

Sheet: power

File: power.sch

Sheet: audio-codec

File: audio-codec.sch

Sheet: usb

File: usb.sch

Sheet: coreboard

File: coreboard.sch

Sheet: audio-inputs

File: audio-inputs.sch

Sheet: midi

File: midi.sch

Sheet: mechanics

File: mechanics.sch

Sheet: audio-outputs

File: audio-outputs.sch

Sheet: control-chain

File: control-chain.sch

Sheet: headphone

File: Headphone.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.sch

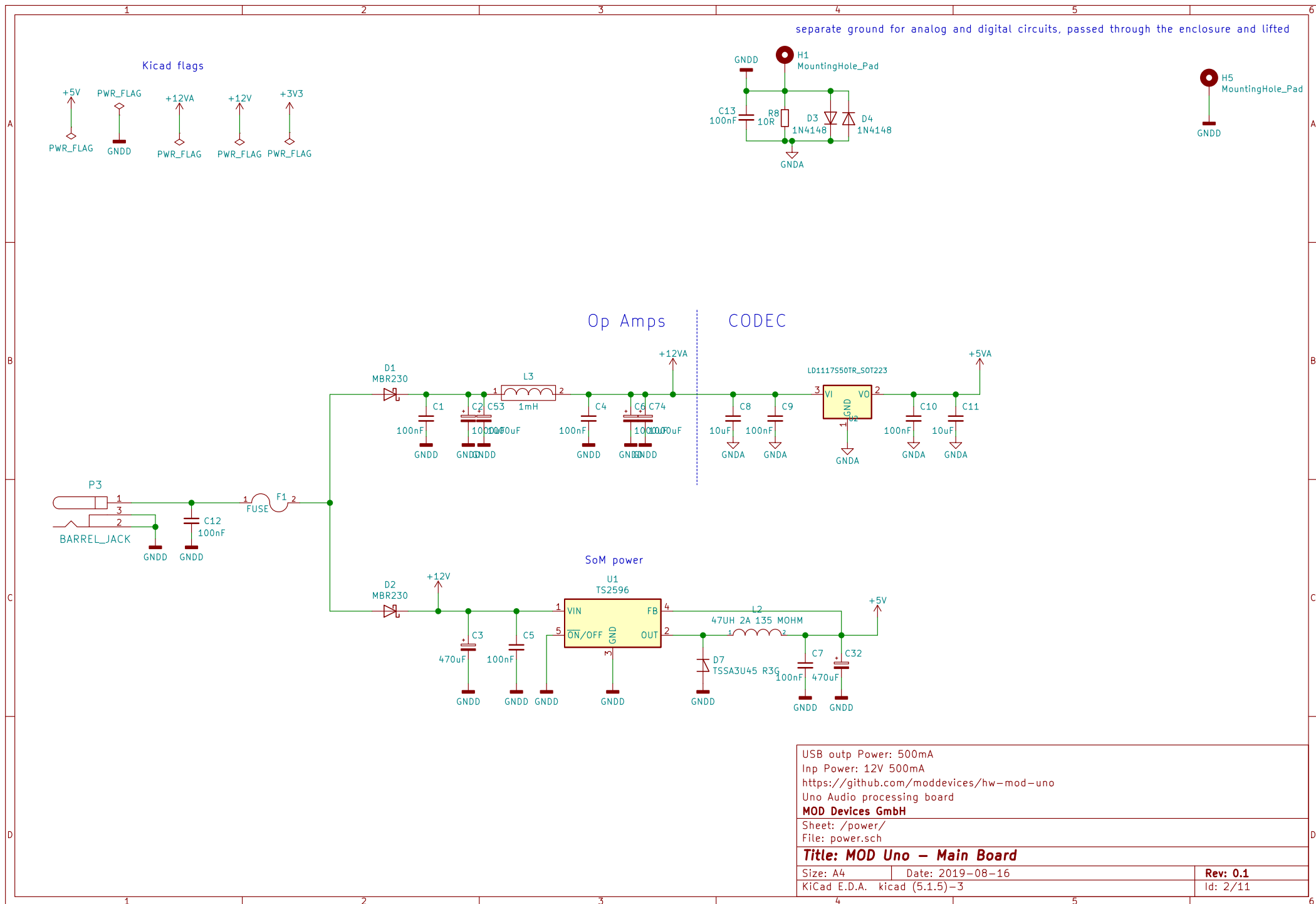
Title: MOD Dwarf – Main Board

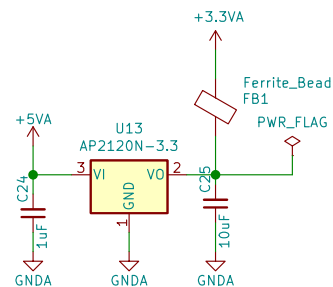
Size: A4 Date: 2019-12-18

KiCad E.D.A. kicad (5.1.5)-3

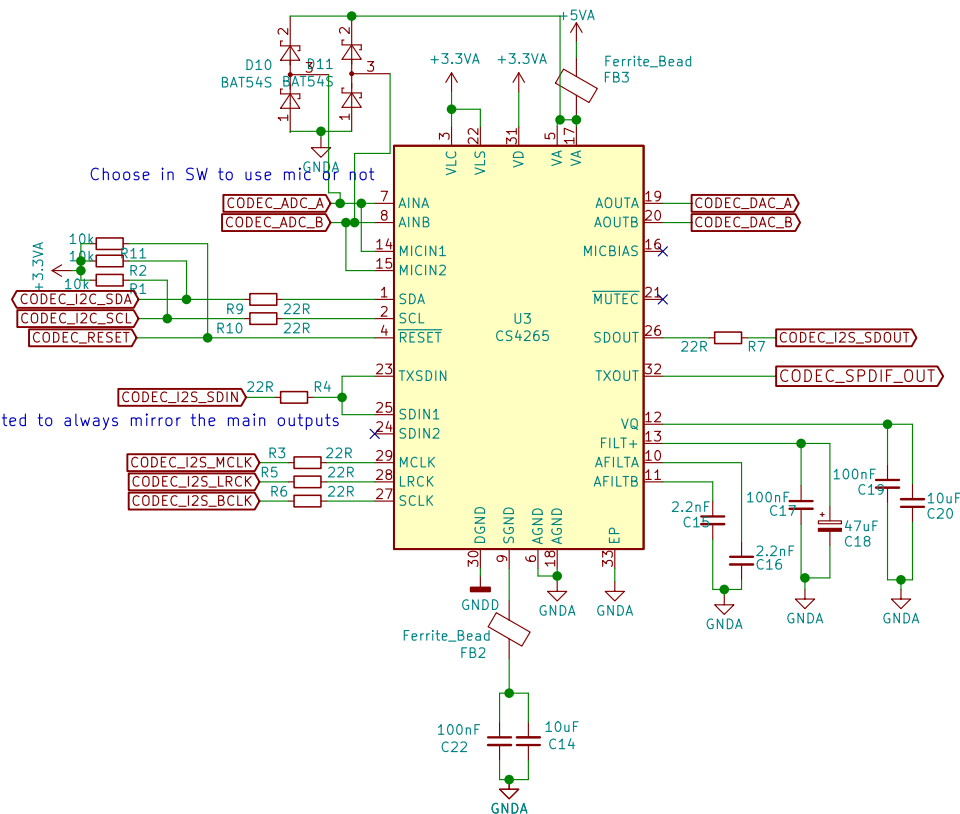
Rev: 0.2

Id: 1/11





Use ferrite beads for EMI suppression and improved power supply decoupling



Choose in SW to use mic or not

SPDIF is connected to always mirror the main outputs

CODEC_ADC_A
CODEC_ADC_B

CODEC_DAC_A
CODEC_DAC_B

USB outp Power: 500mA
Inp Power: 12V 500mA
<https://github.com/moddevices/hw-mod-uno>
Uno Audio processing board

MOD Devices GmbH

Sheet: /audio-codec/

File: audio-codec.sch

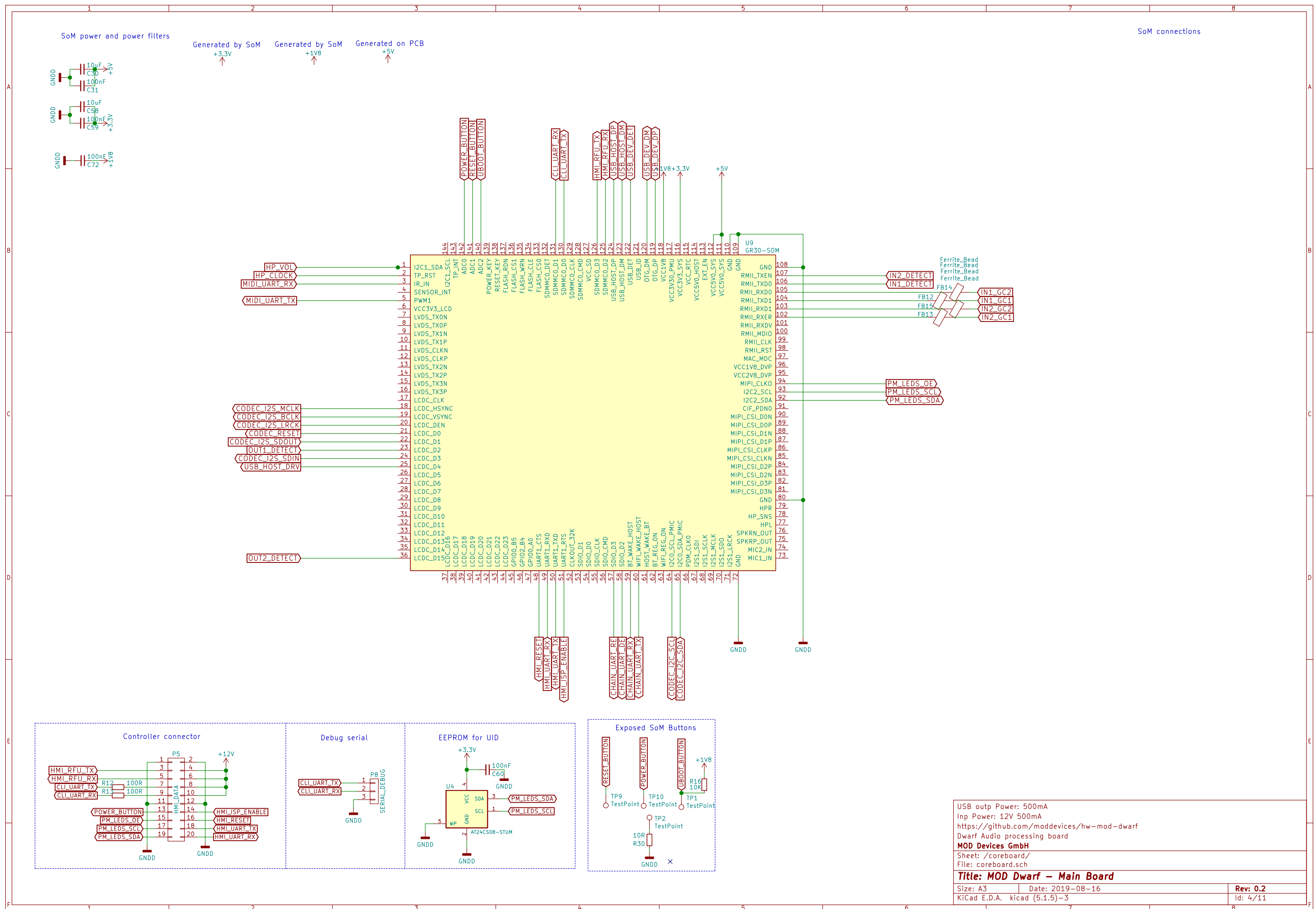
Title: MOD Uno – Main Board

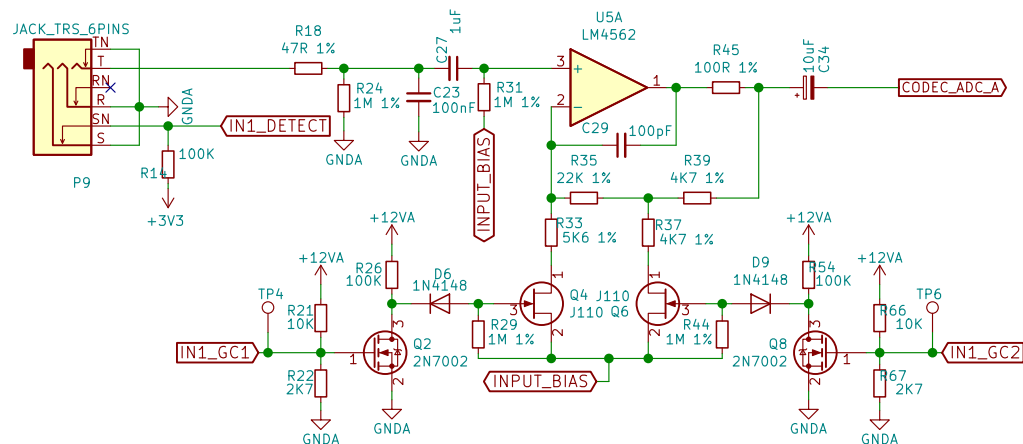
Size: A4 Date: 2019-08-16

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Rev: 0.1

Id: 3/11





GC2, GC1: GAIN (dB)

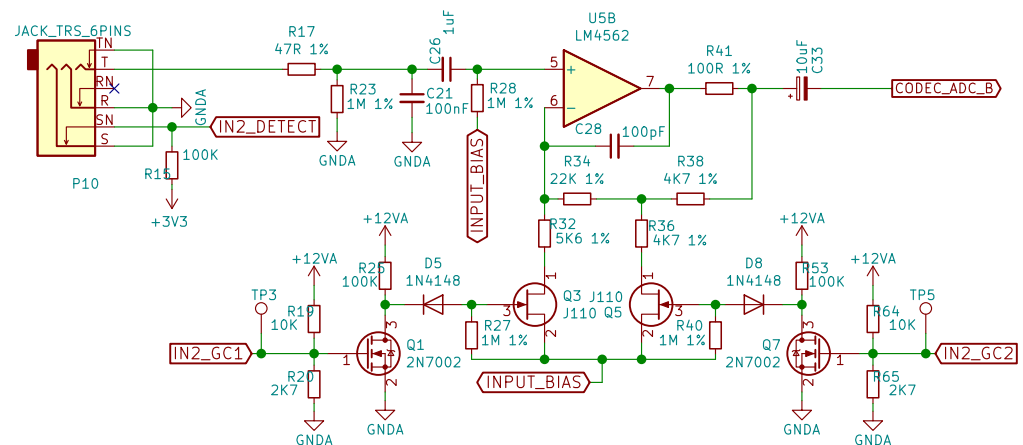
1, 1	0.0
1, 0	6.0
0, 1	15.0
0, 0	20.4

The gain calculation includes the R_{DSon} value

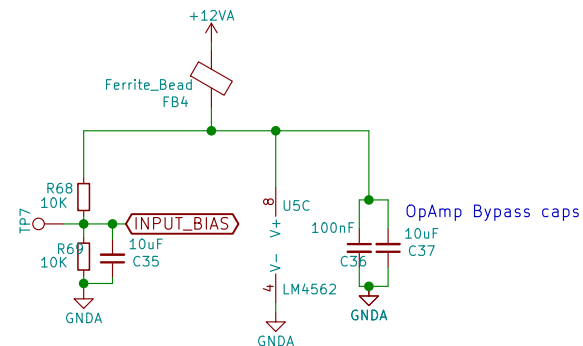
J110: $R_{DSon} = 18R$

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



Use ferrite beads for EMI suppression and improved power supply decoupling



USB outp Power: 500mA
 Inp Power: 12V 500mA
<https://github.com/moddevices/hw-mod-uno>
 Uno Audio processing board

MOD Devices GmbH

Sheet: /audio-inputs/

File: audio-inputs.sch

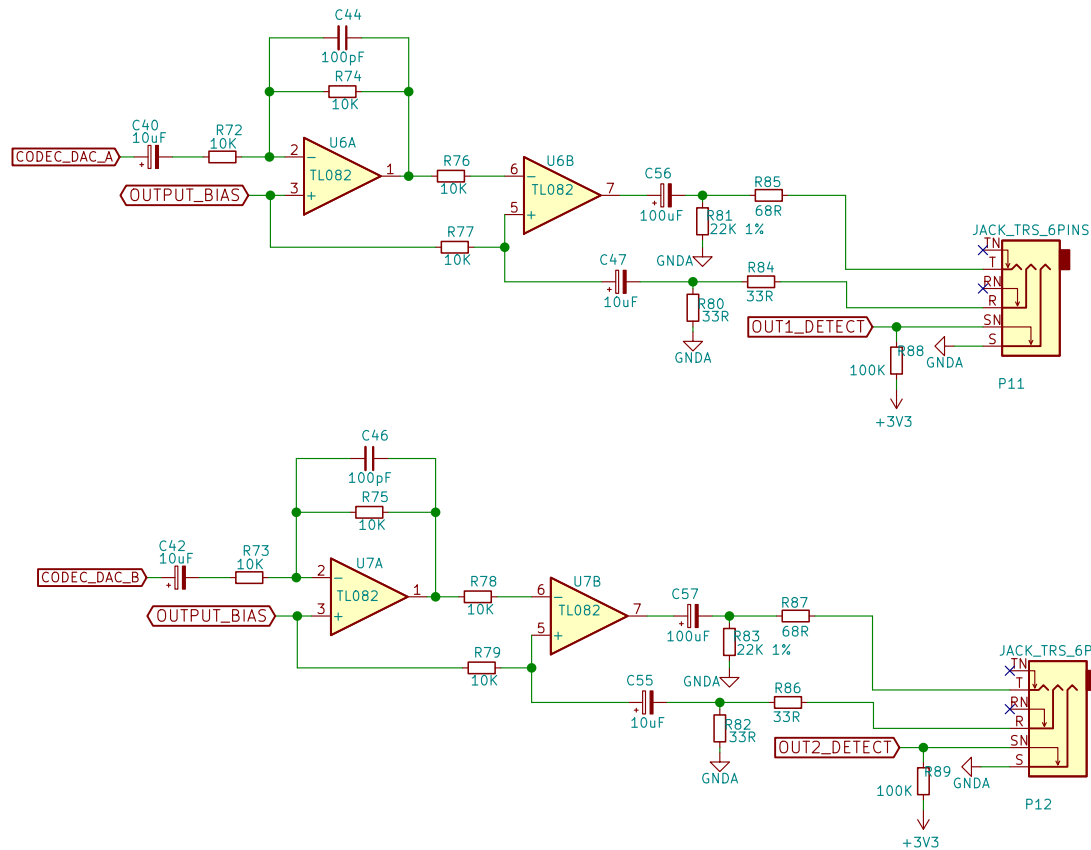
Title: MOD Uno – Main Board

Size: A4 Date: 2019-08-16

KiCad E.D.A. kicad (5.1.5)-3

Rev: 0.1

Id: 5/11

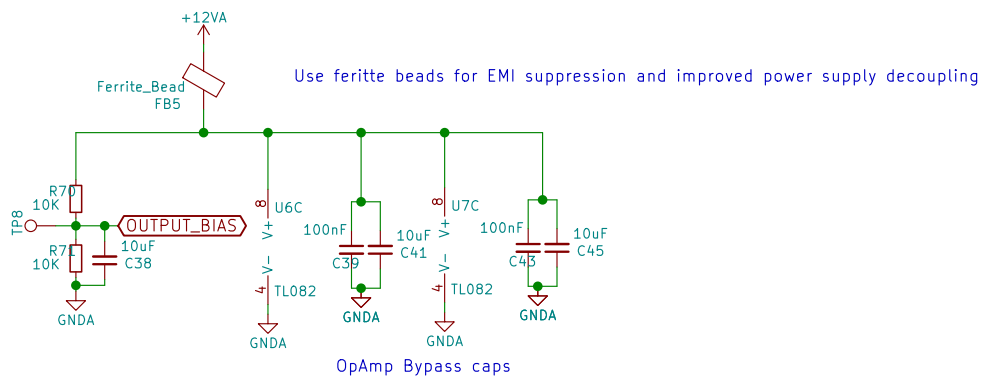


*** The outputs are not balanced ***

.....
The Ring pin is actually a low impedance input, and any signal on it is added to the output signal. This will make a balanced input see only the signal, and provides exactly the same level (and even ground loop compensation) to an unbalanced input.
.....

*** Output Gain ***

.....
OpAmps are configured to not make any gain, this can be adjusted for but every dB of gain will be added to the noise floor as well
MAX Gain:
Codec: $0.65 * V_a = 0.65 * 5 = 3.25V_p$
 $= 1.15V$ RMS line level is $1.25V$ RMS
.....



USB outp Power: 500mA
Inp Power: 12V 500mA
<https://github.com/moddevices/hw-mod-uno>
Uno Audio processing board

MOD Devices GmbH

Sheet: /audio-outputs/
File: audio-outputs.sch

Title: MOD Uno – Main Board

Size: A4 Date: 2019-08-16

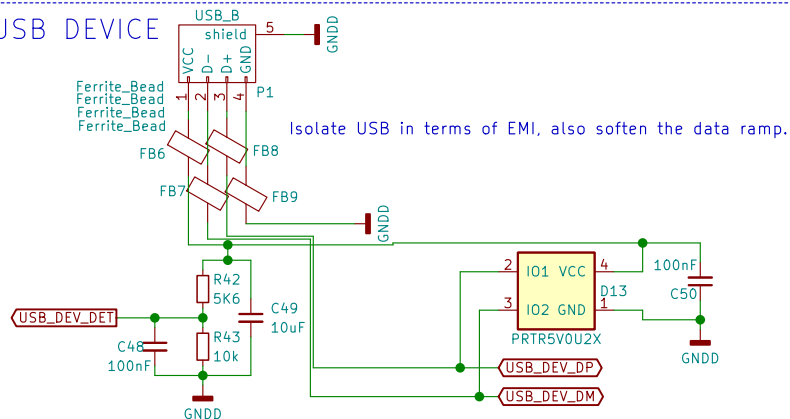
KiCad E.D.A. kicad (5.1.5)-3

Rev: 0.1

Id: 6/11

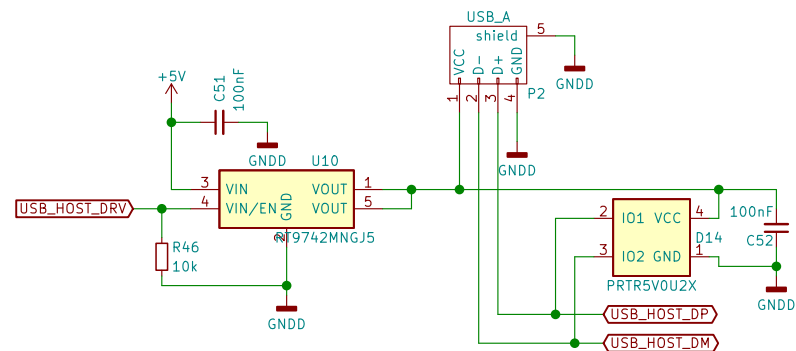
USB DEVICE

Not all beads are needed, prototype which ones are worthwhile to keep



No beads/filtering needed here, as most devices will be powered by the main system

USB HOST



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

Sheet: /usb/
 File: usb.sch

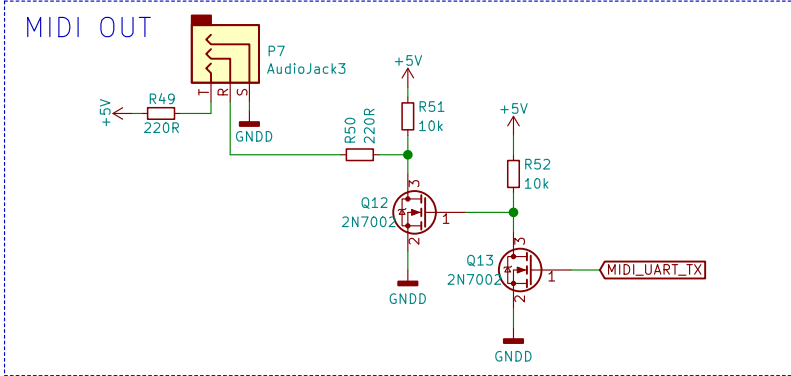
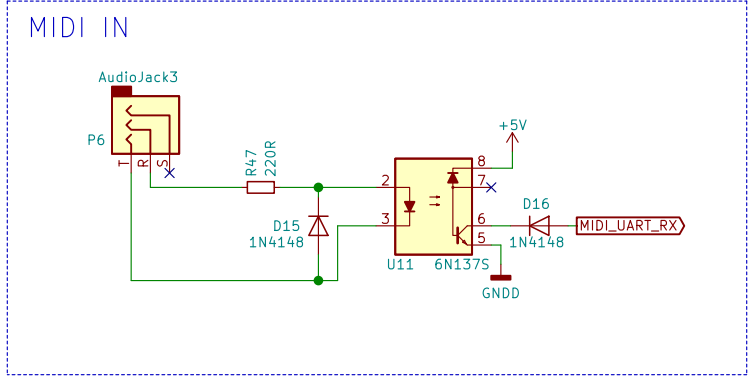
Title: MOD Uno – Main Board

Size: A4 Date: 2019-08-16

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Rev: 0.1

Id: 7/11



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

Sheet: /midi/
 File: midi.sch

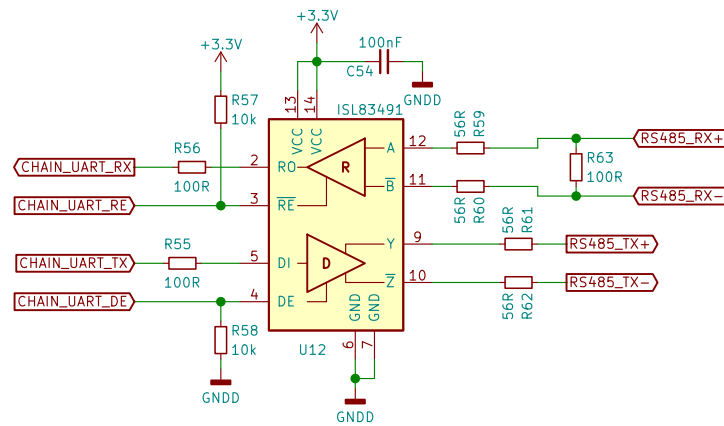
Title: MOD Uno – Main Board

Size: A4 Date: 2019-08-16

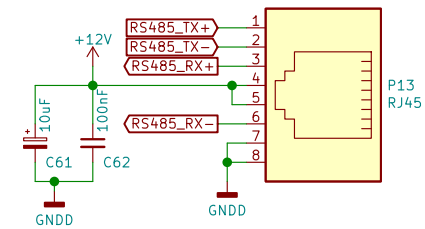
KiCad E.D.A. kicad (5.1.5)-3

Rev: 0.1

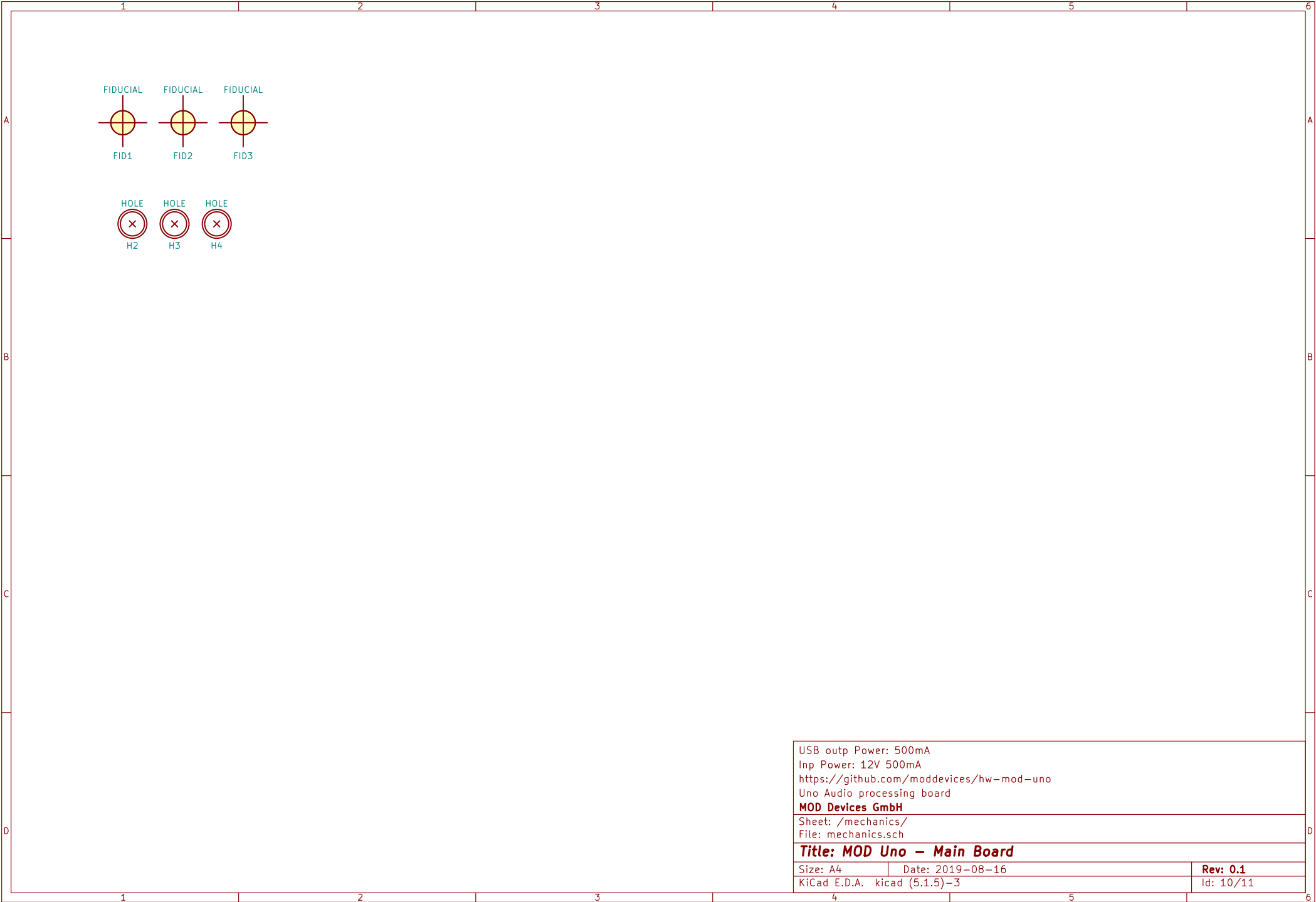
Id: 8/11



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



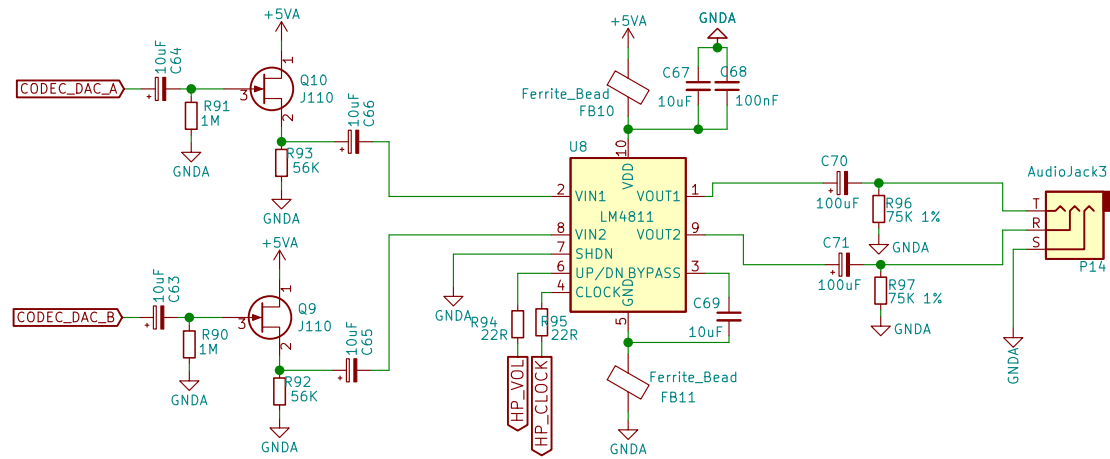
USB outp Power: 500mA	
Inp Power: 12V 500mA	
https://github.com/moddevices/hw-mod-uno	
Uno Audio processing board	
MOD Devices GmbH	
Sheet: /control-chain/	
File: control-chain.sch	
Title: MOD Uno – Main Board	
Size: A4	Date: 2019-08-16
KiCad E.D.A. kicad (5.1.5)-3	Rev: 0.1
	Id: 9/11



USB outp Power: 500mA		
Inp Power: 12V 500mA		
https://github.com/moddevices/hw-mod-uno		
Uno Audio processing board		
MOD Devices GmbH		
Sheet: /mechanics/		
File: mechanics.sch		
Title: MOD Uno – Main Board		
Size: A4	Date: 2019-08-16	Rev: 0.1
KiCad E.D.A. kicad (5.1.5)-3		Id: 10/11

LM4811 has adjustable gain of -33dB to $+12\text{dB}$, this is applied to the main out signal

Minimal load of $16\ \Omega$ with 0.1% THD+N
Max power 105mW



Sheet: /headphone/
File: Headphone.sch

Title:

Size: A4
KiCad E.D.A. kicad (5.1.5)-3

Date:

Rev:
Id: 11/11