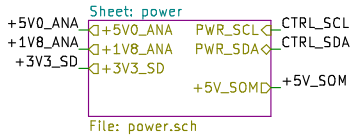
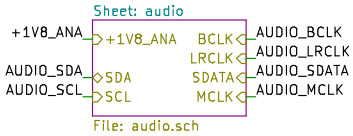
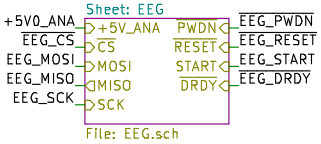
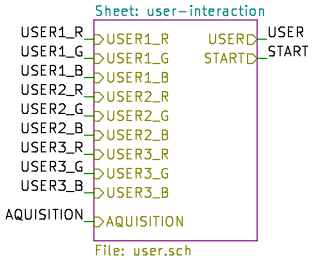


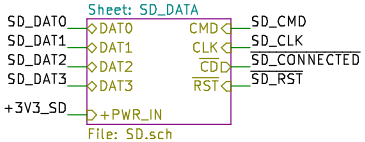


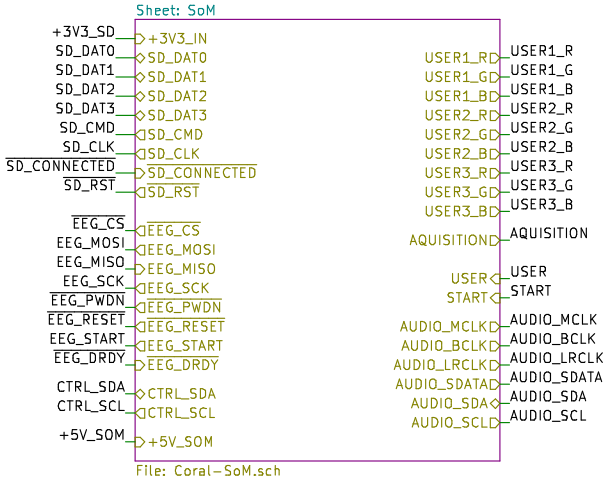


PS I2C addresses:
- **0x5C: HW monitor**

Audio I2C address: 0x0A







State:
- **Preliminary schematics: done**
- **Layout: done**
- **Revised schematic: done**
- **Schematic validation: done**
- **Layout validation: done**
- **BOM optimization: done**
- **Physical testing: to do**

H1 H2

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Sheet: /
File: mist-eeg.sch

Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
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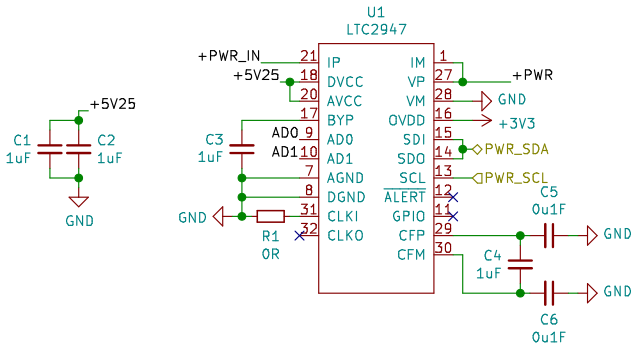
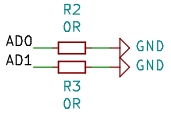


HWMon

HWMon bypass

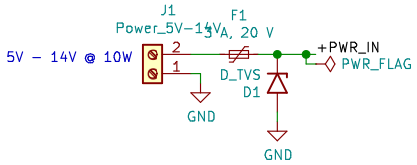


HWMon I2C address

Table 3. I²C Addresses

AD0	AD1	8-BIT ADDRESS BYTE WRITE	8-BIT ADDRESS BYTE READ	7-BIT DEVICE ADDRESS	BINARY DEVICE ADDRESS							
				a6:a0	a6	a5	a4	a3	a2	a1	a0	R/W
L	L	0xB8	0xB9	0x5C	1	0	1	1	1	0	0	1/0
L	H	0xBA	0xBB	0x5D	1	0	1	1	1	0	1	1/0
L	R	0xBC	0xBD	0x5E	1	0	1	1	1	1	0	1/0
R	L	0xC8	0xC9	0x64	1	1	0	0	1	0	0	1/0
R	H	0xCA	0xCB	0x65	1	1	0	0	1	0	1	1/0
R	R	0xCC	0xCD	0x66	1	1	0	0	1	1	0	1/0

Note 10: L: tie to DGND, H: tie to OVDD, R: resistor, connect to DGND with a 100kΩ resistor.



External power port & protection

Rails

3V3 V @ 1.75 A (TPS63070):
- SD card, 2.88 W max

5V0 (clean) @ 50 mA:
- ADS1299 Analog supply
- LTC2947 supply

1V8 (clean) @ 10 mA:
- ADAU1777 Analog supply

5V25 (intermediate) @ 100 mA:
- clean voltage buck-boost

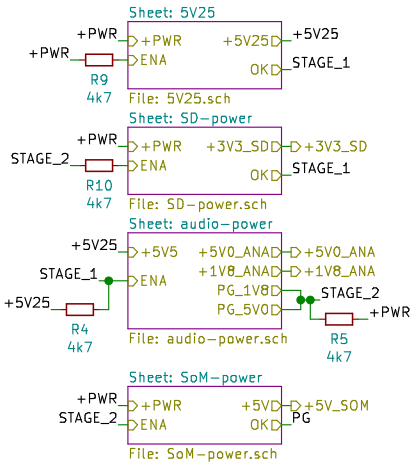
5V @ 1.2 A:
- SoM core voltage

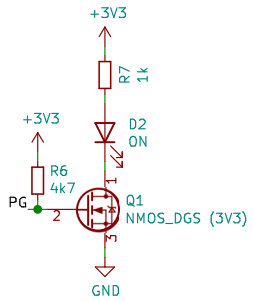
Sequencing

ADC supplies:
1 – 5V25 (intermediate)
2 – 5V & 1V8 (clean)

Audio:
1 – 1.8V (clean)
2 – 3.3V

Global:
1 – 5.25V (Intermediate)
2 – 1.8V (Clean), 5V (Clean)
3 – 3.3V, 5V (Board power)





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Sheet: /power/
File: power.sch

Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
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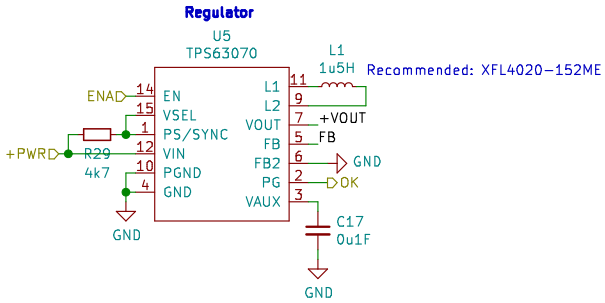

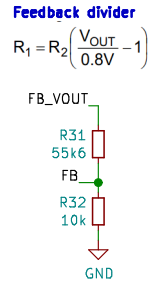

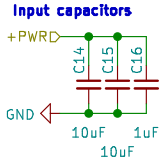

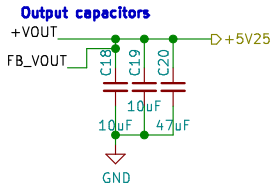

Table 3. Output Filter Selection

INDUCTOR VALUE [µH](1)	OUTPUT CAPACITOR VALUE [µF](2)			
	22	47	68	100
1.0		√	√	√
1.5		√(3)	√	√
2.2			√	√

(1) Inductor tolerance and current de-rating is anticipated. The effective inductance can vary by +20% and –30%.
(2) Capacitance tolerance and bias voltage de-rating of +20% and -50% is anticipated. For capacitors with larger dc bias effect, a larger nominal value needs to be selected.
(3) Typical application. Other check marks indicates recommended filter combinations

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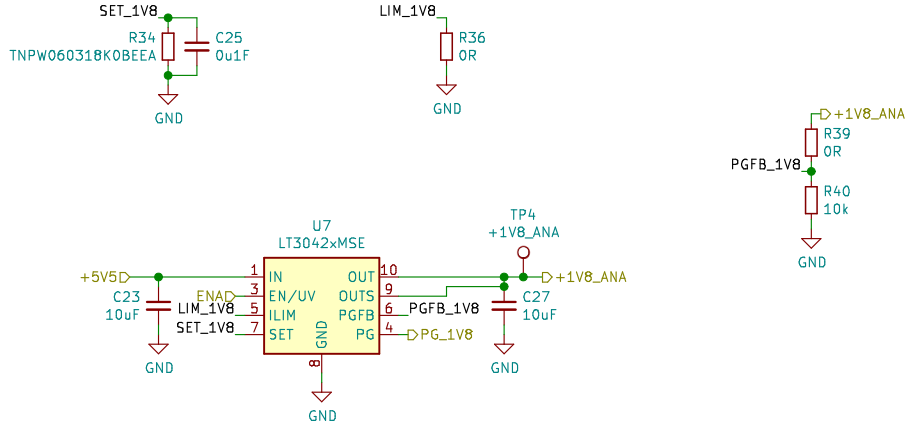
Sheet: /power/5V25/
File: 5V25.sch

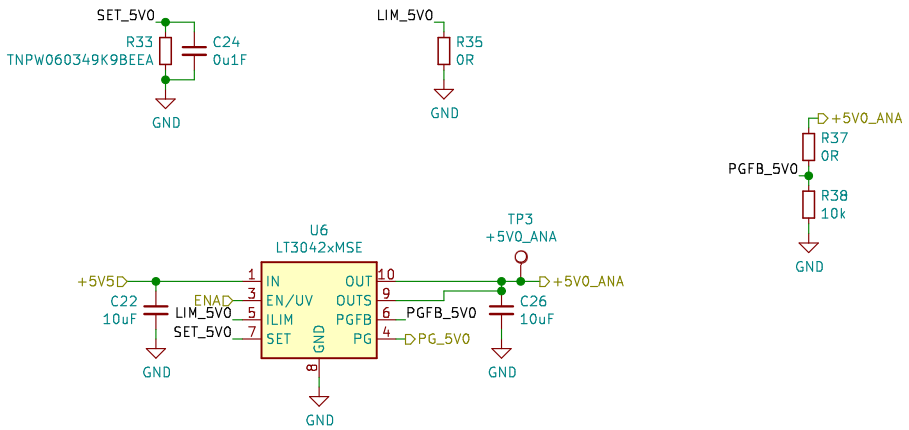
Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 3/11

1V8 (clean regulator)



5V0 (clean regulator)



R_set = Vout / 100µA

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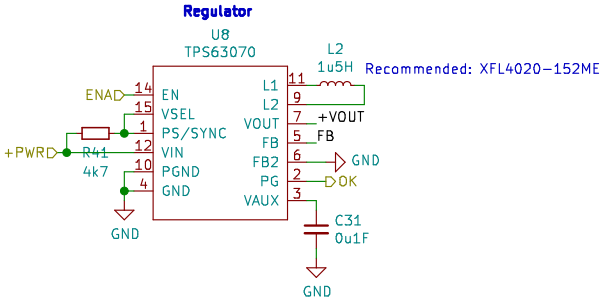
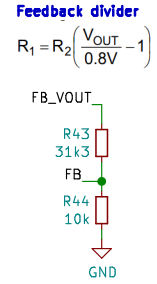
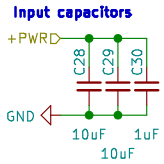
Sheet: /power/audio-power/
File: audio-power.sch

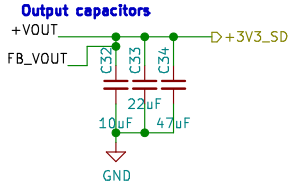
Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 4/11









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1.5		√(3)	√	√
2.2			√	√

(1) Inductor tolerance and current de-rating is anticipated. The effective inductance can vary by +20% and –30%.
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(3) Typical application. Other check marks indicates recommended filter combinations

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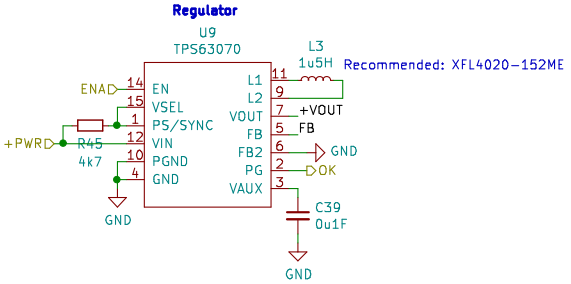
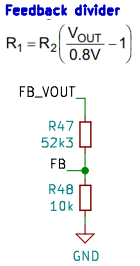
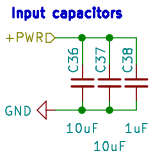
Sheet: /power/SD-power/
File: SD-power.sch

Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 5/11







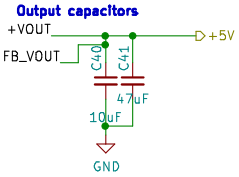


Table 3. Output Filter Selection

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	22	47	68	100
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2.2			√	√

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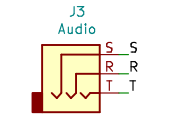
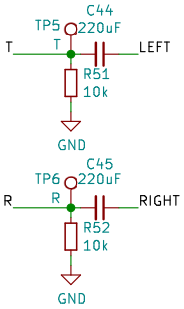
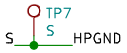
(3) Typical application. Other check marks indicates recommended filter combinations

Sheet: /power/SoM-power/		
File: SoM-power.sch		
Title:		
Size: A4	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 6/11

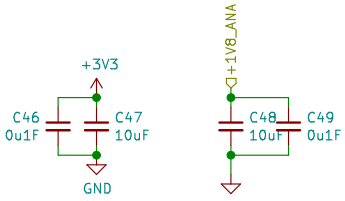
According to wikipedia:
T: Left
R: Right
S: GND

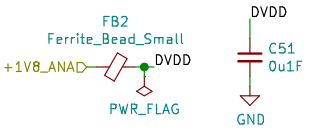




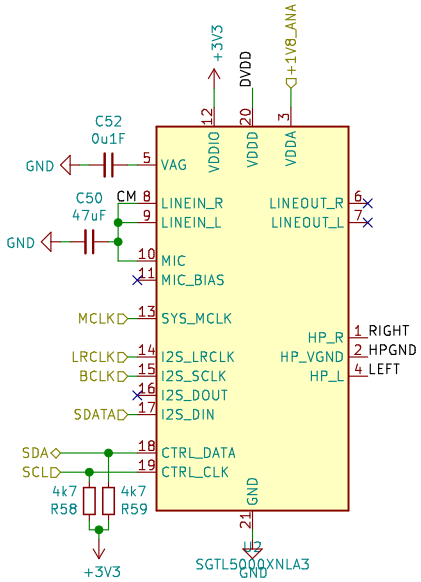


Jack output





Power & decoupling



CODEC

R58, R59 => 4k7
TP9 => deleted
R49, R50, R54, R53 => deleted
R57, D4 => deleted
C52, C53 => deleted
R55, R56 => deleted
FB2 => added

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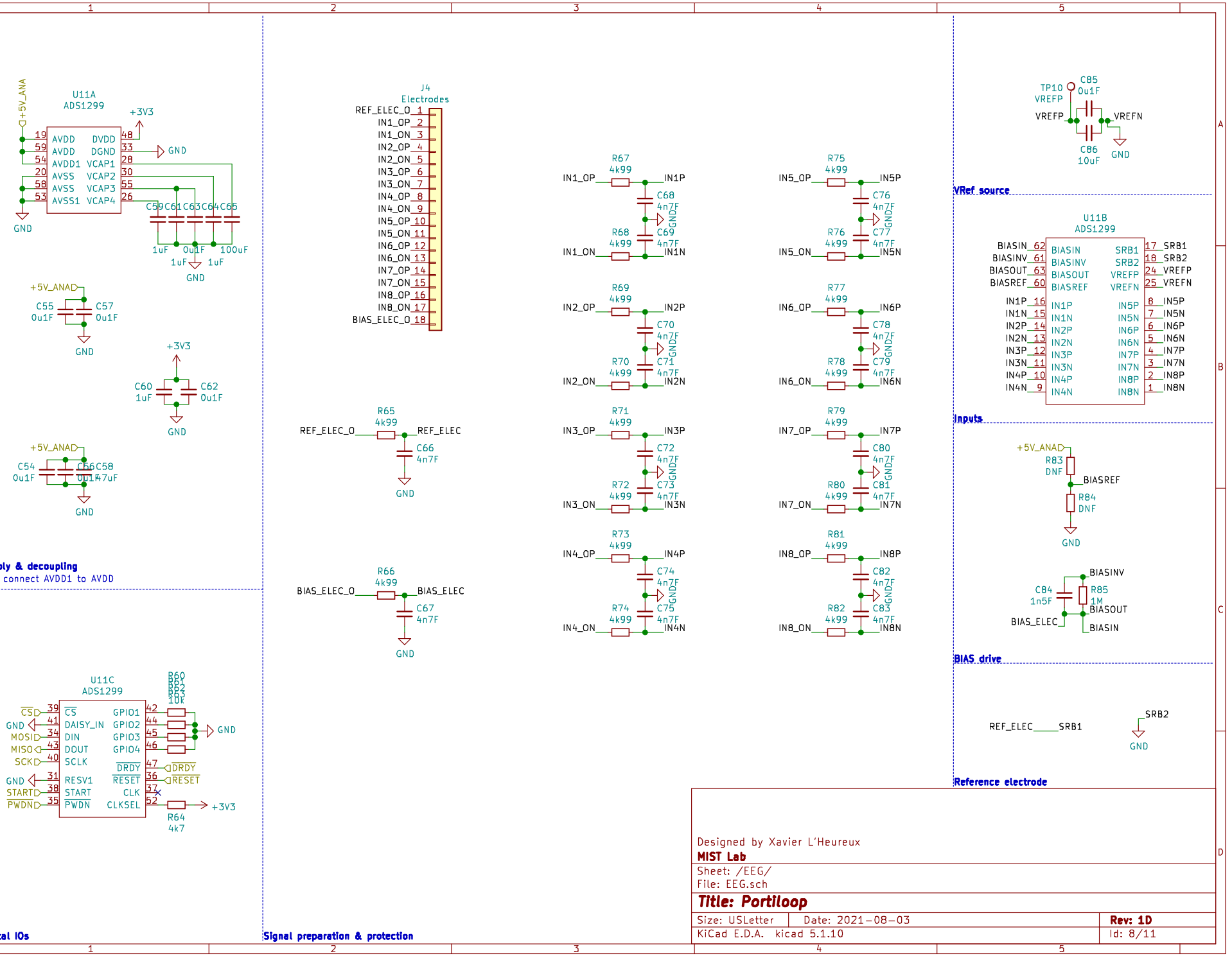
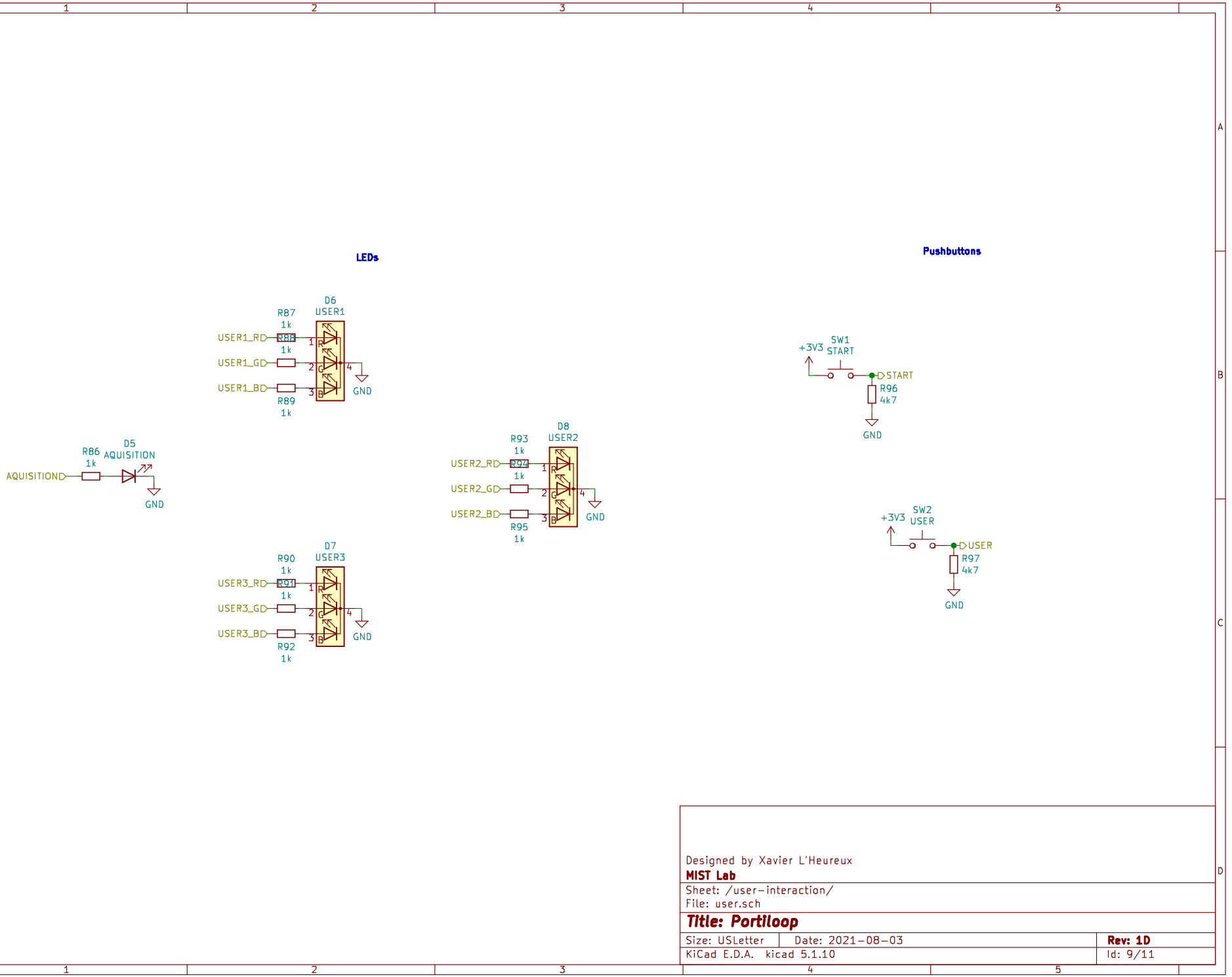
Sheet: /audio/		
File: audio.sch		
Title: Portiloop		
Size: USLetter	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 7/11


U11A
ADS1299
+5V_ANA
+3V3
AVDD
AVDD
AVDD1
AVSS
AVSS
AVSS1
DVDD
DGND
VCAP1
VCAP2
VCAP3
VCAP4
GND
C59 C61 C63 C64 C65
1uF 0u1F 100uF
1uF 1uF
C55 C57
0u1F 0u1F
C60 C62
1uF 0u1F
C54 C56 C58
0u1F 0u1F 47uF
Supply & decoupling
Star connect AVDD1 to AVDD
U11C
ADS1299
CS
DAISY_IN
DIN
DOUT
SCLK
RESV1
START
PWDN
GPIO1
GPIO2
GPIO3
GPIO4
DRDY
RESET
CLK
CLKSEL
R60 R61 R62 R63 10k
R64 4k7
Digital IOs
J4
Electrodes
REF_ELEC_0
IN1_OP
IN1_ON
IN2_OP
IN2_ON
IN3_OP
IN3_ON
IN4_OP
IN4_ON
IN5_OP
IN5_ON
IN6_OP
IN6_ON
IN7_OP
IN7_ON
IN8_OP
IN8_ON
BIAS_ELEC_0
R65 4k99
REF_ELEC
C66 4n7F
R66 4k99
BIAS_ELEC
C67 4n7F
R67 4k99
C68 4n7F
R68 4k99
IN1P
IN1N
R69 4k99
C70 4n7F
R70 4k99
IN2P
IN2N
R71 4k99
C72 4n7F
R72 4k99
IN3P
IN3N
R73 4k99
C74 4n7F
R75 4k99
C76 4n7F
R76 4k99
IN5P
IN5N
R77 4k99
C78 4n7F
R78 4k99
IN6P
IN6N
R79 4k99
C80 4n7F
R80 4k99
IN7P
IN7N
R81 4k99
C82 4n7F
R82 4k99
IN8P
IN8N
Signal preparation & protection
TP10
VREFP
C85 0u1F
C86 10uF
VREFN
VRef source
U11B
ADS1299
BIASIN
BIASINV
BIASOUT
BIASREF
SRB1
SRB2
VREFP
VREFN
Inputs
R83 DNF
R84 DNF
C84 1n5F
R85 1M
Reference electrode
SRB2
Designed by Xavier L'Heureux
MIST Lab
Sheet: /EEG/
File: EEG.sch
Title: Portiloop
Size: USLetter
Date: 2021-08-03
Rev: 1D
KiCad E.D.A. kicad 5.1.10
Id: 8/11


LEDs
Pushbuttons
D6
USER1
R87
1k
R88
1k
R89
1k
USER1_RD
USER1_GD
USER1_BD
GND
D5
AQUISITION
R86
1k
AQUISITION
GND
D8
USER2
R93
1k
R94
1k
R95
1k
USER2_RD
USER2_GD
USER2_BD
GND
D7
USER3
R90
1k
R91
1k
R92
1k
USER3_RD
USER3_GD
USER3_BD
GND
SW1
START
+3V3
START
R96
4k7
GND
SW2
USER
+3V3
USER
R97
4k7
GND
Designed by Xavier L'Heureux
MIST Lab
Sheet: /user-interaction/
File: user.sch
Title: Portiloop
Size: USLetter
Date: 2021-08-03
Rev: 1D
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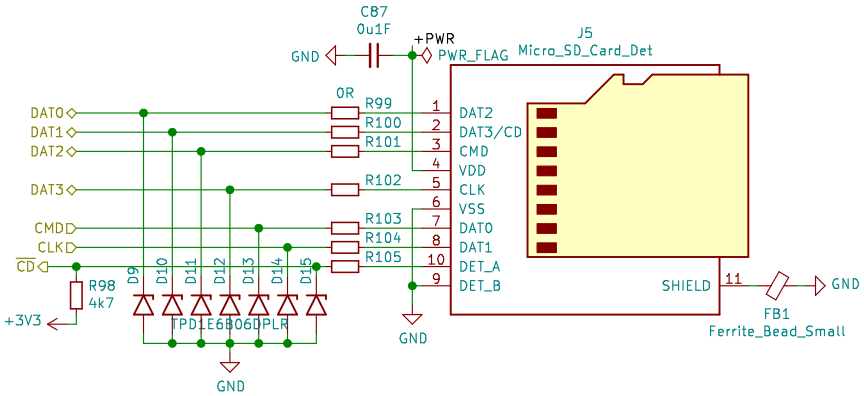
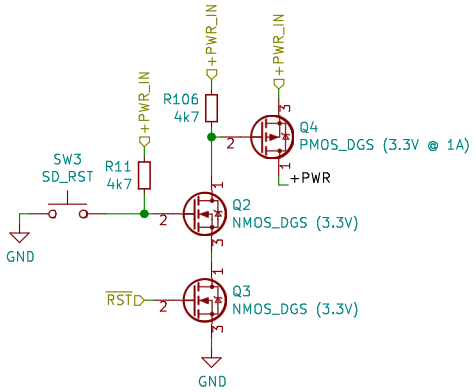
Id: 9/11

SD Card module



Resistor array: test points

Reset switch



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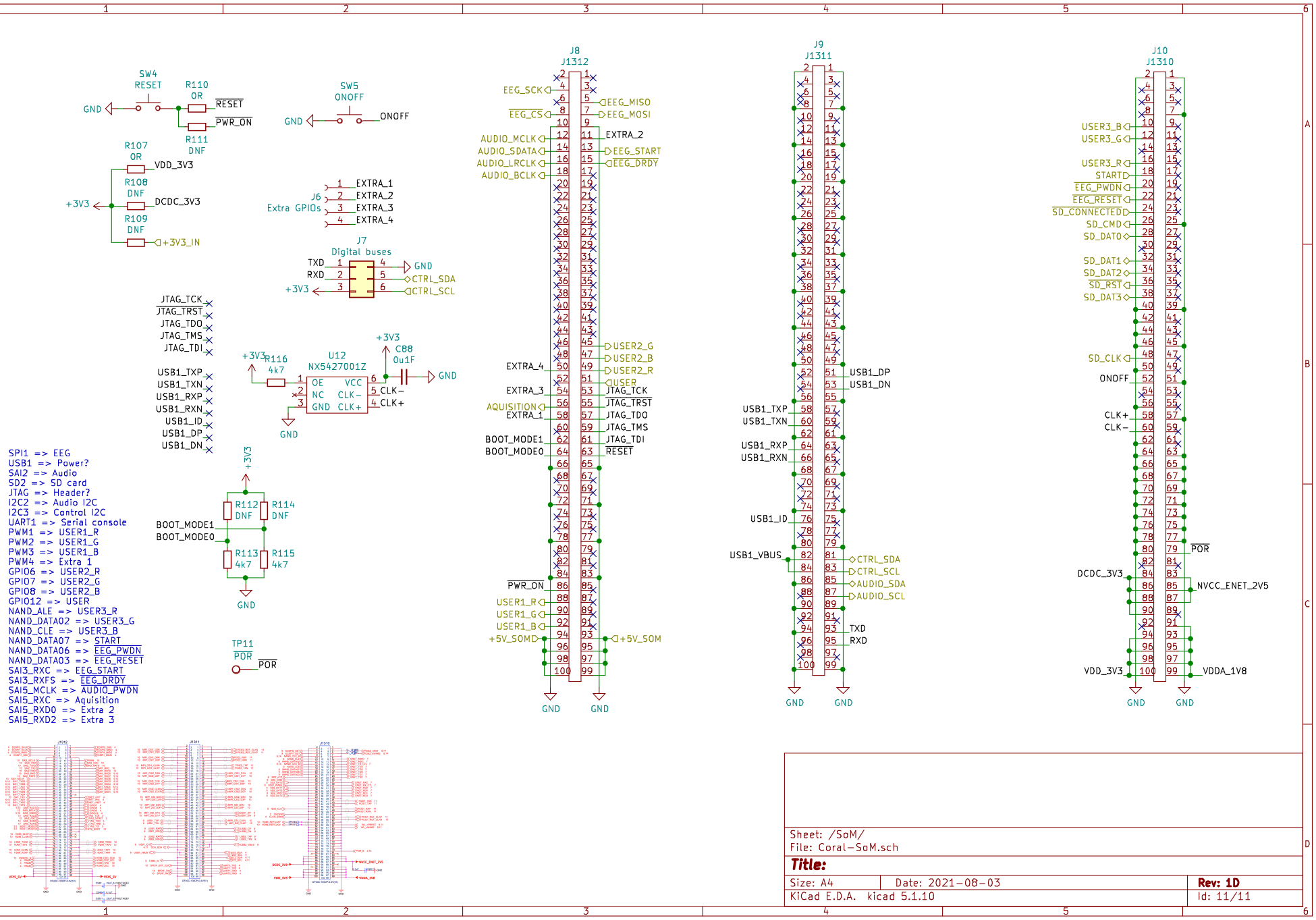
Sheet: /SD_DATA/
File: SD.sch

Title: Portiloop

Size: USLetter	Date: 2021-08-03	**Rev: 1D**
KiCad E.D.A. kicad 5.1.10		Id: 10/11


SW4
RESET
R110
0R
RESET
PWR_ON
R111
DNF
GND
SW5
ONOFF
ONOFF
R107
0R
VDD_3V3
R108
DNF
DCDC_3V3
R109
DNF
+3V3_IN
+3V3
J6
Extra GPIOs
EXTRA_1
EXTRA_2
EXTRA_3
EXTRA_4
J7
Digital buses
TXD
RXD
GND
CTRL_SDA
CTRL_SCL
JTAG_TCK
JTAG_TRST
JTAG_TDO
JTAG_TMS
JTAG_TDI
USB1_TXP
USB1_TXN
USB1_RXP
USB1_RXN
USB1_ID
USB1_DP
USB1_DN
R116
4k7
U12
NX5427001Z
OE
NC
GND
VCC
CLK−
CLK+
C88
0u1F
CLK−
CLK+
SPI1 => EEG
USB1 => Power?
SAI2 => Audio
SD2 => SD card
JTAG => Header?
I2C2 => Audio I2C
I2C3 => Control I2C
UART1 => Serial console
PWM1 => USER1_R
PWM2 => USER1_G
PWM3 => USER1_B
PWM4 => Extra 1
GPIO6 => USER2_R
GPIO7 => USER2_G
GPIO8 => USER2_B
GPIO12 => USER
NAND_ALE => USER3_R
NAND_DATA02 => USER3_G
NAND_CLE => USER3_B
NAND_DATA07 => START
NAND_DATA06 => EEG_PWDN
NAND_DATA03 => EEG_RESET
SAI3_RXC => EEG_START
SAI3_RXFS => EEG_DRDY
SAI5_MCLK => AUDIO_PWDN
SAI5_RXC => Aquisition
SAI5_RXD0 => Extra 2
SAI5_RXD2 => Extra 3
R112
DNF
R114
DNF
R113
4k7
R115
4k7
BOOT_MODE1
BOOT_MODE0
TP11
POR
J8
J1312
EEG_SCK
EEG_CS
EEG_MISO
EEG_MOSI
AUDIO_MCLK
AUDIO_SDATA
AUDIO_LRCLK
AUDIO_BCLK
EXTRA_2
EEG_START
EEG_DRDY
USER2_G
USER2_B
USER2_R
USER
JTAG_TCK
JTAG_TRST
JTAG_TDO
JTAG_TMS
JTAG_TDI
RESET
AQUISITION
PWR_ON
USER1_R
USER1_G
USER1_B
+5V_SOM
J9
J1311
USB1_DP
USB1_DN
CTRL_SDA
CTRL_SCL
AUDIO_SDA
AUDIO_SCL
TXD
RXD
J10
J1310
USER3_B
USER3_G
USER3_R
START
EEG_PWDN
EEG_RESET
SD_CONNECTED
SD_CMD
SD_DAT0
SD_DAT1
SD_DAT2
SD_RST
SD_DAT3
SD_CLK
ONOFF
POR
NVCC_ENET_2V5
VDDA_1V8
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File: Coral−SoM.sch
Title:
Size: A4
Date: 2021−08−03
Rev: 1D
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