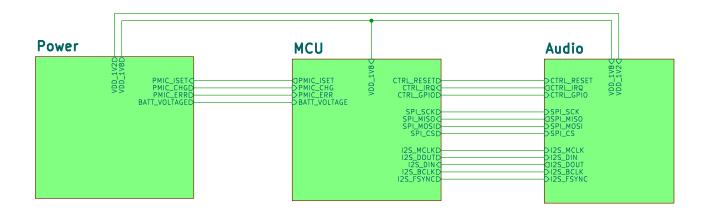
Hearing Aid



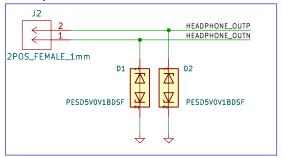
This device is intended to capture audio from two microphones, clean up the signal using a dedicated DSP chip and an MCU, apply compression and send the amplfied mono audio directly into a hearing aid compatible RIC (receiver in canal / earpiece). The device runs off a Li-ion battery and can be charged at 5V. Other features include Bluetooth control and Bluetooth LE Audio.

Yote	
Sheet: / File: yote.kicad_sch	D
Title: Hearing Aid	
Size: A4 Date: 2023-04-01	Rev: 0.1
KiCad E.D.A. 8.0.1	ld: 1/4

MCU User Interface nRF5340 Microcontroller PWR_FLAG +1V8 +1V8 BUTTON1 VDD_1V8D C5 ± C7 C7 100n 100n SHIELD +1V8 U1 Y1 32Mhz 8pF Primary power input XC2 VDD LED off 3.7V battery. В6 DCC Green LED drops 2V (max 25mA) 5mA (target) E1 L1 +BATT XC1 Voltage accross resistor: XC1 10u 3.7 - 2 - 0.1 (transistor) = 1.6V Need 330 ohm resistor L2 D1 RF RF MATCH ANT DECR 2n2 B1 DECRF D3 RESET R11 nRESE1 ANT C8 L C9 ± C10 ⊥ C11 F2 SWDCLK SWDCLK-1u 1u 2n2 0p7 +1V8 SWDIO 330 SWDIO GREEN_LED 4 B10 A11 VDD A9 DCCD D+ A12 Ω1 Primary power input LED NPN_TRANSISTOR C13 1k P0.00/XL1 P0.01/XL2 P0.02/NFC1 P0.03/NFC2 P0.04/AIN0 P0.05/AIN1 P0.06/AIN2 P0.08/TRACEDATA3/SCK P0.09/TRACEDATA3/SCK P0.09/TRACEDATA3/MOS Ţ 10 10u 1.8 - 0.7 (transistor) = 0.95VHfe = 100Α7 DECD 1k resistor will pass 1mA ⊥ C14 Enough to saturate BATT_VOLTAGE +1V8 T 1u 5.5V scaled to 1.8V for ADC voltage BATT_VOLTAGE protection —
□BATT_VOLTAGE No capacitor used **Debug Interface** × D11 DCCH See power sheet because VDDH not used VDDH B11 SPI_SCK VBUS -DSPI_SCK VTref (VCC pin) used for sensing the VDD voltage, not for powering the board +1V8SPI_MOSI PO.09/TRACEDATA2/MOSI--DSPI MOSI × C11 DECU-B5 DECN-DECA SPI_MISO P0.10/TRACEDATA1/MISO--⊲SPI_MISO \triangle DECUSB SWO PO.11/TRACEDATAO/CSN-I2S_MCLK PO.12/TRACECLK/DCX P0.13/100 K10 P0.14/101 K9 P0.15/102 K8 P0.16/103 L7 P0.17/5CK DI2S_MCLK I2S alternative names: ± C16 RESET C15 € RESET 12S_BCLK MCLK = MCK-DI2S_BCLK 100n 1u 12S_DIN BCLK = SCKC19 BUTTON1 D10 P1.00 P1.01 -□12S_DIN SWDCLK T 100n I2S_FSYNC FSYNC = LRCK / WS OND SI SWDIO SWCLK DI2S_FSYNC SWDIO DOUT = SDOUT SPI_CS P0.17/SCK K7
P0.18/CSN K7 PMIC_ISET< -DSPI_CS DIN = SDINSWO × J11 P1.02/I2C CTRL_RESET →CTRL_RESET × K12 P1.03/I2C CTRL_IRQ P0.19 K5 P0.20 K5 CTRL_IRQ × K3 P1.03 TC2030-NL CTRL_GPIO CTRL_GPIO P0.21 J4 PMIC_ERR P1.05 →□PMIC_ERR P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 P0.25/AIN4 PMIC_CHG P1.06 □PMIC_CHG \triangle G3 P1.07 I2S_DOUT P1.08 -DI2S_DOUT P1.09 P0.26/AIN5 J2 × P1.10 P0.27/AIN6 P0.28/AIN7 P1.11 P1.12 P0.29 P1.13 P0.30 P1.14 × C10 P1.15 C5 🗘 P0.31 Yote Sheet: /MCU/ NRF5340-CLAA-R File: mcu.kicad sch Title: Microcontroller Size: A4 Date: 2023-04-03 Rev: 0.1 KiCad E.D.A. 8.0.1 ld: 2/4

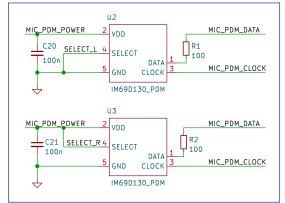
Audio

Headphone Out



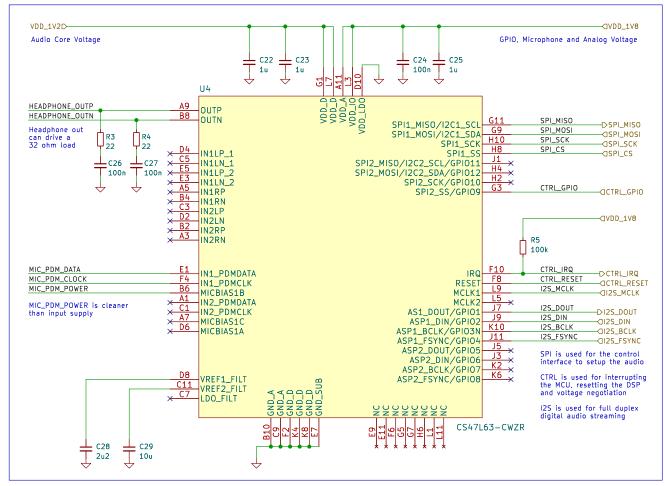
ESD protection diodes

PDM Digital Microphones



One mic is configured to output on left channel and other on right via SELECT pin config. This way they can share the same stereo stream

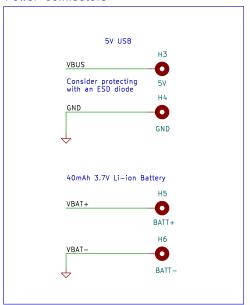
Digital Signal Processor (DSP)



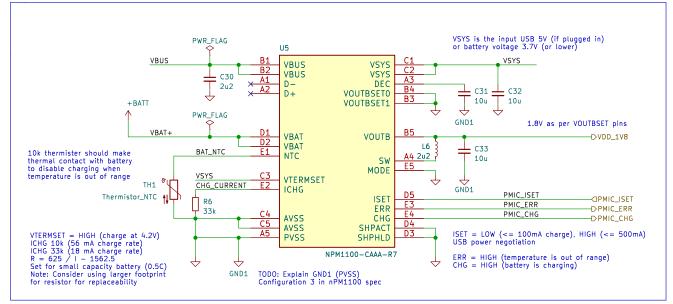
Yote						
Sheet: /Audio/						
File: dsp.kicad_sch						
Title: Audio						
Size: A4	Date: 20	23-04-03			Rev: 0.1	
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4			5			6

Power Supply

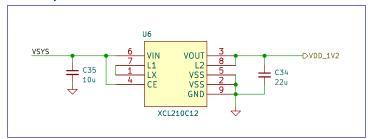
Power Connectors



Battery Charger and 1.8V Converter



1.2V DC/DC Converter



Battery Voltage Measurement

