

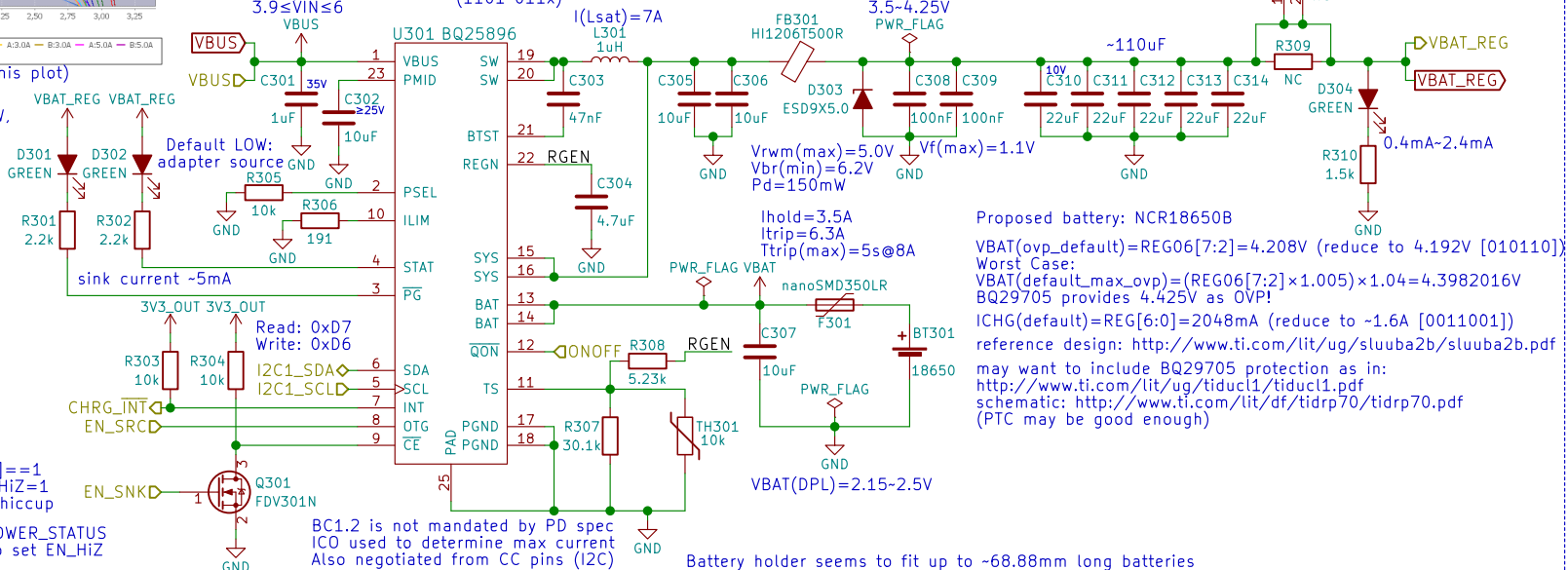
(interpret RSOC% based on this plot)

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)

Battery Charge Controller



This disables charging but maybe not $VBUS \rightarrow VOUT$ if PTN5110HQ's $FAULT_STATUS[6] = 1$ (Force Off VBUS bit) then set $EN_HiZ = 1$ EN_HiZ may be auto-set when in hiccup

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

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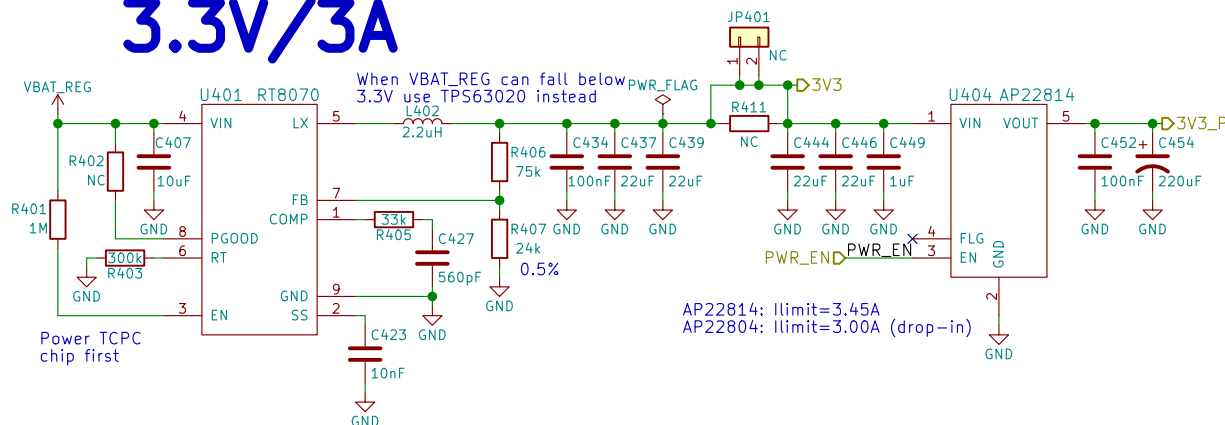
Sheet: /Battery/
 File: battery.sch

Size: A4 Date: 2018-08-14
 KiCad E.D.A. kicad 5.0.0

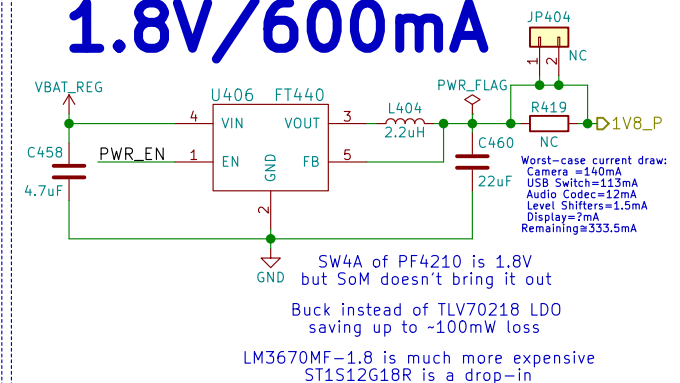
eric.kuzmenko@puri.sm
 angus.ainslie@puri.sm
 nicole.ferber@puri.sm
 christian.schilmoeller@puri.sm

Rev: v0.1.0
 Id: 3/24

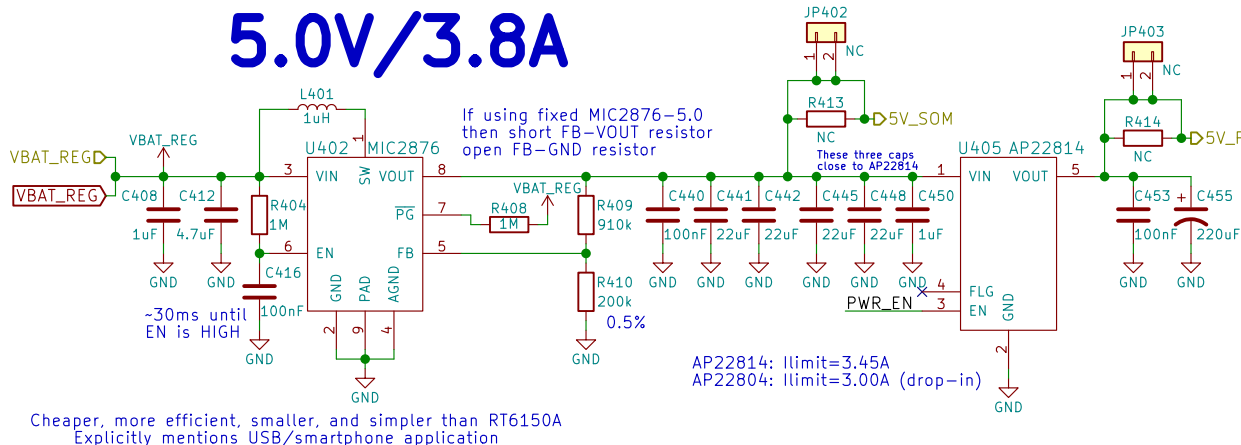
3.3V/3A



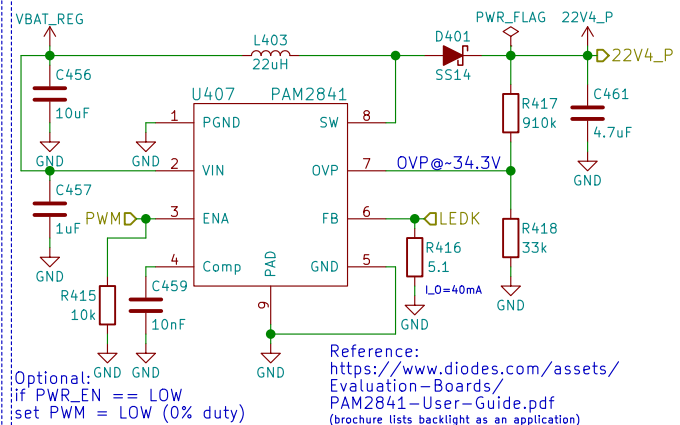
1.8V/600mA



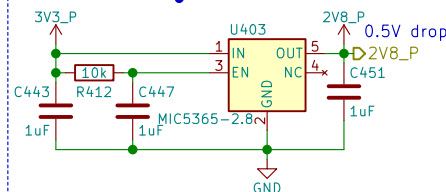
5.0V/3.8A



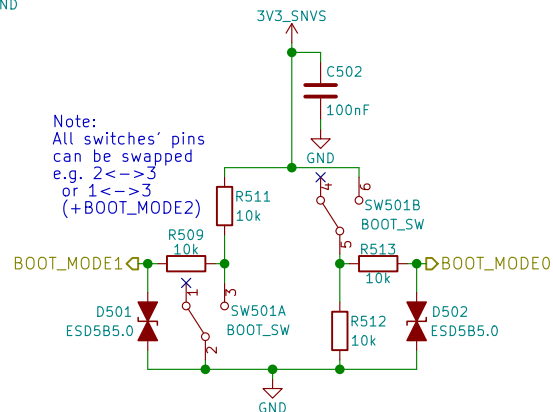
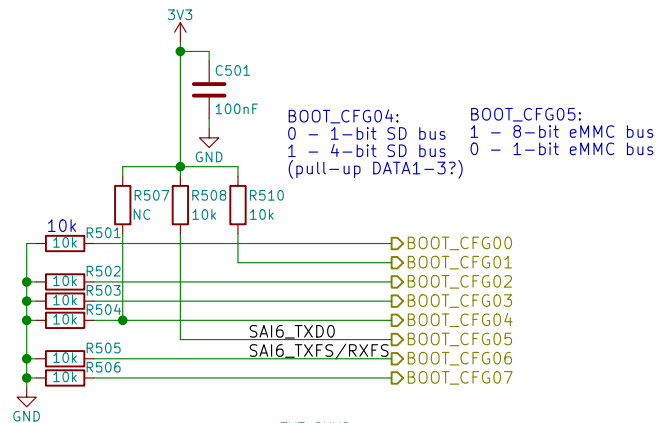
22.4V/40mA



2.8V/150mA

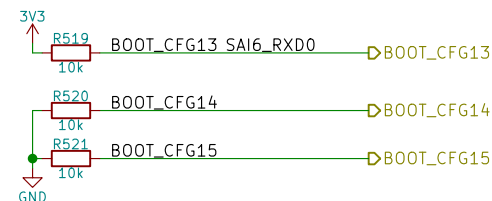
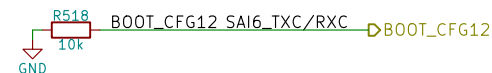
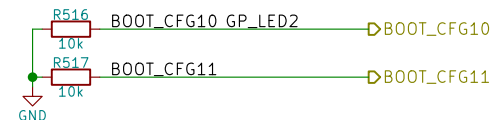
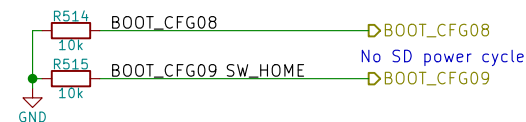


Boot Config



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

BOOT_CFG[14:12]		Only eMMC			
		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



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Sheet: /Boot Config/
File: boot.sch

Size: A4
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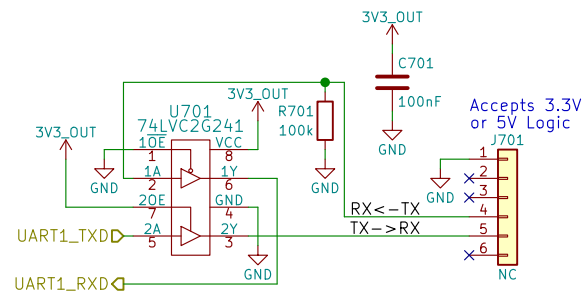
nicole.farber@puri.sm

christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 5/24

UART Debug



UART Debug



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Sheet: /UART Debug/

File: uart.sch

Size: A4

Date: 2018-08-14

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Rev: v0.1.0

Id: 7/24

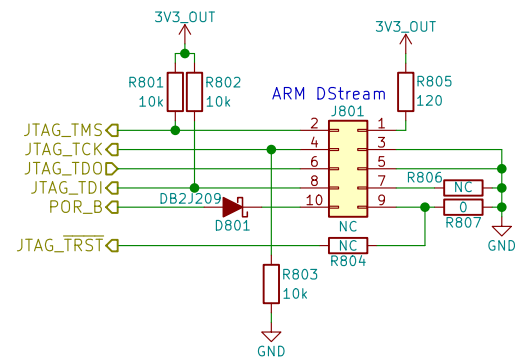
eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

nicole.farber@puri.sm

christian.schilmoeller@puri.sm

JTAG



JTAG



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Sheet: /JTAG/

File: jtag.sch

Size: A4	Date: 2018-08-14
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Size: A4	Date: 11/01/2025
KiCad E.D.A.	kicad 5.0.0

eric.kuzmenko@puri.sm

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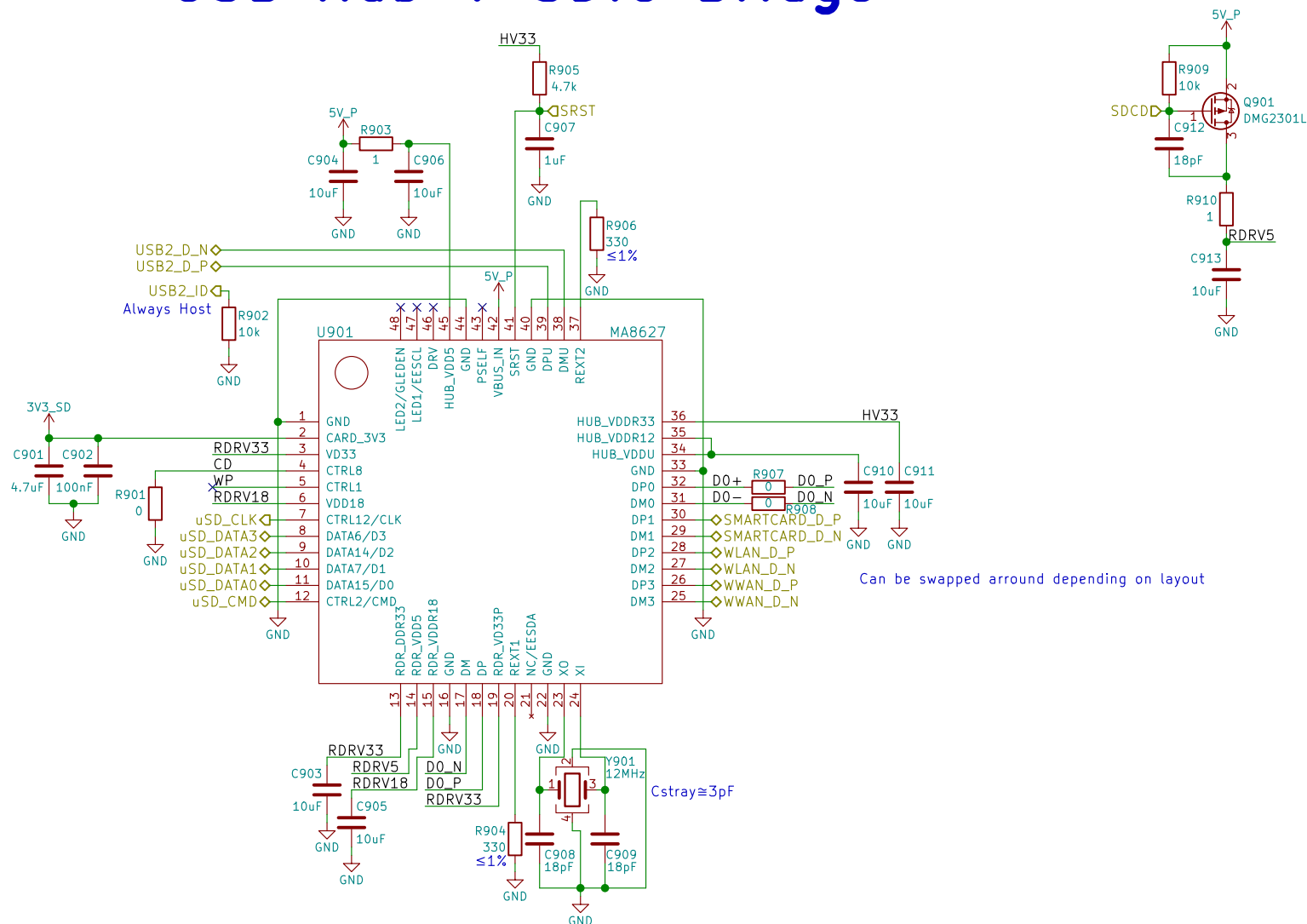
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christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 8/24

USB Hub + SDIO Bridge



USB Hub + SDIO Bridge



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Sheet: /USB Hub + SDIO Bridge/
File: usb_hub_sdio.sch

Size: A4 Date: 2018-08-14

KiCad E.D.A. kicad 5.0.0

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angus.ainstie@puri.sm

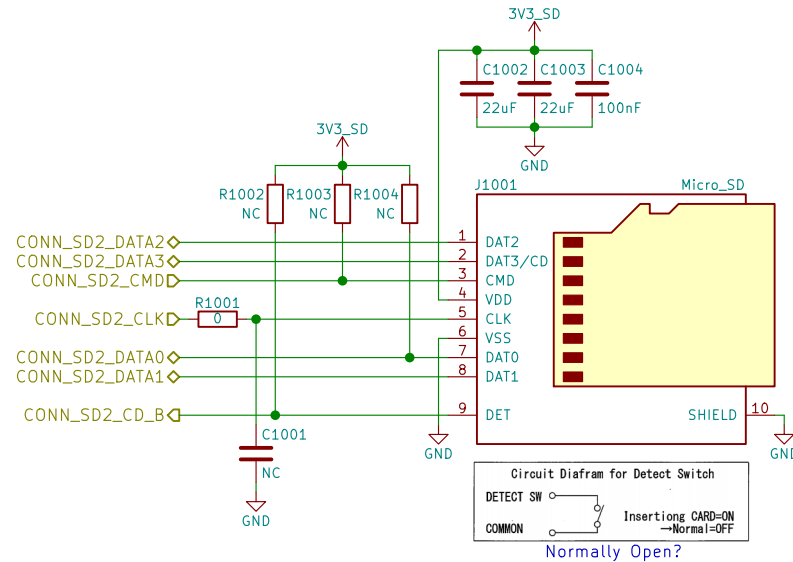
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christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 9/24

μSD



uSD Card



Purism

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Sheet: /uSD Card/

File: sd.sch

Size: A4 Date: 2018-08-14

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Rev: v0.1.0

Id: 10/24

MIPI



MIPI



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Sheet: /MIPI/
File: mipi.sch

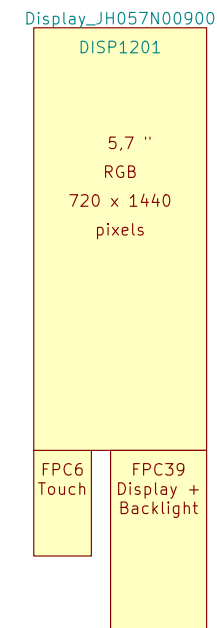
Size: A4
KiCad E.D.A. kicad 5.0.0

Date: 2018-08-14

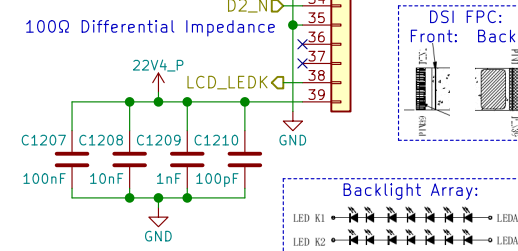
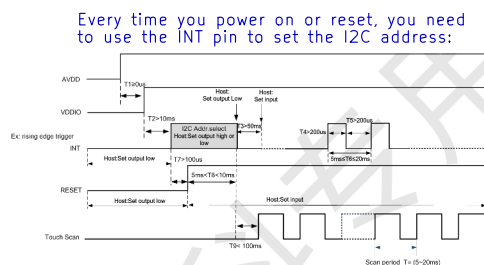
Rev: v0.1.0
Id: 11/24

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

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



	7-Bit Address	8-Bit Write Address	8-Bit Read Address
LOW	0x5D	0xBA	0xBB
HIGH	0x14	0x28	0x29



 Purism

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Size: A4	Date: 2018-08-14
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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



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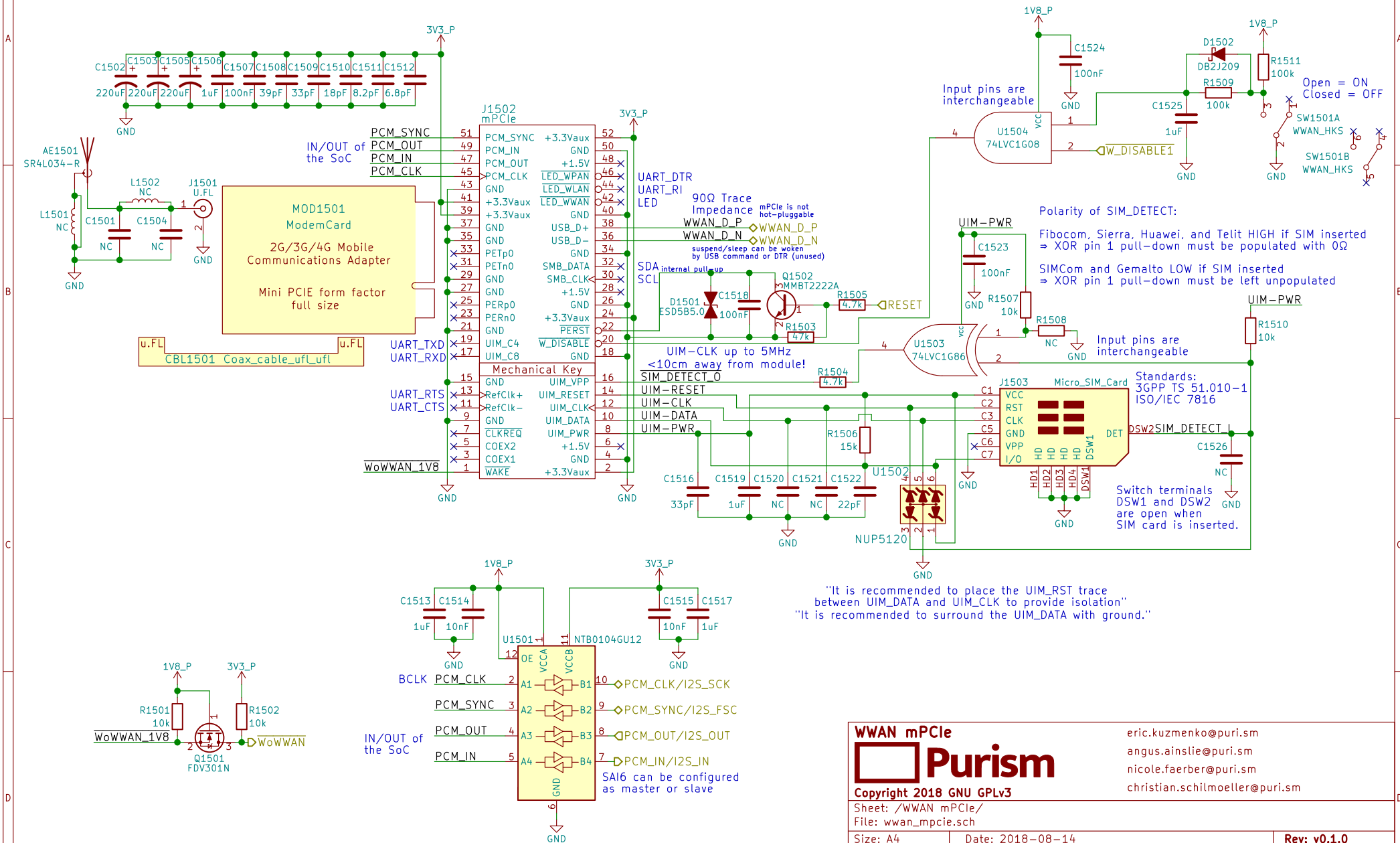
Sheet: /Buttons & LED/
 File: buttons_led.sch

Size: A4 Date: 2018-08-14
 KiCad E.D.A. kicad 5.0.0

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

Rev: v0.1.0
 Id: 14/24

WWAN mPCIe



Purism

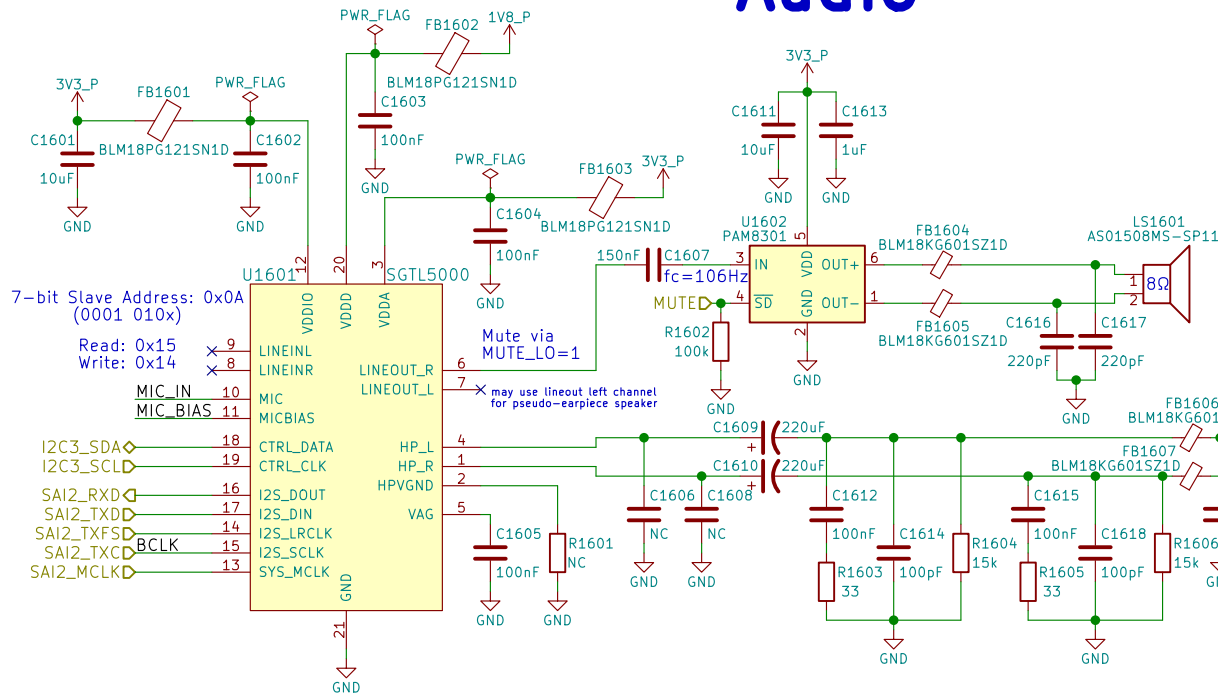
Sheet: /WWAN mPCIe/
File: wwan_mpcie.sch

Size: A4	Date: 2018-08-14
KiCad E.D.A. kicad 5.0.0	

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christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 15/24

Audio



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>
 (Nitin6 does the same)
 +Zener diode to protect against ranges outside of -0.9V to 3.3V

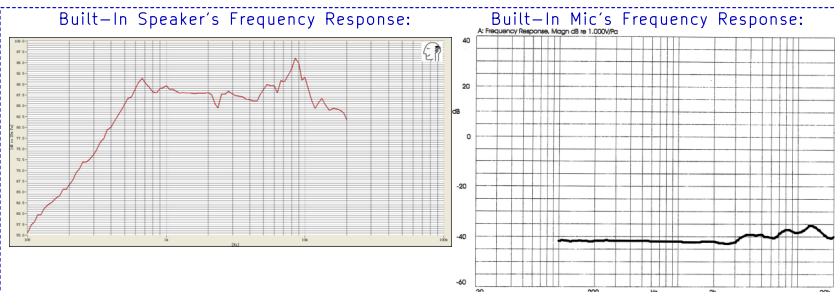
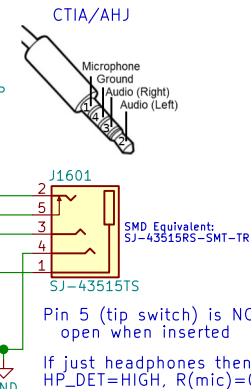
dB specs in datasheet is a unit of power gain (not dBu or VU) with respect to the DAC's unattenuated output

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

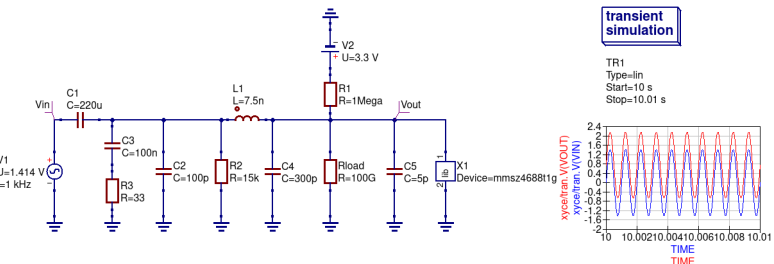
If HP_DET is HIGH for >100ms then HPs are present

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

Could use FSA8008 to detect mic



Simulation of HP_DET
without HP jack inserted:



LCR Measurements:

Earbud Microphone:	Headset Speaker:	Earbud Speaker:
$\leq 1\text{kHz}$ $L_s = 3.844\text{mH}$ $L_p = 15.757\text{H}$ $C_s = 6.583\mu\text{F}$ $C_p = 1612.8\text{pF}$ $R_s = 1.5465\text{k}\Omega\text{ms}$ $R_p = 1.5478\text{k}\Omega\text{ms}$ $\theta = -0.8\text{deg}$	$\leq 1\text{kHz}$ $L_s = 244.4\mu\text{H}$ $L_p = 141.99\text{mH}$ $C_s = 103.6\mu\text{F}$ $C_p = 178.77\text{nF}$ $R_s = 36.86\Omega\text{ms}$ $R_p = 36.86\Omega\text{ms}$ $\theta = -2.3\text{deg}$	$\leq 1\text{kHz}$ $L_s = 25.2\mu\text{H}$ $L_p = 311.0\text{mH}$ $C_s = 1.0\text{mF}$ $C_p = 81.95\text{nF}$ $R_s = 17.030\Omega\text{ms}$ $R_p = 17.034\Omega\text{ms}$ $\theta = 0.5\text{deg}$

Audio



Purism

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Sheet: /Audio/
File: audio.sch

eric.kuzmenko@puri.sm

angus.ainslie@puri.sm

nicole.ferber@puri.sm

christian.schilmoeller@puri.sm

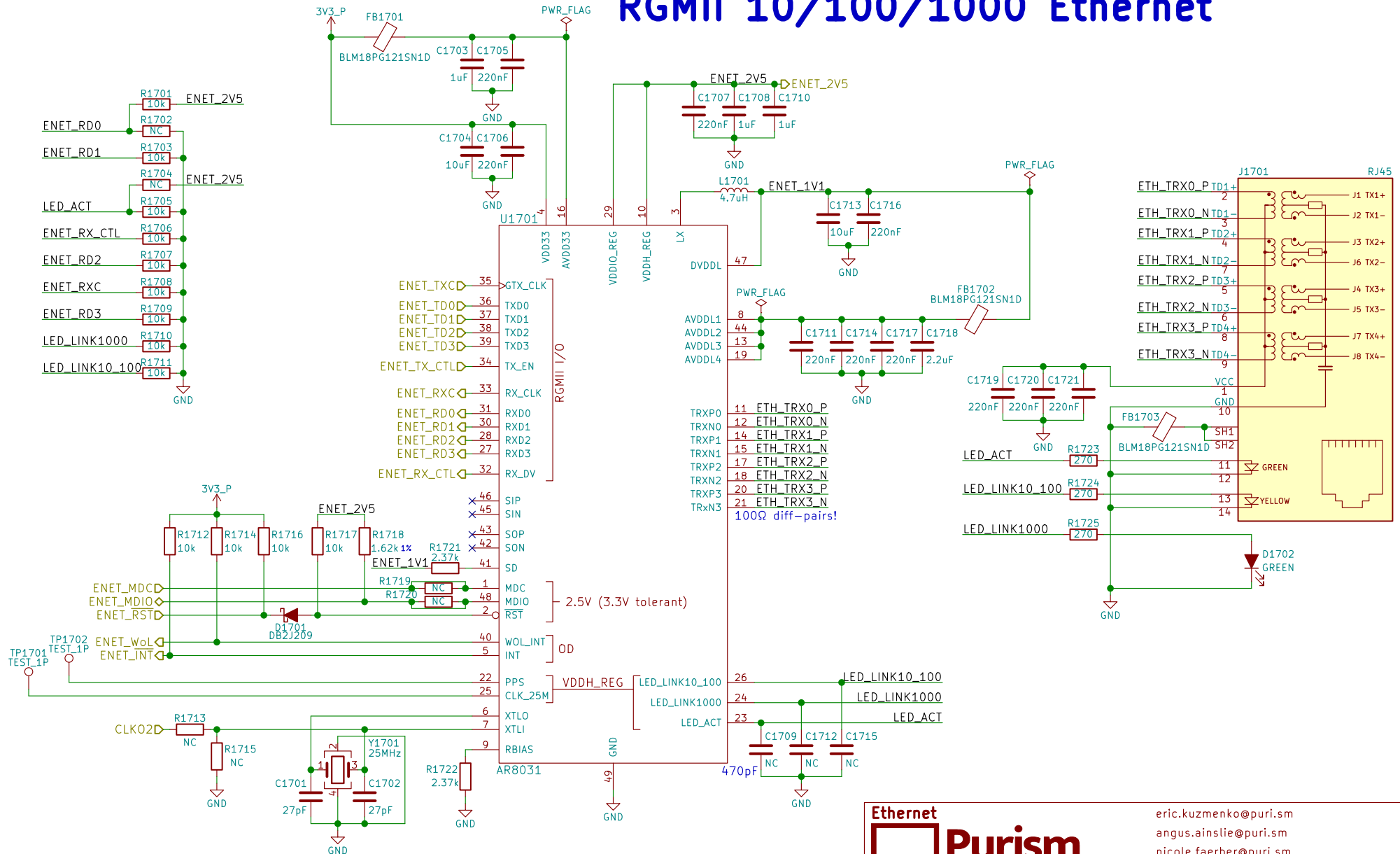
Size: A4	Date: 2018-08-14
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KiCad E.D.A.	kicad 5.0.0
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Rev: v0.1.0

Id: 16/24

RGMII 10/100/1000 Ethernet



Ethernet

Purism

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Sheet: /Ethernet/
File: ethernet.sch

Size: A4 Date: 2018-08-14
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: 17/24

WLAN+BT M.2

RS9116 NC:
RTS, CTS, BT_HOST_WAKE

RS9116 datasheet says
no WIFI_WAKE
but the schematic has it

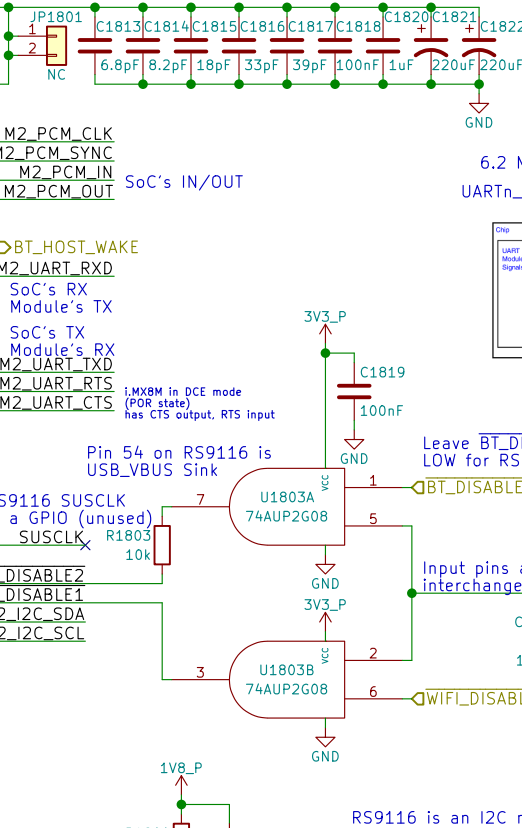
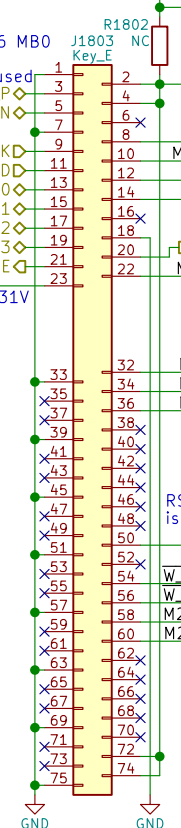
RedPine RS9116 MBO
Requires 5V on
Pin 54 if USB used

WLAN_D_P
WLAN_D_N
WIFI_CLK
WIFI_CMD
WIFI_DATA0
WIFI_DATA1
WIFI_DATA2
WIFI_DATA3
WIFI_WAKE

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

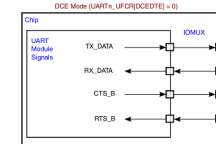
MOD1801
WifiBTCard
WiFi + Bluetooth
M.2 Form Factor
Key ID "E"
width: 22 mm
length: 30 mm

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→TX
CTS→CTS
RTS→RTS

Leave BT_DISABLE
LOW for RS9116

Pin 54 on RS9116 is
USB_VBUS Sink

RS9116 SUSCLK
is a GPIO (unused)
SUSCLK

W_DISABLE2
W_DISABLE1
M2_I2C_SDA
M2_I2C_SCL

Input pins are
interchangeable

BT_DISABLE

WIFI_DISABLE

SW1801A
WLAN_HKS

SW1801B
WLAN_HKS

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

Open = ON
Closed = OFF

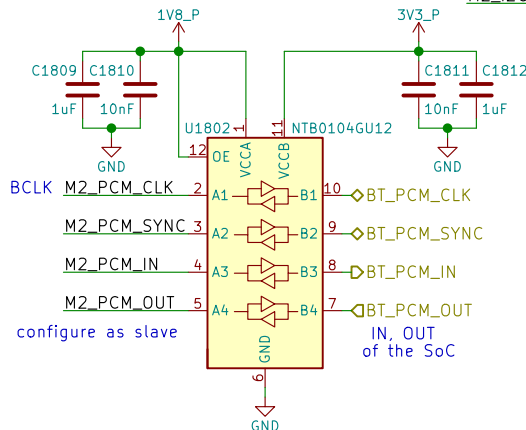
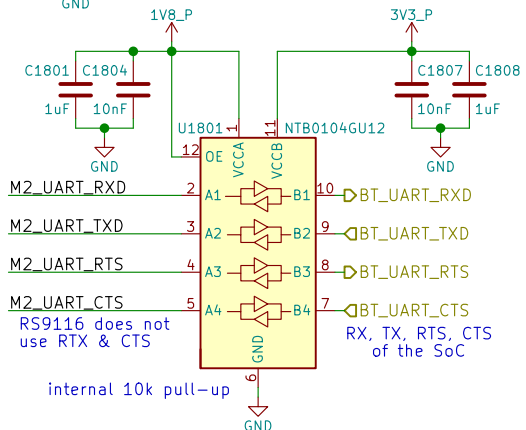
RS9116 is an I2C master
⇒ its SCL is an output
(ok bc only device on I2C2)

M2_I2C_SDA

M2_I2C_SCL

I2C2_SDA

I2C2_SCL



WLAN+BT M.2



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Sheet: /WLAN+BT M.2/

File: wifi_bt_m2.sch

Size: A4

Date: 2018-08-14

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Rev: v0.1.0

Id: 18/24

eric.kuzmenko@puri.sm

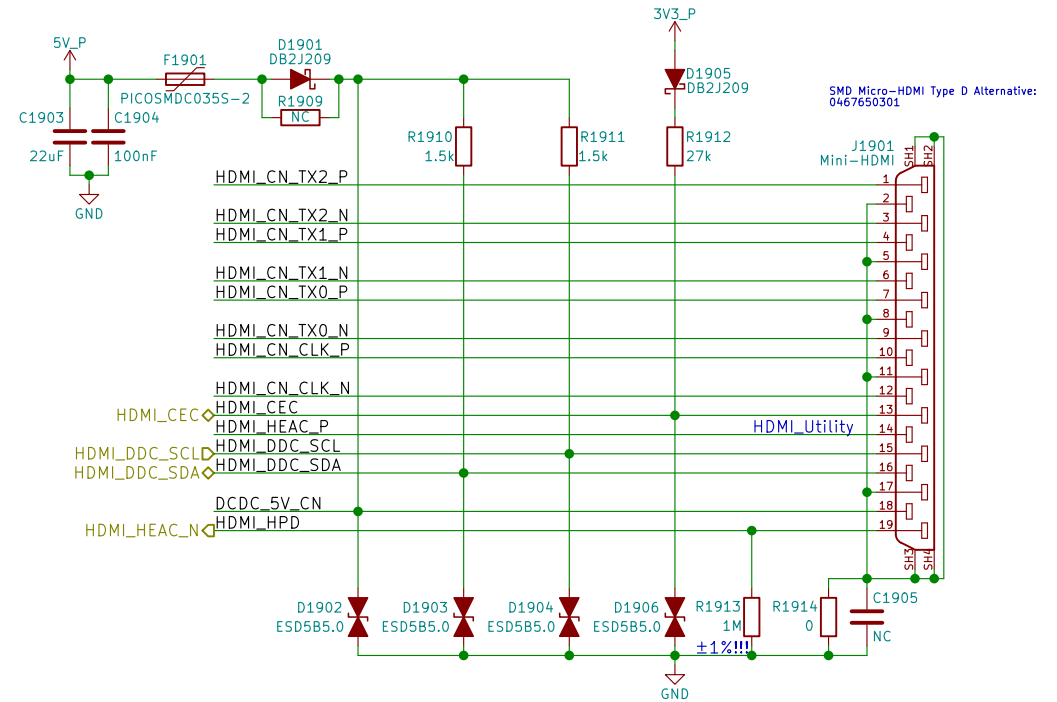
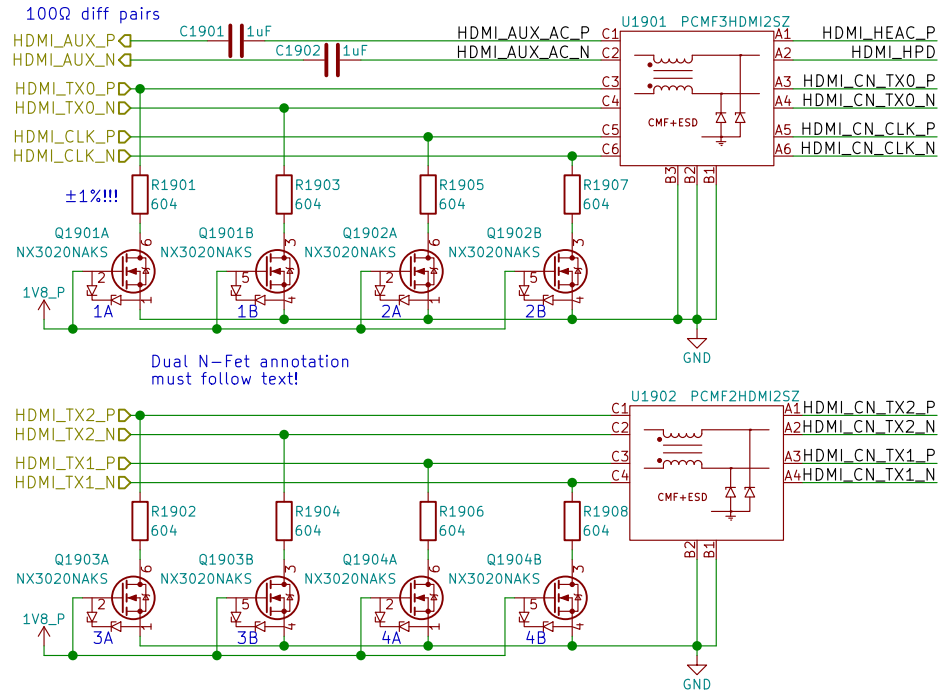
angus.ainstlie@puri.sm

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christian.schilmoeller@puri.sm

TUSB1046 can be used for DP over USB-C

HDMI



HDMI



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Sheet: /HDMI/
File: hdmi.sch

Size: A4 Date: 2018-08-14
KiCad E.D.A. kicad 5.0.0

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christian.schilmoeller@puri.sm

Rev: v0.1.0
Id: 19/24

1

B



C

D

Table 19: Accelerometer and gyroscope SAD+Read/Write patterns



Size: A4 Date: 2018-08-14 Rev: v0.1.0

RICADU E.D.A. RICADU S.O.O	Id. 20/24
----------------------------	-----------

Id: 20/24

Id: 21/24

[illegible]

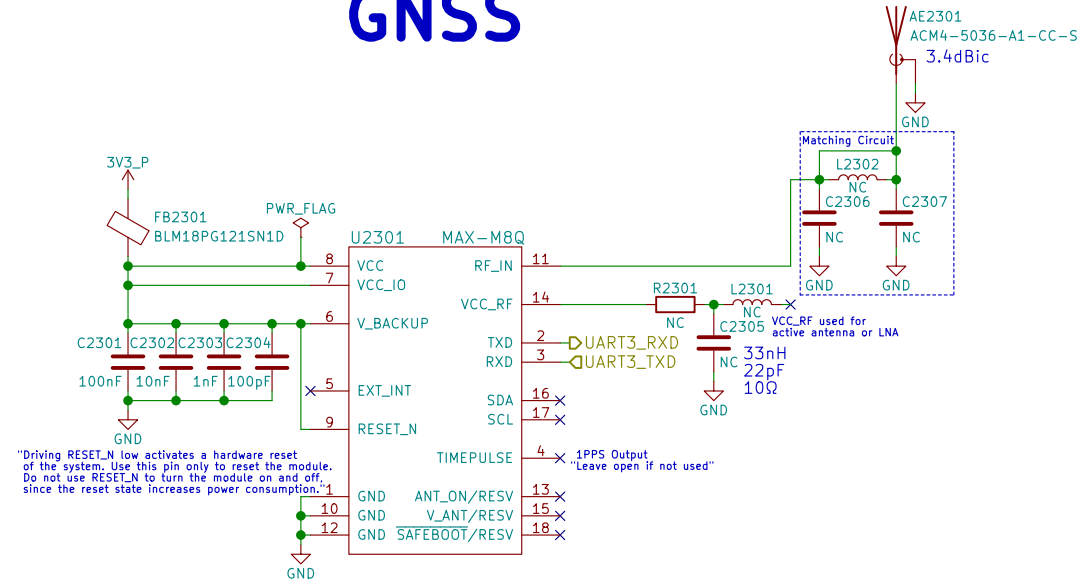
Smart Card



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



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Sheet: /GNSS/
 File: gnss.sch

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

Date: 2018-08-14

Rev: v0.1.0

Id: 23/24

eric.kuzmenko@puri.sm

angus.ainstlie@puri.sm

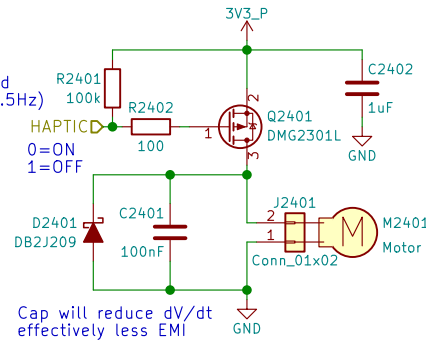
nicole.farber@puri.sm

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



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Sheet: /Haptic Motor/
 File: haptic.sch

Size: A4 Date: 2018-08-14

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angus.ainslie@puri.sm

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christian.schilmoeller@puri.sm

Rev: v0.1.0

Id: 24/24