Sheet: power

File: power.sch

Sheet: coreboard

File: coreboard.sch

Sheet: mechanics

File: mechanics.sch

Sheet: audio-codec

File: audio-codec.sch

Sheet: audio-inputs

File: audio-inputs.sch

Sheet: audio-outputs

File: audio-outputs.sch

Sheet: audio-headphones

File: audio-headphones.sch

Sheet: control-voltage

File: control-voltage.sch

Sheet: spdif

File: spdif.sch

Sheet: usb

File: usb.sch

Sheet: midi

File: midi.sch

Sheet: control-chain

File: control-chain.sch

Notes

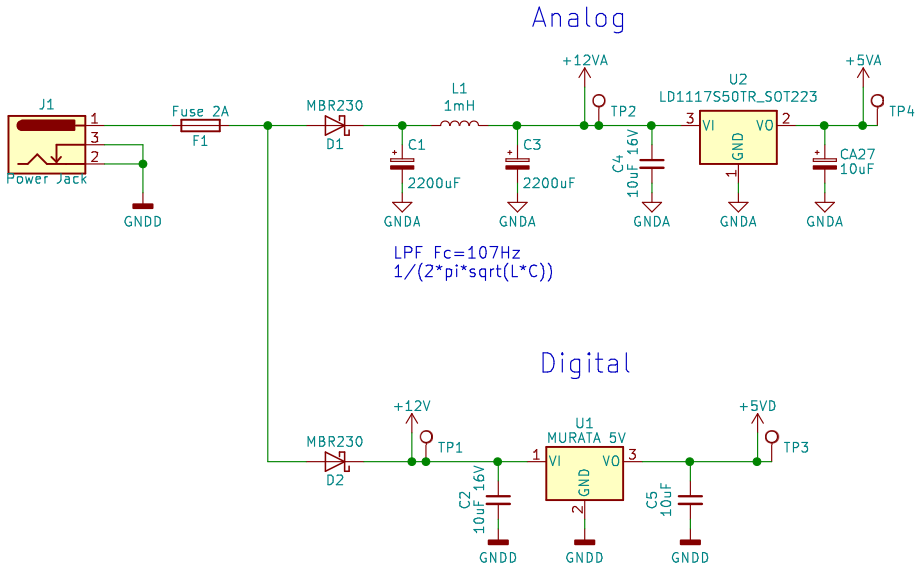
- All resistors named as RA* must have at least 1% tolerance
- All non-polarized capacitors named as CA* must use NP0 Temp. Coef.
- All other non-polarized capacitors should use X7R Temp. Coef.
- Decoupling caps must be placed as close as possible of the IC power pins
- IC's such as the codec, ADC, DAC, headphone amplifier, EEPROM should not be changed to maintain software compatibility

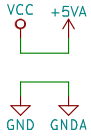
USB outp Power: 1.5A
Inp Power: 12V 700mA
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

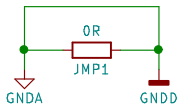
Sheet: /
File: bottom-board.sch

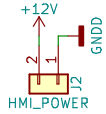
Title: MOD DuoX - Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.2**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 1/13







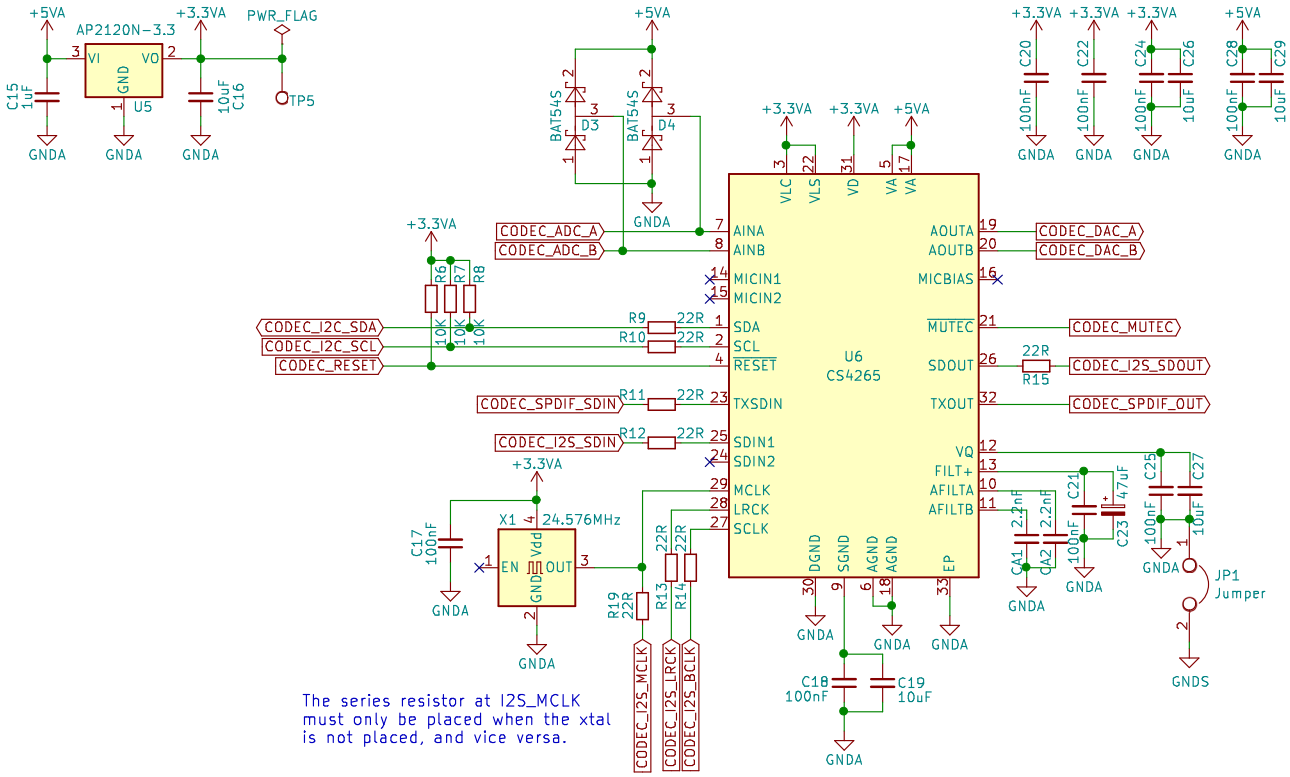


https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

Sheet: /power/
File: power.sch

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 2/13

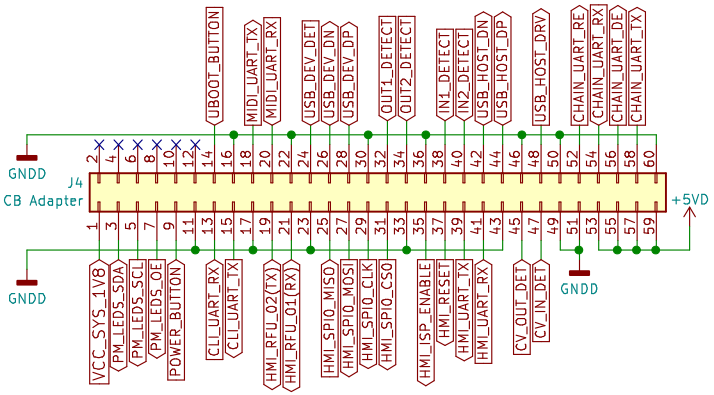


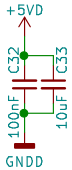
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

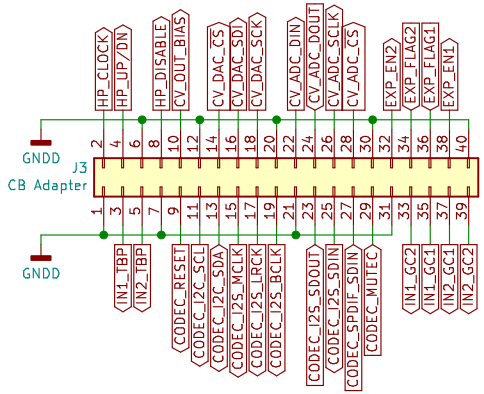
Sheet: /audio-codec/
File: audio-codec.sch

Title: MOD DuoX – Bottom Board

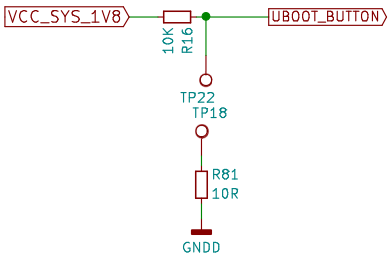
Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 3/13



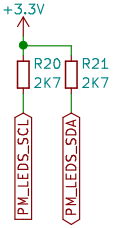




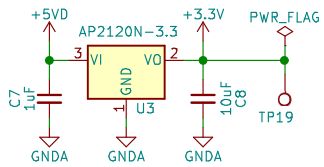
By connecting the 2 test pins the board boots in revocery mode



Pull-up

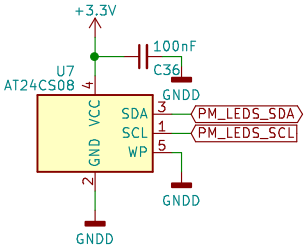


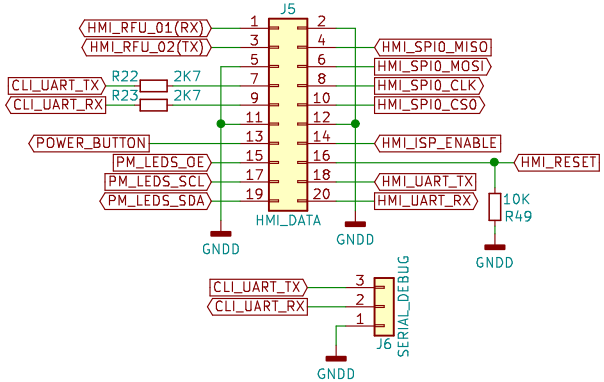
POWER



Used for I/O reference and to power the AT24 memory

HW ID



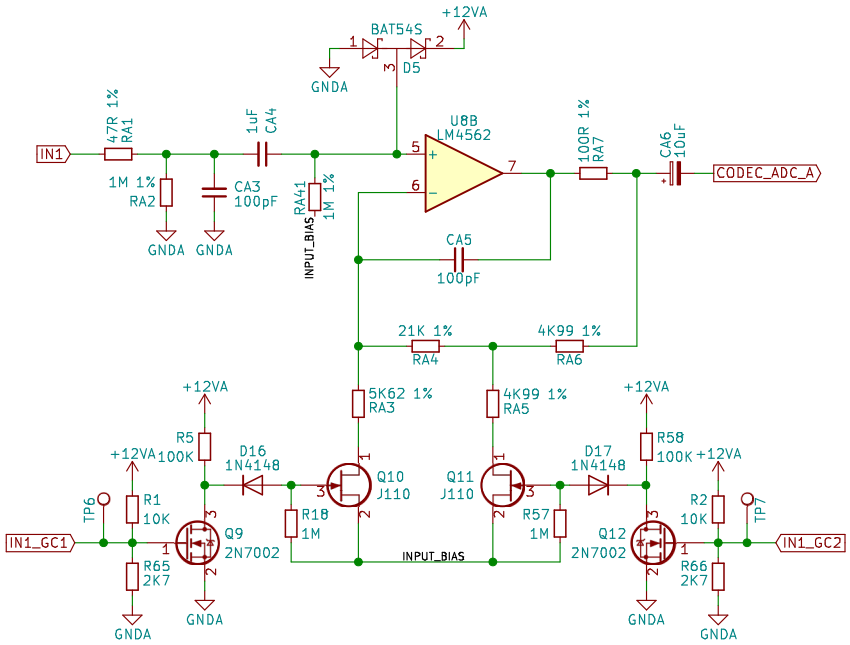


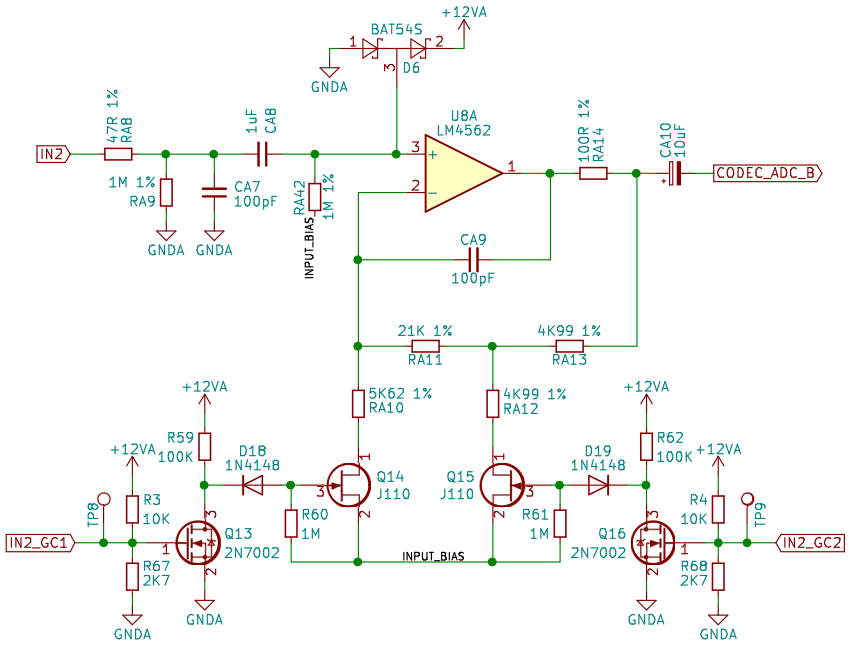
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

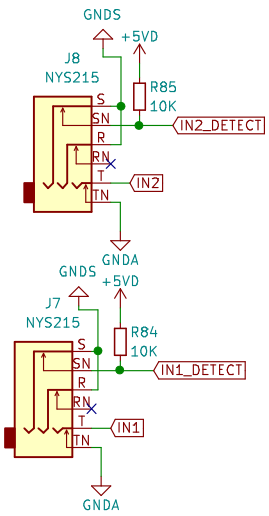
Sheet: /coreboard/
File: coreboard.sch

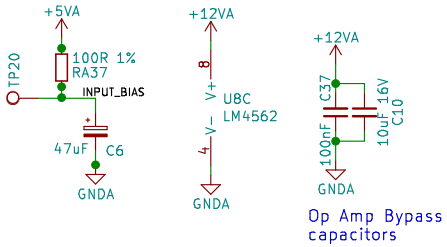
Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 4/13









Op Amp Bypass capacitors

GPIO controllable gain spec:

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

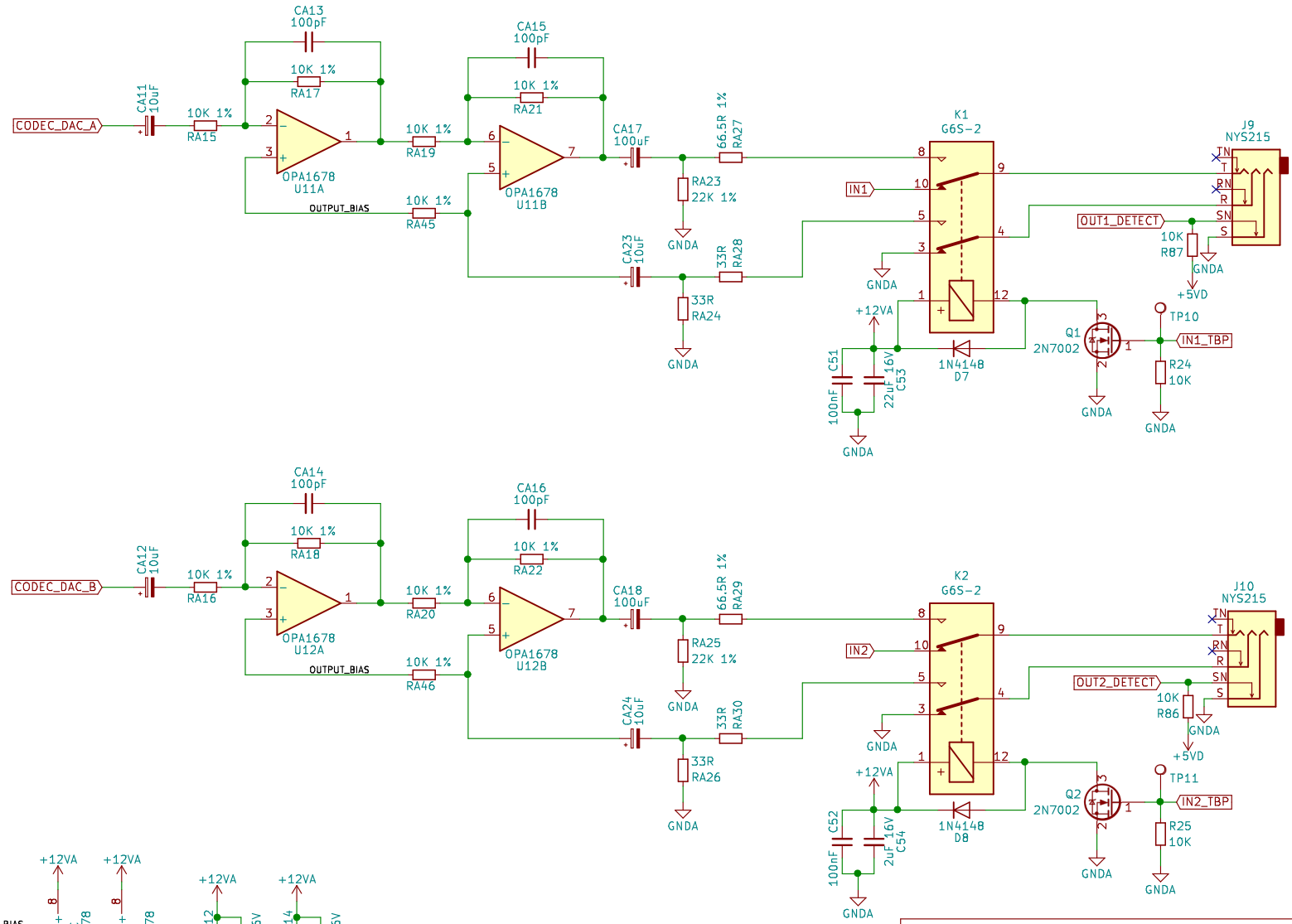
The CODEC only presents optimal dynamic range and THD+N for PGA setting: −12dB to +6dB.

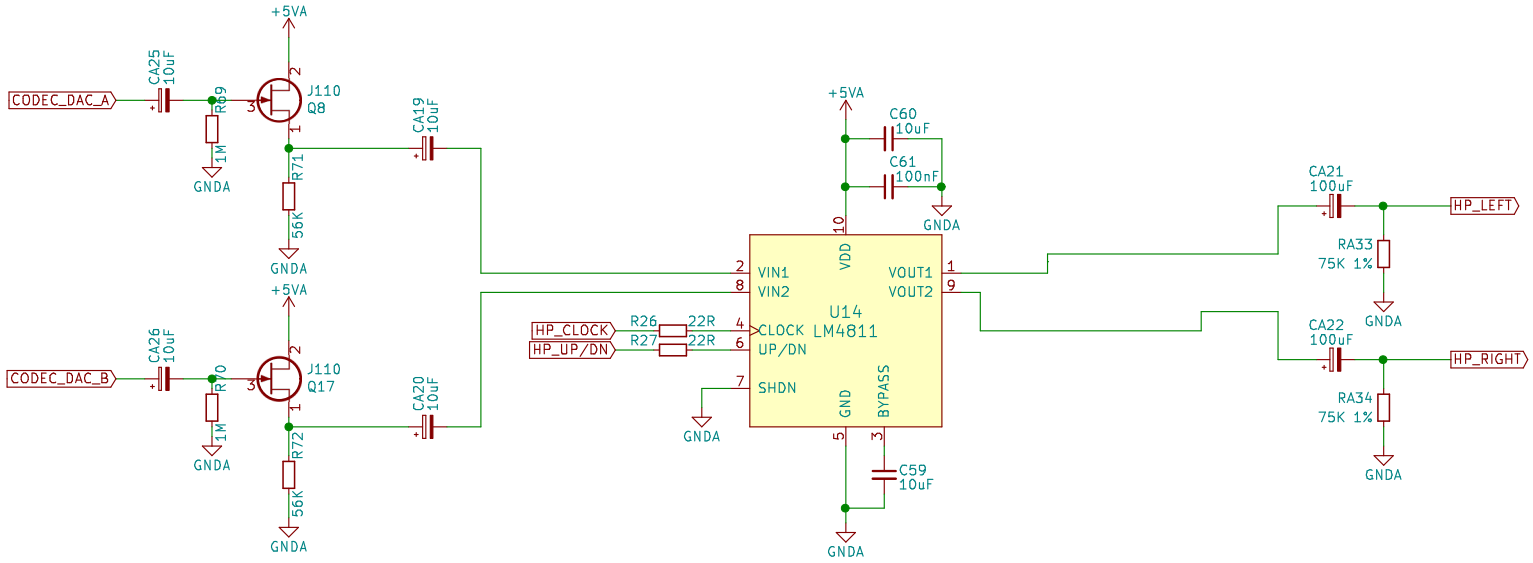
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

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

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 5/13


CA13
100pF
10K 1%
RA17
CA11
10uF
CODEC_DAC_A
10K 1%
RA15
OPA1678
U11A
OUTPUT_BIAS
CA15
100pF
10K 1%
RA21
10K 1%
RA19
10K 1%
RA45
OPA1678
U11B
CA17
100uF
66.5R 1%
RA27
RA23
22K 1%
GNDA
CA23
10uF
33R
RA28
33R
RA24
K1
G6S-2
IN1
+12VA
C51
100nF
22uF 16V
C53
1N4148
D7
Q1
2N7002
TP10
IN1_TBP
R24
10K
J9
NYS215
OUT1_DETECT
10K
R87
+5VD
CA14
100pF
10K 1%
RA18
CA12
10uF
CODEC_DAC_B
10K 1%
RA16
OPA1678
U12A
OUTPUT_BIAS
CA16
100pF
10K 1%
RA22
10K 1%
RA20
10K 1%
RA46
OPA1678
U12B
CA18
100uF
66.5R 1%
RA29
RA25
22K 1%
CA24
10uF
33R
RA30
33R
RA26
K2
G6S-2
IN2
C52
100nF
2uF 16V
C54
1N4148
D8
Q2
2N7002
TP11
IN2_TBP
R25
10K
J10
NYS215
OUT2_DETECT
10K
R86
+5VD
+5VA
TP21
100R 1%
RA38
OUTPUT_BIAS
47uF
C9
U11C
OPA1678
U12C
OPA1678
C12
100nF
10uF 16V
C13
C14
100nF
10uF 16V
C38
Op Amp Bypass capacitors
*** 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.
.....
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH
Sheet: /audio-outputs/
File: audio-outputs.sch
Title: MOD DuoX – Bottom Board
Size: A4
Date: 2020-05-15
Rev: Rev 1.12
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1
Id: 6/13



HP circuit values designed for Dual 70mW @ RL=32ohm

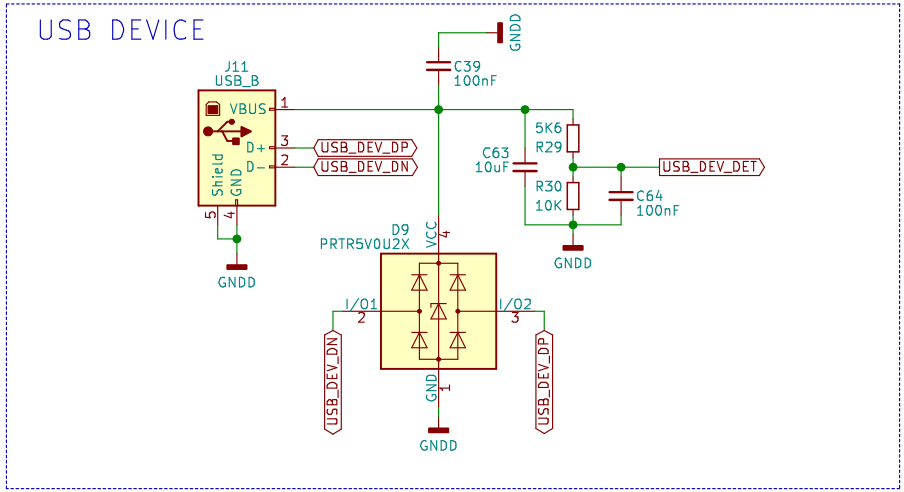
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

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

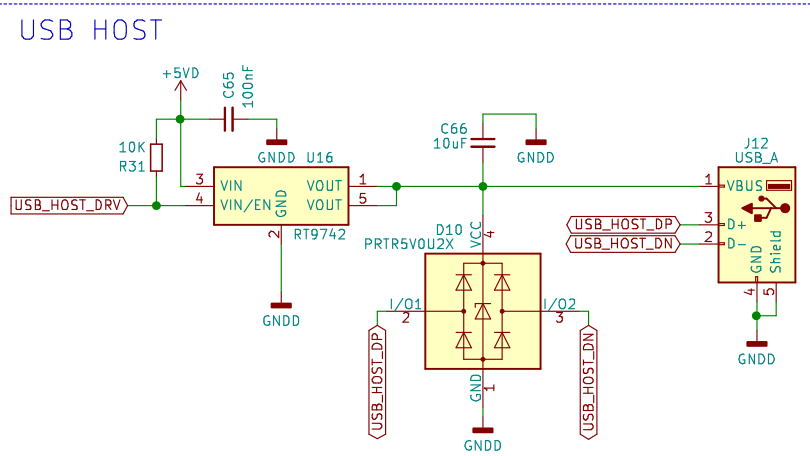
Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 7/13

USB DEVICE



USB HOST



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

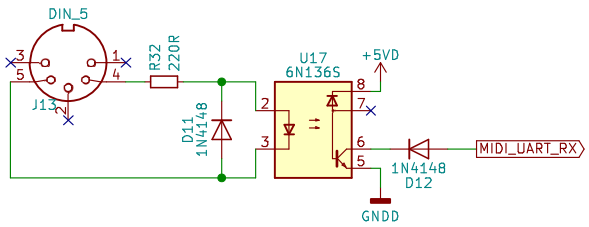
Sheet: /usb/
File: usb.sch

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 8/13

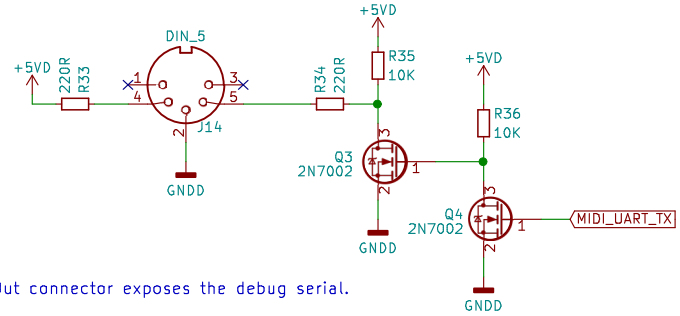
MIDI IN

Opto:
If = 16mA, Vf = 1.4V



MIDI In connector can be used to trigger a special boot mode by connecting pin 3 to GND.

MIDI OUT



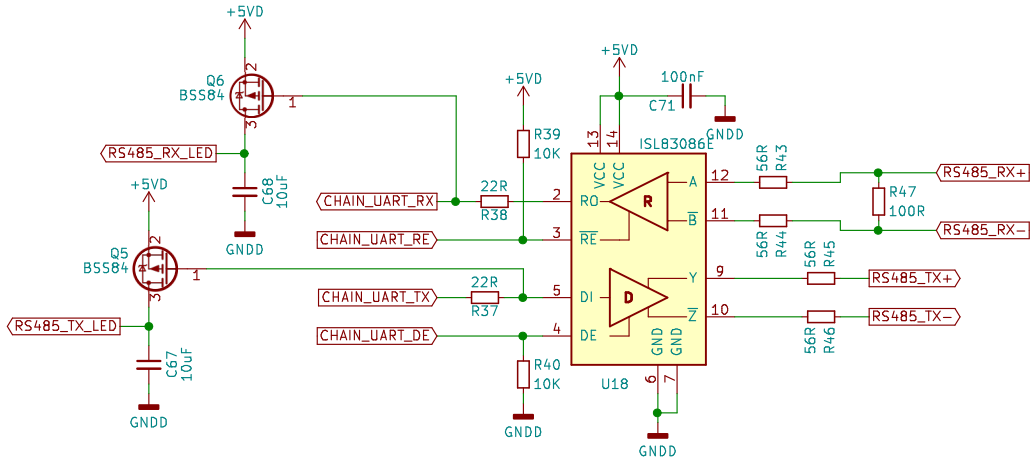
MIDI Out connector exposes the debug serial.

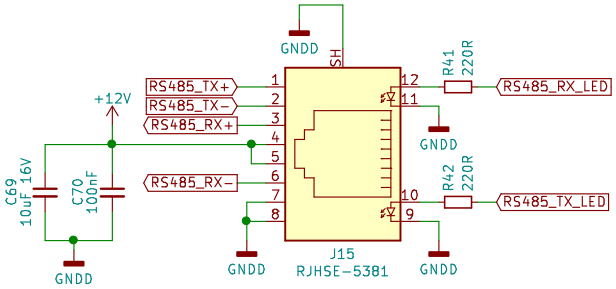
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

Sheet: /midi/
File: midi.sch

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 9/13



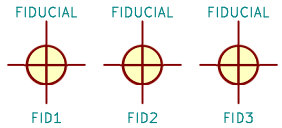


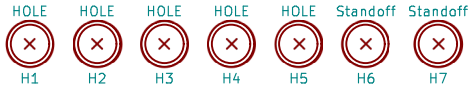
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

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

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 10/13





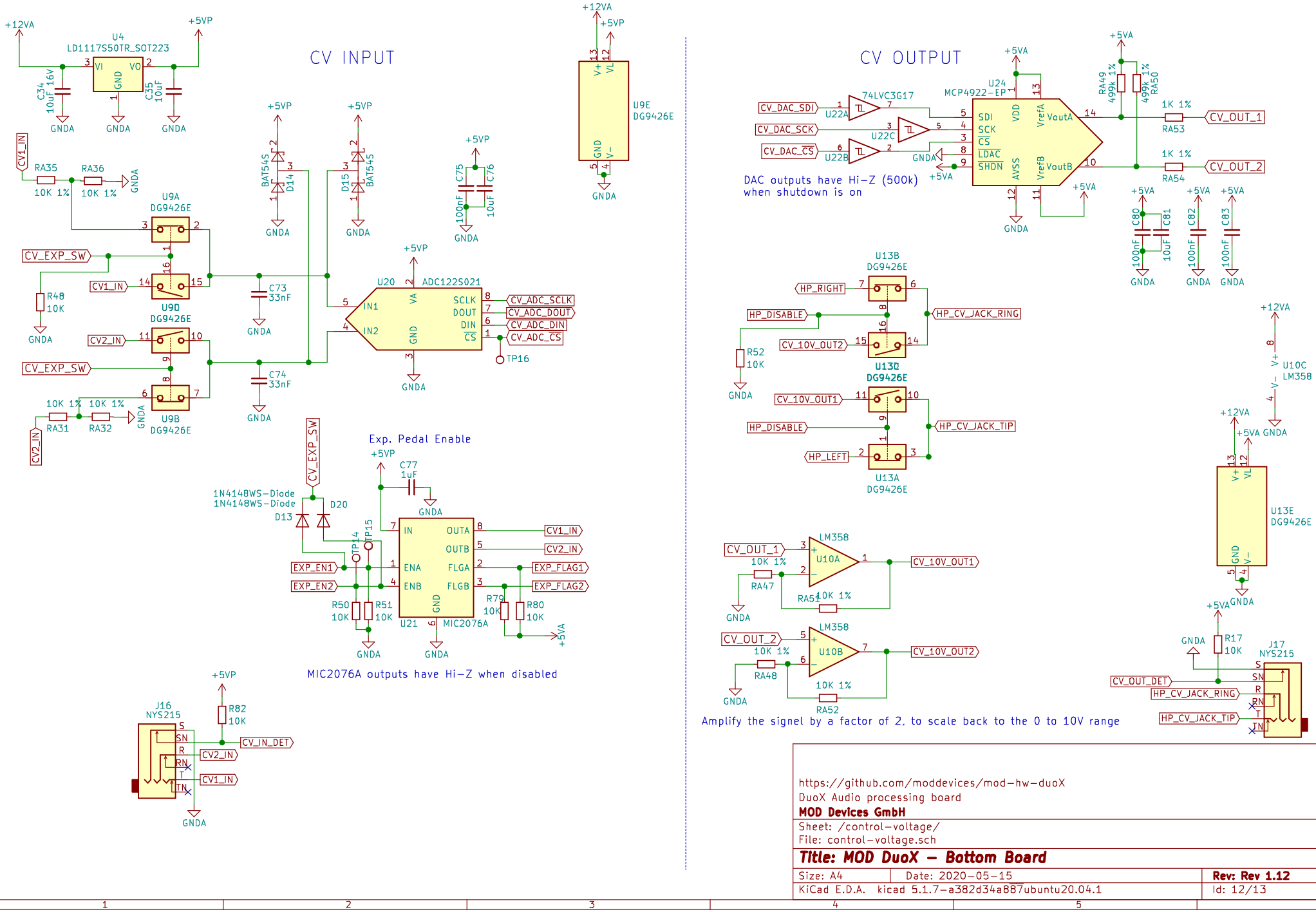
IMG1
Logo

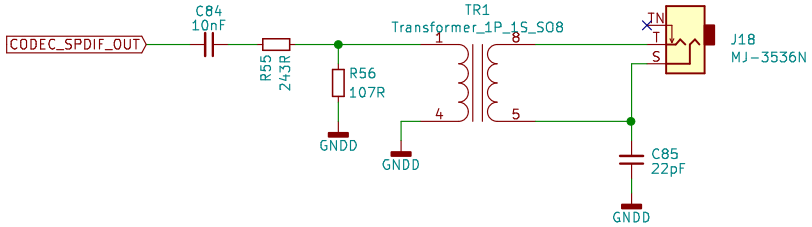
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH

Sheet: /mechanics/
File: mechanics.sch

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 11/13


CV INPUT
CV OUTPUT
U4
LD1117S50TR_SOT223
+12VA
+5VP
+5VA
GNDA
U9A
U9B
U9C
U9D
U9E
DG9426E
U20
ADC122S021
U21
MIC2076A
U24
MCP4922-EP
74LVC3G17
U10A
U10B
U10C
U13A
U13B
U13C
U13E
LM358
J16
J17
NYS215
CV1_IN
CV2_IN
CV_EXP_SW
CV_ADC_SCLK
CV_ADC_DOUT
CV_ADC_DIN
CV_ADC_CS
CV_DAC_SDI
CV_DAC_SCK
CV_DAC_CS
CV_OUT_1
CV_OUT_2
CV_10V_OUT1
CV_10V_OUT2
CV_OUT_DET
CV_IN_DET
HP_RIGHT
HP_DISABLE
HP_LEFT
HP_CV_JACK_RING
HP_CV_JACK_TIP
EXP_EN1
EXP_EN2
EXP_FLAG1
EXP_FLAG2
Exp. Pedal Enable
MIC2076A outputs have Hi-Z when disabled
DAC outputs have Hi-Z (500k) when shutdown is on
Amplify the signel by a factor of 2, to scale back to the 0 to 10V range
https://github.com/moddevices/mod-hw-duoX
DuoX Audio processing board
MOD Devices GmbH
Sheet: /control-voltage/
File: control-voltage.sch
Title: MOD DuoX - Bottom Board
Size: A4
Date: 2020-05-15
Rev: Rev 1.12
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1
Id: 12/13



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

Sheet: /spdif/
File: spdif.sch

Title: MOD DuoX – Bottom Board

Size: A4	Date: 2020-05-15	**Rev: Rev 1.12**
KiCad E.D.A. kicad 5.1.7-a382d34a887ubuntu20.04.1		Id: 13/13