



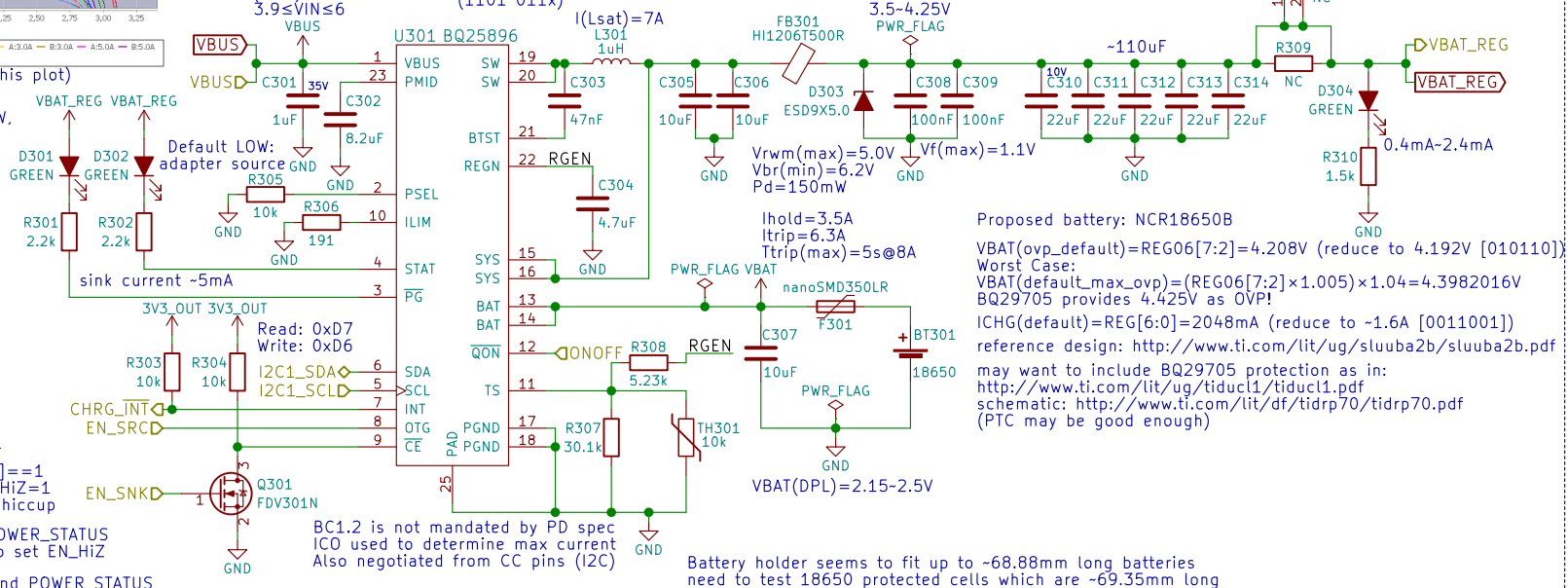
(interpret RSOC% based on this plot)

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



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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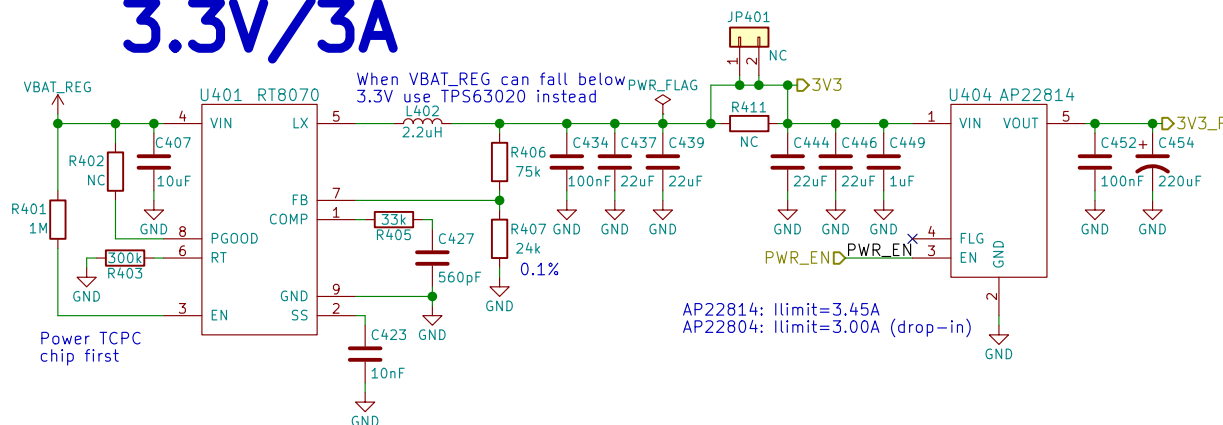
Sheet: /Battery/
 File: battery.sch

Size: A4
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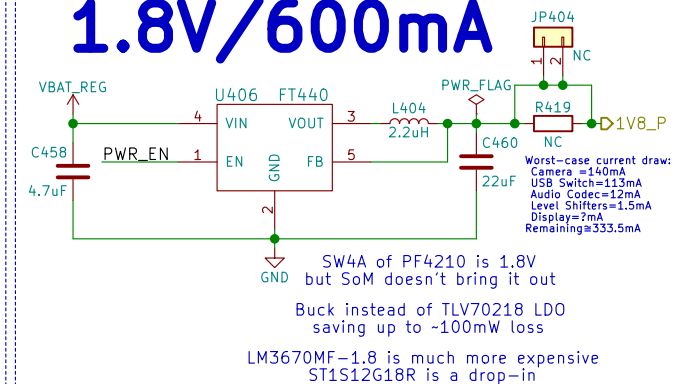
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 angus.ainslie@puri.sm
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 christian.schilmoeller@puri.sm

Rev: v0.1.0
 Id: 3/24

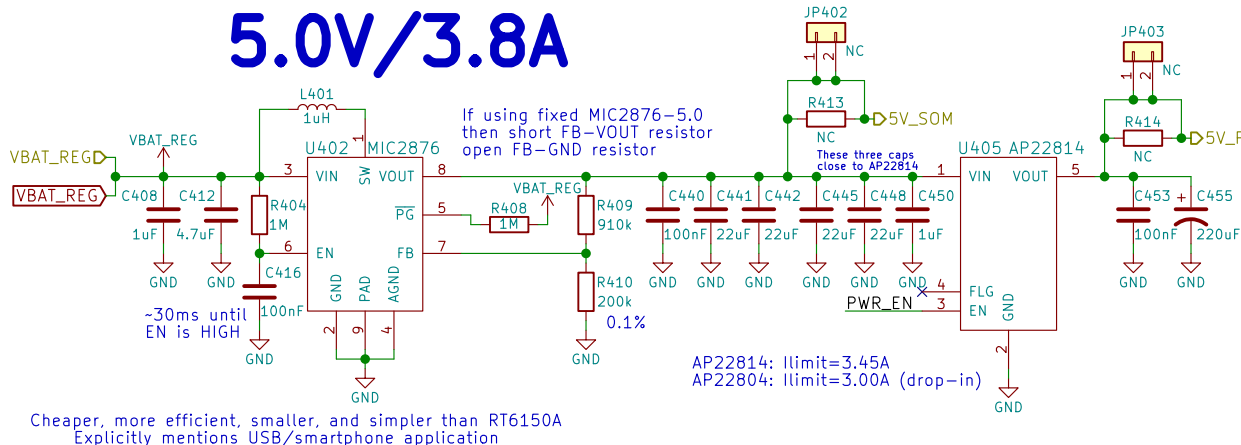
3.3V/3A



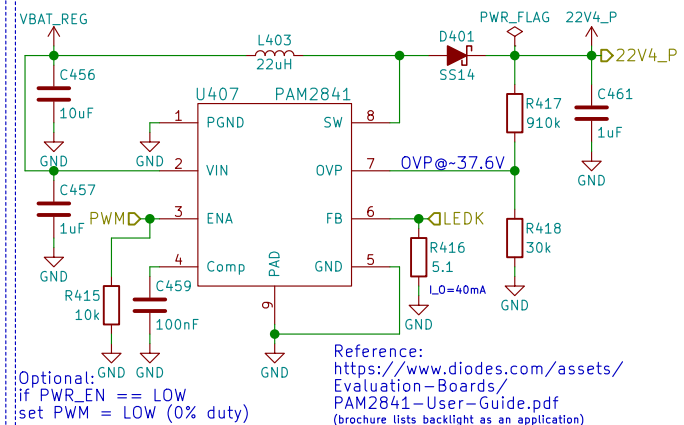
1.8V/600mA



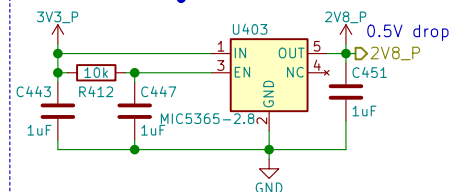
5.0V/3.8A



22.4V/40mA



2.8V/150mA



Power

Power

Purism

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Sheet: /Power/
File: power.sch

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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



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Sheet: /Boot Config/
File: boot.sch

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Id: 5/24

[illegible]

<div> <div>RTC</div> <div>  <div>Purism</div> </div> </div> <div> <div>Copyright 2018 GNU GPLv3</div> <div> <div>Sheet: /RTC/</div> <div>File: rtc.sch</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>Size: A4</div> <div>Date: 2018-07-17</div>	<div>Rev: v0.1.0</div> <div>Id: 6/24</div>	
<div>KiCad E.D.A. kicad 5.0.0</div>		

The diagram shows a 3.3V logic level shifter circuit. It uses a 74LVC2G241 buffer (U701) to convert the UART1_TXDD and UART1_RXDD signals to 3.3V logic levels. The circuit includes a 10F capacitor, a 100k resistor (R701), and a 100nF capacitor (C701). The output is connected to the RX and TX pins of a module labeled J701, which is noted to accept 3.3V or 5V logic.

UART Debug  Purism		eric.kuzmenko@puri.sm angus.ainslie@puri.sm nicole.fauber@puri.sm christian.schilmoeller@puri.sm
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Sheet: /UART Debug/ File: uart.sch		
Size: A4	Date: 2018-07-17	Rev: v0.1.0
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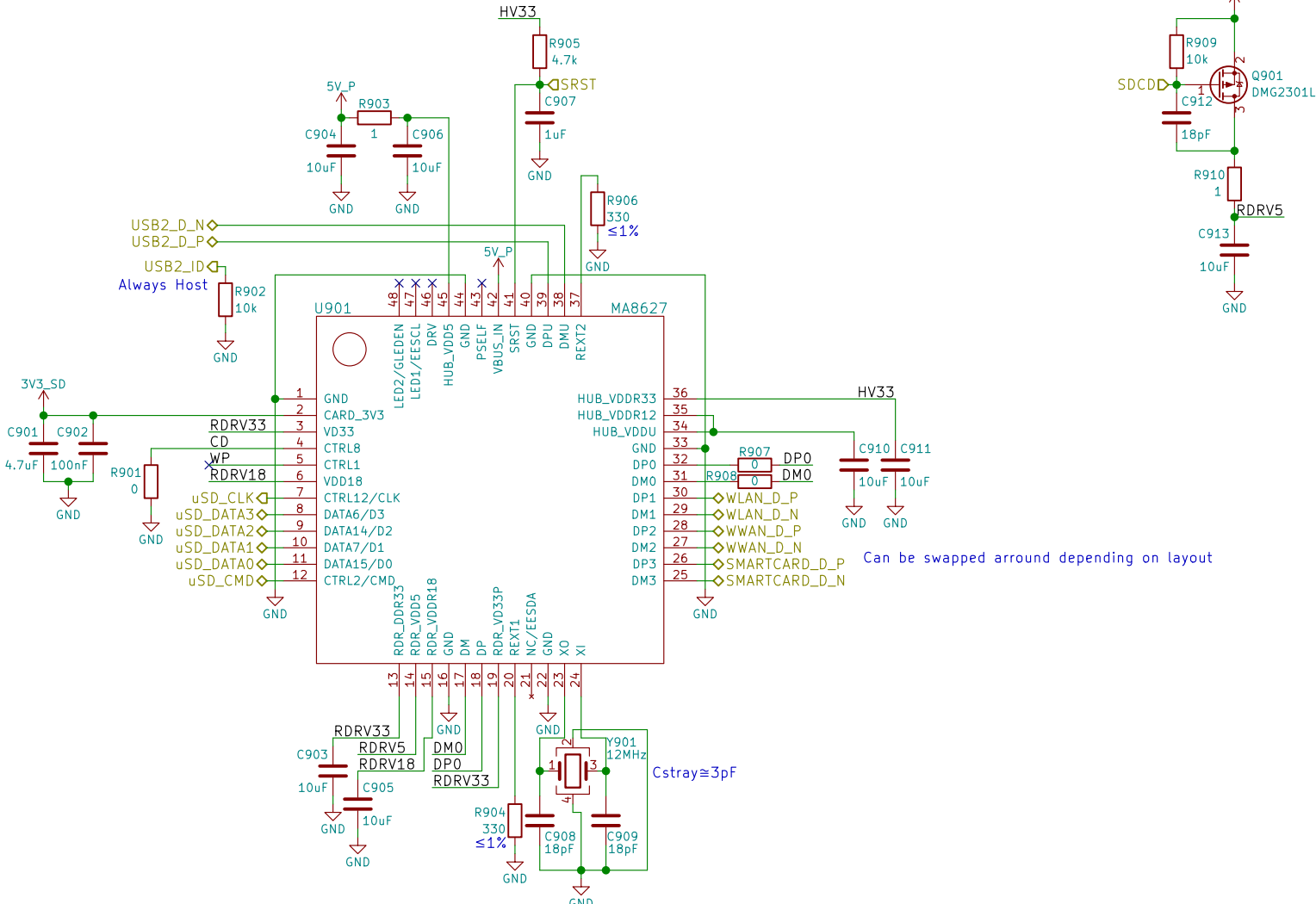
Purism

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USB Hub + SDIO Bridge



USB Hub + SDIO Bridge



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Sheet: /USB Hub + SDIO Bridge/

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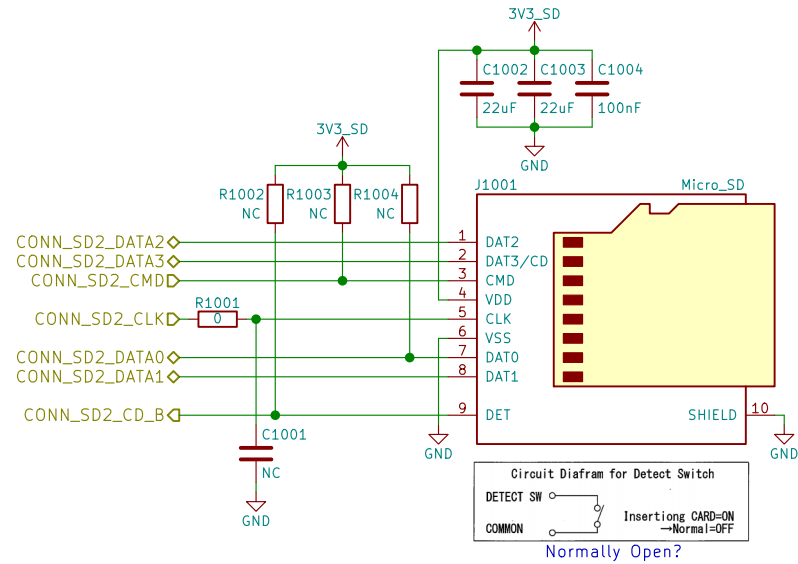
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Rev: v0.1.0

Id: 9/24

μSD



uSD Card



Purism

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Sheet: /uSD Card/

File: sd.sch

Size: A4 Date: 2018-07-17

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Id: 10/24

MIPI



MIPI



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Sheet: /MIPI/
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Size: A4 Date: 2018-07-17
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Rev: v0.1.0
Id: 11/24

A

B

C

D

1

1

2

7

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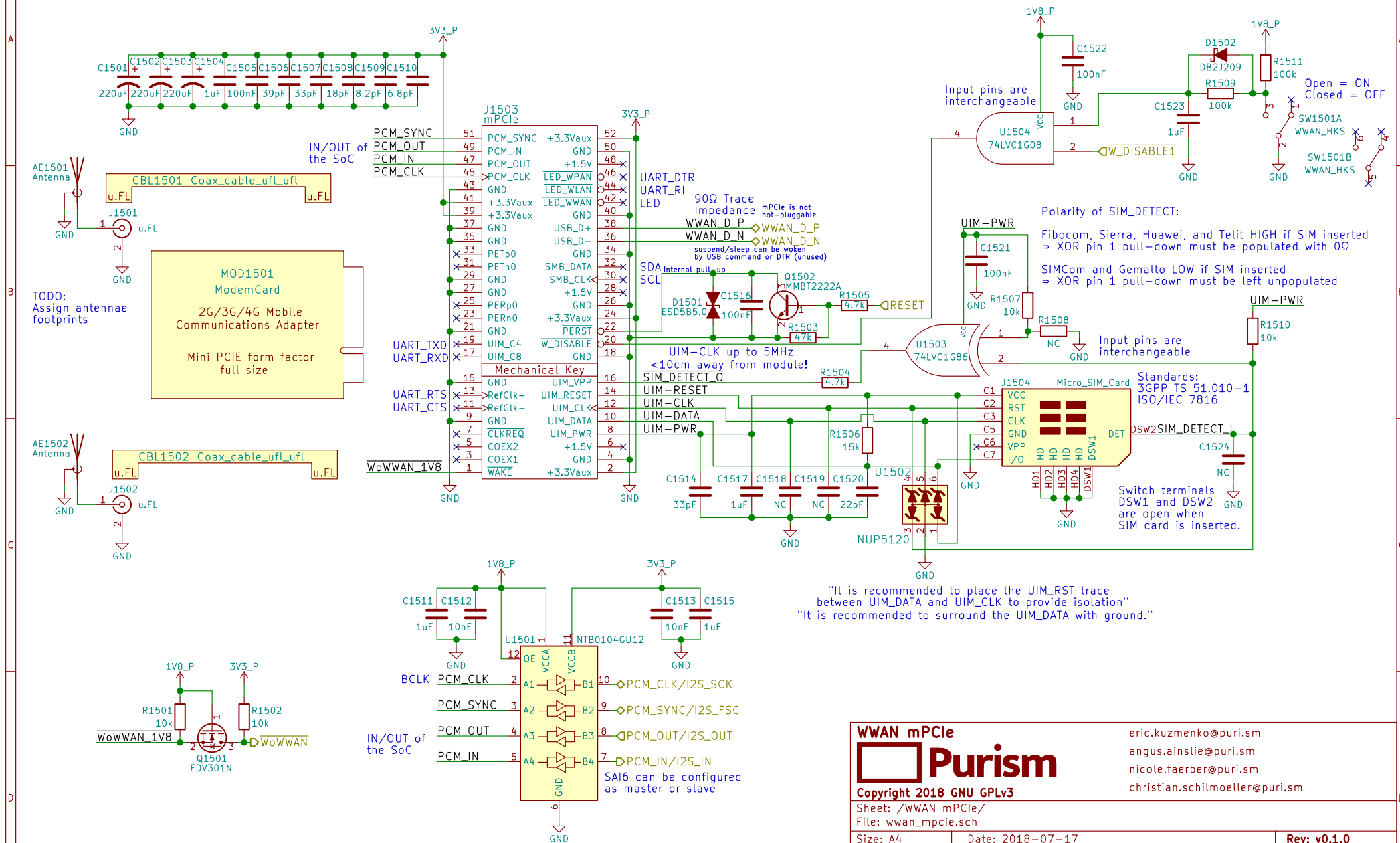
Sheet: /Buttons & LED/
 File: buttons_led.sch

Size: A4 Date: 2018-07-17
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Rev: v0.1.0
 Id: 14/24

WWAN mPCIe



WWAN mPCIe



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Sheet: /WWAN mPCIe/

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Size: A4

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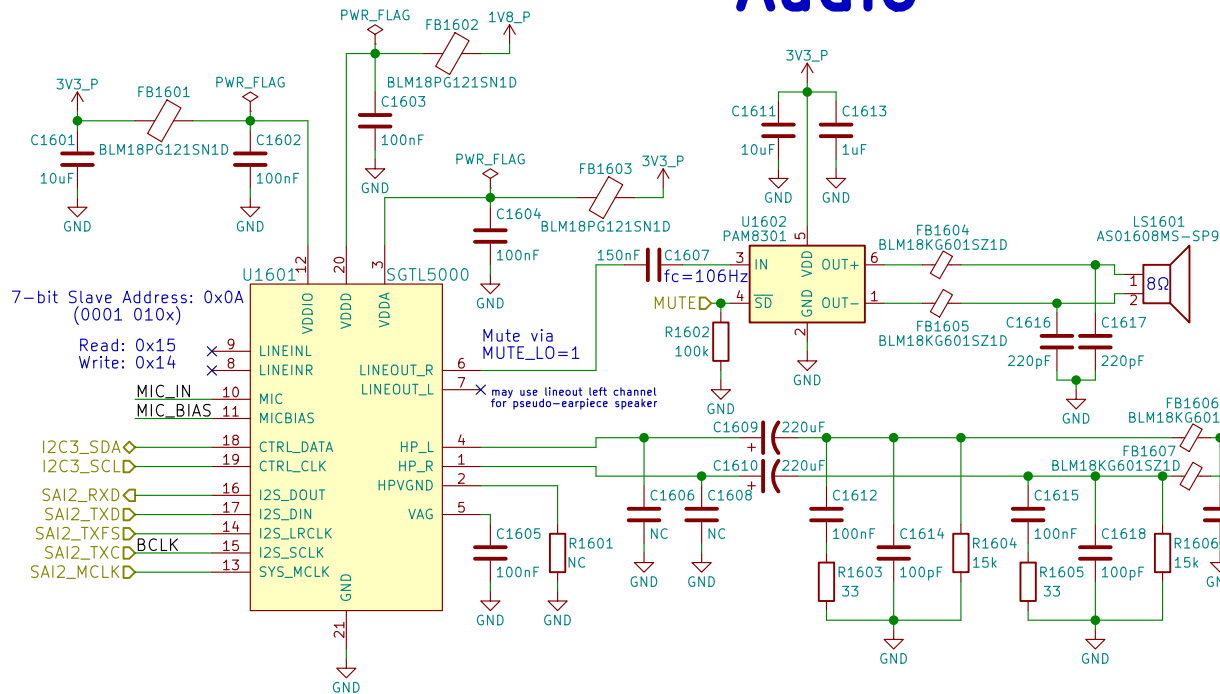
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Rev: v0.1.0

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-circuit6>
 (Nit6 does the same)
 +Zener diode to protect against ranges outside of -0.9V to 3.3V

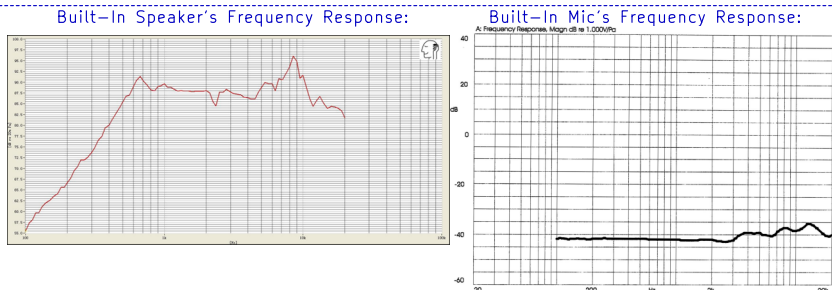
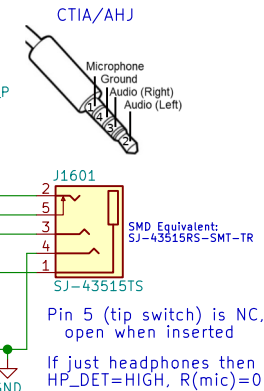
dB specs in datasheet is a unit of power gain (not dBu or VU)
with respect to the DAC's unattenuated output

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

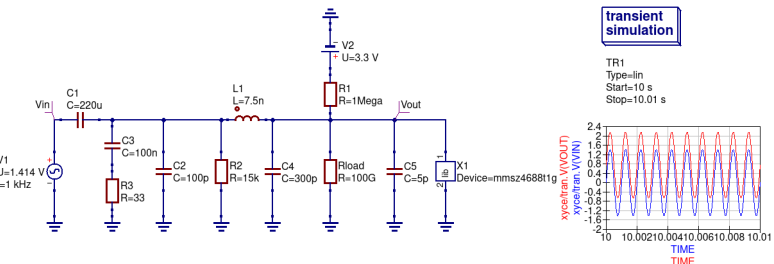
If HP_DET is HIGH for >100ms then HPs are present

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:
@1kHz	@1kHz	@1kHz
Ls = 3.844mH	Ls = 244.4uH	Ls = 25.2uH
Lp = 15.757H	Lp = 141.99mH	Lp = 311.0mH
Cs = 6.583uF	Cs = 103.6uF	Cs = 1.0mF
Cp = 1612.8pF	Cp = 178.77nF	Cp = 81.95nF
Rs = 1.5465kOhms	Rs = 36.86kOhms	Rs = 17.03kOhms
Rp = 1.5478kOhms	Rp = 36.86kOhms	Rp = 17.03kOhms
θ = -0.8deg	θ = -2.3deg	θ = 0.5deg

Audio



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Sheet: /Audio/
File: audio.sch

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Rev: v0.1.0

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[illegible]

Purism

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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

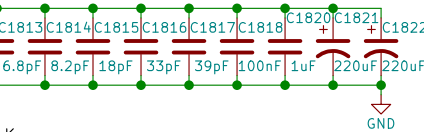
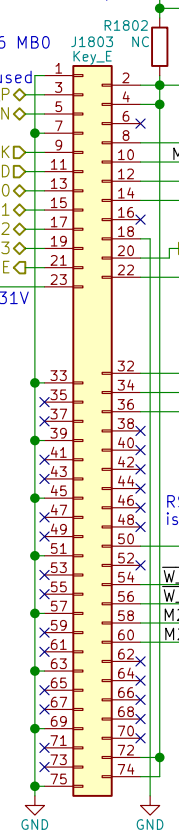
RedPine RS9116 MB0
Requires 5V on
Pin 54 if USB used

WLAN_D_P
WLAN_D_N
WIFI_CLK
WIFI_CMD
WIFI_DATA0
WIFI_DATA1
WIFI_DATA2
WIFI_DATA3
WIFI_WAKE

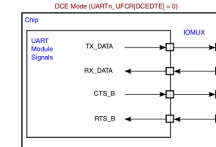
RedPine RS9116
has 100k pull-up to
3.3V making SDIO_RST
~2.55V when HIGH

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

SoC's IN/OUT
SoC's RX
Module's TX
SoC's TX
Module's RX
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS

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

U1803A
74LVC2G08
U1803B
74LVC2G08

BT_DISABLE
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_RXD
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS

BT_UART_RXD
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS

BT_UART_RXD
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS

WLAN+BT M.2
Purism

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

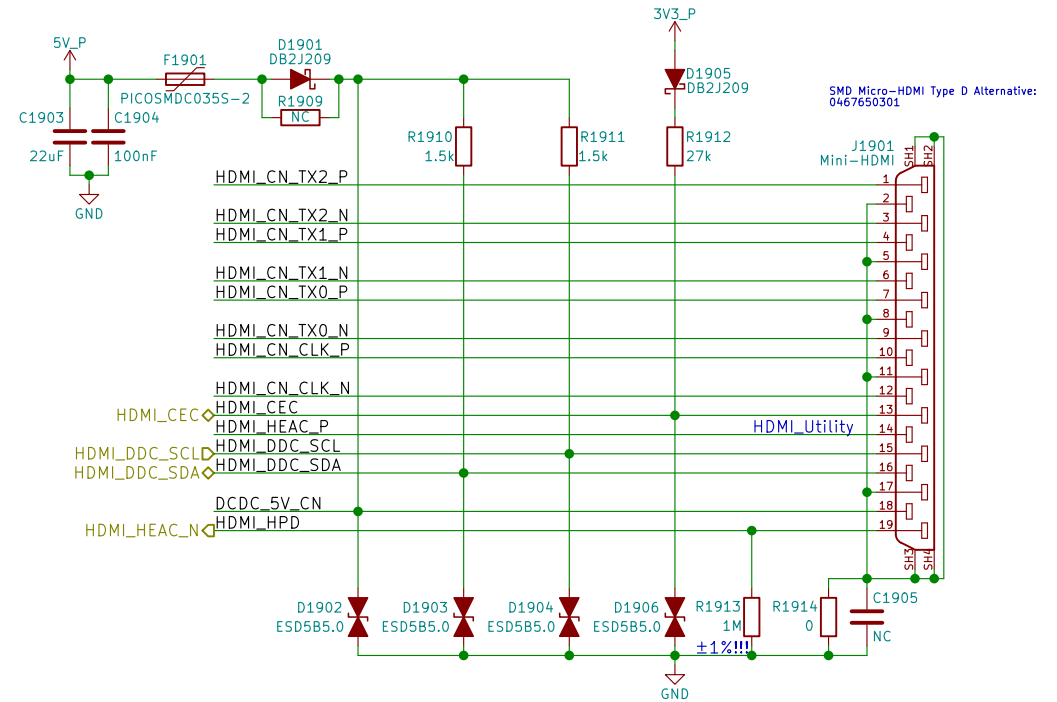
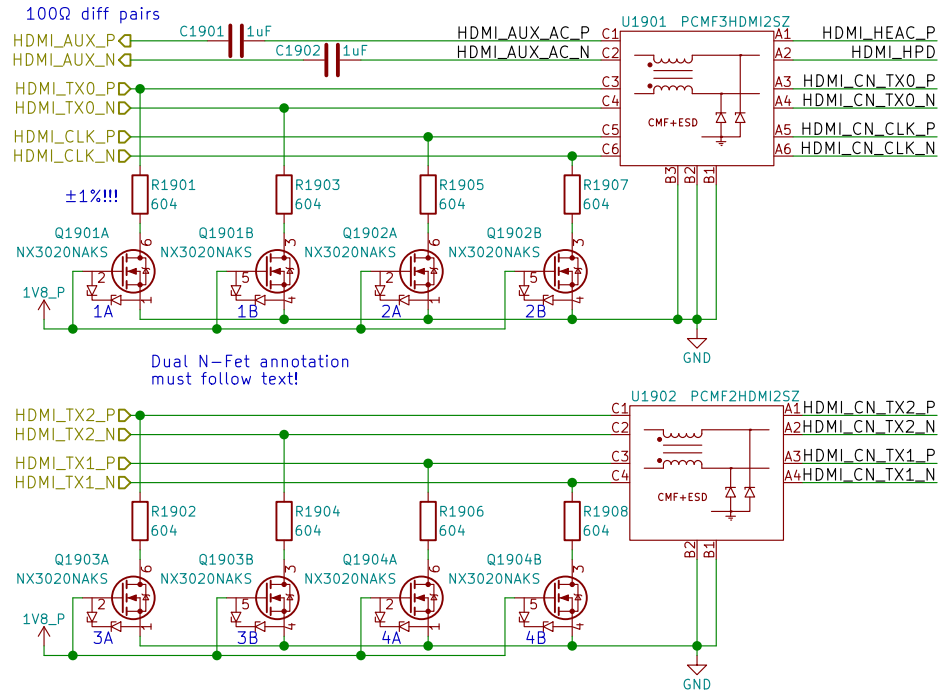
Size: A4
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Rev: v0.1.0
Id: 18/24

TUSB1046 can be used for DP over USB-C

HDMI



HDMI



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Sheet: /HDMI/
File: hdmi.sch

Size: A4 Date: 2018-07-17
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Rev: v0.1.0
Id: 19/24

D

Id: 20/24

SPI NOR Flash  Purism		eric.kuzmenko@puri.sm angus.ainslie@puri.sm nicole.ferber@puri.sm christian.schilmoeller@puri.sm
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Sheet: /SPI Flash/ File: flash.sch		
Size: A4	Date: 2018-07-17	Rev: v0.1.0
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Smart Card



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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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 File: gnss.sch

Size: A4 Date: 2018-07-17
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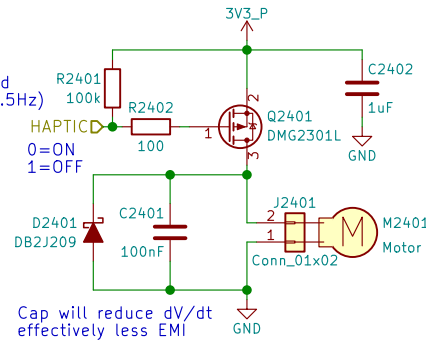
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Rev: v0.1.0
 Id: 23/24

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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 File: haptic.sch

Size: A4 Date: 2018-07-17
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