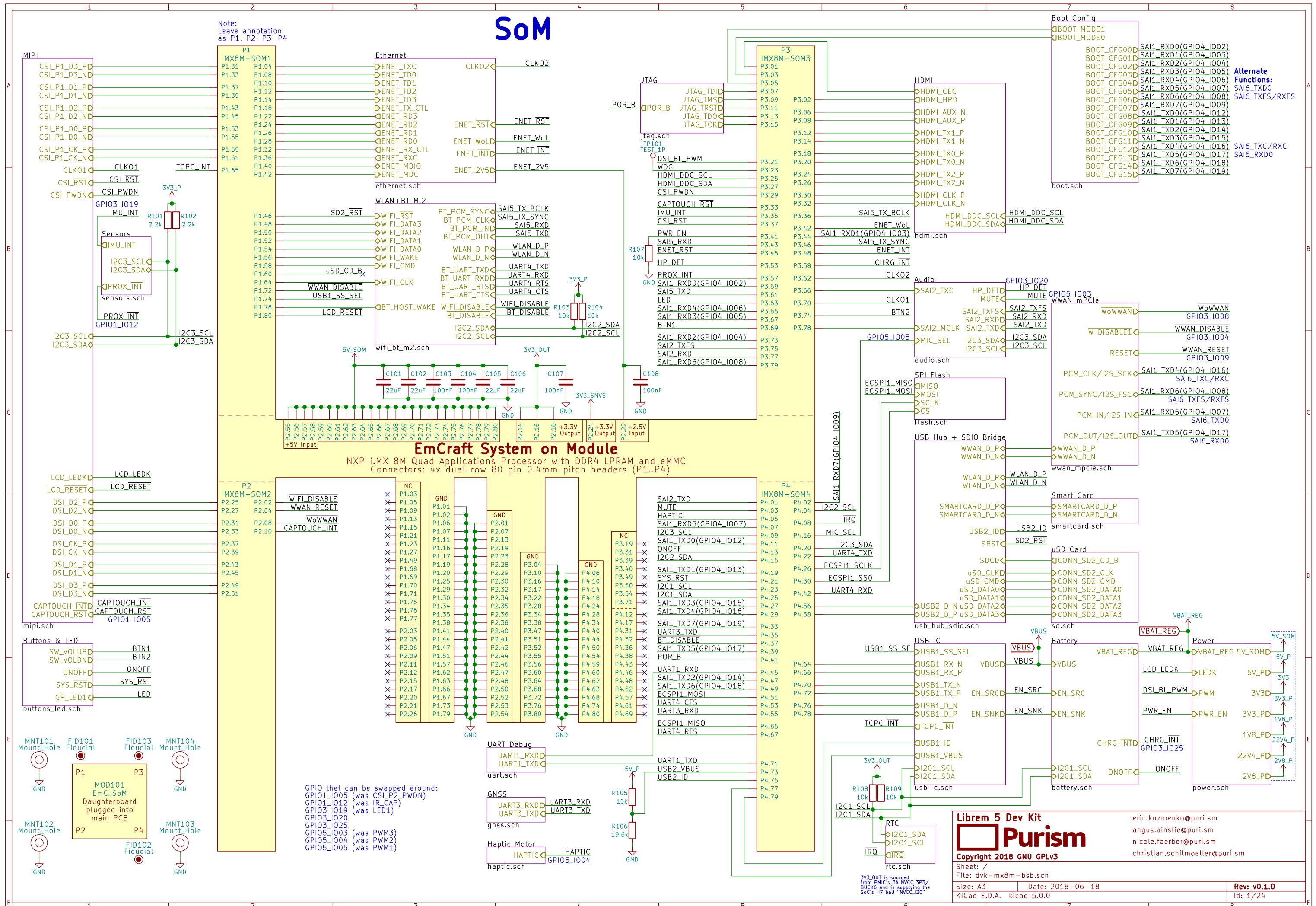


SoM

Note:
Leave annotation
as P1, P2, P3, P4



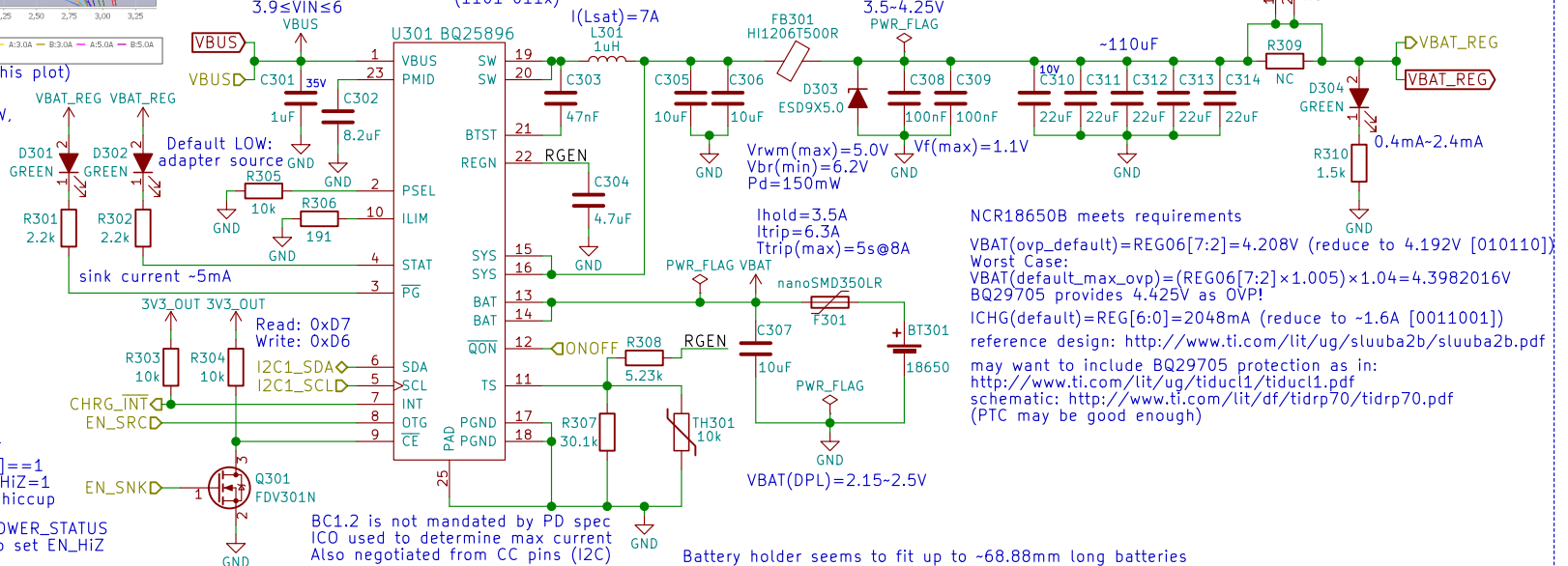


(interpret RSOC% based on this plot)

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

$1.658 \leq ILIM \leq 2.063$
 $ILIM(nom) \approx 1.859A$
 $3.9 \leq VIN \leq 6$
 7-bit Slave Address: 0x6B (1101 011x)



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

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 5.0.0

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

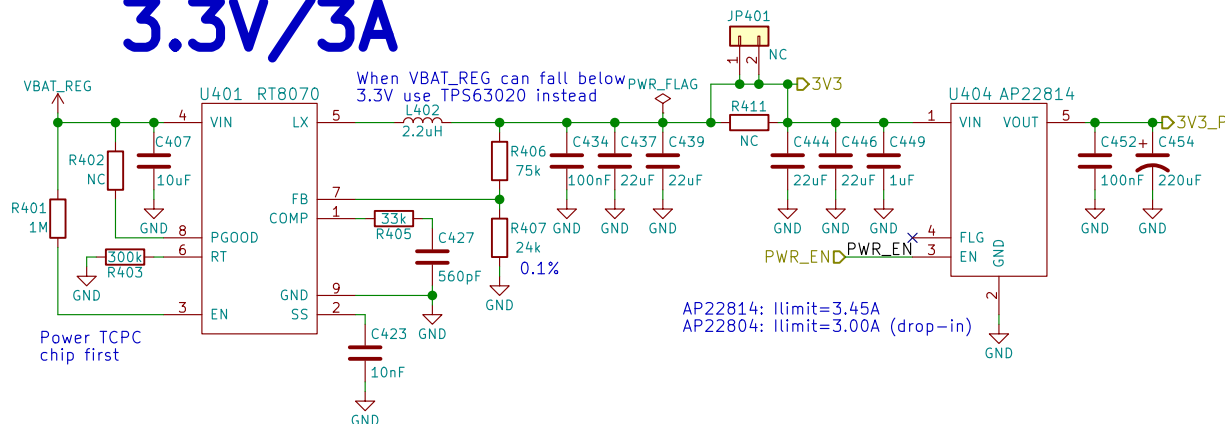
nicole.farber@puri.sm

christian.schilmoeller@puri.sm

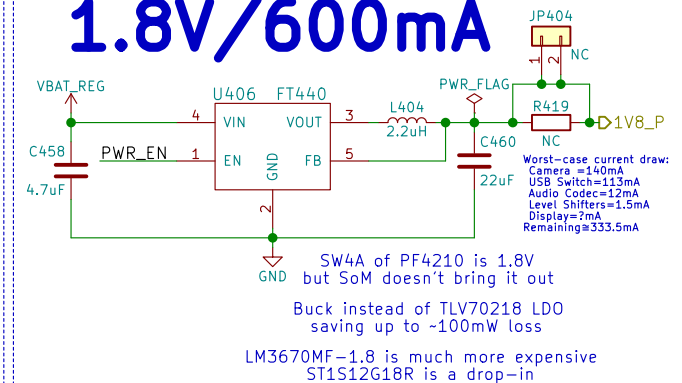
Rev: v0.1.0

Id: 3/24

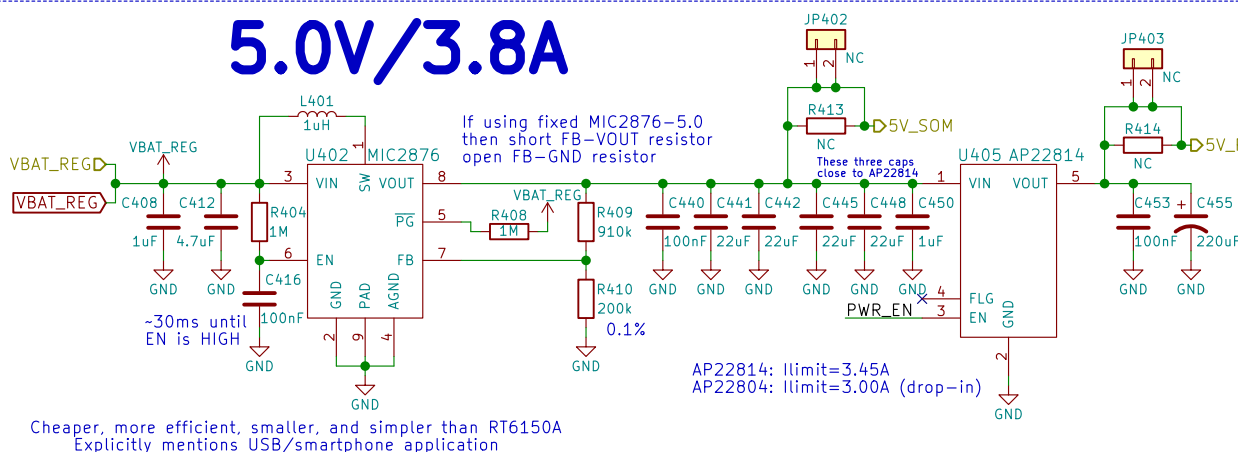
3.3V/3A



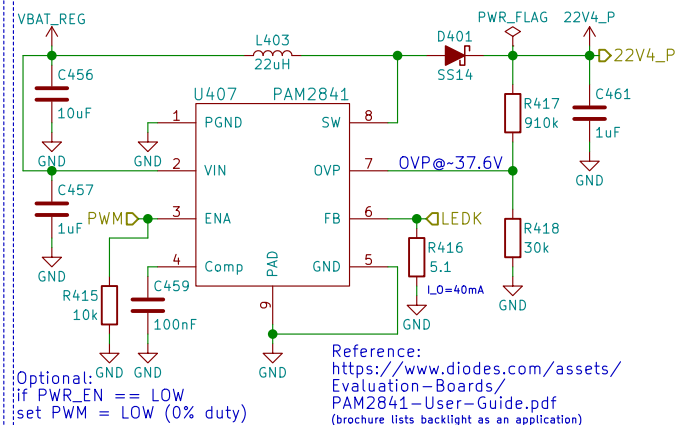
1.8V/600mA



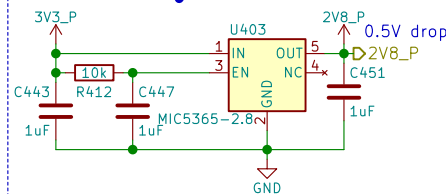
5.0V/3.8A



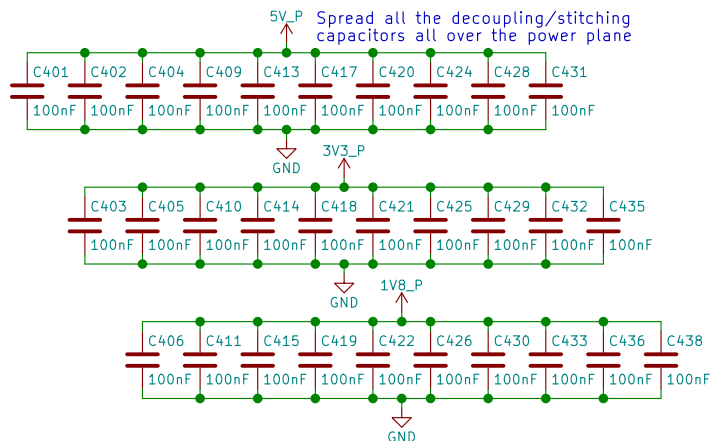
22.4V/40mA



2.8V/150mA



Power



Power

Purism

Copyright 2018 GNU GPLv3

Sheet: /Power/
File: power.sch

Size: A4
KiCad E.D.A. kicad 5.0.0

eric.kuzmenko@puri.sm

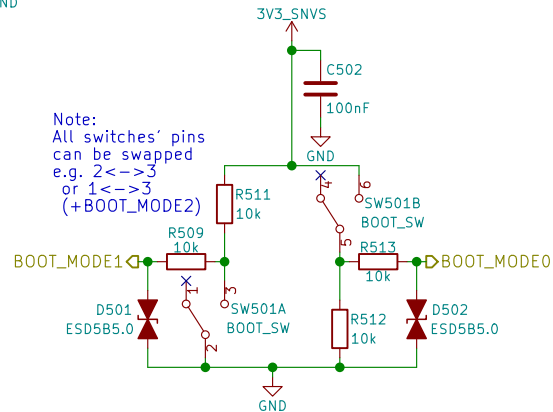
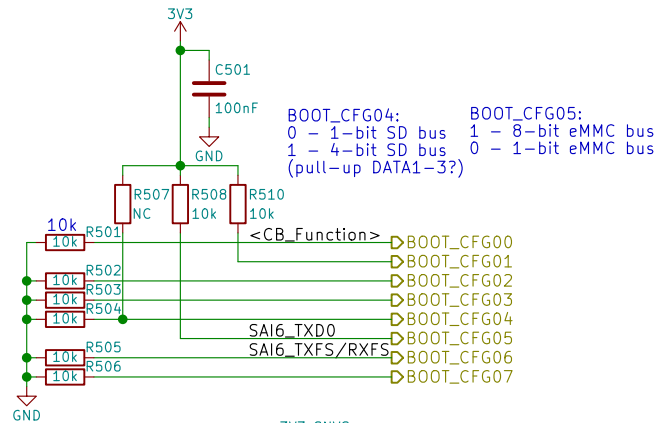
angus.ainslie@puri.sm

nicole.faeber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 4/24

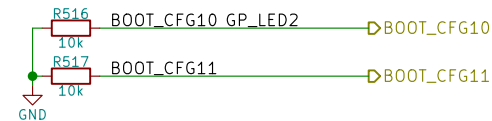
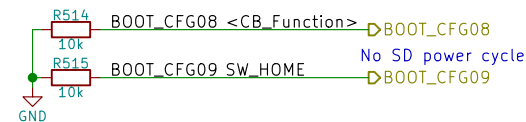
Boot Config



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 5.0.0

eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

nicole.ferber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 5/24

7-bit Slave Address: 0x68
(1101 000x)

Read: 0xD1
Write: 0xD0

U601

I2C1_SDA 1 SDA SCL 8 I2C1_SCL 7 D601 DB2J209 3V3_OUT R601 10k FB601

2 SQA NC 6 VSS IRQ 5 NC VDD

RV-4162-C7

GND

When powered on
VBAT_REG is used
3.5-4.25V

VIH(min) not given, however
assuming $V_{IH(min)} \approx 0.77647 \cdot V_{DD}$
@ $V_{DD} = 4.25V$ then $V_{IH(min)} \approx 3.2999975V$

VBAT is PTC fused
If battery is depleted
then current is $\sim 350nA$
($< 1\mu Watt$)

BLM18PG1215N1D

VBAT


R602 4.99k

BAT54C

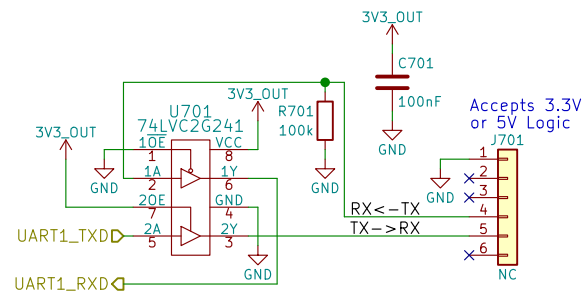
VBAT_REG

C601 100nF

GND

<div> <div> <div>RTC</div> <div>  <div>Purism</div> </div> </div> <div> <div>eric.kuzmenko@puri.sm</div> <div>angus.ainslie@puri.sm</div> <div>nicole.faeerber@puri.sm</div> <div>christian.schilmoeller@puri.sm</div> </div> </div>	
Copyright 2018 GNU GPLv3	
Sheet: /RTC/ File: rtc.sch	
Size: A4	Date: 2018-06-18
KiCad E.D.A. kicad 5.0.0	Rev: v0.1.0 Id: 6/24

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 5.0.0

Rev: v0.1.0

Id: 7/24

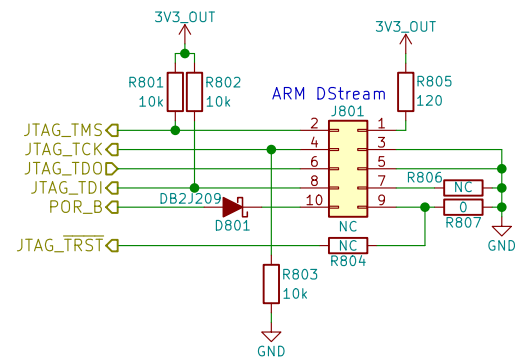
eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

JTAG



JTAG



Copyright 2018 GNU GPLv3

Sheet: /JTAG/

File: jtag.sch

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

Size: A4	Date: 11/01/2025
KiCad E.D.A.	kicad 5.0.0

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

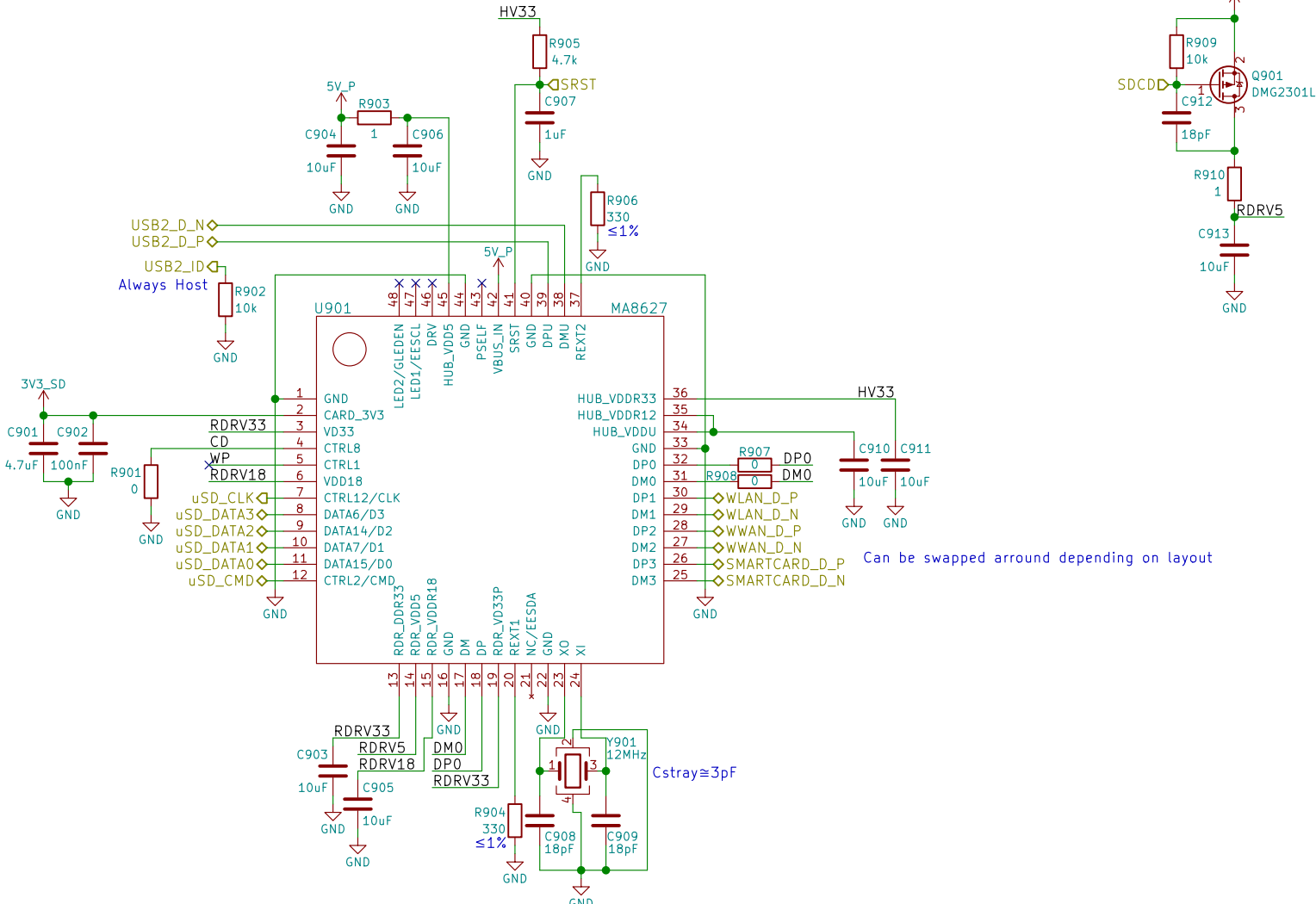
nicole.faerber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 8/24

USB Hub + SDIO Bridge



USB Hub + SDIO Bridge



Copyright 2018 GNU GPLv3

Sheet: /USB Hub + SDIO Bridge/

File: usb_hub_sdio.sch

Size: A4	Date:
----------	-------

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

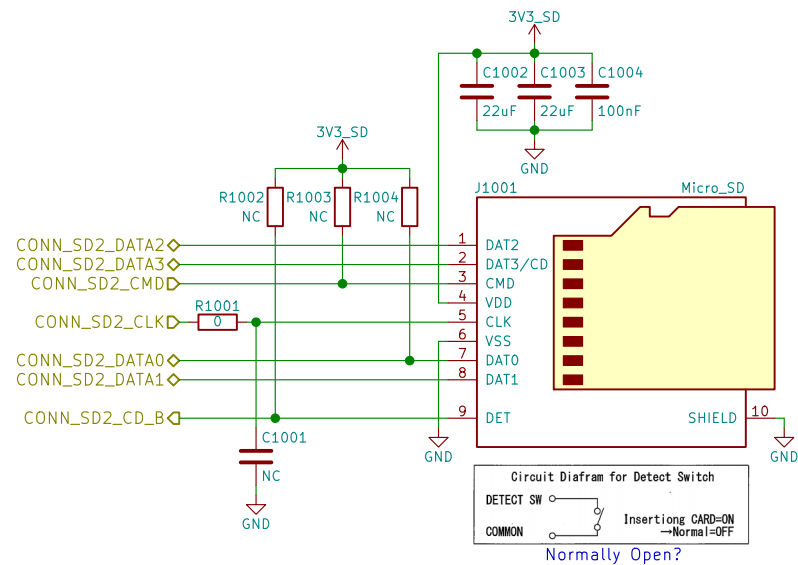
nicole.faerber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 9/24

μSD



uSD Card



Purism

Copyright 2018 GNU GPLv3

Sheet: /uSD Card/

File: sd.sch

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.ferber@puri.sm

christian.schilmoeller@puri.sm

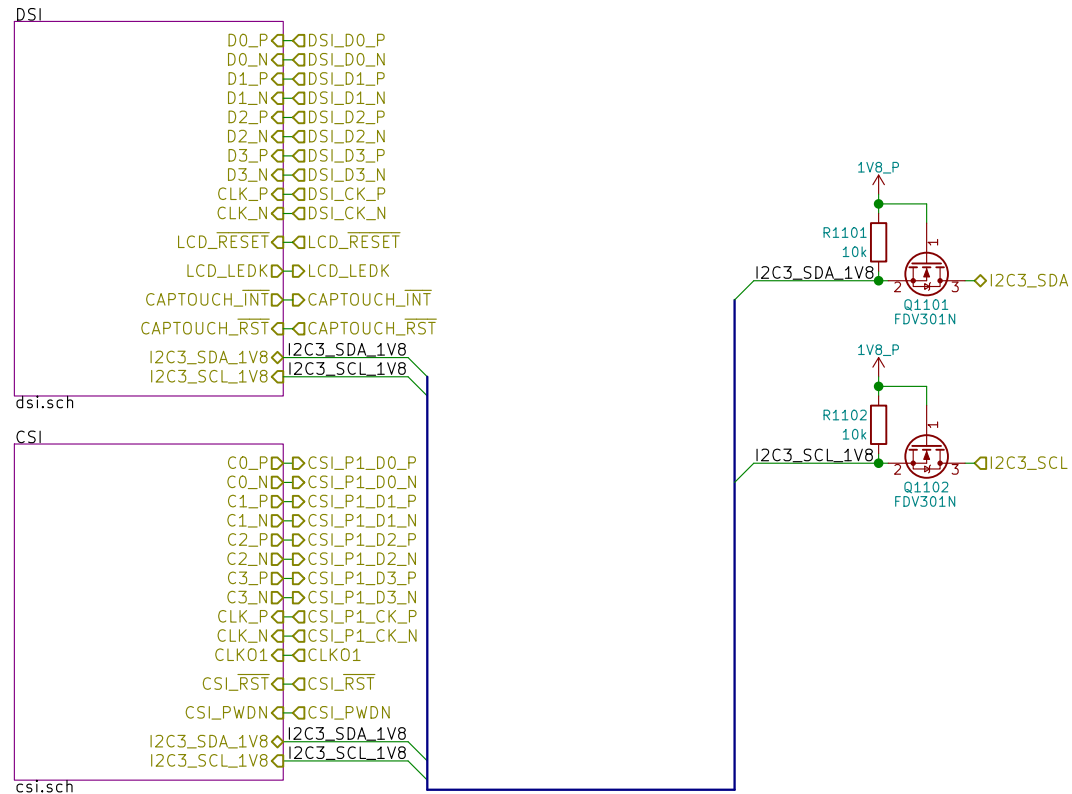
Size: A4	Date: 2018-06-18
----------	------------------

Size: A4	Date: 11/01/2025
KiCad E.D.A.	kicad 5.0.0

Rev: v0.1.0

Id: 10/24

MIPI



MIPI



Copyright 2018 GNU GPLv3

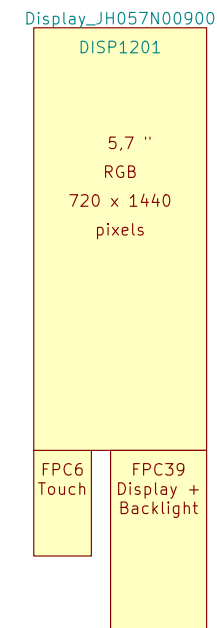
Sheet: /MIPI/
File: mipi.sch

Size: A4 Date: 2018-06-18
KiCad E.D.A. kicad 5.0.0

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


Rev: v0.1.0
Id: 11/24

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




Pin#	Definition
1	SCL
2	SDA
3	INT
4	RESET
5	VDD2.85
6	GND

Front:



Back:



DSI FPC:
Front: Back:

Backlight Array:

LED K1

LED K2

LEDA1

LEDA2

MIPI DSI



Copyright 2018 GNU GPLv3

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

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

Size: A4	Date: 2018-06-18
KiCad E.D.A. kicad 5.0.0	

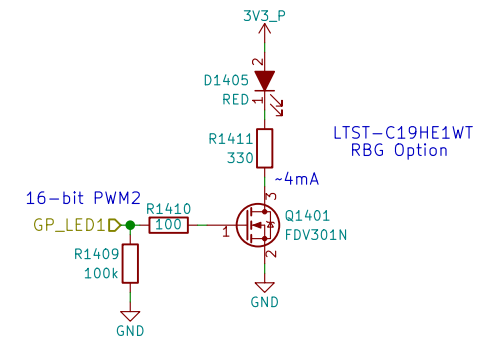
Rev: v0.1.0
Id: 12/24

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

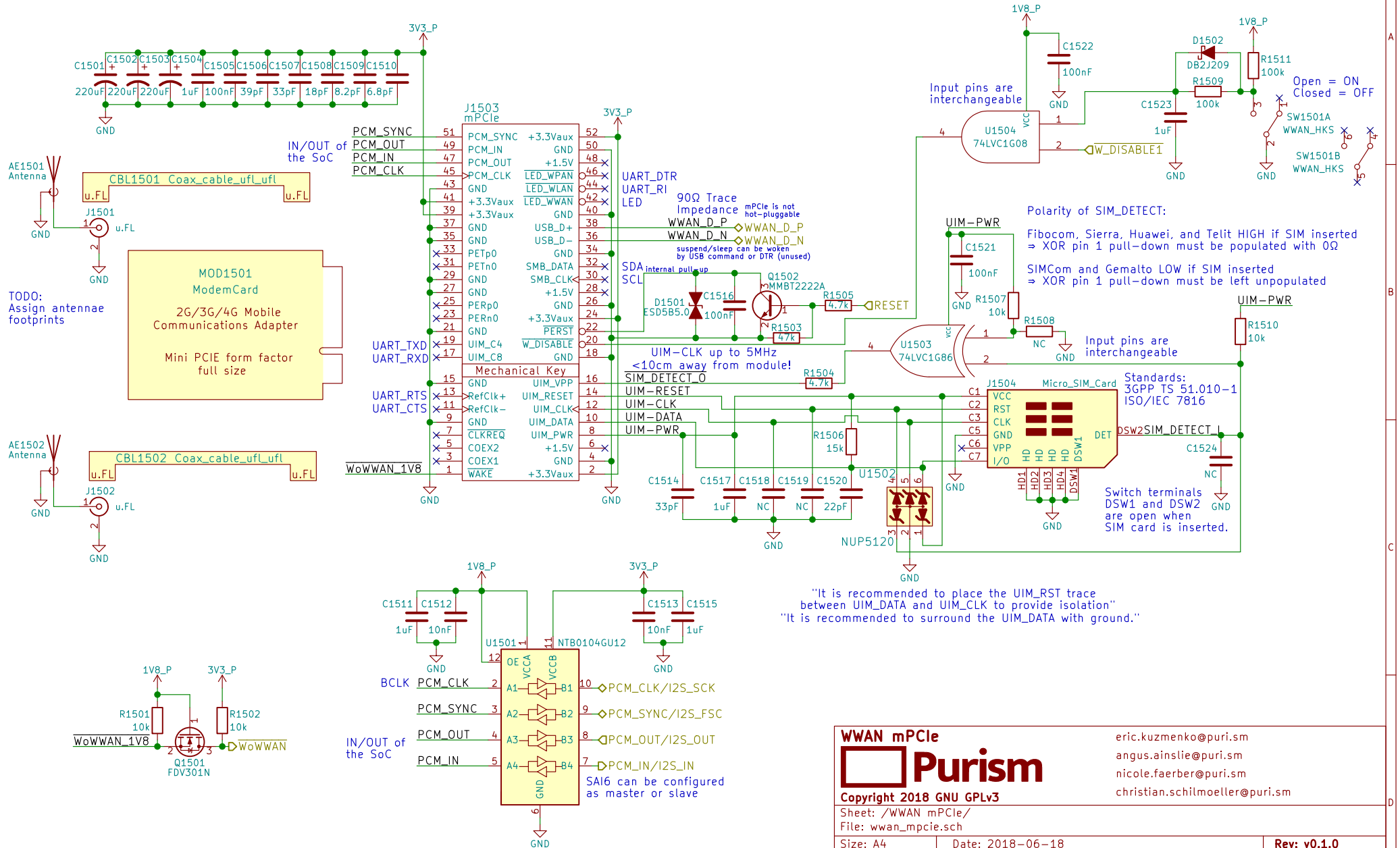
Sheet: /Buttons & LED/
 File: buttons_led.sch

Size: A4 Date: 2018-06-18
 KiCad E.D.A. kicad 5.0.0

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

Rev: v0.1.0
 Id: 14/24

WWAN mPCIe



WWAN mPCIe

Purism

Copyright 2018 GNU GPLv3

Sheet: /WWAN mPCIe/
File: wwan_mpcie.sch

Size: A4 Date: 2018-06-18
KiCad E.D.A. kicad 5.0.0

eric.kuzmenko@puri.sm

angus.ainstie@puri.sm

nicole.faeber@puri.sm

christian.schilmoeller@puri.sm

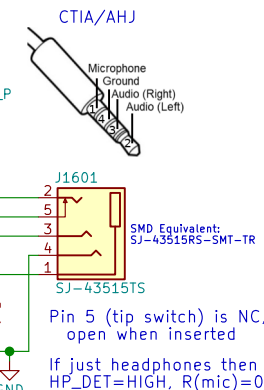
Rev: v0.1.0

Id: 15/24

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-creating-a-short-circuit>
 (Nitt6 does the same)
 +Zener diode to protect against ranges outside of -0.9V to 3.3V

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

Could use FSA8008 to detect mic

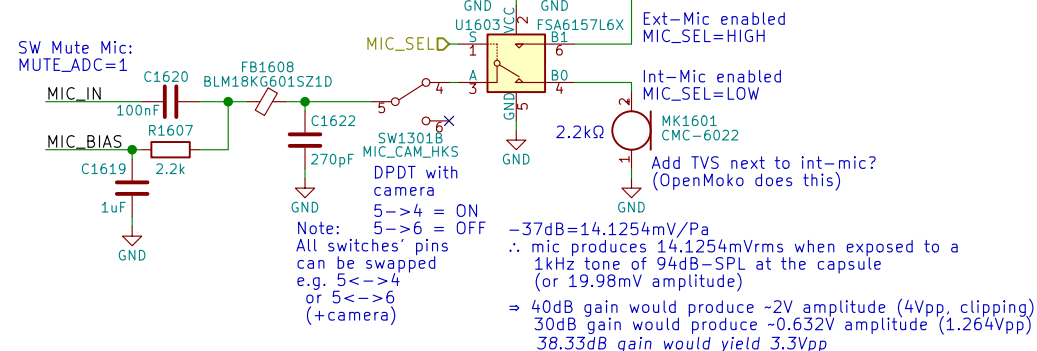


Frequency Response, Magn dB re 1.000V/Pa

dB re 1V/Pa

100 1k 10k 20k

Earbud Microphone: @1kHz	Headset Speaker: @1kHz	Earbud Speaker: @1kHz
<p> $L_s = 3.844\text{mH}$ $L_p = 15.757\text{H}$ $C_s = 6.583\mu\text{F}$ $C_p = 1612.8\text{pF}$ $R_s = 1.54656\text{k}\Omega\text{ms}$ $R_p = 1.5478\text{k}\Omega\text{ms}$ $\theta = -0.8\text{deg}$ </p>	<p> $L_s = 244.4\mu\text{H}$ $L_p = 141.99\text{mH}$ $C_s = 103.6\mu\text{F}$ $C_p = 177.78\text{nF}$ $R_s = 36.860\text{m}\Omega\text{ms}$ $R_p = 36.860\text{m}\Omega\text{ms}$ $\theta = -2.3\text{deg}$ </p>	<p> $L_s = 25.2\mu\text{H}$ $L_p = 311.0\text{mH}$ $C_s = 1.0\text{mF}$ $C_p = 81.95\text{nF}$ $R_s = 17.030\text{m}\Omega\text{ms}$ $R_p = 17.034\text{m}\Omega\text{ms}$ $\theta = 0.5\text{deg}$ </p>



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

Rev: v0.1.0

[illegible]

Purism

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

Id: 17/24

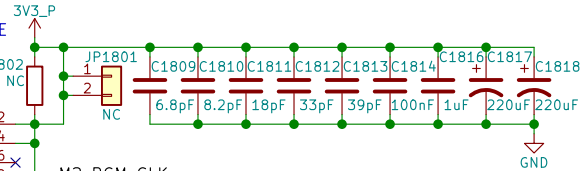
WLAN+BT M.2

RS9116 NC:
RTS, CTS, BT_HOST_WAKE

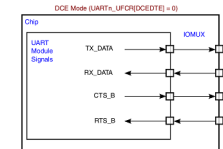
RS9116 datasheet says
no WIFI_WAKE
but the schematic has it

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

Socket: Table 46
Module: Table 23
M.2 Key E



6.2 M.2 Signal Directions
UARTn_UFCR[DCEDTE]=0 on POR

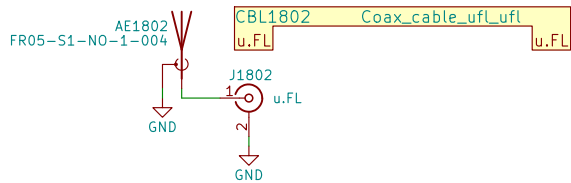
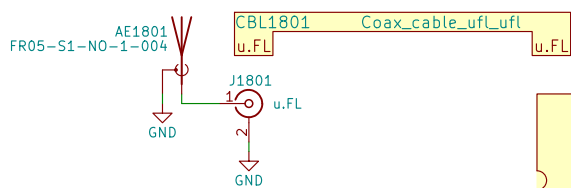


TX output
RX input
CTS output
RTS input
TX<->RX
RX<->CTS
CTS<->RTS
RTS<->RTS

RedPine RS9116
has 100k pull-up to
3.3V making SDIO_RST
~2.55V when HIGH

MOD1801
WifiBTCard
Wifi + Bluetooth
M.2 Form Factor
Key ID "E"
width: 22 mm
length: 30 mm

TODO:
Assign antennae
footprints



Pin 54 on RS9116 is
USB_VBUS Sink

Leave BT_DISABLE
LOW for RS9116

RS9116 SUSCLK
is a GPIO (unused)
SUSCLK

W_DISABLE2
W_DISABLE1
M2_I2C_SDA
M2_I2C_SCL

U1803A 74LVC2G08
U1803B 74LVC2G08

Input pins are
interchangeable

WIFI_DISABLE

RS9116 is an I2C master
its SCL is an output
(ok bc only device on I2C2)

M2_I2C_SDA
M2_I2C_SCL

Q1801 FDV301N
Q1802 FDV301N

1V8_P
3V3_P

BT_UART_RXD
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS

BT_UART_CTS
BT_UART_CTS
BT_UART_CTS
BT_UART_CTS

BT_UART_CTS
BT_UART_CTS
BT_UART_CTS
BT_UART_CTS

WLAN+BT M.2
Purism

Copyright 2018 GNU GPLv3

Sheet: /WLAN+BT M.2/
File: wifi_bt_m2.sch

Size: A4
KiCad E.D.A. kicad 5.0.0

Date: 2018-06-18

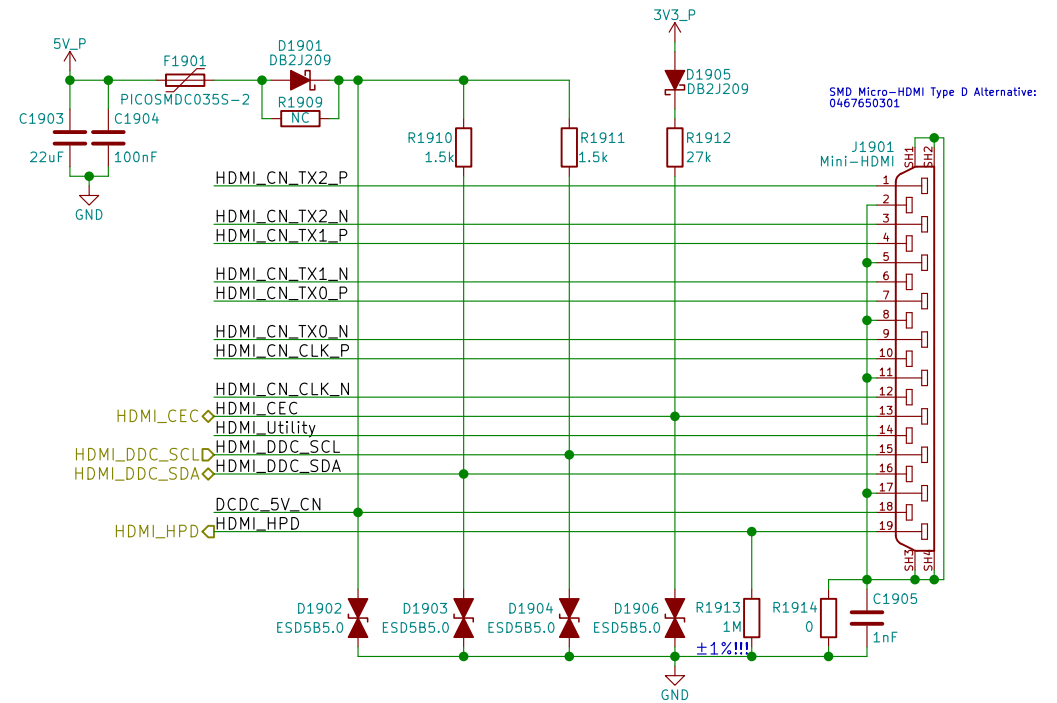
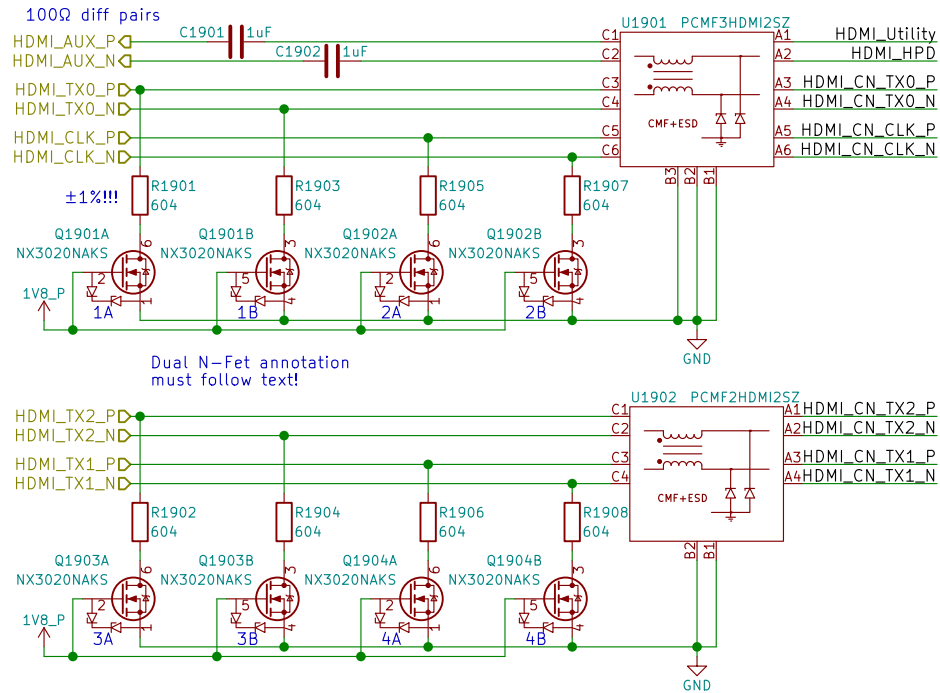
eric.kuzmenko@puri.sm
angus.ainstlie@puri.sm
nicole.farber@puri.sm
christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 18/24

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
KiCad E.D.A. kicad 5.0.0

Date: 2018-06-18

Rev: v0.1.0
Id: 19/24

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

SPI NOR Flash  Purism		eric.kuzmenko@puri.sm angus.ainslie@puri.sm nicole.faeber@puri.sm christian.schilmoeller@puri.sm
Copyright 2018 GNU GPLv3		
Sheet: /SPI Flash/ File: flash.sch		
Size: A4	Date: 2018-06-18	Rev: v0.1.0
KiCad E.D.A. kicad 5.0.0		Id: 21/24

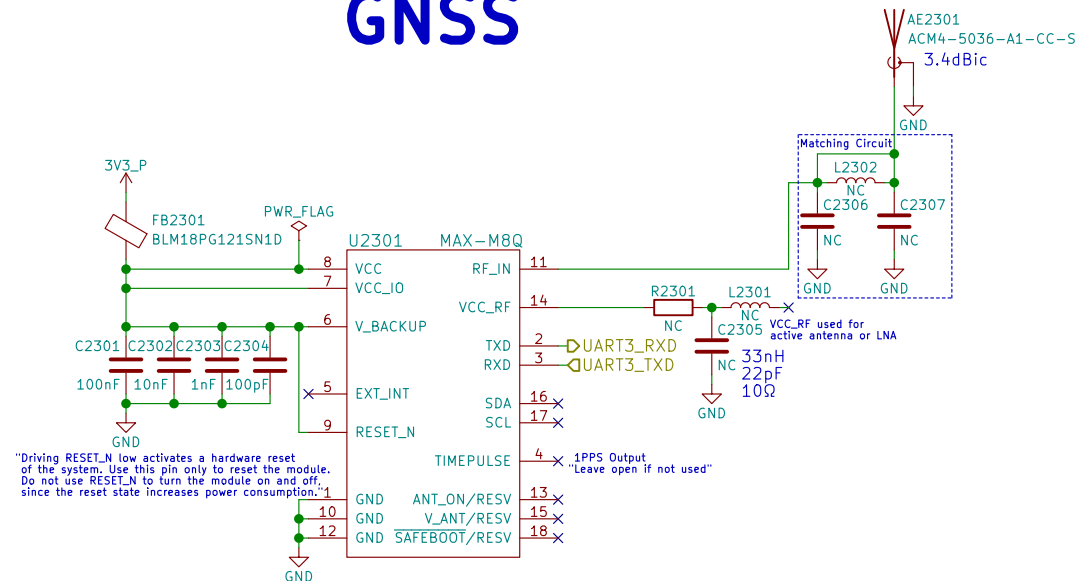
Smart Card



christian.schilmoeller@puri.sm

Id: 22/24

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



Copyright 2018 GNU GPLv3

Sheet: /GNSS/
 File: gnss.sch

Size: A4
 KiCad E.D.A. kicad 5.0.0

Date: 2018-06-18

Rev: v0.1.0

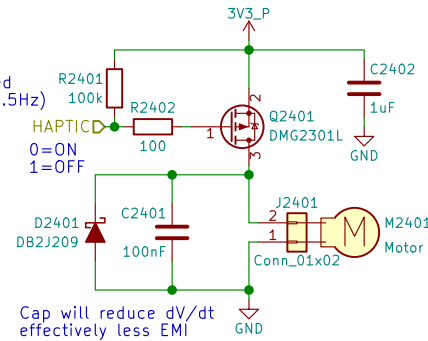
Id: 23/24

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

Haptic Motor

PWM pins occupied:
 GPIO1_I001 - LCD Backlight
 GPIO1_I013 - LED
 GPIO1_I014 - Ethernet (CLKO_25MHz)
 GPIO1_I015 - CSI (CLKO2)

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



Copyright 2018 GNU GPLv3

Sheet: /Haptic Motor/
 File: haptic.sch

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

Size: A4 Date: 2018-06-18

KiCad E.D.A. kicad 5.0.0

Rev: v0.1.0

Id: 24/24