power

File: power.kicad_sch

coreboard

File: coreboard.kicad_sch

mechanics

File: mechanics.kicad_sch

audio-codec

File: audio-codec.kicad_sch

audio-inputs

File: audio-inputs.kicad_sch

audio-outputs

File: audio-outputs.kicad_sch

headphone

File: Headphone.kicad_sch

usb

File: usb.kicad_sch

midi

File: midi.kicad_sch

control-chain

File: control-chain.kicad_sch

Notes

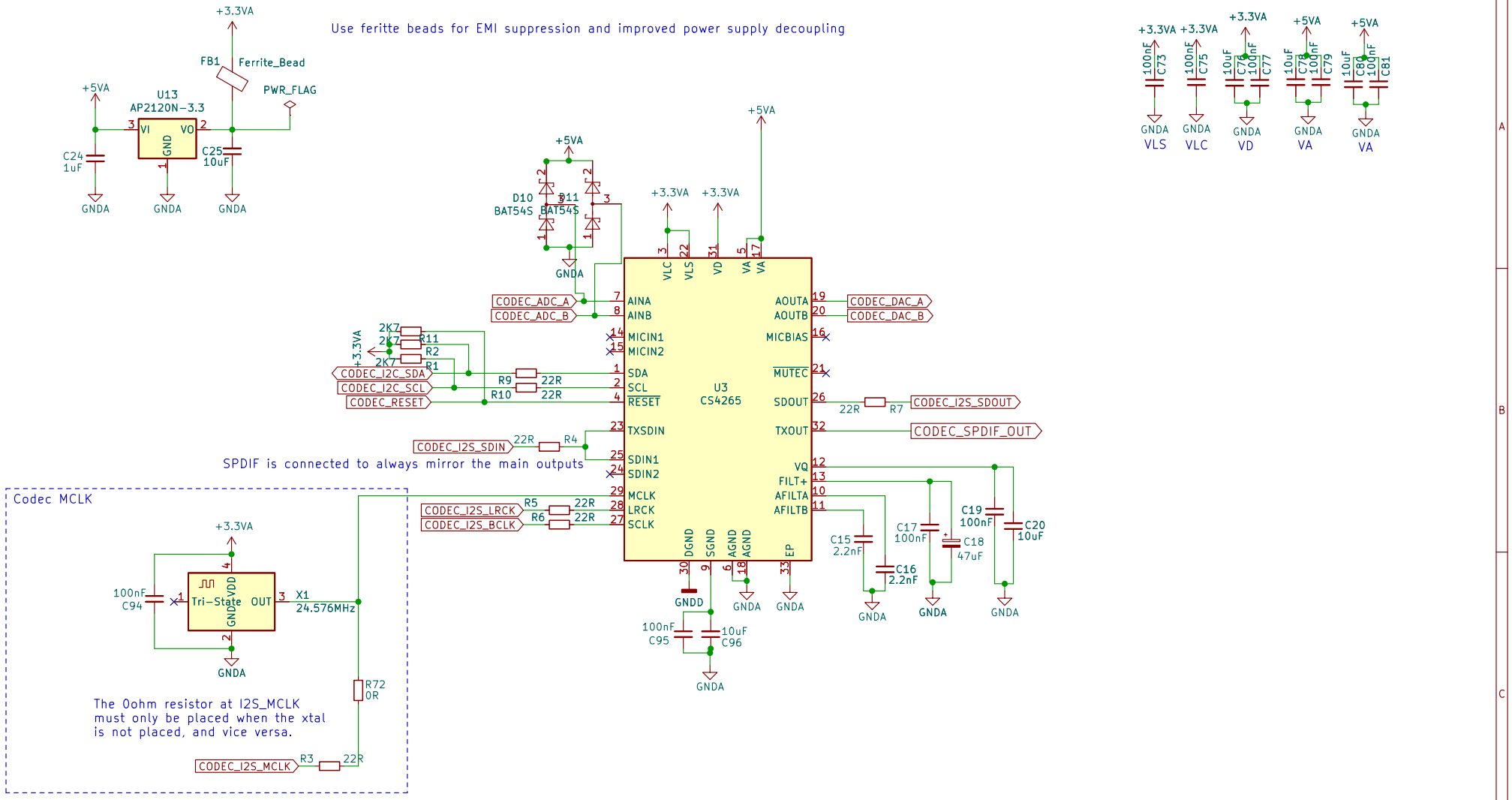
- All resistors named as RA* must have 1% tolerance
- All non-polarized capacitors named as CA* must use NP0 Temp. Coef.
- All other non-polarized capacitors should use X7R Temp. Coef.
- Decoupling caps must be placed as close as possible of the IC power pins

USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /
File: bottom-board.kicad_sch

Title: MOD Dwarf - Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A.	kicad 6.0.10-86aedd382b~118~ubuntu22.04.1	Id: 1/11

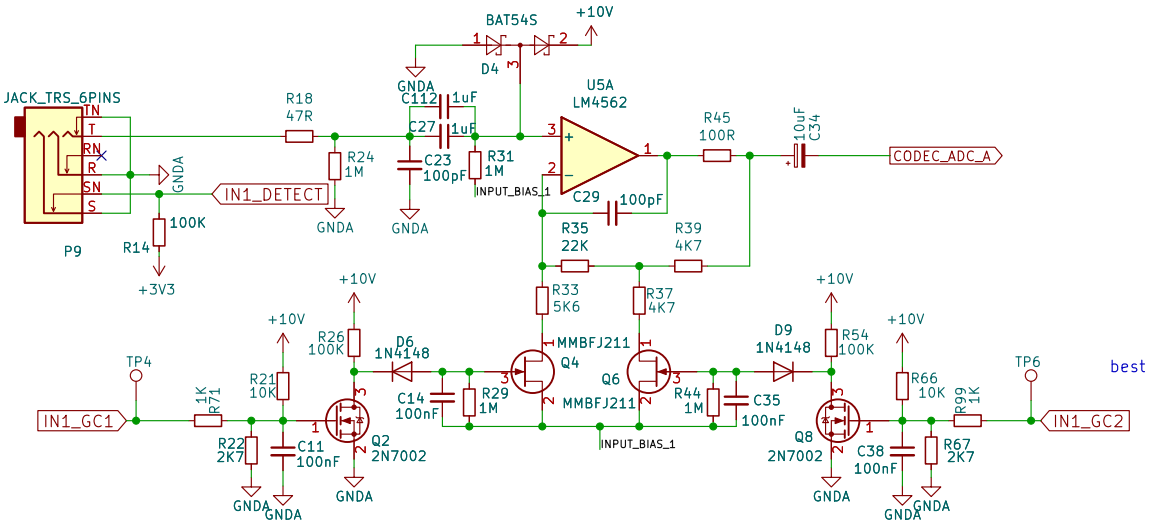


USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /audio-codec/
File: audio-codec.kicad_sch

Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A.	kicad 6.0.10-86aedd382b~118~ubuntu22.04.1	Id: 2/11



GC2, GC1	GAIN (dB)
1, 1	0.0
1, 0	6.0
0, 1	15.0
0, 0	20.4

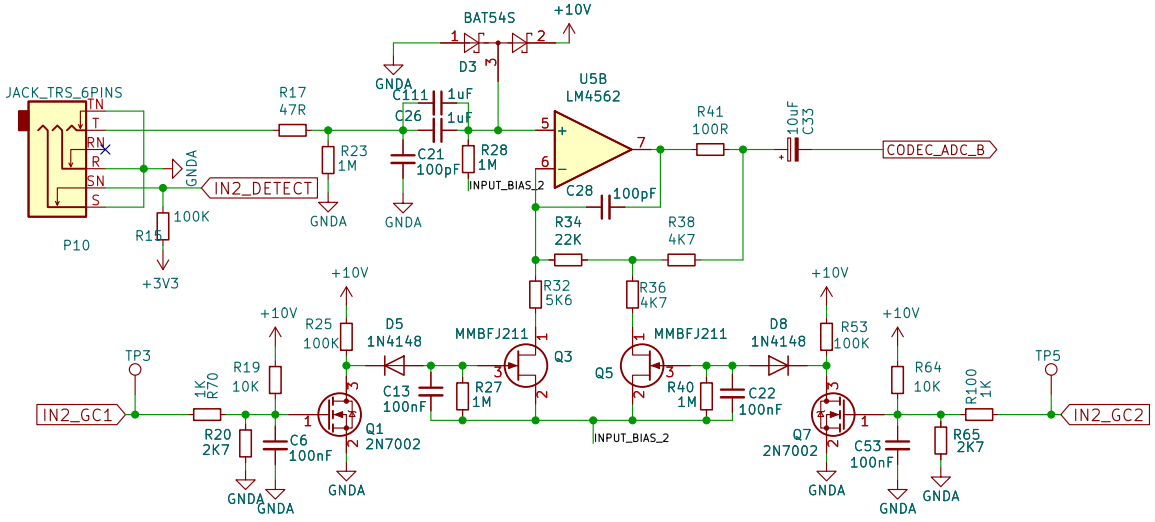
The gain calculation includes the RDSon value

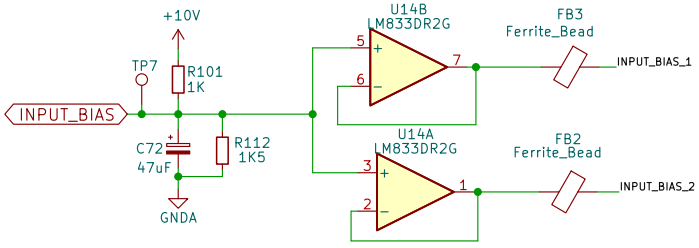
J110: RDSon = 18R

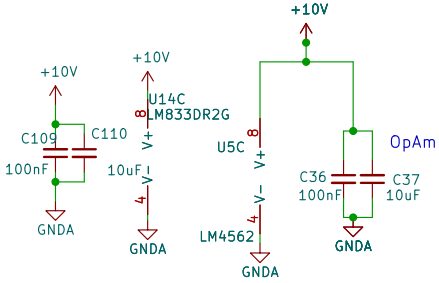
The CODEC only presents optimal dynamic range and THD+N for PGA setting: −12dB to +6dB.

best achievable noise will be −94dB since this is the Johnson noise with an impedance of 1Meg

For C27/C112 & C26/C111 one of the 2 should be placed, they have different footprints on the PCB







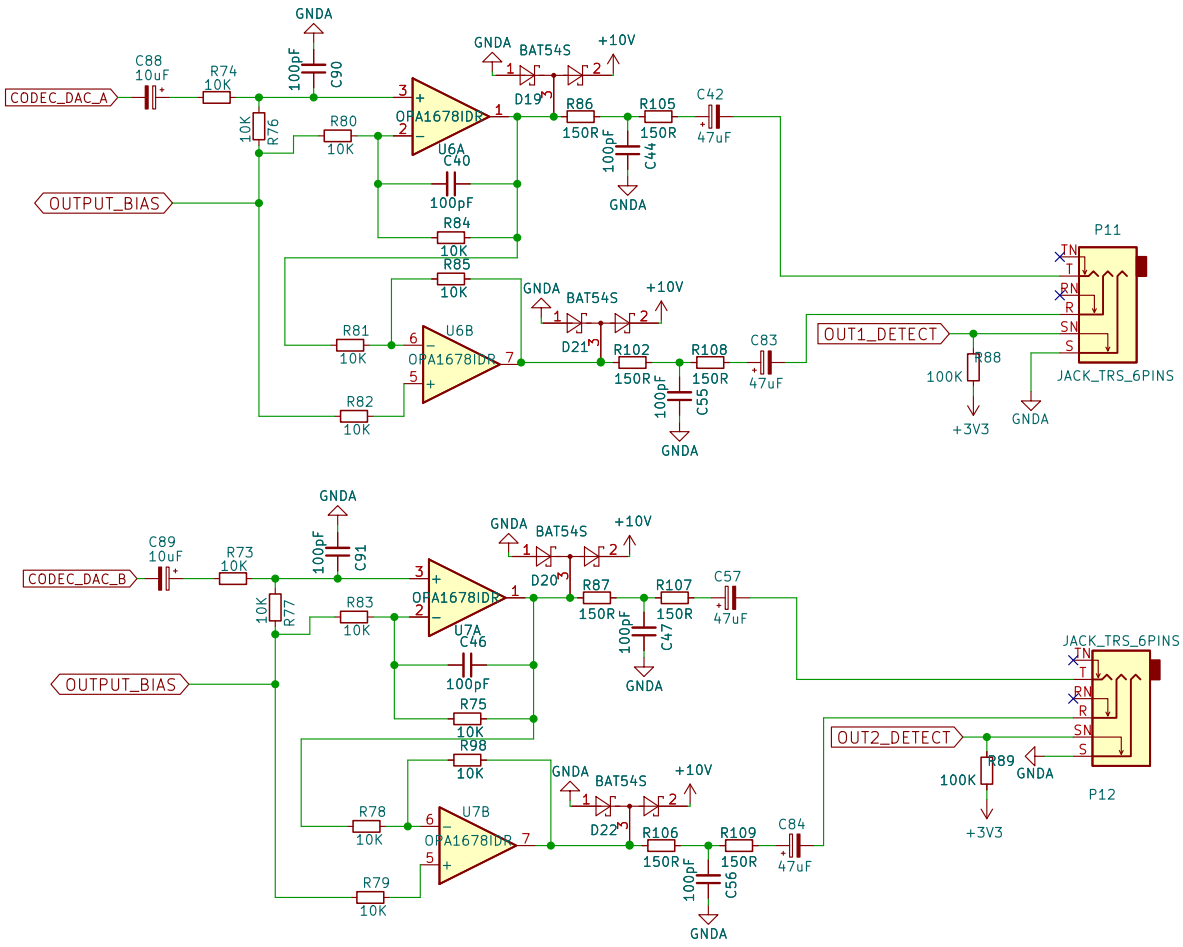
OpAmp Bypass caps

https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /audio-inputs/
File: audio-inputs.kicad_sch

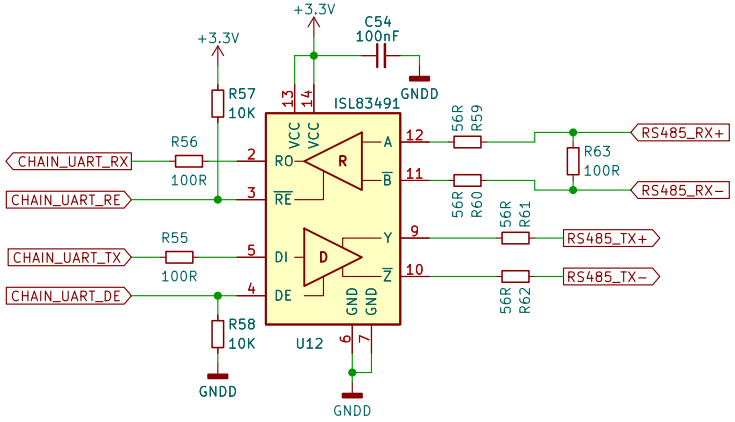
Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 3/11

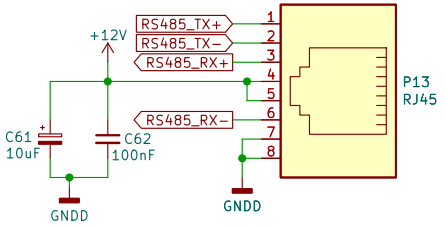


USB outp Power: 500mA	
Inp Power: 12V 500mA	
https://github.com/moddevices/hw-mod-dwarf	
Dwarf Audio processing board	
MOD Devices GmbH	
Sheet: /audio-outputs/	
File: audio-outputs.kicad_sch	
Title: MOD Dwarf – Main Board	
Size: A4	Date: 2021-09-06
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1	Id: 4/11

Rev: 3.0



This port is NOT used for ethernet, but for a serial protocol that includes power over the RJ−45 connector



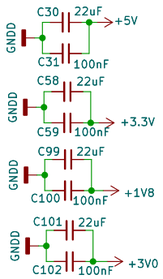
USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /control-chain/
File: control-chain.kicad_sch

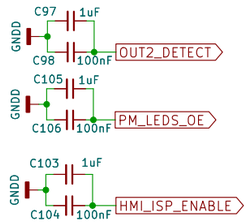
Title: MOD Dwarf – Main Board

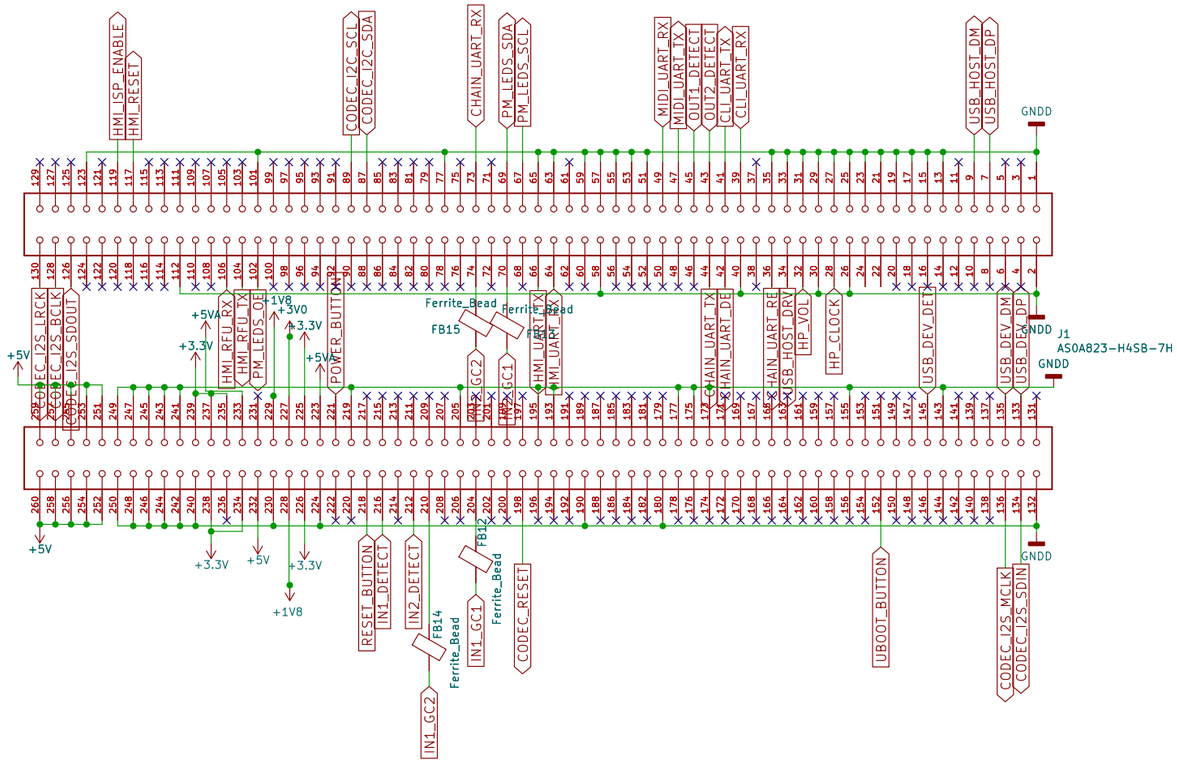
Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 5/11

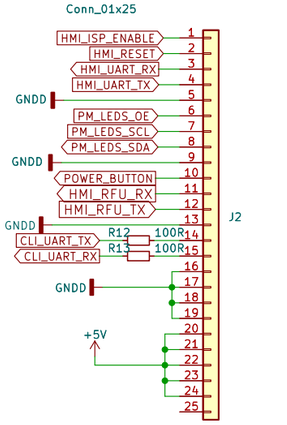
SoM power and power filters



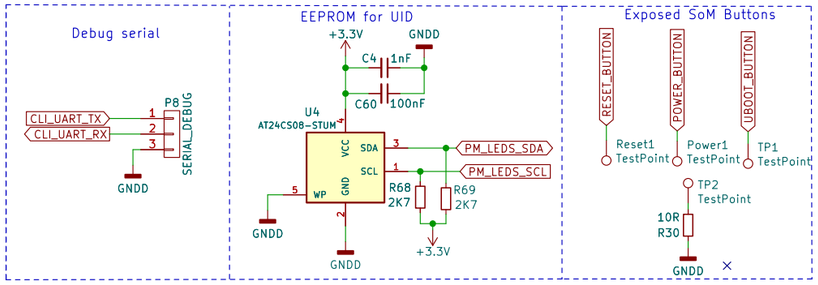
Filter for each used I/O group







Controller connector



USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

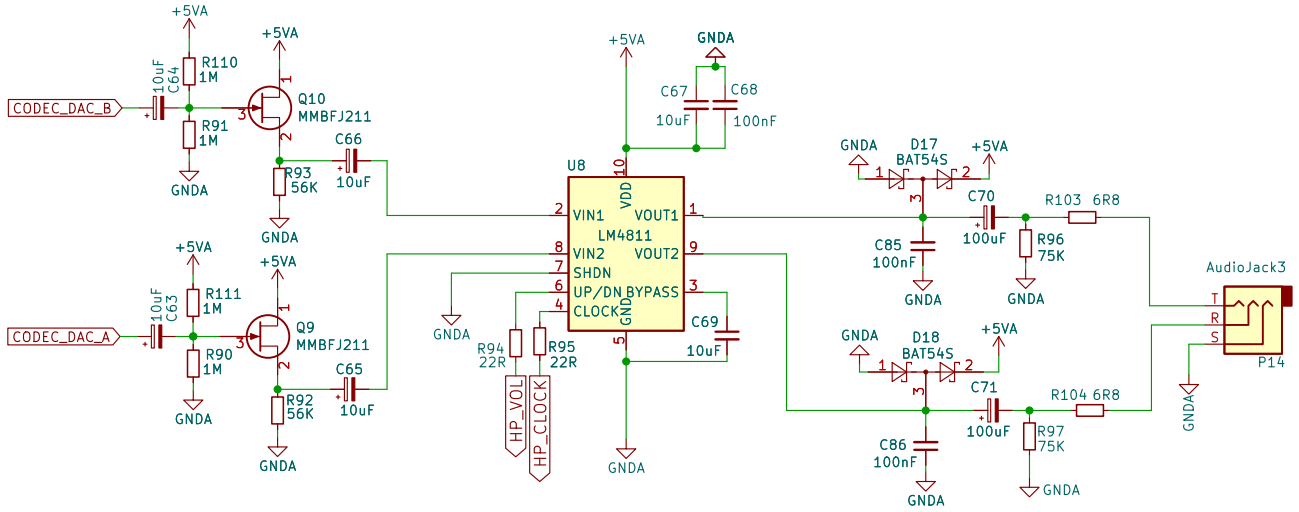
Sheet: /coreboard/
File: coreboard.kicad_sch

Title: MOD Dwarf – Main Board

Size: A3	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 6/11

LM4811 has adjustable gain of −33dB to +12dB, this is applied to the main out signal

Minimal load of 16 ohm with 0.1% THD+N
Max power 105mW

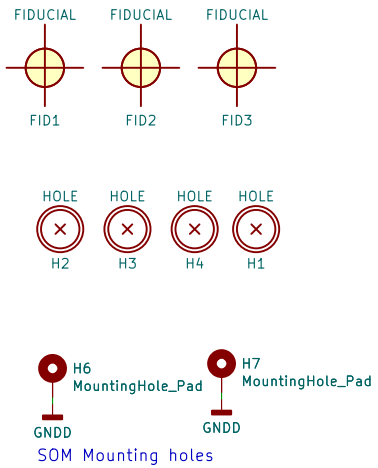


USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /headphone/
File: Headphone.kicad_sch

Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 7/11



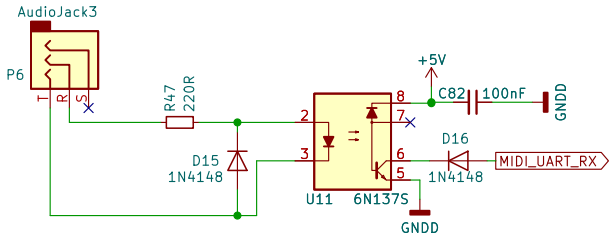
USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /mechanics/
File: mechanics.kicad_sch

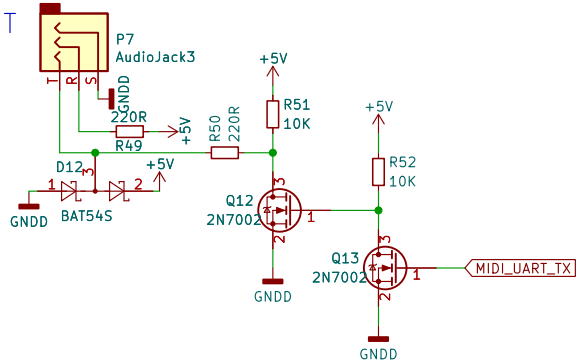
Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 8/11

MIDI IN



MIDI OUT

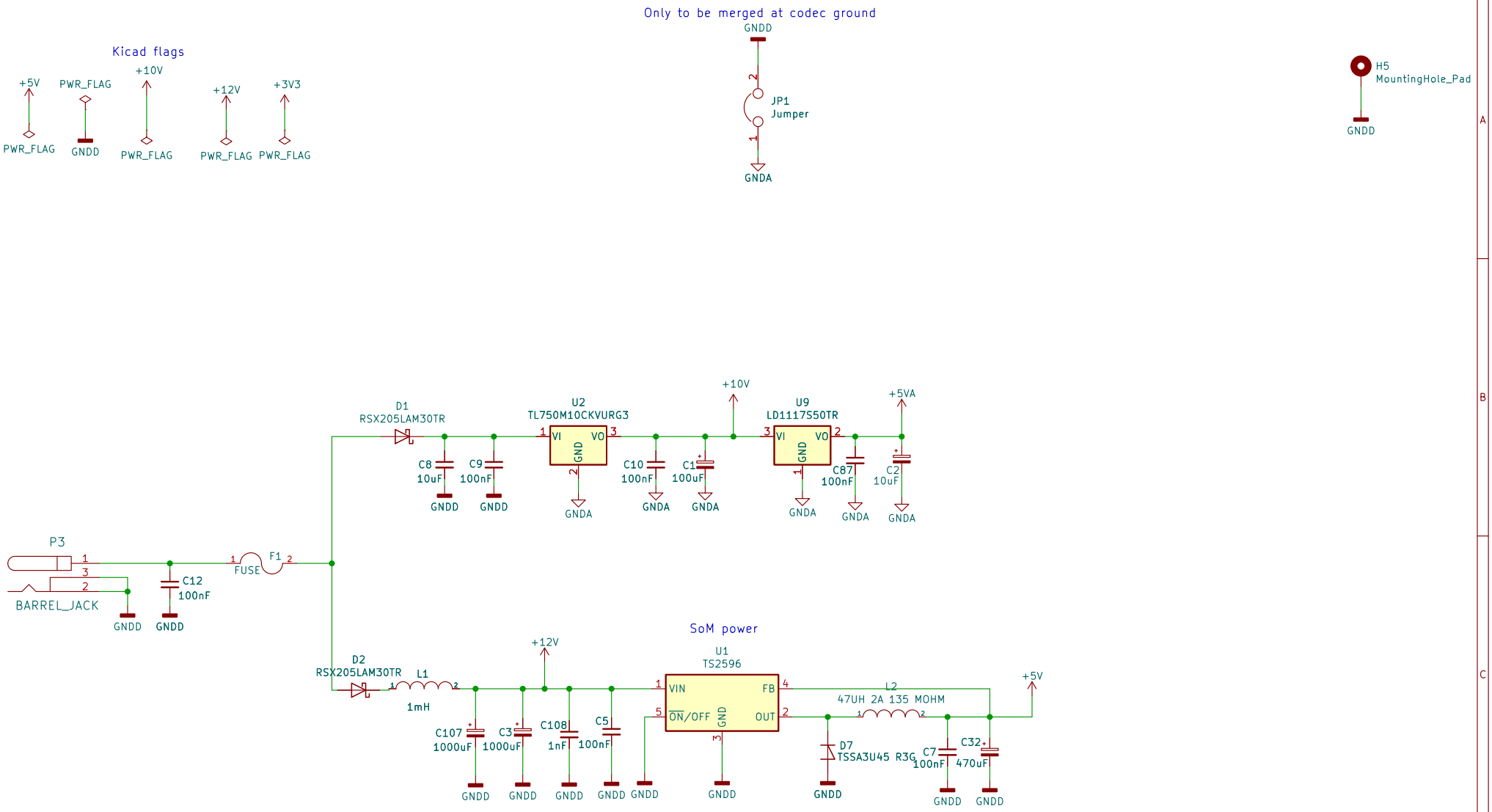


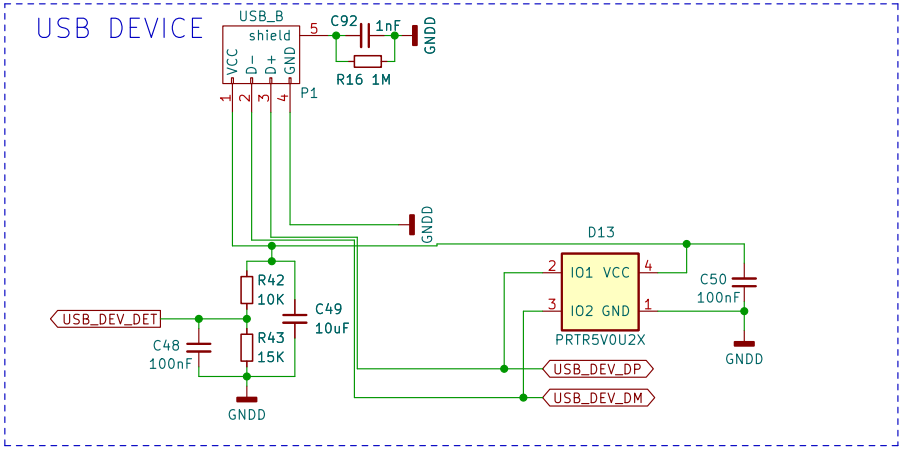
USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

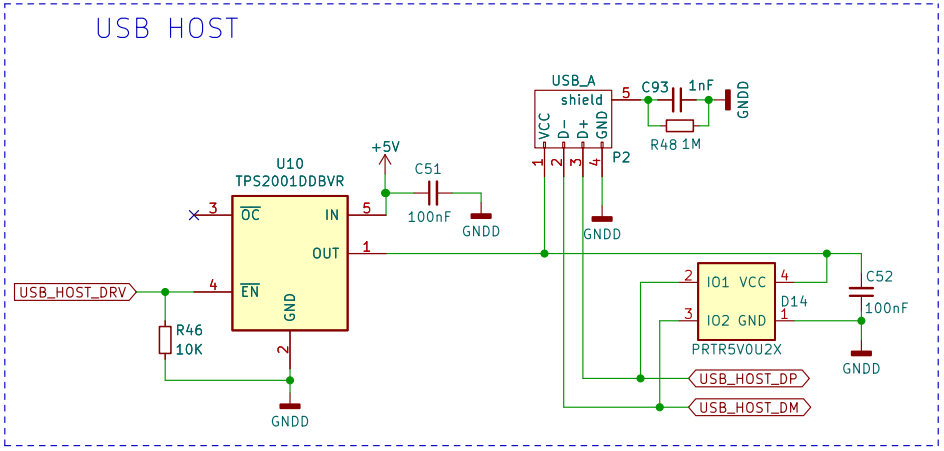
Sheet: /midi/
File: midi.kicad_sch

Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 9/11


Only to be merged at codec ground
GNDD
JP1
Jumper
GNDA
Kicad flags
+5V
PWR_FLAG
GNDD
+10V
+12V
+3V3
H5
MountingHole_Pad
D1
RSX205LAM30TR
U2
TL750M10CKVURG3
VI
VO
GND
C8
10uF
C9
100nF
C10
100nF
C1
100uF
U9
LD1117S50TR
C87
100nF
+5VA
C2
10uF
P3
BARREL_JACK
F1
FUSE
C12
100nF
SoM power
D2
RSX205LAM30TR
L1
1mH
U1
TS2596
VIN
FB
ON/OFF
OUT
L2
47UH 2A 135 MOHM
+5V
D7
TSSA3U45 R3G
C107
1000uF
C3
1000uF
C108
1nF
C5
100nF
C7
100nF
C32
470uF
USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH
Sheet: /power/
File: power.kicad_sch
Title: MOD Dwarf – Main Board
Size: A4
Date: 2021-09-06
Rev: 3.0
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1
Id: 10/11





USB outp Power: 500mA
Inp Power: 12V 500mA
https://github.com/moddevices/hw-mod-dwarf
Dwarf Audio processing board
MOD Devices GmbH

Sheet: /usb/
File: usb.kicad_sch

Title: MOD Dwarf – Main Board

Size: A4	Date: 2021-09-06	**Rev: 3.0**
KiCad E.D.A. kicad 6.0.10-86aedd382b~118~ubuntu22.04.1		Id: 11/11