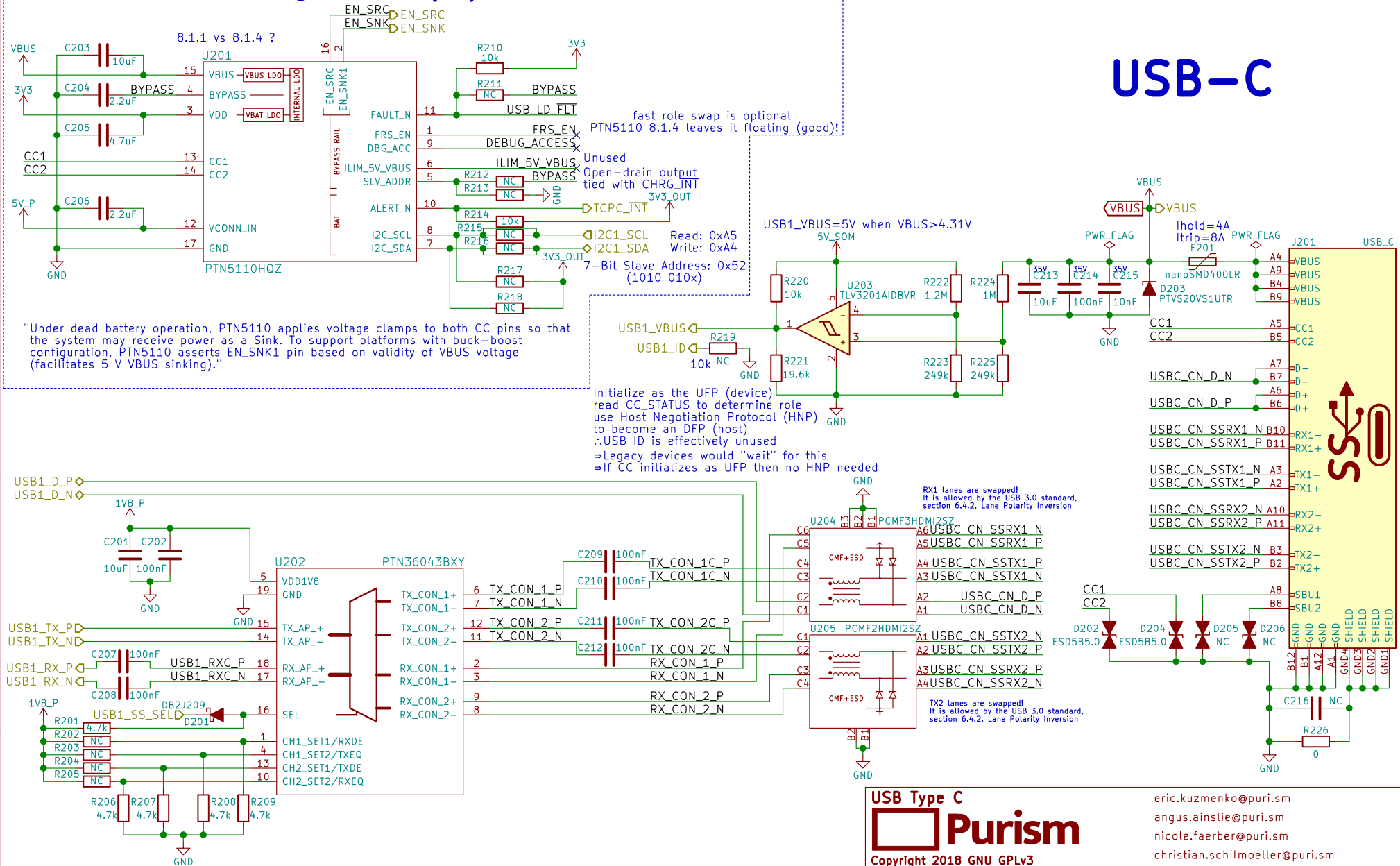
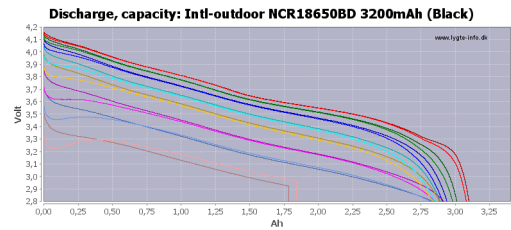


USB-C TCPC – Config Channel (CC) and PD Role Controller

USB-C





(interpret RSOC% based on this plot)

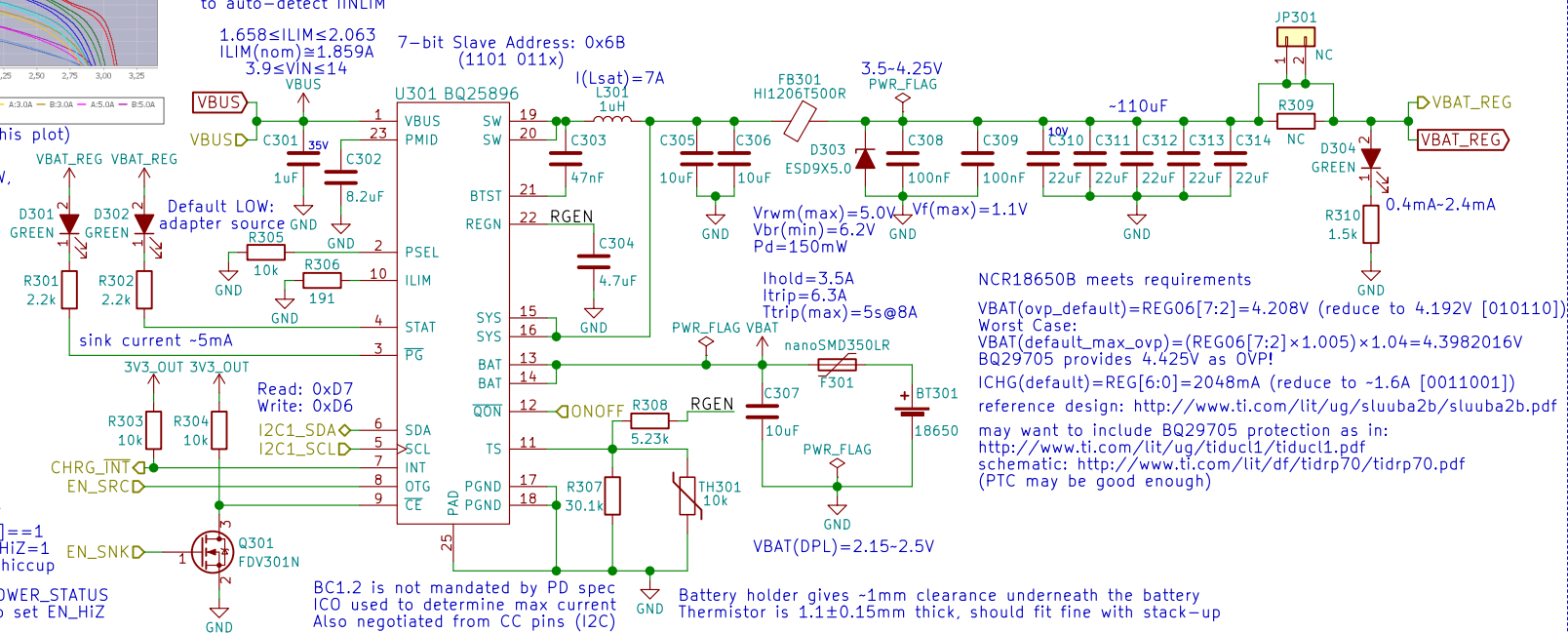
Drawing ~320mA, or consuming $\leq 1.152W$, should give close to 10 hours going from 100% to 0% charge

use AUTO_DPDM_EN to auto-detect IINLIM

$1.658 \leq I_{LIM} \leq 2.063$
 $I_{LIM}(nom) \approx 1.859A$
 $3.9 \leq V_{IN} \leq 14$

7-bit Slave Address: 0x6B (1101 011x)

Battery Charge Controller



Reading PTN5110HQ's CC_STATUS and POWER_STATUS registers will tell TCPM (i.MX8M) when to set EN_HI_Z

Also, reading PTN5110HQ's CC_STATUS and POWER_STATUS registers will tell TCPM (i.MX8M) when to set OTG_CONFIG=1 (this will also happen when PTN5110HQ sets EN_SRC HIGH)

Battery

Purism

Copyright 2018 GNU GPLv3

Sheet: /Battery/
File: battery.sch

Size: A4 Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

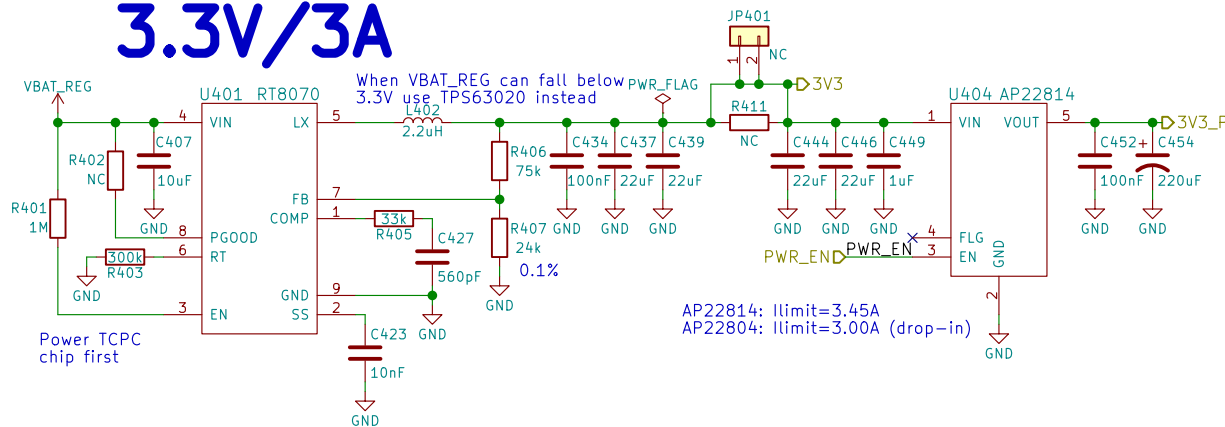
nicole.farber@puri.sm

christian.schilmoeller@puri.sm

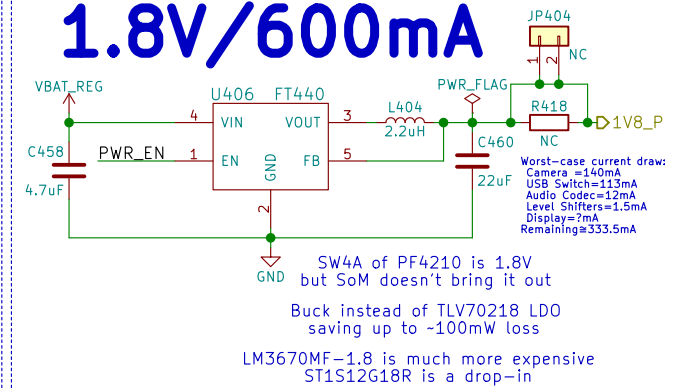
Rev: v0.1.0

Id: 3/24

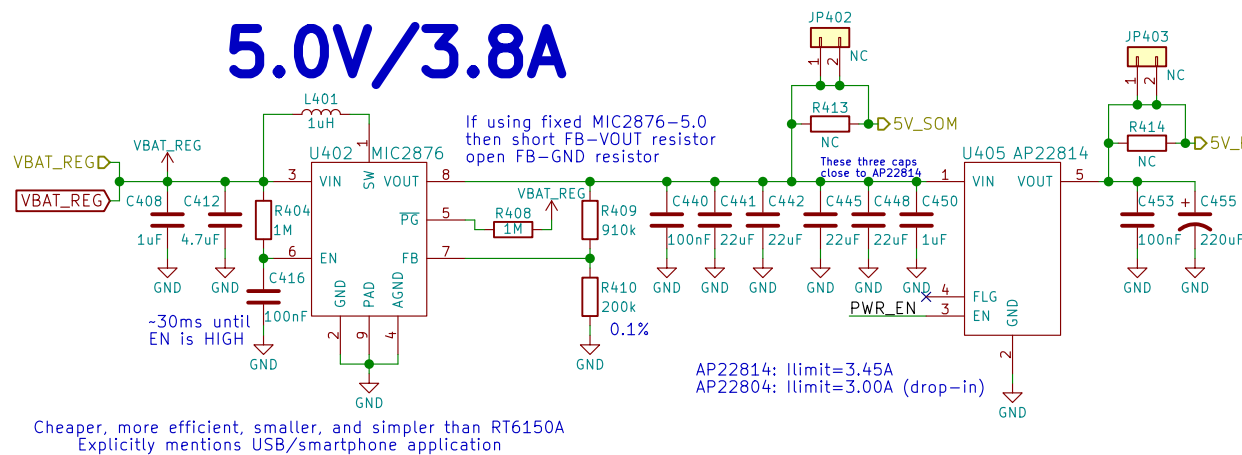
3.3V/3A



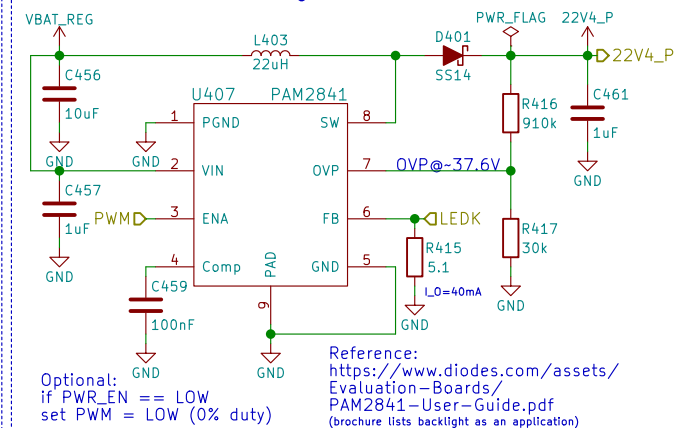
1.8V/600mA



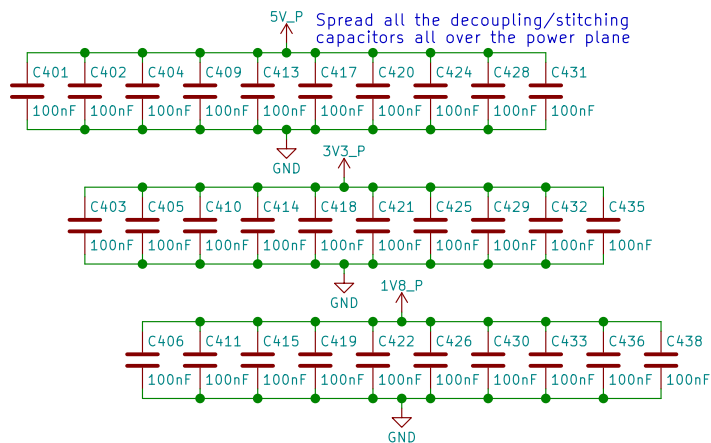
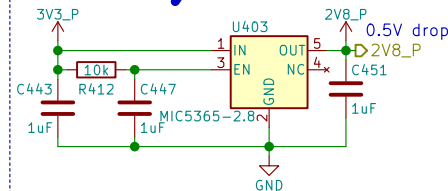
5.0V/3.8A



22.4V/40mA



2.8V/150mA



Power

Power

Purism

Copyright 2018 GNU GPLv3

Sheet: /Power/
File: power.sch

Size: A4
KiCad E.D.A. kicad 4.0.6

Date: 2018-06-18

Rev: v0.1.0

Id: 4/24

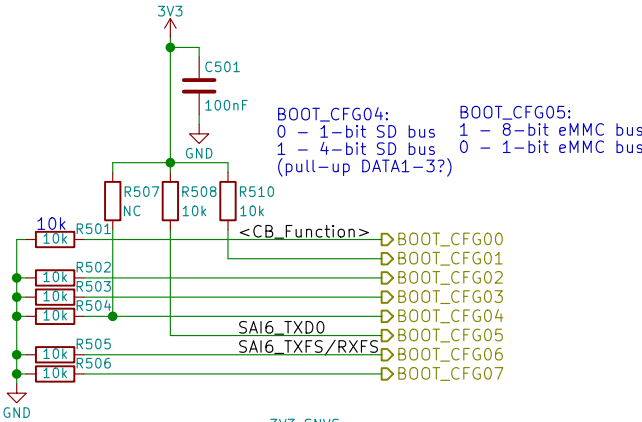
eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

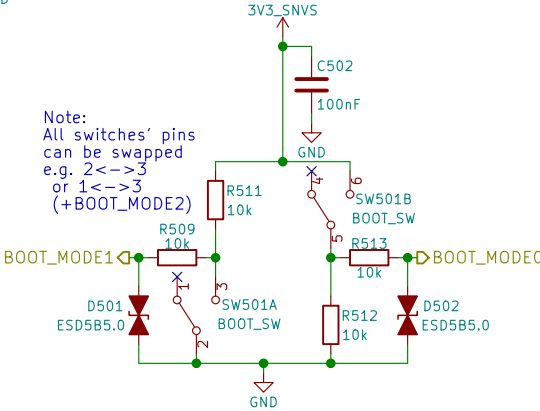
nicole.farber@puri.sm

christian.schilmoeller@puri.sm

Boot Config

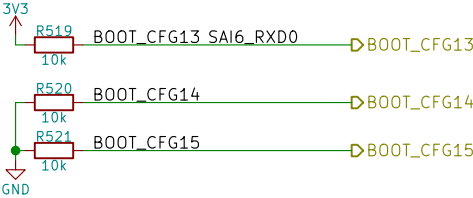
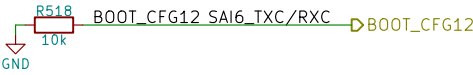
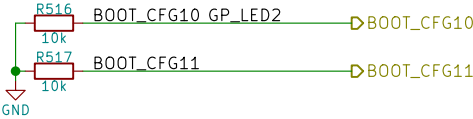
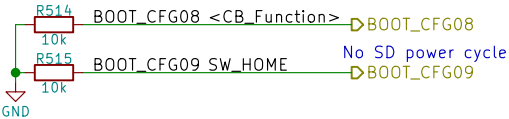


Note:
All switches' pins
can be swapped
e.g. 2<->3
or 1<->3
(+BOOT_MODE2)




2->1: eMMC 2->3: USB (Serial Downloader)	
BOOT_MODE[1:0]	Boot Type
00	Boot From Fuses
01	Serial Downloader
10	Internal Boot
11	Reserved

Only eMMC					
BOOT_CFG[14:12]			Boot device		
001			SD/eSD		
010			MMC/eMMC		
011			NAND		
Fuse	Config	Definition	GPIO ¹	Shipped value	Settings
BOOT_CFG[11:10]	OEM	USDHC port selection	Yes	00	00 - USDHC-1 01 - USDHC-2 10 - USDHC-3 else - reserved



Boot Configuration



Copyright 2018 GNU GPLv3

Sheet: /Boot Config/
File: boot.sch

Size: A4
KiCad E.D.A. kicad 4.0.6

Date: 2018-06-18

Rev: v0.1.0
Id: 5/24

eric.kuzmenko@puri.sm
angus.ainstlie@puri.sm
nicole.farber@puri.sm
christian.schilmoeller@puri.sm

Real-Time Clock



Note:

Datasheet says slave address is 0xD0
with a R/W bit appended, since 0xD must
be 4-bits wide the actual 7-bit address is
0x68 (110 1000), and becomes 0xD0 during a
write operation (1101 0000)

Reference:

https://github.com/HIO-Project/linux-imx6-nano-imx_3.10.17_1.0.1_ga/blob/8848e94b2f889fe44f6736e2d4c98851a2282275/arch/arm/boot/dts/imx6qdl-mtp.dtsi#L351

RTC



Copyright 2018 GNU GPLv3

Sheet: /RTC/

File: rtc.sch

Size: A4

Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

Rev: v0.1.0

Id: 6/24

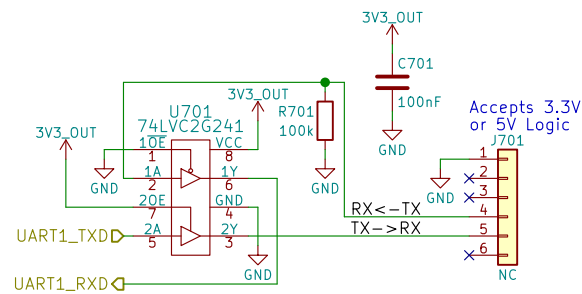
eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

UART Debug



UART Debug



Copyright 2018 GNU GPLv3

Sheet: /UART Debug/

File: uart.sch

Size: A4

Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

Rev: v0.1.0

Id: 7/24

eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

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christian.schilmoeller@puri.sm

JTAG



JTAG



Copyright 2018 GNU GPLv3

Sheet: /JTAG/

File: jtag.sch

Size: A4

Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

Rev: v0.1.0

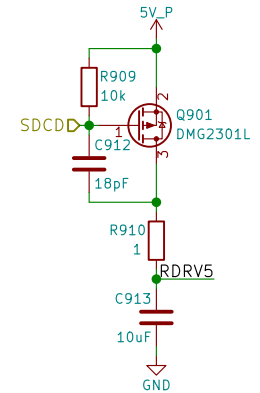
Id: 8/24

eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

[illegible]

Can be swapped around depending on layout

 $C_{\text{stray}} \cong 3 \text{ pF}$

Purism

Sheet: /USB Hub + SDIO Bridge/

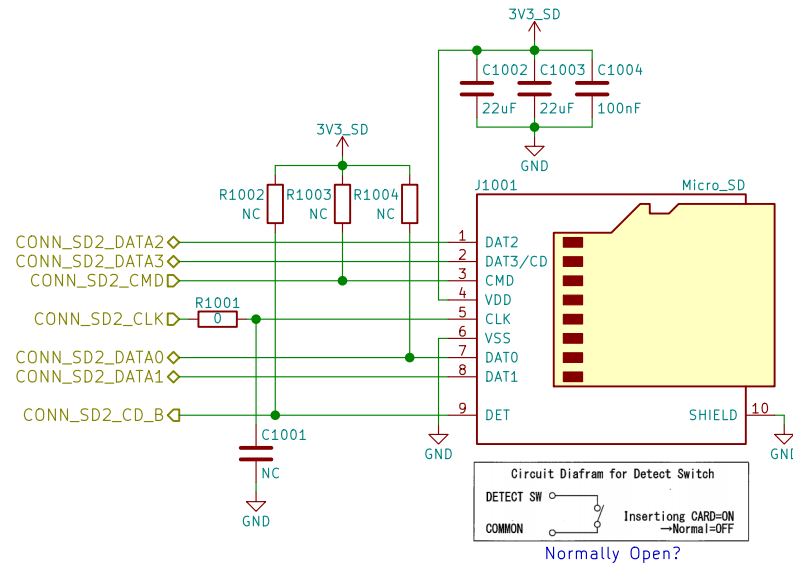
Size: A4	Date: 2018-06-18
----------	------------------

4

christian.schilmoeller@p

Id: 9/24

μSD



uSD Card



Purism

Copyright 2018 GNU GPLv3

Sheet: /uSD Card/

File: sd.sch

Size: A4

Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

Rev: v0.1.0

Id: 10/24

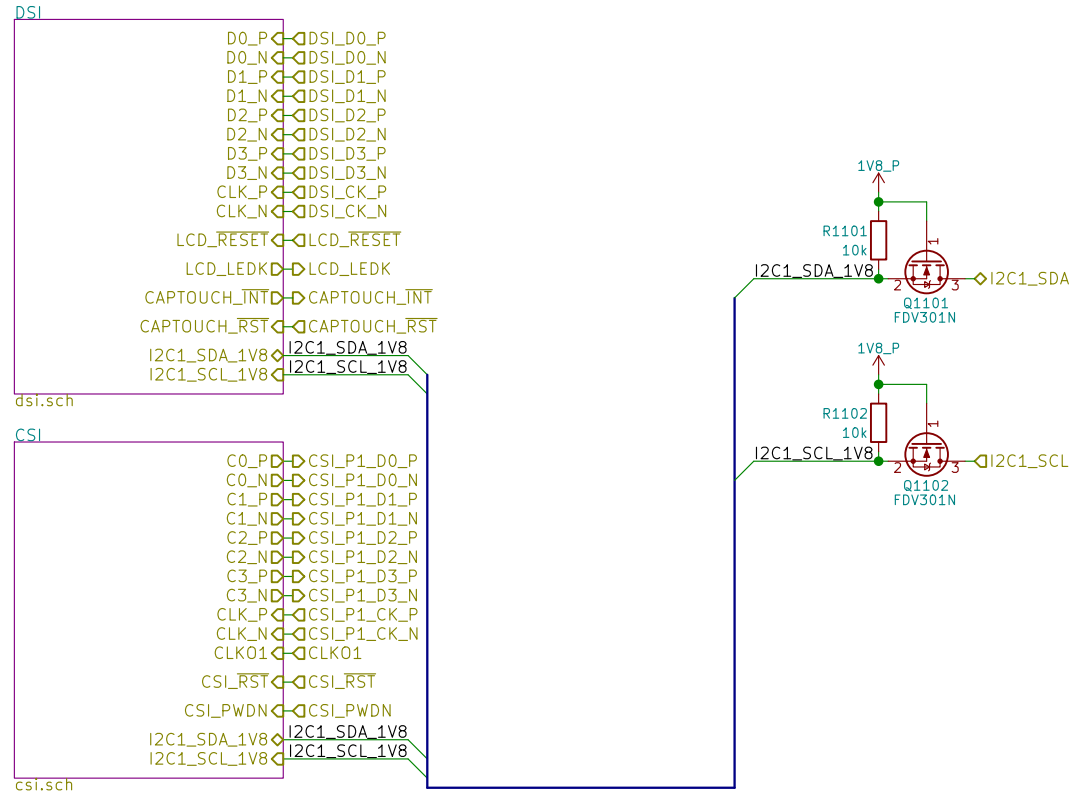
eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

MIPI



MIPI



Copyright 2018 GNU GPLv3

Sheet: /MIPI/

File: mipi.sch

Size: A4 Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

nicole.farber@puri.sm

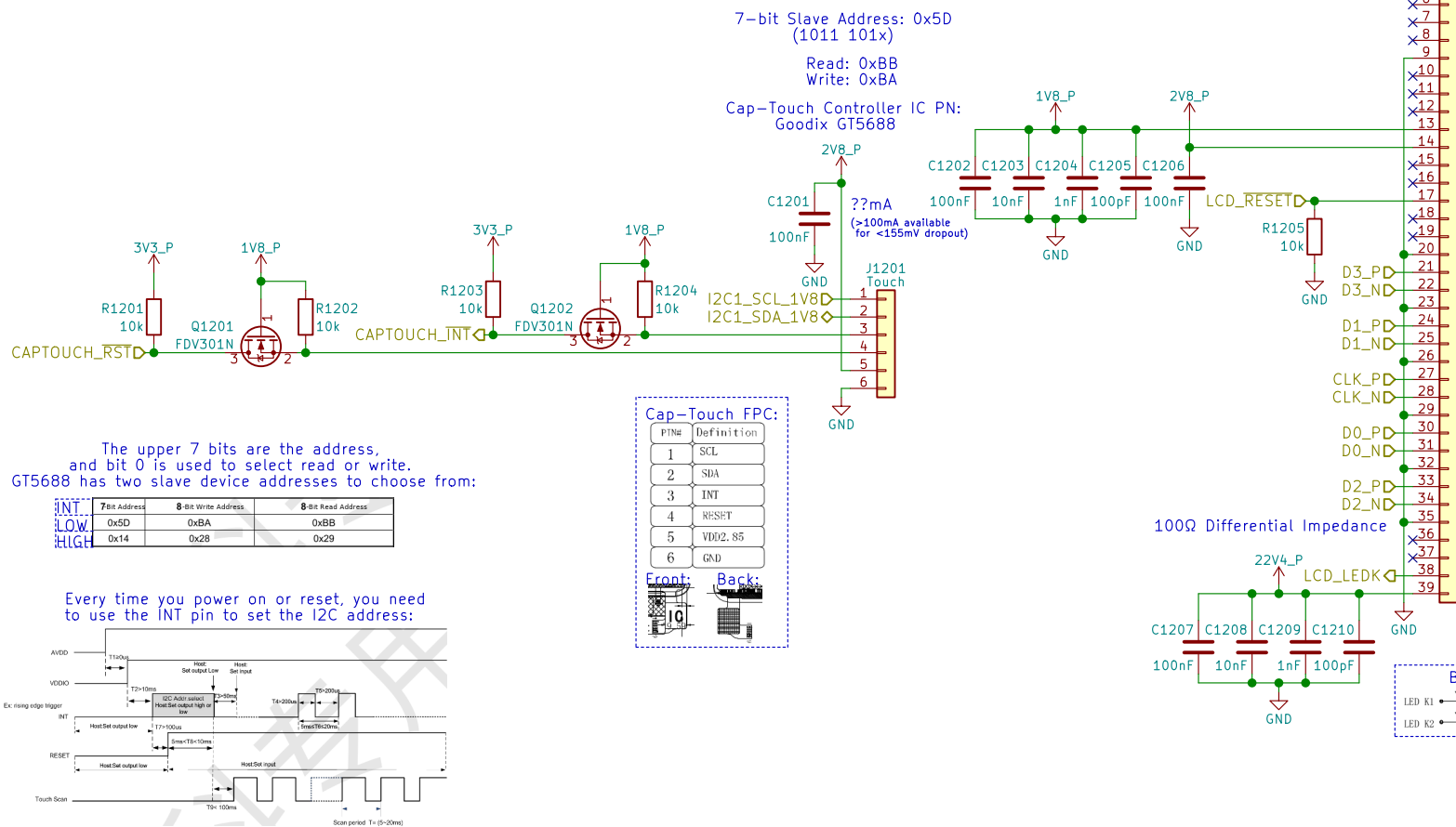
christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 11/24

Display & Touch Controller

LCD PN:
Shenzhen Jinghong Electronics Co., Ltd.
JH057N00900



Display_JH057N00900

DISP1201

5.7 "
RGB
720 x 1440
pixels

FPC6
Touch

FPC39
Display +
Backlight

DSI FPC:
Front: Back:

Backlight Array:

LED K1 LEDA1
LED K2 LEDA2

MIPI DSI

Purism

Copyright 2018 GNU GPLv3

Sheet: /MIPI/DSI/
File: dsi.sch

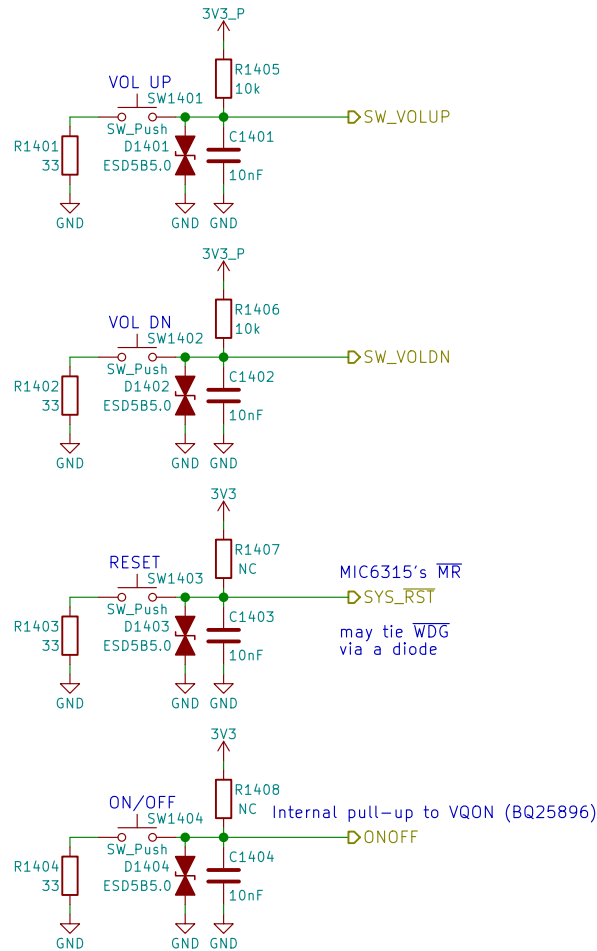
Size: A4 Date: 2018-06-18
KiCad E.D.A. kicad 4.0.6

eric.kuzmenko@puri.sm
angus.ainstie@puri.sm
nicole.farber@puri.sm
christian.schilmoeller@puri.sm

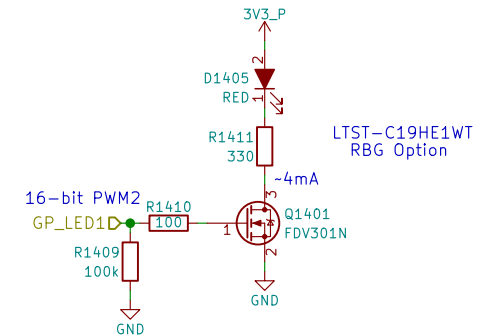
Rev: v0.1.0
Id: 12/24

Id: 13/24

Buttons & LED



Use PWM2_PWMSAR to set the compare value (duty cycle)
Use PWM2_PWMCR[15:4] to set the PRESCALER (frequency)
Use PWM2_PWMPR to set the top of the counter (frequency)



Buttons & LED



Copyright 2018 GNU GPLv3

Sheet: /Buttons & LED/
File: buttons_led.sch

Size: A4 Date: 2018-06-18

KiCad E.D.A. kicad 4.0.6

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

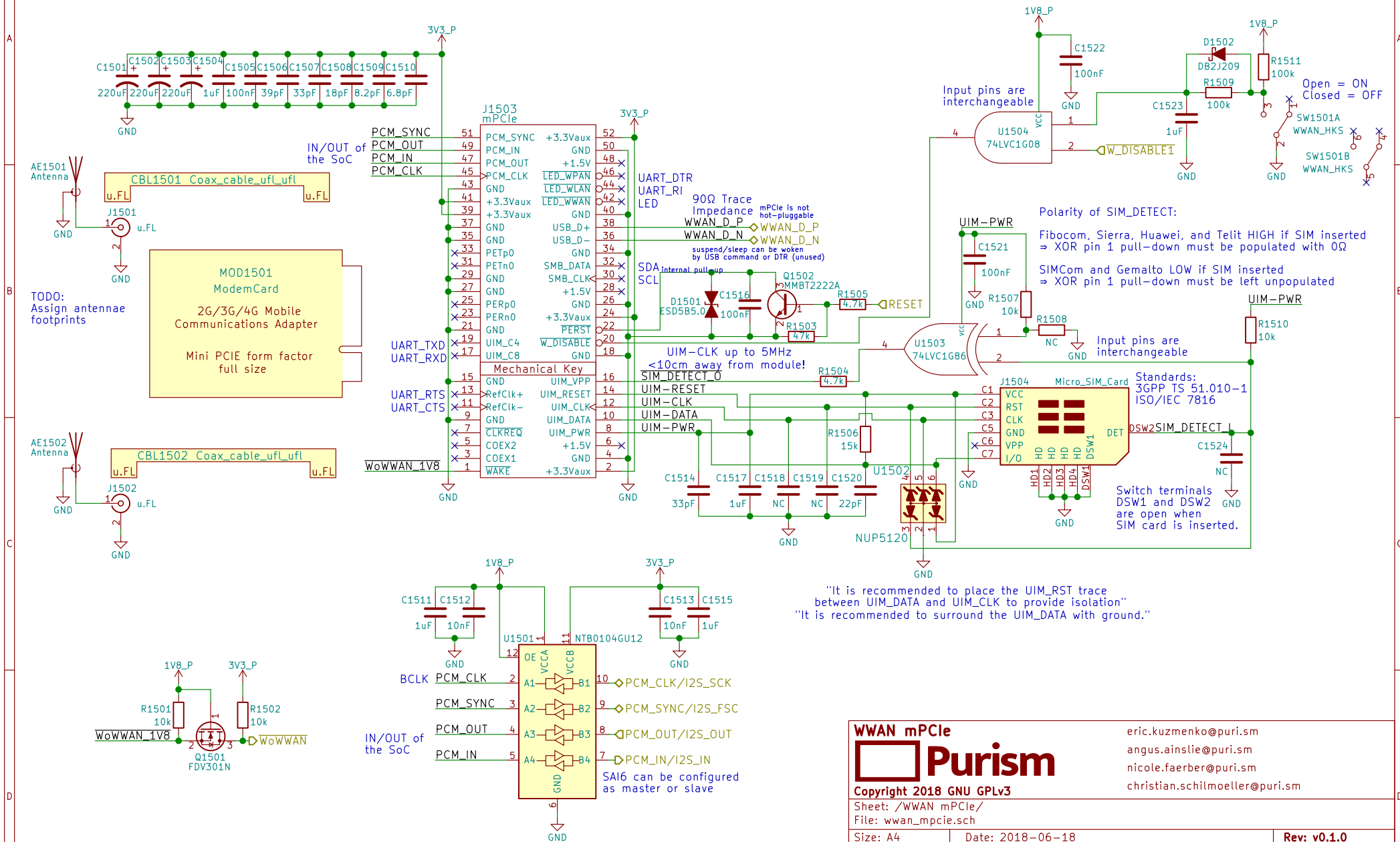
nicole.farber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 14/24

WWAN mPCle



WWAN mPCIe



Copyright 2018 GNU GPLv3

Sheet: /WWAN mPCIe/
File: wwan_mpcie.sch

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.ferber@puri.sm

christian.schilmoeller@puri.sm

Size: A4	Date: 2018-06-18
----------	------------------

Rev: v0.1.0

KiCad E.D.A. kicad 4.0.6

Id: 15/24

Audio

Reference:
http://www.52rd.com/S_txt/2011_3/TXT26685.htm
<http://www.sengpielaudio.com/calculator-transferfactor.htm>
<https://electronics.stackexchange.com/questions/31442/how-can-i-switch-this-audio-jack-using-its-own-mechanical-switches-without-cre>
 (Nit6 does the same)
 +Zener diode to protect against ranges outside of -0.9V to 3.3V

dB specs in datasheet is a unit of power gain (not dBu or VU) with respect to the DAC's unattenuated output

"HP Output - 62.5mW max, 1.02kHz sine into 16Ω load at 3.3 V"
 $\Rightarrow (1V)^2/(16\Omega)=62.5mW$
 $\therefore V_{rms}=1V \Rightarrow V_p(\text{amplitude})=1.414V$
 $\therefore I_{rms}(\text{max})=62.5mA$

If HP_DET is HIGH for >100ms then HPs are present

S/E button on earbud headsets shorts the mic for key function

Could use FSA8008 to detect mic



Pin 5 (tip switch) is NC, open when inserted
 If just headphones then HP_DET=HIGH, R(mic)=0
 may add ~220uF cap parallel to Zener

Ext-Mic enabled MIC_SEL=HIGH
 Int-Mic enabled MIC_SEL=LOW
 Add TVS next to int-mic? (OpenMoko does this)
 $-37dB=14.1254mV/Pa$
 $\therefore \text{mic produces } 14.1254mV_{rms} \text{ when exposed to a } 1kHz \text{ tone of } 94dB-SPL \text{ at the capsule (or } 19.98mV \text{ amplitude)}$
 $\Rightarrow 40dB \text{ gain would produce } -2V \text{ amplitude (4Vpp, clipping)}$
 $30dB \text{ gain would produce } -0.632V \text{ amplitude (1.264Vpp)}$
 $38.33dB \text{ gain would yield } 3.3V_{pp}$

SW Mute Mic: MUTE_ADC=1

MIC_IN

MIC_BIAS

C1619

1uF

GND

C1620

100nF

GND

FB1608

BLM18KG601SZ1D

GND

C1622

270pF

GND

SW1301B

MIC_CAM_HKS

DPDT with camera

5->4 = ON

5->6 = OFF

All switches' pins can be swapped

e.g. 5<->4

or 5<->6

(+camera)

FB1606

BLM18KG601SZ1D

GND

C1621

270pF

GND

D1601

ESD5B5.0

GND

D1602

ESD5B5.0

GND

C1624

270pF

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

C1623

100nF

GND

C1625

10nF

GND

U1603

FSA6157L6X

GND

2.2kΩ

MK1601

CMC-6022

GND

Add TVS next to int-mic?

(OpenMoko does this)

GND

3V3_P

RGMII 10/100/1000 Ethernet

Ethernet

Purism

Copyright 2018 GNU GPLv3

Sheet: /Ethernet/
File: ethernet.sch

Size: A4	Date: 2018-06-18	Rev: v0.1.0
KiCad E.D.A.	kicad 4.0.6	Id: 17/24

eric.kuzmenko@puri.sm
angus.ainslie@puri.sm
nicole.ferber@puri.sm
christian.schilmoeller@puri.sm

 **Purism**

eric.kuzmenko@puri.sm
angus.ainslie@puri.sm
nicole.farber@puri.sm
christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 17/24

WLAN+BT M.2

RS9116 NC:
RTS, CTS, BT_HOST_WAKE

RS9116 datasheet says
no WIFI_WAKE
but the schematic has it

RedPine RS9116 MB0
Requires 5V on
Pin 54 if USB used

Socket: Table 46
Module: Table 23

M.2 Key E

3V3_P

NC

1

2

3

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289

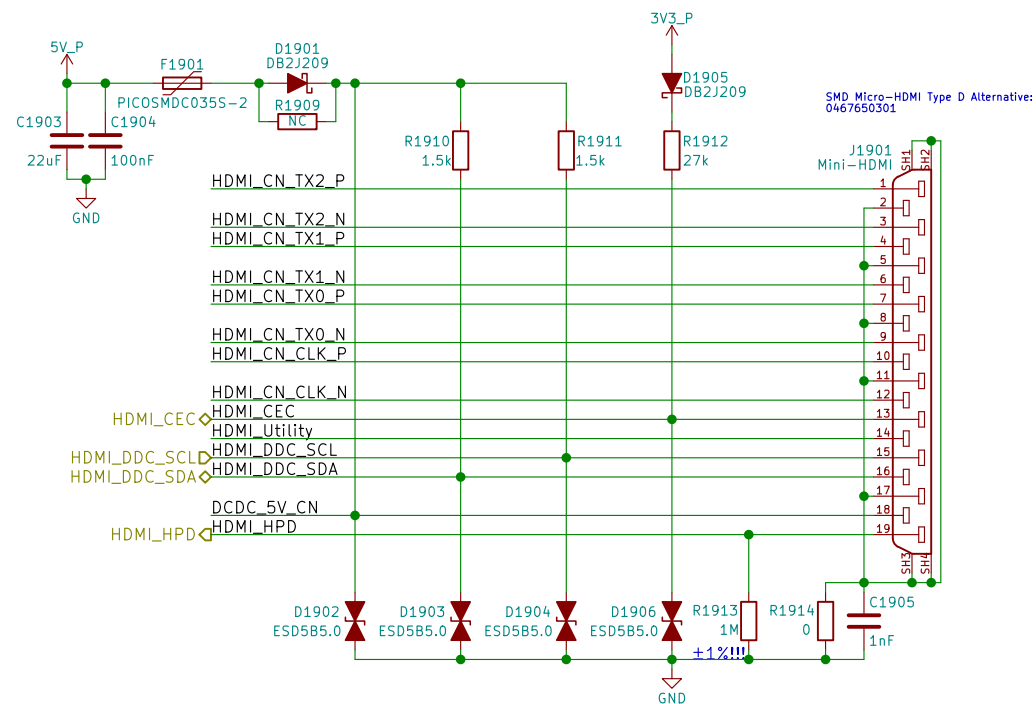
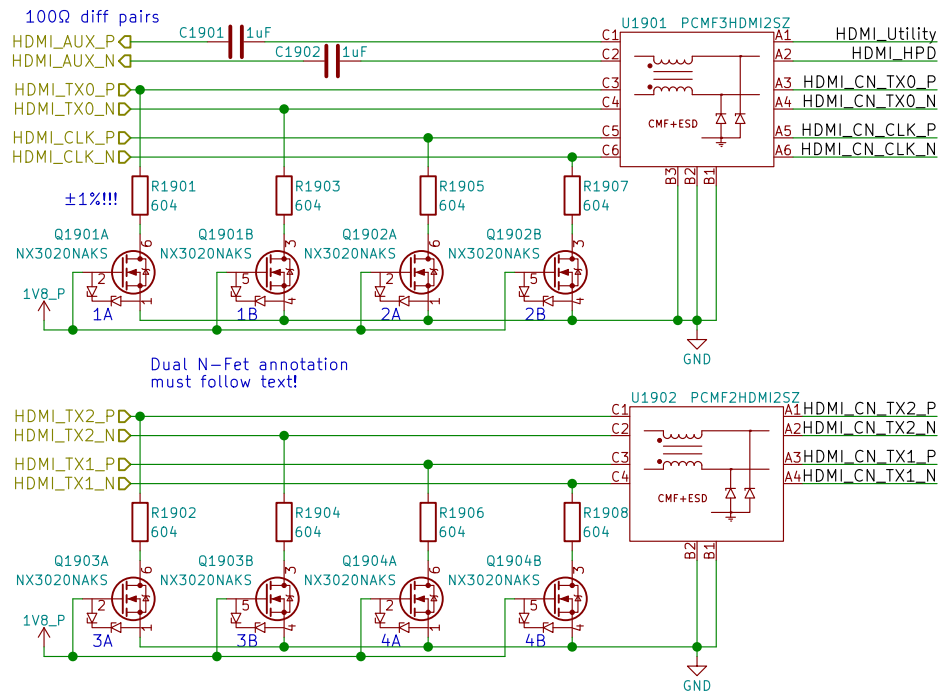
290

291

TUSB1046 can be used for DP over USB-C

HDMI

Layout Note:
May need swap some signals
due to micro-HDMI pinout diff
depending on pin location/routing



HDMI



Copyright 2018 GNU GPLv3

Sheet: /HDMI/
File: hdmi.sch

Size: A4	Date: 2018-06-18
KiCad E.D.A. kicad 4.0.6	

eric.kuzmenko@puri.sm
angus.ainslie@puri.sm
nicole.ferber@puri.sm
christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 19/24

1

B



C

D

3



•



1

SPI NOR Flash



SPI NOR Flash



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Sheet: /SPI Flash/
File: flash.sch

Size: A4 Date: 2018-06-18
KiCad E.D.A. kicad 4.0.6

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Rev: v0.1.0
Id: 21/24

[illegible]

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Sheet: /Smart Card/ File: smartcard.sch		
Size: A4	Date: 2018-06-18	Rev: v0.1.0
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GNSS



References:
https://www.u-blox.com/sites/default/files/MAX-M8_HardwareIntegrationManual_L%28UBX-13004876%29.pdf
https://www.u-blox.com/sites/default/files/MAX-8-M8-FW3_HardwareIntegrationManual_L%28UBX-15030059%29.pdf

GNSS



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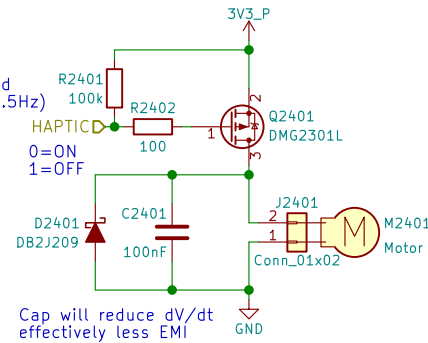
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Haptic Motor

PWM pins occupied:
 GPIO1_I001 - LCD Backlight
 GPIO1_I013 - LED
 GPIO1_I014 - Ethernet (CLK0_25MHz)
 GPIO1_I015 - CSI (CLK02)

PWM needed?
 Only needs to be toggled
 ON 1 sec, OFF 1 sec (0.5Hz)
 Can MUX as either
 GPIO or PWM2
 swapping with LED



When the motor is off
 both terminals are at GND
 Motor will have wire leads
 with a 2-pin Molex or Boom Precision
 connector installed (by request)
 Metal housing is floating
 thick adhesive layer underneath
 (not connected to either pin)

Haptic/Vibration Motor



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 File: haptic.sch

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