

Estimated remaining capacity					
Voltage	AW 18650 2600mAh (black)	Sanyo 18650 2600mAh (Red)	Panasonic CCR18650CH 2250mAh	Panasonic NCR18650A 3100mAh	Panasonic NCR18650B 3400mAh
4.2	100%	100%	100%	100%	100%
4.1	92%	92%	94%	94%	94%
4.0	78%	79%	85%	83%	84%
3.9	61%	61%	76%	73%	74%
3.8	43%	44%	66%	60%	62%
3.7	14%	15%	54%	52%	53%
3.6	3%	5%	26%	38%	39%
3.5	1%	2%	12%	20%	22%
3.4	0%	1%	5%	11%	13%
3.3	0%	0%	2%	1%	3%
3.2	0%	0%	0%	0%	0%

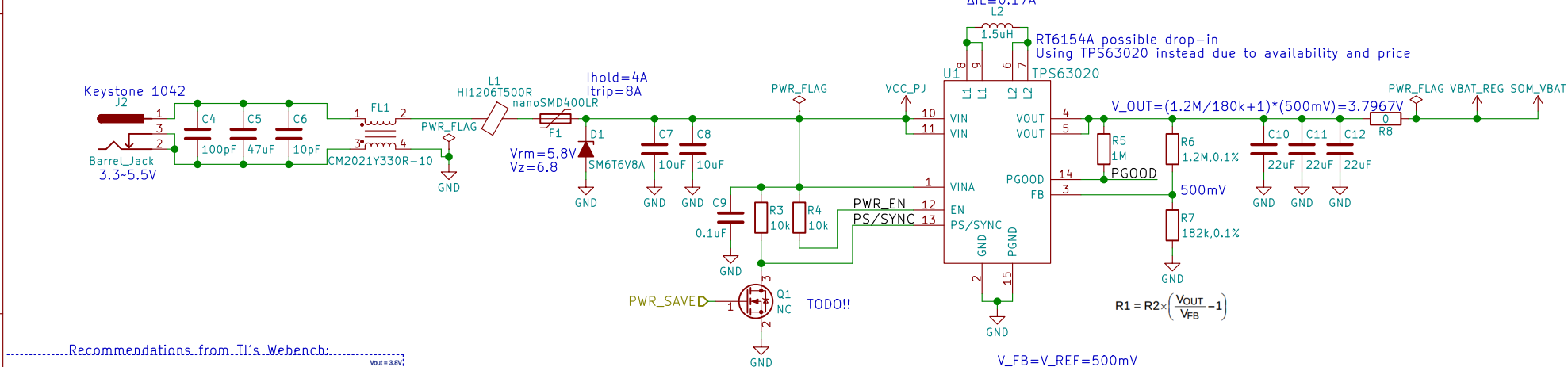
Measured 1 hour after discharge at 1A

⇒ 18650 batteries don't reach 3.3V until depleted

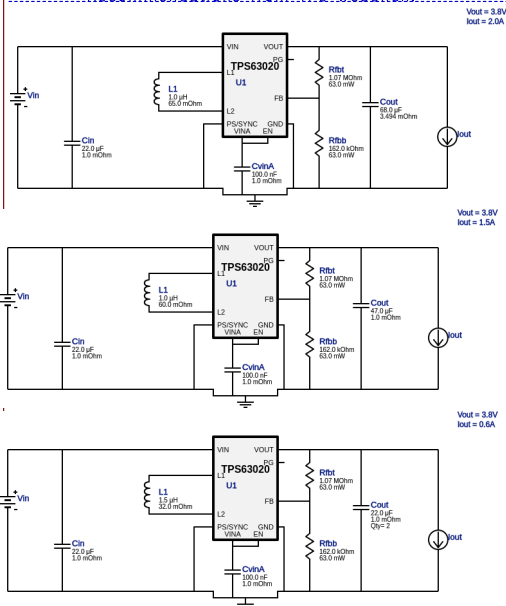
$$I_{PEAK} = \frac{I_{out}}{\eta \times (1 - D)} + \frac{V_{in} \times D}{2 \times f \times L}$$

$$= \frac{2A}{0.9 \times \left(1 - \frac{3.7967V - 3.0V}{3.7967V}\right)} + \frac{3.0V \times \left(\frac{3.7967V - 3.0V}{3.7967V}\right)}{2 \times 2.4MHz \times 1.5\mu H} = 2.899803756A$$

Calculated  $I_{peak} \approx 2.9A$   
 $I_L(sat) = 4.4A @ 20\% \text{ drop}$   
 $\Delta I_L \approx 0.17A$



Recommendations from TI's Webench:



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Sheet: /Battery/

File: battery.sch

**Title: Battery**

Size: A4 Date: 2018-04-11

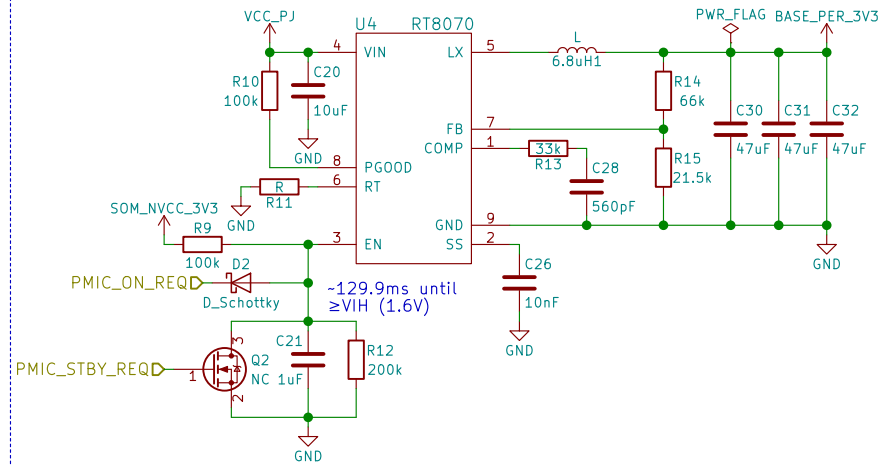
KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

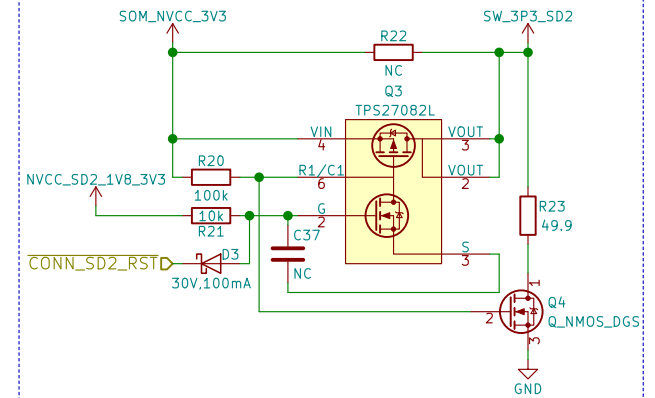
Id: 2/14

## 3.3V/3A

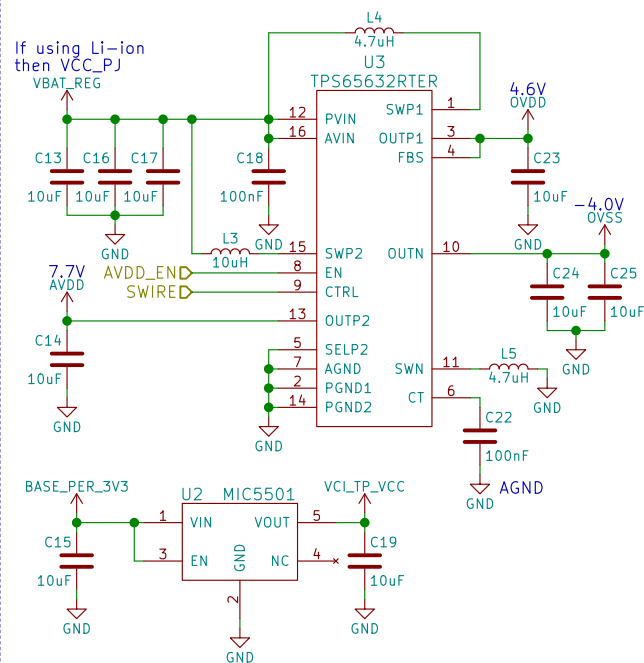
When VBAT can fall below 3.3V use TPS63020 instead!



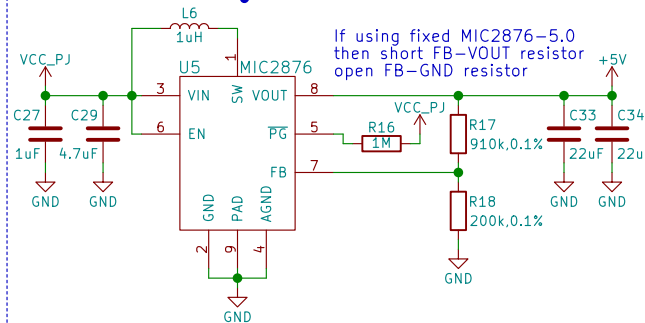
## SD POWER



## AMOLED POWER

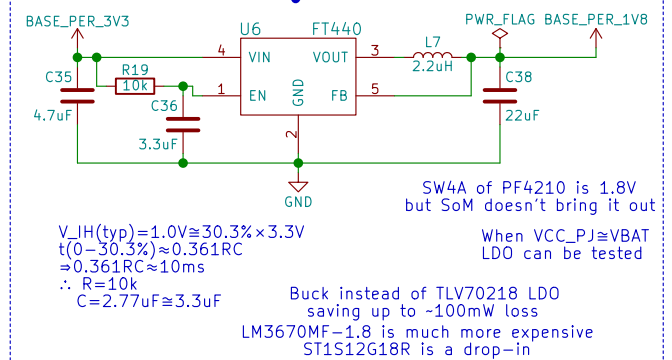


## 5.0V/800mA



Cheaper, more efficient, smaller, and simpler than RT6150A  
Explicitly mentions USB/smartphone application

## 1.8V/600mA



SW4A of PF4210 is 1.8V but SoM doesn't bring it out

When VCC\_PJ ≈ VBAT LDO can be tested

$V_{IH}(typ) = 1.0V \approx 30.3\% \times 3.3V$   
 $t(0-30.3\%) \approx 0.361RC$   
 $\approx 0.361RC \approx 10ms$   
 $\therefore R = 10k$   
 $C = 2.77uF \approx 3.3uF$

Buck instead of TLV70218 LDO  
saving up to ~100mW loss  
LM3670MF-1.8 is much more expensive  
ST1S12G18R is a drop-in

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Purism SPC

Sheet: /Power/  
File: power.sch

Title: Power

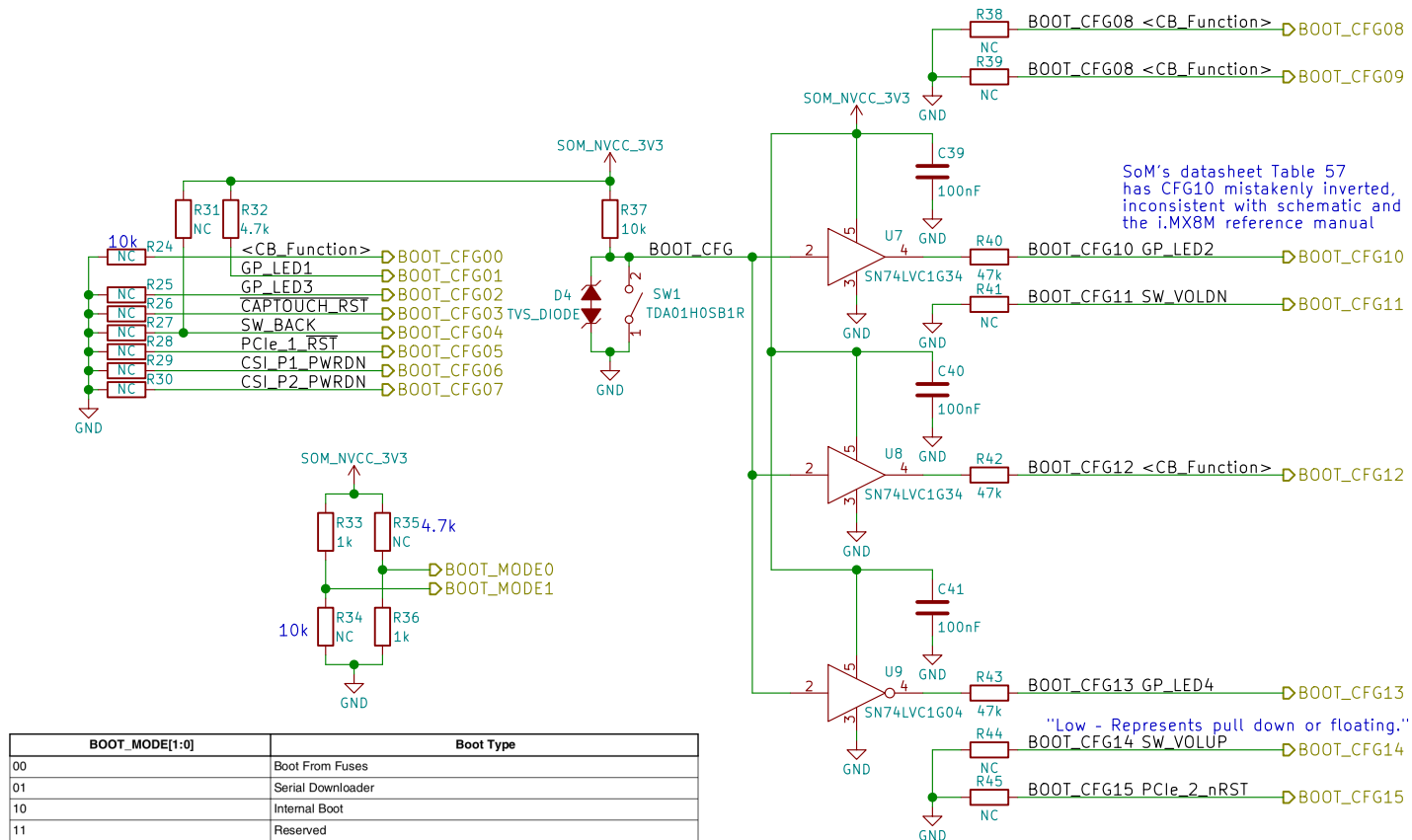
Size: A4  
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Date: 2018-04-11

Rev: v0.1.0

Id: 3/14

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



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**Purism SPC**

Sheet: /Boot Config/  
File: boot.sch

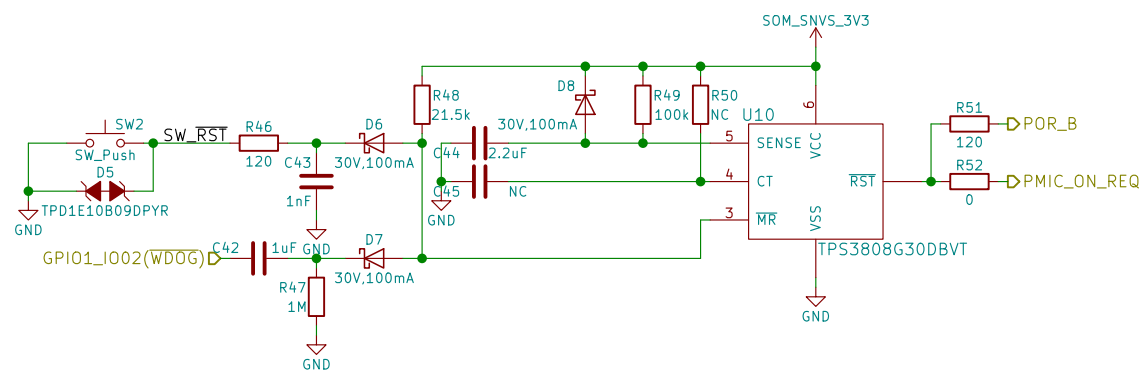
**Title: Boot Configuration**

Size: A4 Date: 2018-04-11

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**Rev: v0.1.0**

Id: 4/14



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**Purism SPC**

Sheet: /Reset & Watchdog/  
File: watchdog.sch

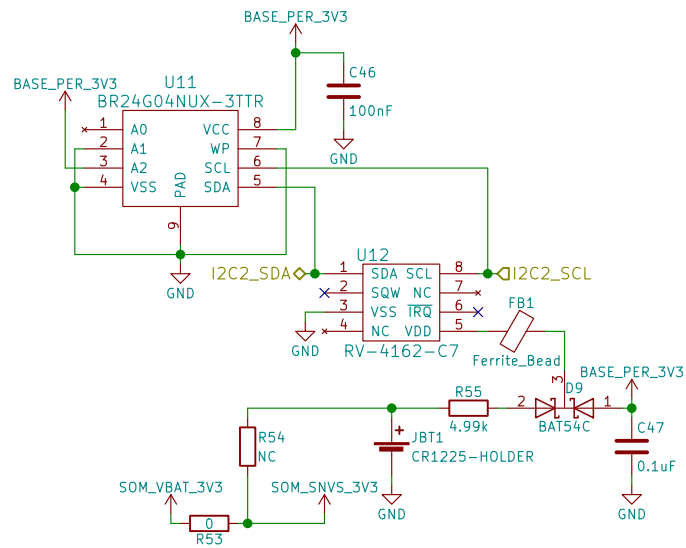
**Title: Reset & Watchdog**

Size: A4 Date: 2018-04-11

KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

Id: 5/14



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**Purism SPC**

Sheet: /RTC Battery/  
File: rtc.sch

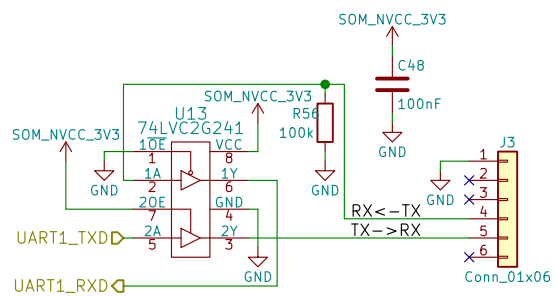
**Title: RTC Battery**

Size: A4 Date: 2018-04-11

KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

Id: 6/14



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**Purism SPC**

Sheet: /UART Debug/  
File: uart.sch

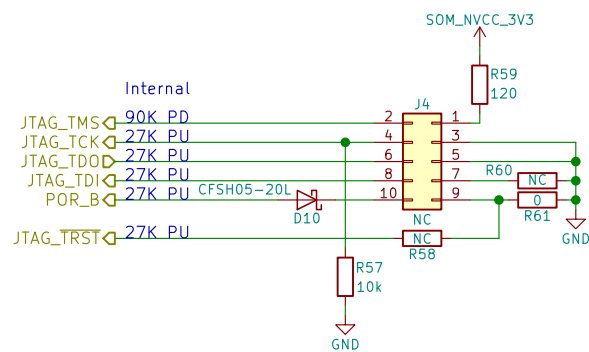
**Title: UART Debug**

Size: A4 Date: 2018-04-11

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**Rev: v0.1.0**

Id: 7/14



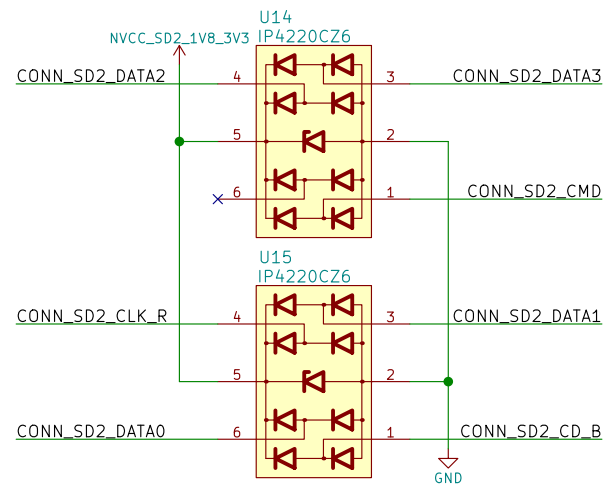
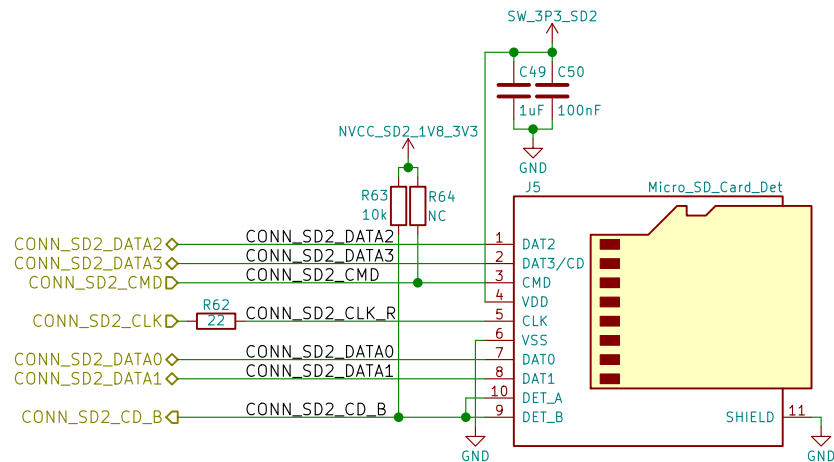
GNU GPLv3  
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**Purism SPC**  
Sheet: /JTAG/  
File: jtag.sch

**Title: JTAG**

Size: A4  
Date: 2018-04-11  
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**Rev: v0.1.0**  
Id: 8/14





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**Purism SPC**

Sheet: /uSD Card/  
File: sd.sch

**Title: uSD Card**

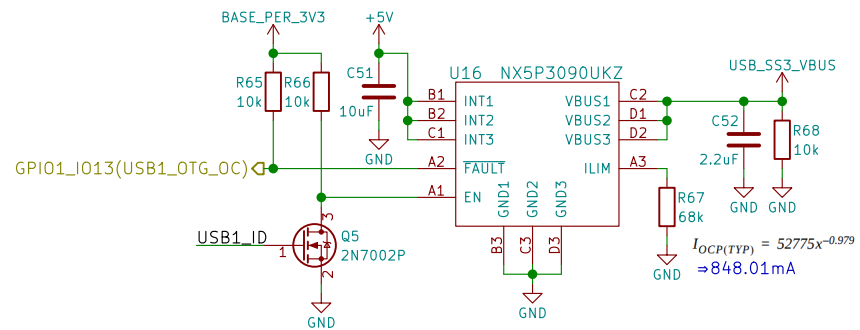
Size: A4 Date: 2018-04-11

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**Rev: v0.1.0**

Id: 9/14

USB1\_ID



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**Purism SPC**

Sheet: /USB/  
File: usb.sch

**Title: USB**

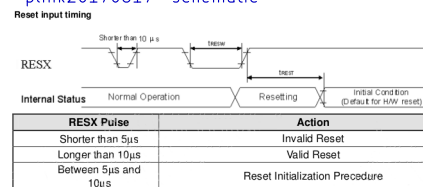
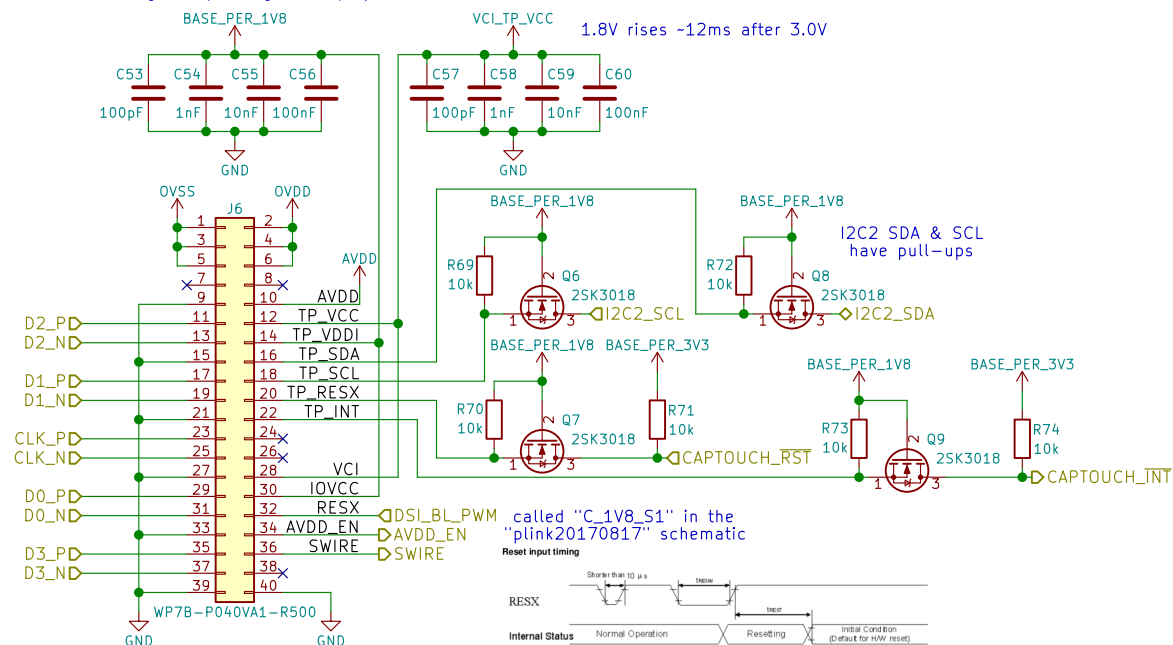
Size: A4 Date: 2018-04-11

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**Rev: v0.1.0**

Id: 10/14

Using H546DLB01.1 pin assignment may need to be changed depending on display used



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**Purism SPC**

Sheet: /MIPI DSI/  
File: mipi\_dsi.sch

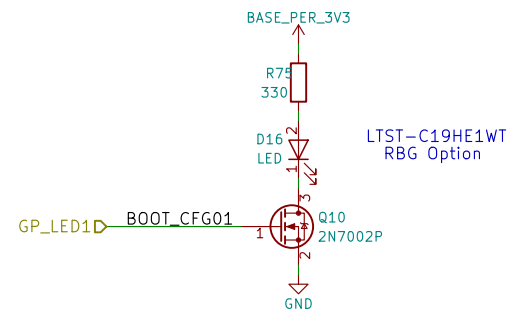
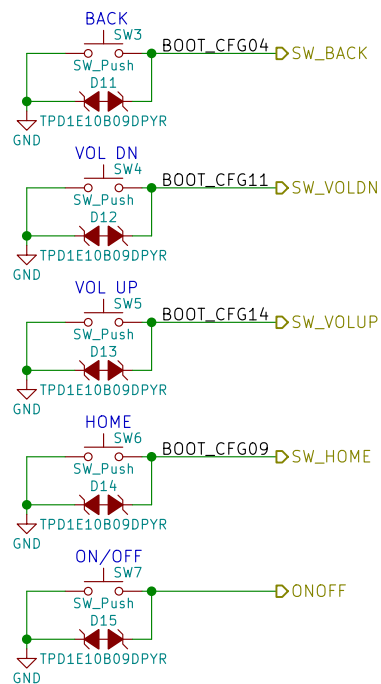
**Title: MIPI DSI**

Size: A4 Date: 2018-04-11

KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

Id: 11/14



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**Purism SPC**

Sheet: /Buttons & LED/  
File: buttons\_led.sch

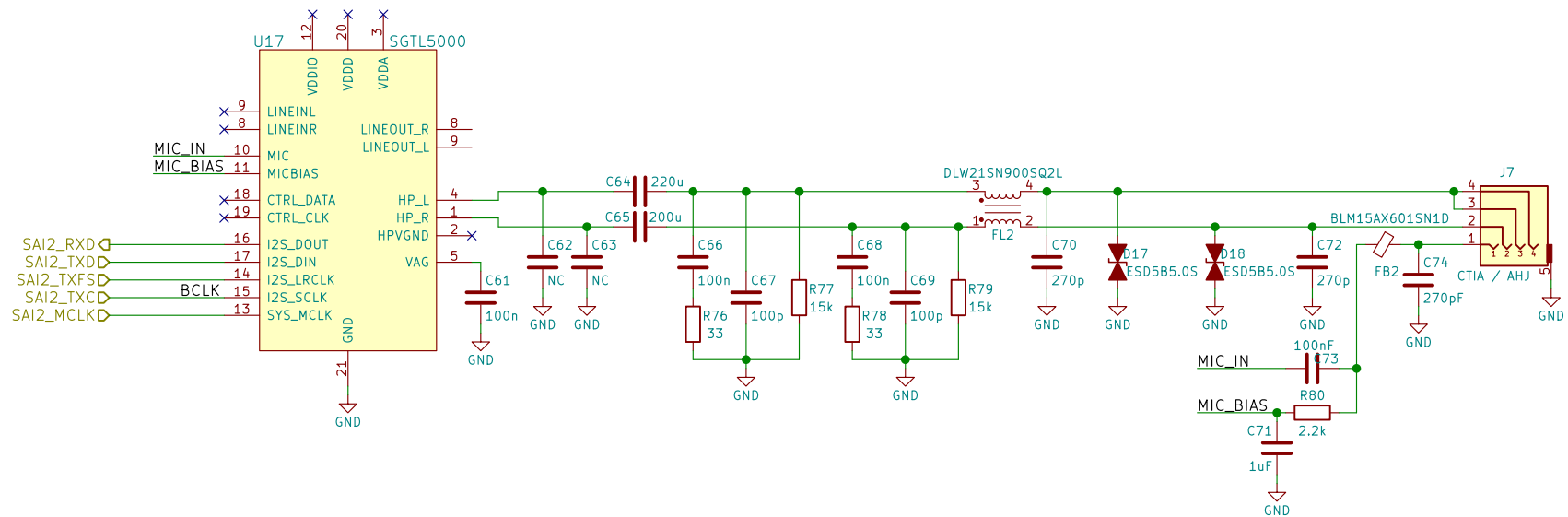
**Title: Buttons & LED**

Size: A4 Date: 2018-04-11

KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

Id: 12/14



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**Purism SPC**

Sheet: /Audio/  
File: audio.sch

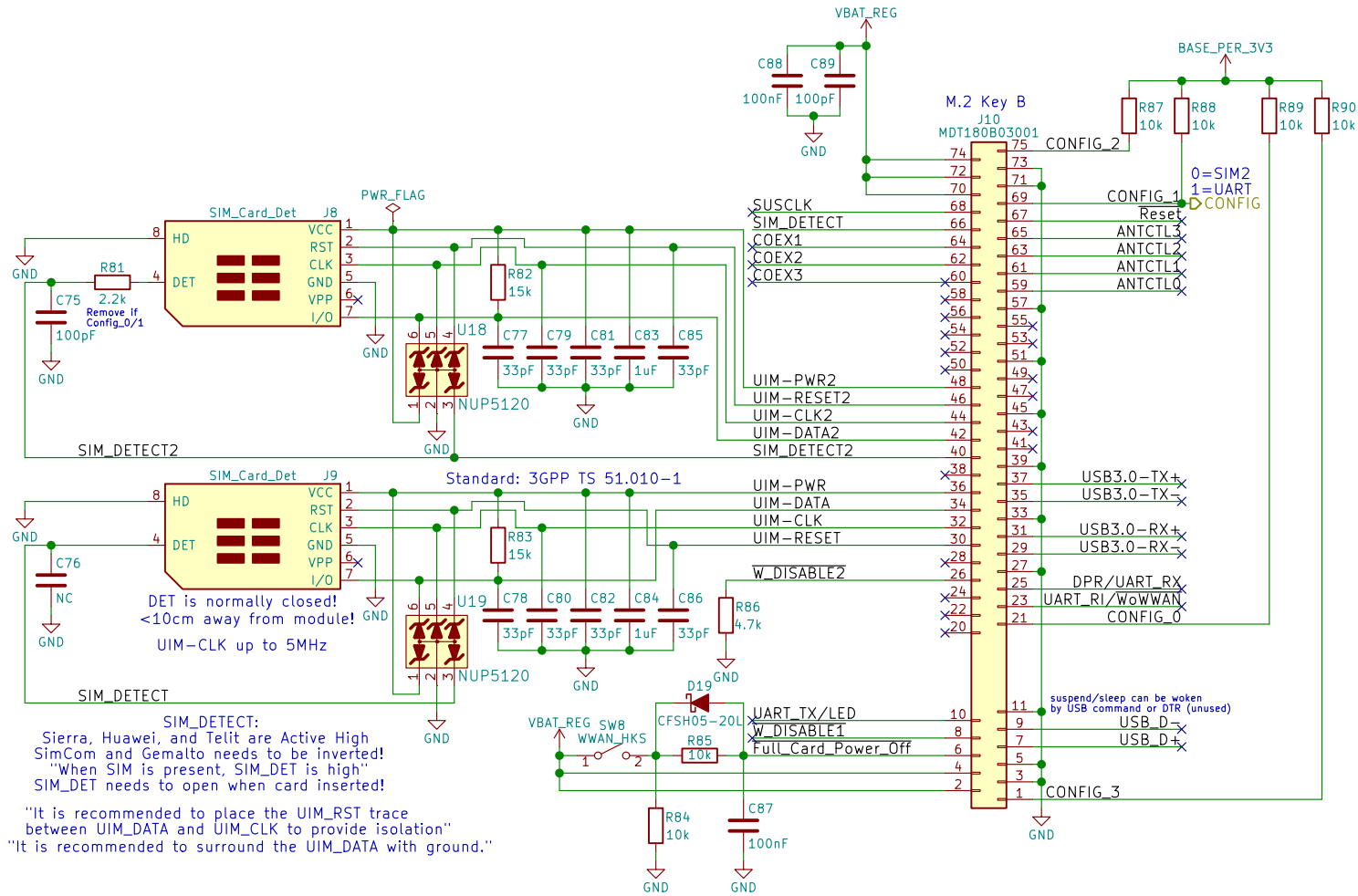
**Title: Audio**

Size: A4 Date: 2018-04-11

KiCad E.D.A. kicad 4.0.7

**Rev: v0.1.0**

Id: 13/14



Some modems are NC for the USB3.0 interface  
Typically host support for USB3.0 is optional  
Some modems require the USB3.0 interface  
USB3.0 unused with Gemalto and SimCom  
Some modules do GNSS over USB

	Assumes SIM2	Assumes UART	Assumes SIM2	Assumes UART
Pin	Port Config_0 <sup>1</sup>	Port Config_1 <sup>2</sup>	Port Config_2 <sup>3</sup>	Port Config_3 <sup>4</sup>
GPIO_0	GNSS_SCL	GNSS_SCL	SIM_DET2	HSIC_Data
GPIO_1	GNSS_SDA	GNSS_SDA	UIM_DATA2	HSIC_Strobe
GPIO_2	GNSS_IRQ	GNSS_IRQ	UIM_CLK2	IPC_0
GPIO_3	SYSClk	GNSS_0	UIM_RST2	IPC_1
GPIO_4	TX_BLANKING	GNSS_1	UIM_PWR2	IPC_2
GPIO_5	AUDIO_0	AUDIO_0	RFU	Audio_0
GPIO_6	AUDIO_1	AUDIO_1	RFU	Audio_1
GPIO_7	AUDIO_2	AUDIO_2	RFU	IPC_3/Audio_2
GPIO_8	AUDIO_3	AUDIO_3	RFU	IPC_4/Audio_3
GPIO_9	LED#1	LED#1	LED#1	IPC_5
GPIO_10	W_Disable2#	W_Disable2#	W_Disable2#	IPC_6
GPIO_11	Wake_On_WWAN	Wake_On_WWAN	Wake_On_WWAN	IPC_7
GPIO_12	DPR	DPR	DPR	IPC_8

Module Configuration	CONFIG_0 (Pin 21)	CONFIG_1 (Pin 69)	CONFIG_2 (Pin 75)	CONFIG_3 (Pin 1)	Module Type and Main Host Interface	Port Configuration <sup>2</sup>	State
GND	GND	GND	GND	SSD - SATA	N/A	N/A	
GND	NC	GND	GND	SSD - PCIe	N/A	N/A	
GND	GND	NC	GND	WWAN - PCIe	0	0	
GND	NC	NC	GND	WWAN - PCIe	1	1	
GND	GND	GND	NC	WWAN - USB 3.0	0	2	
GND	NC	GND	NC	WWAN - USB 3.0	1	4	
GND	GND	NC	NC	WWAN - USB 3.0	2	5	
GND	NC	NC	NC	WWAN - USB 3.0	3	6	
NC	GND	GND	GND	WWAN - SSIC	0	7	
NC	NC	GND	GND	WWAN - SSIC	1	8	
NC	GND	NC	GND	WWAN - SSIC	2	9	
NC	NC	NC	GND	WWAN - SSIC	3	10	
NC	GND	GND	NC	WWAN - PCIe	2	11	
NC	NC	GND	NC	WWAN - PCIe	3	12	
NC	GND	NC	NC	RFU	N/A	13	
NC	NC	NC	NC	No Module Present	N/A	15	

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**Purism SPC**

Sheet: /WWAN M.2/  
File: wwan\_m2.sch

**Title:**

Size: A4  
KiCad E.D.A. kicad 4.0.7

Date: 2018-04-11

Rev: v0.1.0  
Id: 14/14