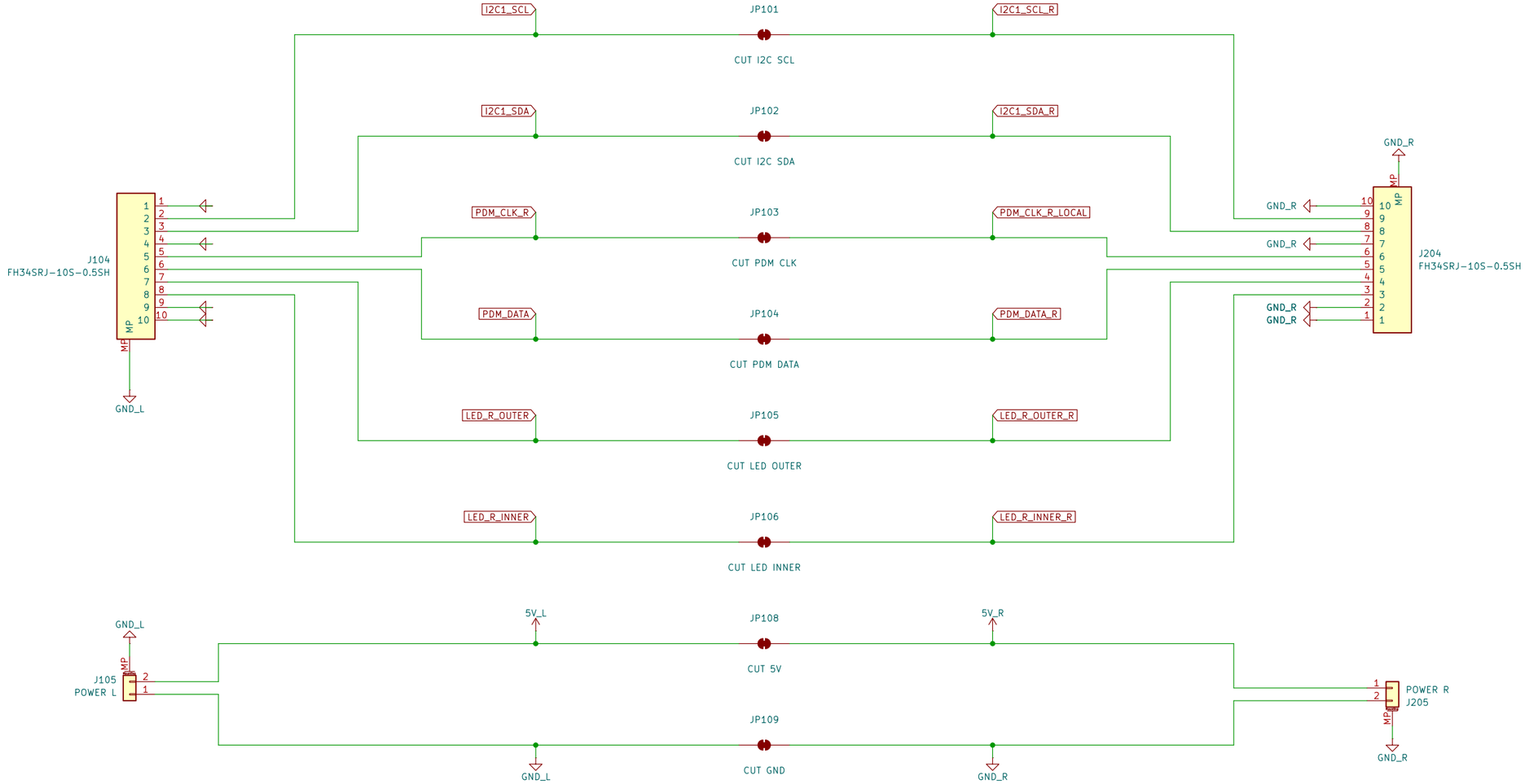
Right sensors and interfaces

File: right-interfaces.kicad_sch

LEFT / signal FFC

Temporary joined-test cut/re-solder links

RIGHT / signal FFC



Separate 28 AWG power wires after mousebite separation

JP101–JP106 + JP108/JP109 are pre-bridged copper solder jumpers; cut/re-solder individual paths for testing, with power off.
F.Cu traces pass between mousebite holes; no V-scores, pours or vias across the break lines. No fitted parts or paste.
Separate both perforation rows, discard the bridge, deburr and check isolation; then fit the band FFC and Pico-EZmate power jumper.

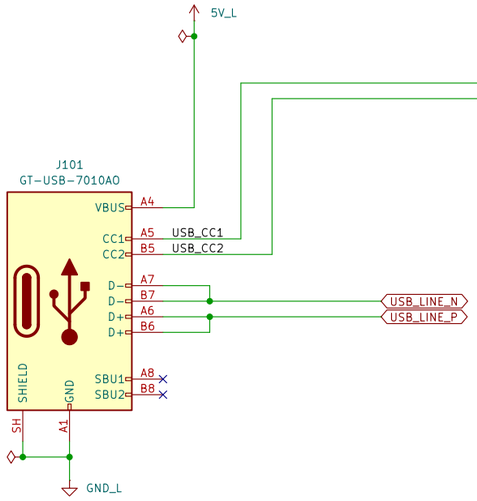
Cross-band: 1/4/9/10 GND; 2 SCL; 3 SDA; 5 PDM CLK; 6 PDM DATA; 7 OUTER; 8 INNER.
Cable mapping must preserve contact identity at both sockets; verify actual cable continuity.
Left/right rails are deliberately distinct from ear-project global power names.

neggl.es

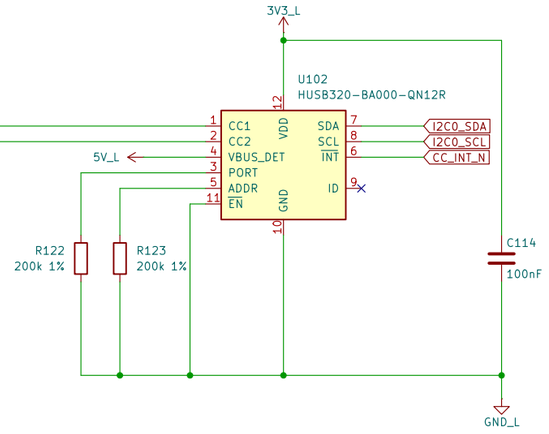
Sheet: espurr-band		
File: espurr-band.kicad_sch		
Title: ESPurr headband		
Size: A3	Date: 2026-10-25	**Rev: 1-draft**
KiCad E.D.A. 10.0.4		Id: 1/5

ESPurr headband — USB and left 3.3V

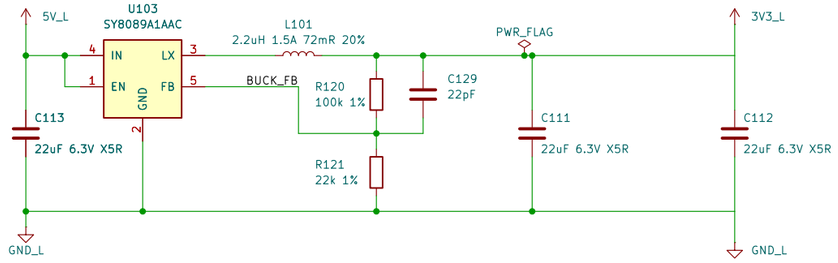
USB-C / input protection



HUSB320 sink / I2C0 0x42



SY8089A1AAC @ 3.3v



BA000: VBUS_DET direct to raw VBUS. PORT=200k to GND selects sink; ADDR=200k selects 0x42.
CC controller supplies dead-battery Rd; no external CC or D+/D- clamps. Native USB flashing; no PD.

USB VBUS feeds 5V_L directly; source OCP is the prototype fallback. SY8089A1 VIN range 2.5–5.5V.
R120/R121 = 100k/22k: 3.327V nominal; C129 = 22pF feed-forward across R120. No bootstrap capacitor.
C113 input = 22uF; C111/C112 output = 2 x 22uF, 6.3V X5R 0603 CL10A226MQ8NRNC (~19.5uF total at 3.3V, typical 25C).
L101 = 2.2uH ANR3015T2R2M, 1.5A rating. Qualify bias loss, inrush, load transients and temperature on hardware.

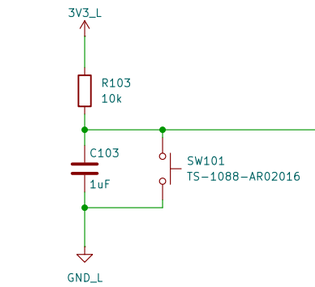
neggl.es

Sheet: USB and 3.3V power File: usb-power.kicad_sch		
Title: ESPurr headband		
Size: A3	Date: 2026-10-25	**Rev: 1-draft**
KiCad E.D.A. 10.0.4		Id: 2/5

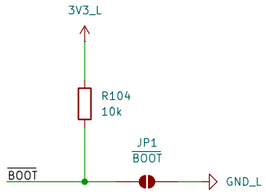
ESPurr headband — controller and controls

ESP32-S3-WROOM-1-N16R8 / 16MB flash / 8MB PSRAM

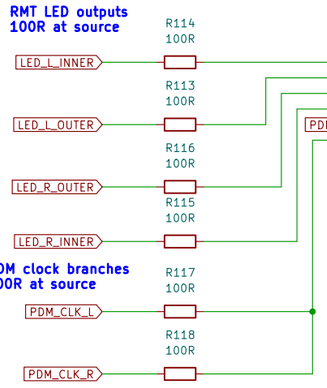
RESET / EN



BOOT / rear service pads

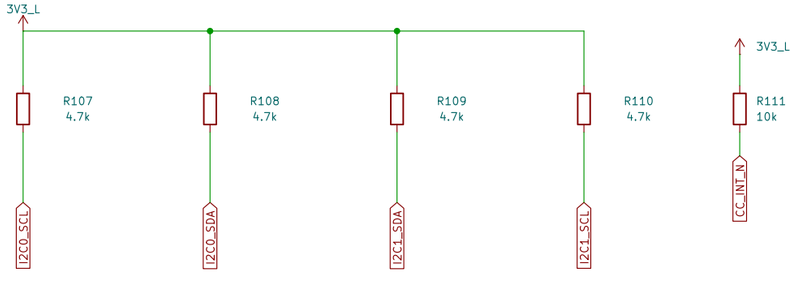


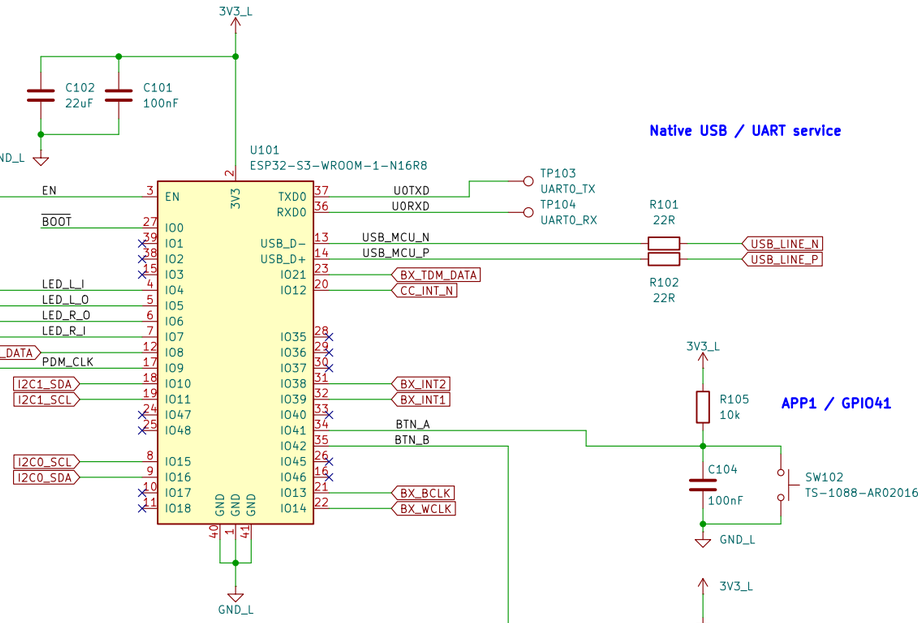
RMT LED outputs 100R at source



PDM clock branches 100R at source

I2C pull-ups / one set on left 3V3





Native USB / UART service

APP1 / GPIO41

APP2 / GPIO42

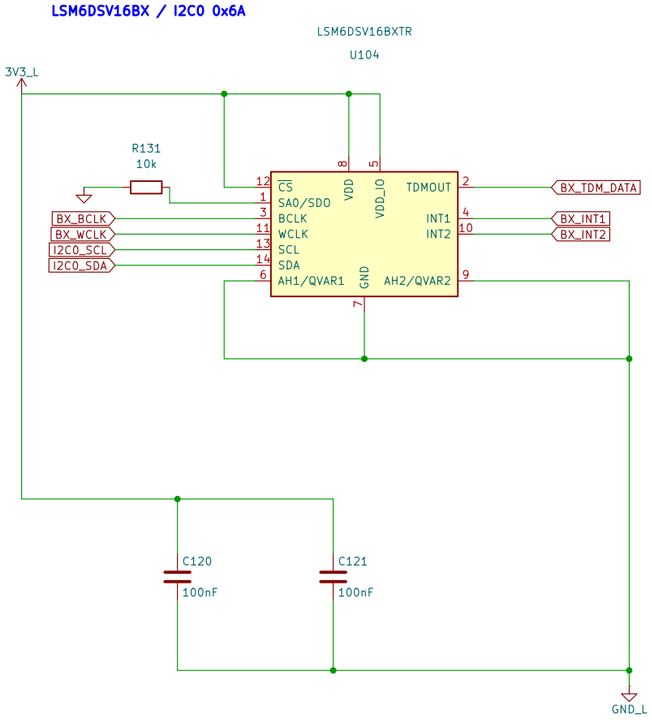
LEDs: GPIO6/7 right outer/inner; GPIO5/4 left outer/inner. I2C0 SDA/SCL=16/15; I2C1=10/11; CC_INT_N=12.
I2S0: PDM CLK=GPIO9, DATA=GPIO8; shared DATA has no pulls (disable MCU internal pulls).
I2S1: BX BCLK/WCLK/DATA=GPIO13/14/21; INT1/2=GPIO38/39. APP1/2=GPIO41/42.
USB=GPIO19/20; rear UART0=43/44 and GPIO0 boot jumper. GPIO3/45/46 straps unused; GPIO1/2/17/18/40 spare.
Pads 28–30 (GPIO35–37) reserved for PSRAM. GPIO47/48 unused for future WROOM-2. Right LED GPIO swap needs firmware integration.

neggl.es

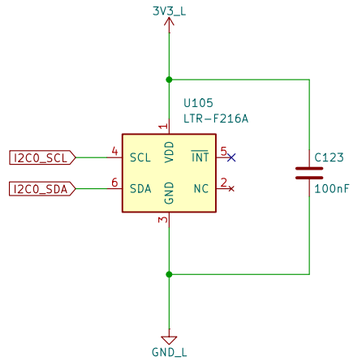
Sheet: Controller and controls		
File: controller.kicad_sch		
Title: ESPurr headband		
Size: A3	Date: 2026-10-25	**Rev: 1-draft**
KiCad E.D.A. 10.0.4		Id: 3/5

ESPurr headband — left sensors and flex interfaces

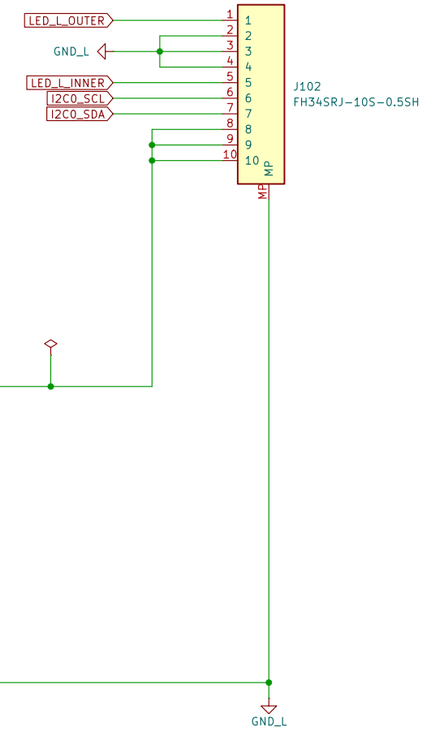
LSM6DSV16BX / I2C0 0x6A



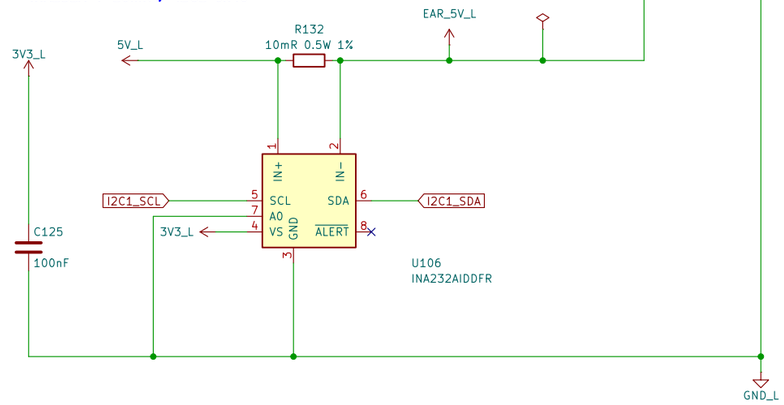
LTR-F216A / I2C0 0x53



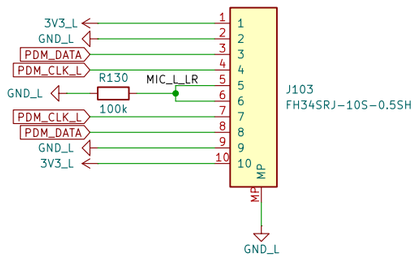
Left ear / identity mapping



INA232A + 10mR / I2C1 0x40



Reversible mic flex / LEFT



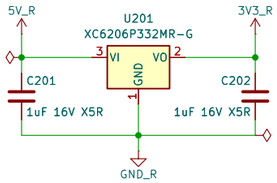
BX: on rigid main board: Qvar disabled. TDM: 16kHz WCLK, 2.048MHz BCLK, 8 x 16-bit slots: Z/Y/X=0/1/2.
TP107/108 expose clocks: verify edge/alignment and <=4ns p-p BCLK jitter on bench. No MCLK.
Gettop MD-DRA371-H10 (C5027576), nominal 3V3 accepted. Put 100nF on mic flex.
SEL=0: data after falling edge. ALS and INA are polled; their interrupts are unused.

neggl.es

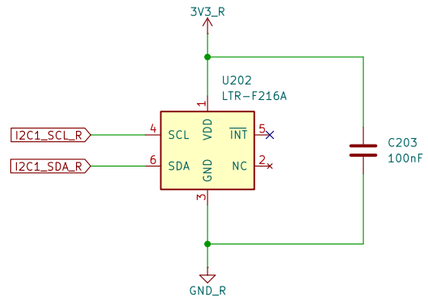
Sheet: Left sensors and interfaces		
File: left-interfaces.kicad_sch		
Title: ESPurr headband		
Size: A3	Date: 2026-10-25	**Rev: 1-draft**
KiCad E.D.A. 10.0.4		Id: 4/5

ESPurr headband — right sensors and flex interfaces

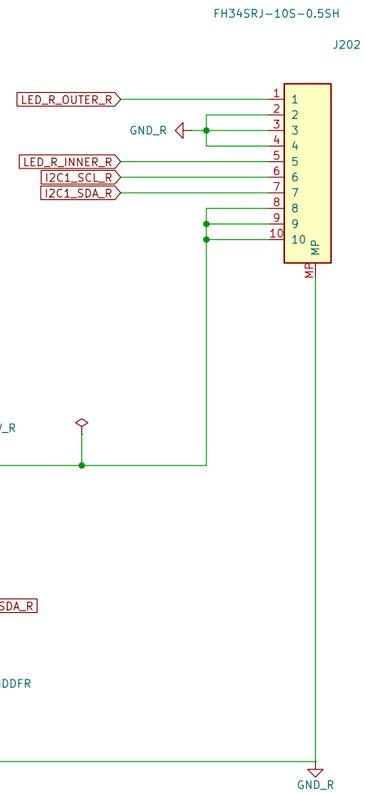
Local 3.3V / XC6206



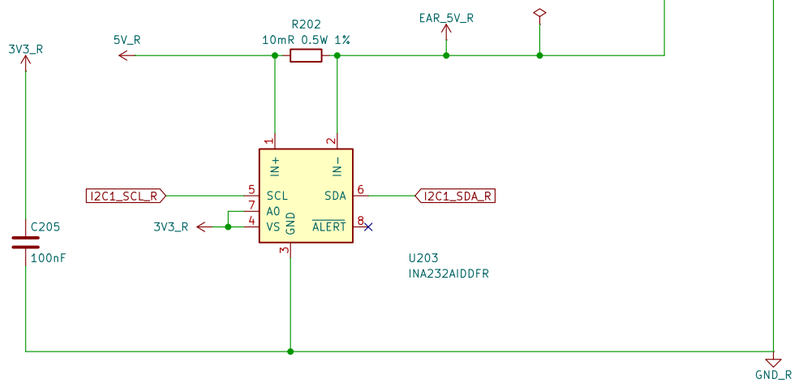
LTR-F216A / I2C1 0x53



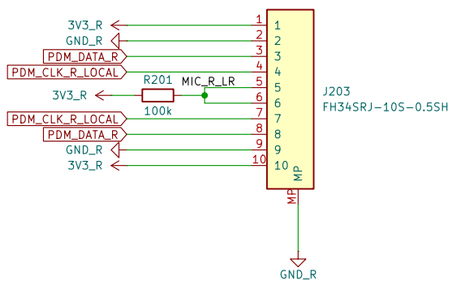
Right ear / identity mapping



INA232A + 10mR / I2C1 0x41



Reversible mic flex / RIGHT



XC6206P332MR-G: local right 3V3 from unmeasured 5V_R, before INA701. 2.2uF input/output ceramics.
INA701 measures the ear LED supply only; A0 tied to VS selects 0x55. ALS fixed 0x53; both devices polled.
Same Gettop MD-DRA371-H10 mic flex as left. SEL=1: data after rising edge; check PCM channel mapping in firmware.
MIC 1/10=3V3, 2/9=GND, 3/8=DATA, 4/7=CLK, 5/6=SEL. Flex needs local 100nF.

neggl.es

Sheet: Right sensors and interfaces		
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KiCad E.D.A. 10.0.4		Id: 5/5