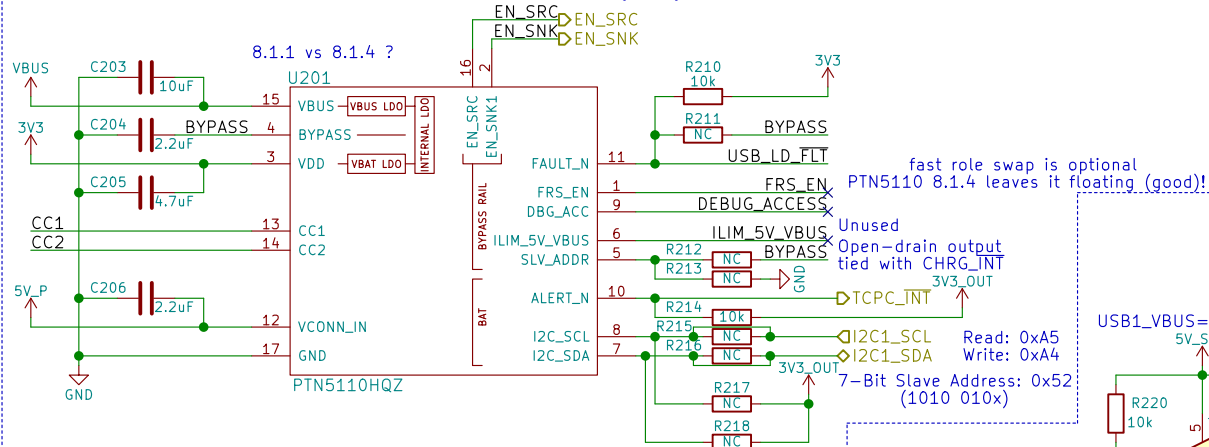
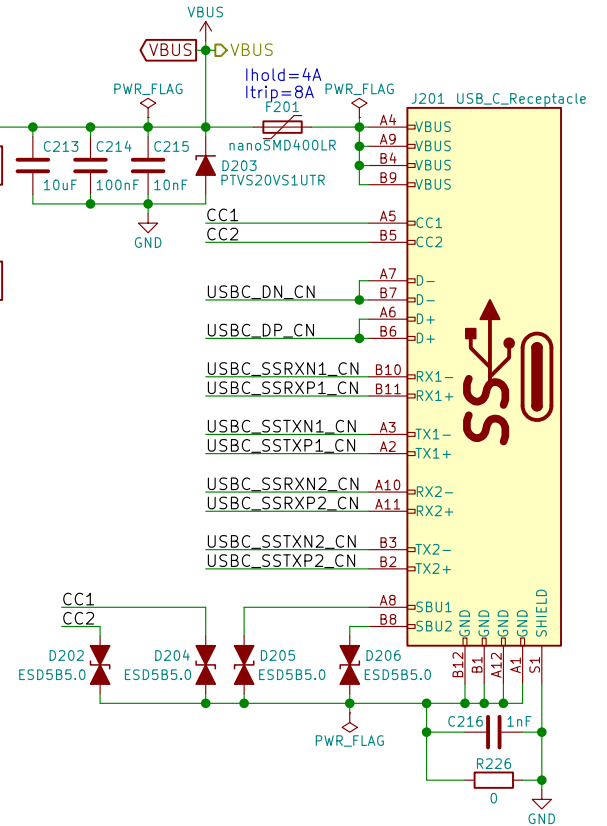
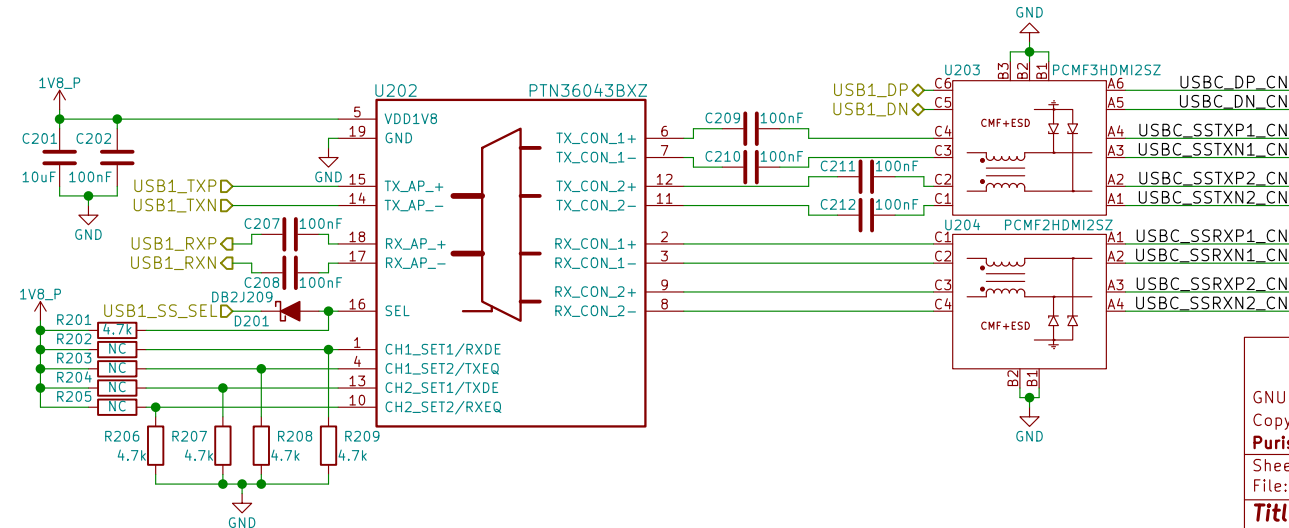


USB-C TCPC – Config Channel (CC) and PD Role Controller



"Under dead battery operation, PTN5110 applies voltage clamps to both CC pins so that the system may receive power as a Sink. To support platforms with buck-boost configuration, PTN5110 asserts EN_SNK1 pin based on validity of VBUS voltage (facilitates 5 V VBUS sinking)."



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Purism SPC

Sheet: /USB-C/

File: usb-c.sch

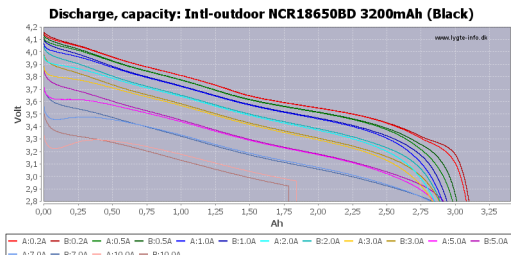
Title: USB Type C

Size: A4 Date: 2018-06-07

KiCad E.D.A. kicad 4.0.7

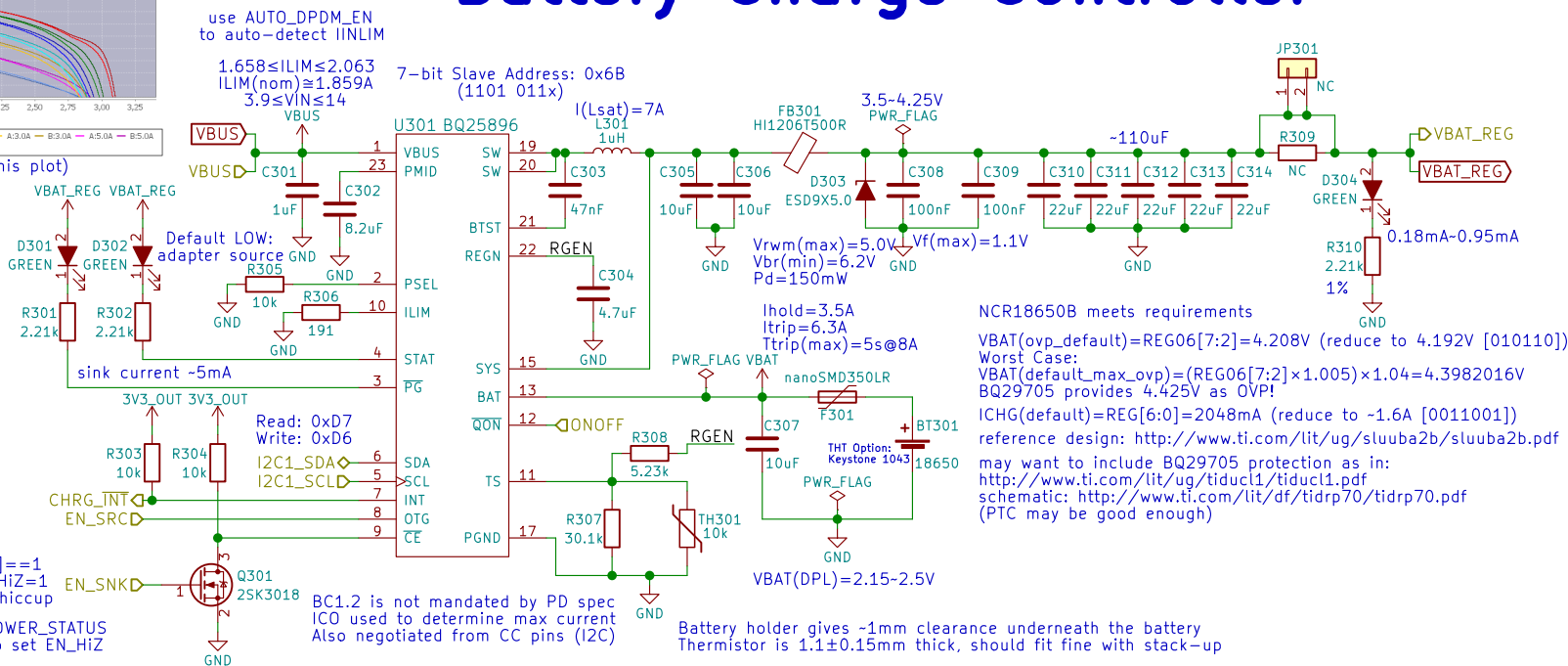
Rev: v0.1.0

Id: 2/24



(interpret RSOC% based on this plot)

Drawing ~333.33mA, or consuming <1.2W, should give close to 10 hours going from 100% to 0% charge



This disables charging but maybe not VBUS->VOUT if PTN5110HQ's FAULT_STATUS[6]=1 (Force Off VBUS bit) then set EN_HI_Z=1 EN_HI_Z 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_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)

BC1.2 is not mandated by PD spec ICO used to determine max current Also negotiated from CC pins (I2C)

Battery holder gives ~1mm clearance underneath the battery Thermistor is $1.1 \pm 0.15mm$ thick, should fit fine with stack-up

Battery holder seems to fit up to ~68.88mm long batteries need to test 18650 protected cells which are ~69.35mm long

GNU GPLv3

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Purism SPC

Sheet: /Battery/

File: battery.sch

Title: Battery

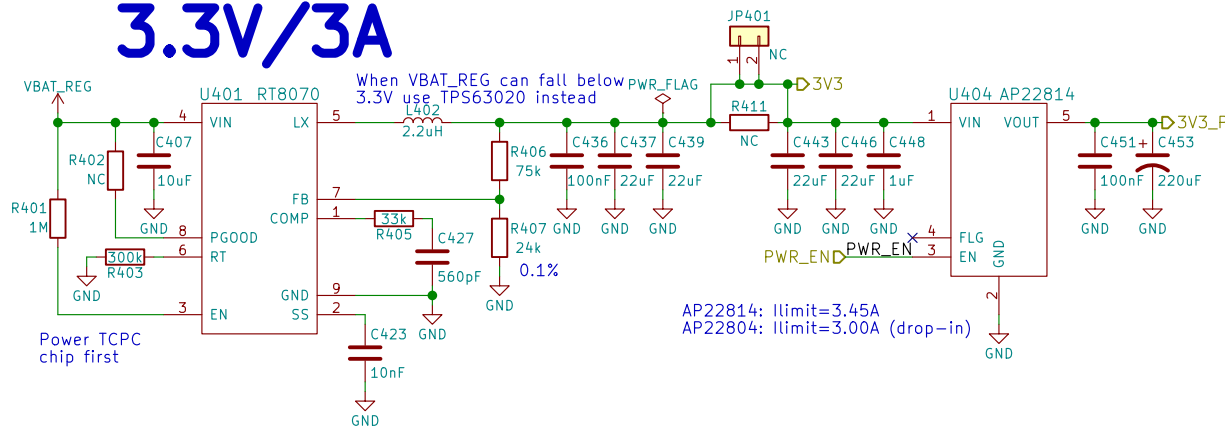
Size: A4 Date: 2018-06-07

KiCad E.D.A. kicad 4.0.7

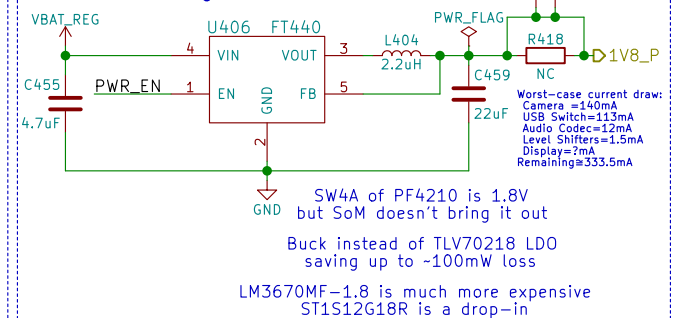
Rev: v0.1.0

Id: 3/24

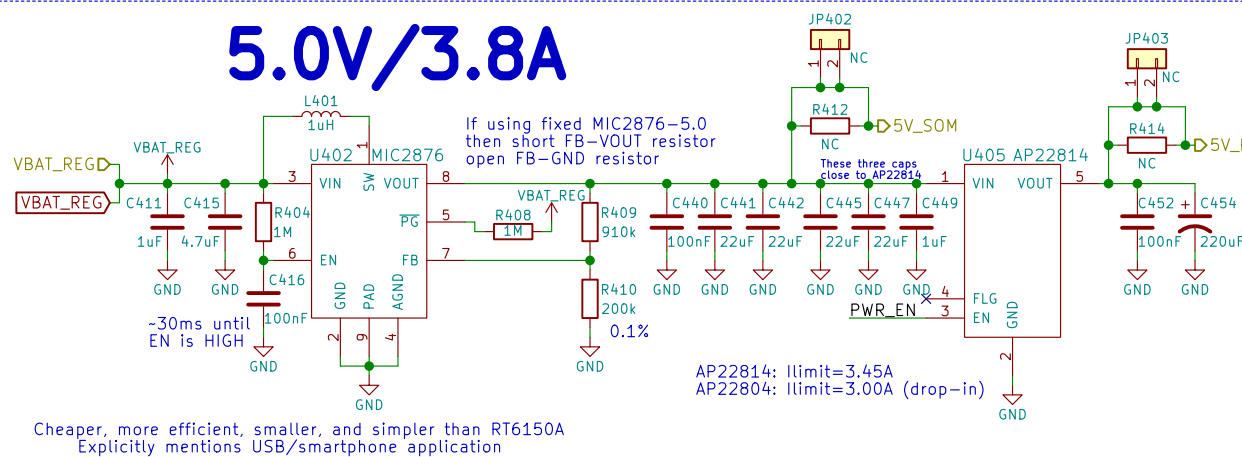
3.3V/3A



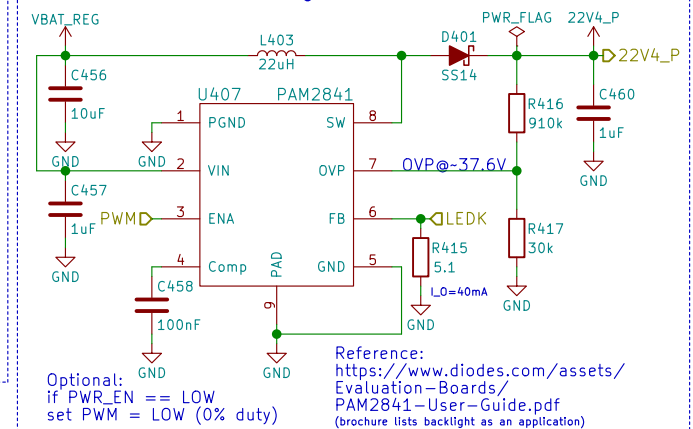
1.8V/600mA



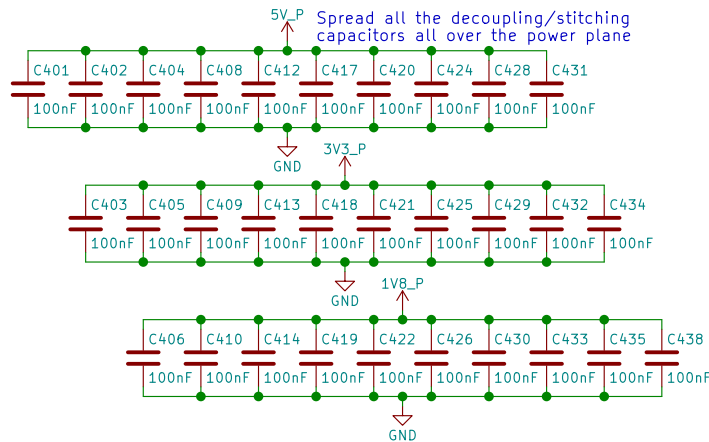
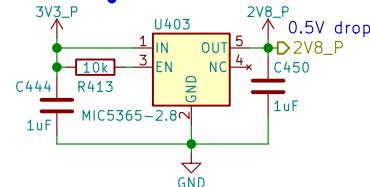
5.0V/3.8A



22.4V/40mA



2.8V/150mA



GNU GPLv3
Copyright 2018
Purism SPC

Sheet: /Power/
File: power.sch

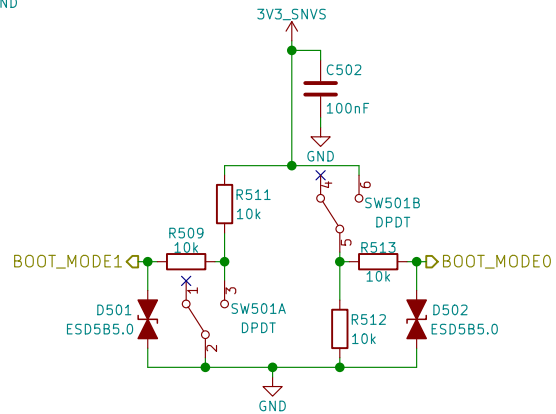
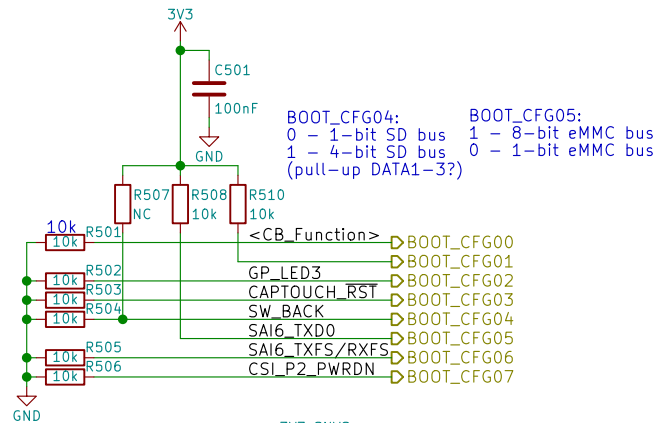
Title: Power

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

Date: 2018-06-07

Rev: v0.1.0

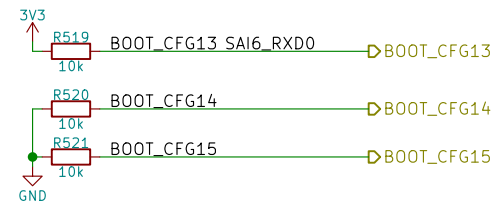
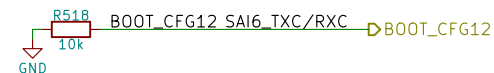
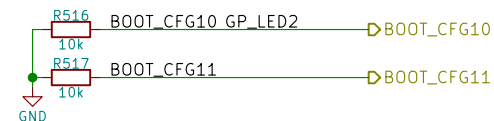
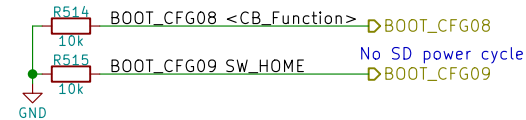
Id: 4/24



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



GNU GPLv3
Copyright 2018

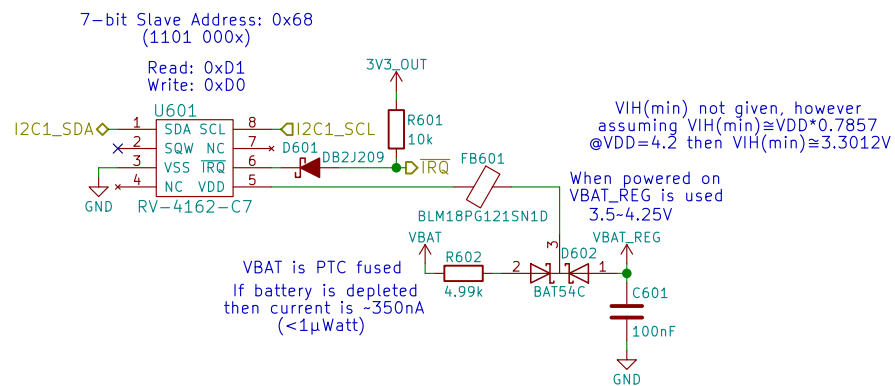
Purism SPC

Sheet: /Boot Config/
File: boot.sch

Title: Boot Configuration

Size: A4 Date: 2018-06-07
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0
Id: 5/24



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

GNU GPLv3
Copyright 2018

Purism SPC

Sheet: /RTC/
File: rtc.sch

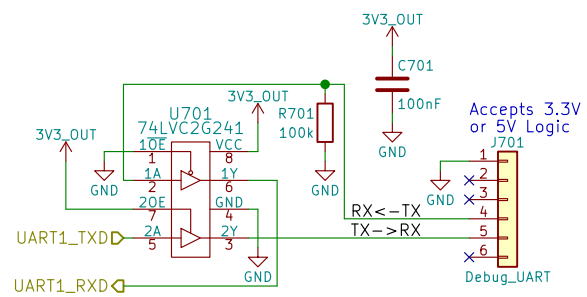
Title: RTC

Size: A4 Date: 2018-06-07

KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 6/24



GNU GPLv3
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Purism SPC

Sheet: /UART Debug/
File: uart.sch

Title: UART Debug

Size: A4 Date: 2018-06-07

KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 7/24

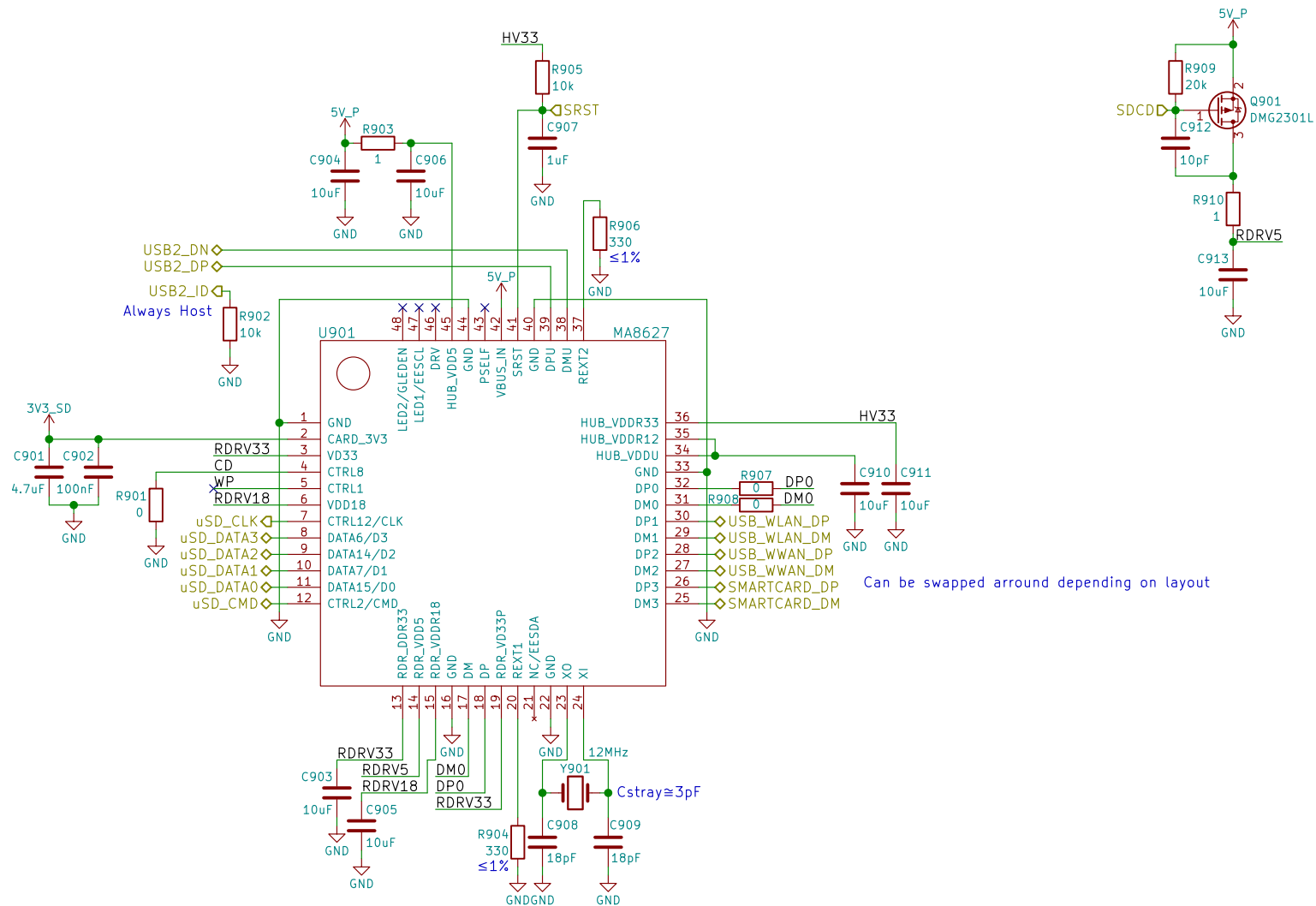


GNU GPLv3
Copyright 2018
Purism SPC
Sheet: /JTAG/
File: jtag.sch

Title: JTAG

Size: A4 Date: 2018-06-07
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0
Id: 8/24



GNU GPLv3
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Purism SPC

Sheet: /USB Hub + SDIO Bridge/

File: usb_hub_sdio.sch

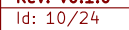
Title: USB Hub + SDIO Bridge

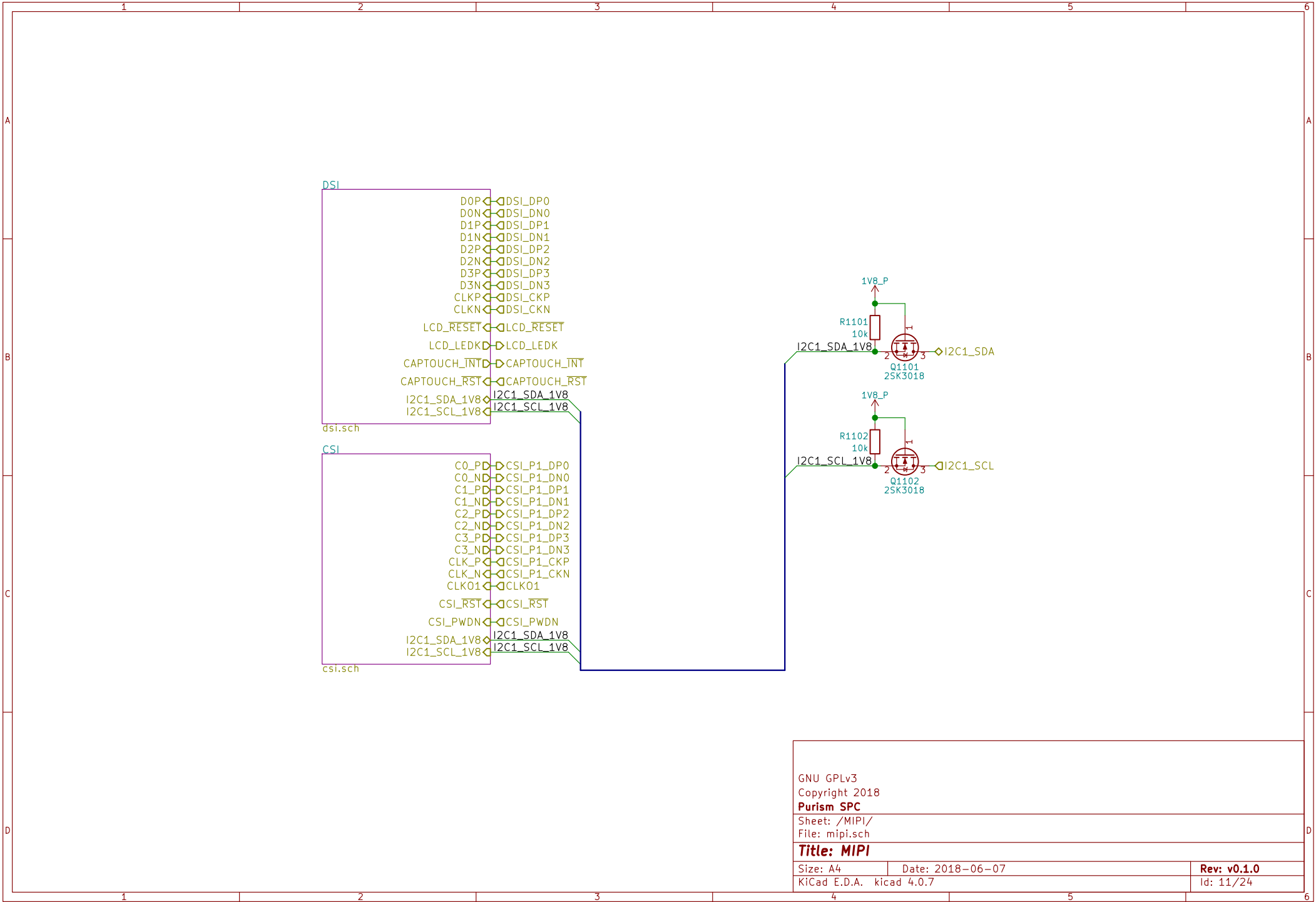
Size: A4 Date: 2018-06-07

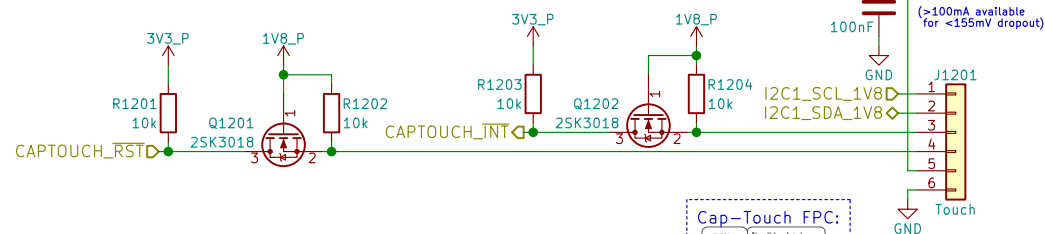
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 9/24



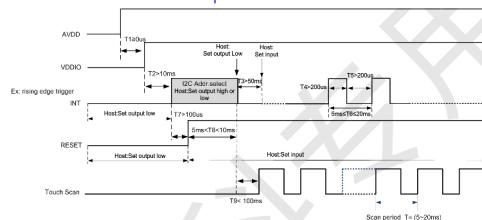




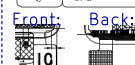
The upper 7 bits are the address, and bit 0 is used to select read or write. GT5688 has two slave device addresses to choose from:

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

Every time you power on or reset, you need to use the INT pin to set the I2C address:

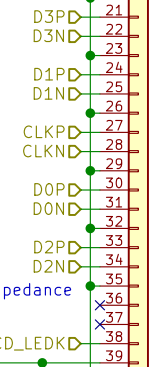
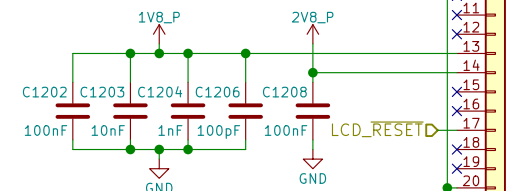


Pin#	Definition
1	SCL
2	SDA
3	INT
4	RESET
5	VDD2, R5
6	GND

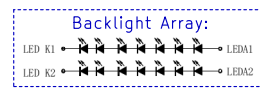
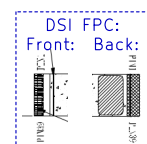
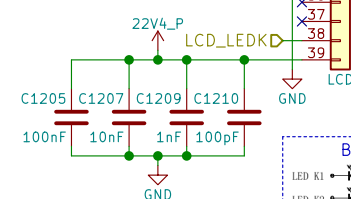


LCD PN:
Shenzhen Jinghong Electronics Co., Ltd.
JH057N00900

Note:
No power-up sequence is given in the spec sheet



100Ω Differential Impedance



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Purism SPC

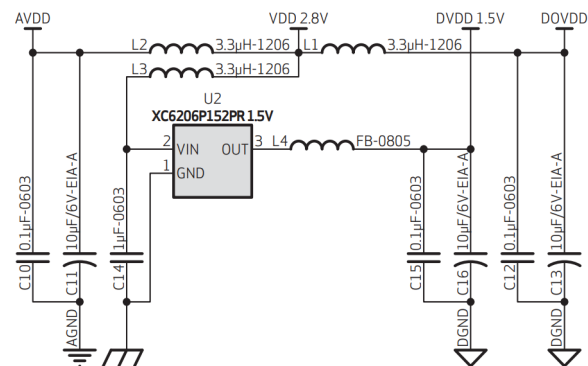
Sheet: /MIPI/DSI/
File: dsi.sch

Title: MIPI DSI

Size: A4 Date: 2018-06-07
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0
Id: 12/24

Using Internal DVDD 1.5V Regulator:



2.7 POWER UP SEQUENCE

Based on the system power configuration (1.8V or 2.8V for I/O power, using external DVDD or internal DVDD, requiring access to the I2C during power up period or not), the power up sequence will differ. If 1.8V is used for I/O power, using the internal DVDD is preferred. If 2.8V is used for I/O power, due to a high voltage drop at the internal DVDD regulator, there is a potential heat issue. Hence, for a 2.8V power system, OmniVision recommends using an external DVDD source. Due to the higher power down current when using an external DVDD source, OmniVision strongly recommends cutting off all powers, including the external DVDD, when the sensor is not in use in the case of 2.8V I/O and external DVDD.

2.7.1 POWER UP WITH INTERNAL DVDD

For powering up with the internal DVDD and I2C access during the power ON period, the following conditions must occur:

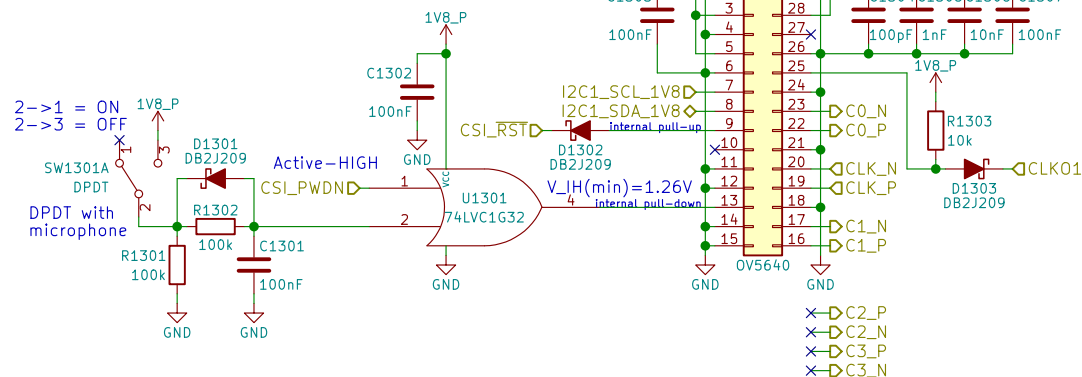
1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. PWDN is active high with an asynchronized design (does not need clock)
3. PWDN pin tied to digital ground if it is not controlled.
4. if PWDN pin is controlled as below, for PWDN to go low, power must first become stable (AVDD to PWDN ≥ 5 ms)
5. RESETB is active low with an asynchronized design
6. master clock XVCLK should provide at least 1 ms before host accesses the sensor's registers
7. host can access I2C bus (if shared) during entire period. 20ms after RESETB goes high, host can access the sensor's registers to initialize sensor

figure 2-3 power up timing with internal DVDD



note $t_0 \geq 0$ ms, delay from DOVDD stable to AVDD stable, it is recommended to power up AVDD shortly after DOVDD has been powered up
 $t_1 \geq 0$ ms, delay from XVCLK off to AVDD off
 $t_2 \geq 5$ ms, delay from AVDD stable to sensor power up stable, PWDN can be pulled low after this point, XVCLK can be turned on after power on
 $t_3 \geq 1$ ms, delay from sensor power up stable to RESETB pull up
 $t_4 \geq 20$ ms, delay from RESETB pull high to SCCB initialization
 $t_5 \geq 0$ ms, delay from AVDD off to DOVDD off
 $t_6 \geq 0$ ms, delay from RESETB pull low to AVDD off

5640_05_2-2



Camera PN:
 Truly C08725-B5SA-E
 7-bit Slave Address: 0x78
 (1111 000x)
 Read: 0xF1
 Write 0xF0

OV5640 CMOS Image Sensor Datasheet:
https://cdn.sparkfun.com/datasheets/Sensors/LightImaging/OV5640_datasheet.pdf

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Purism SPC

Sheet: /MIPI/CSI/
 File: csi.sch

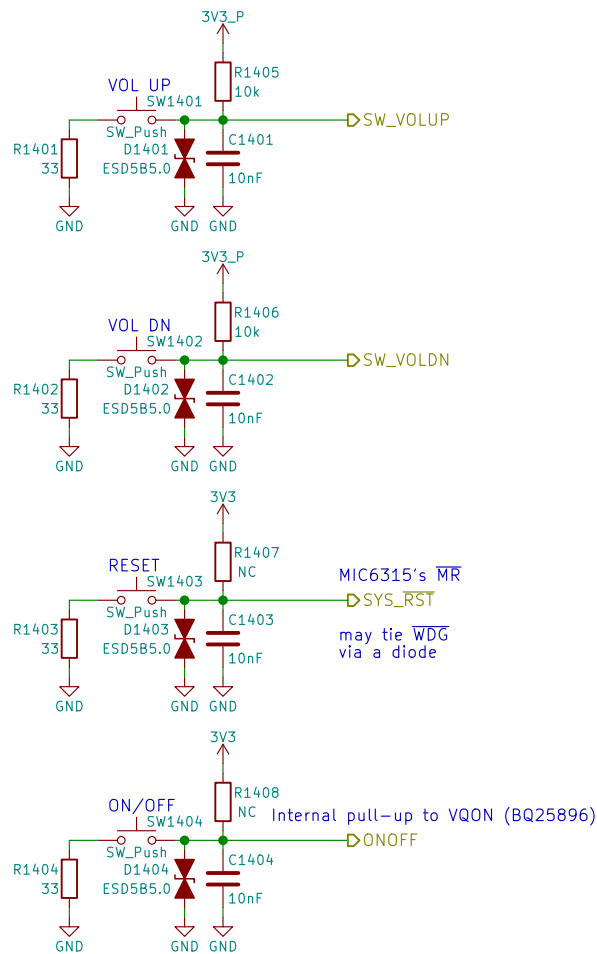
Title: MIPI CSI

Size: A4 Date: 2018-06-07

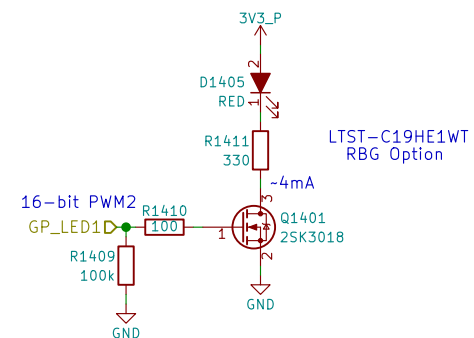
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 13/24



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)



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Purism SPC

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

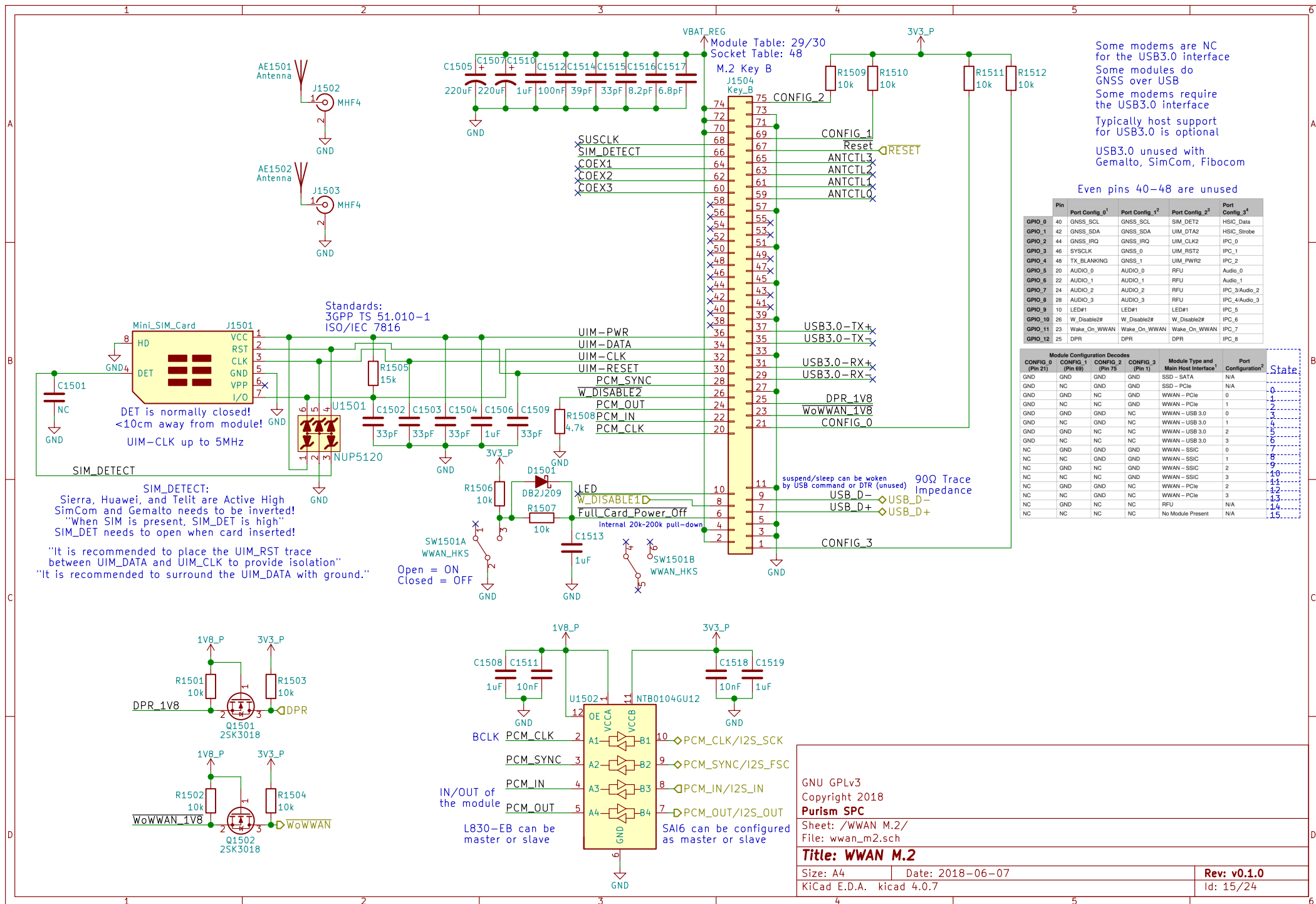
Title: Buttons & LED

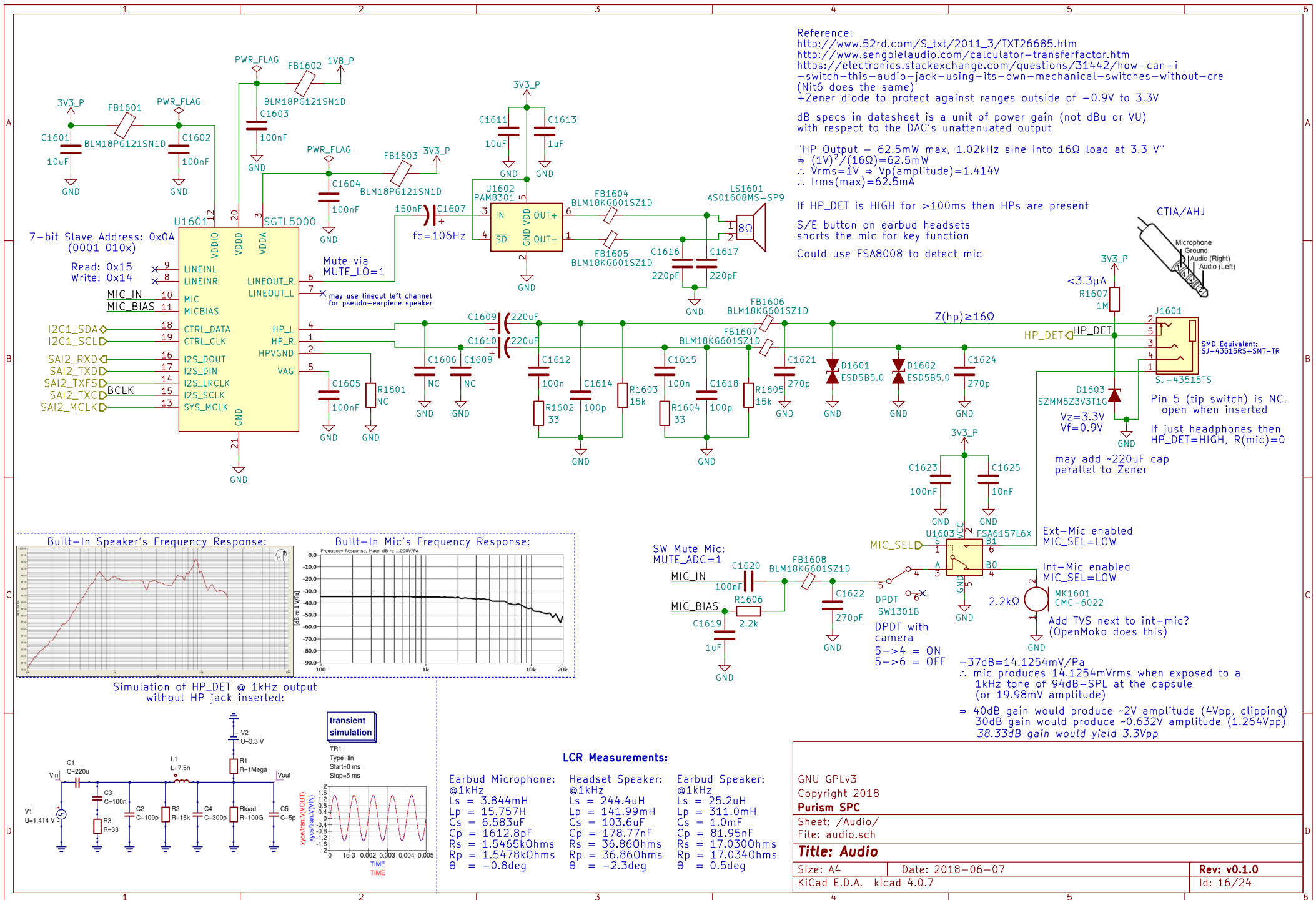
Size: A4 Date: 2018-06-07

KiCad E.D.A. kicad 4.0.7

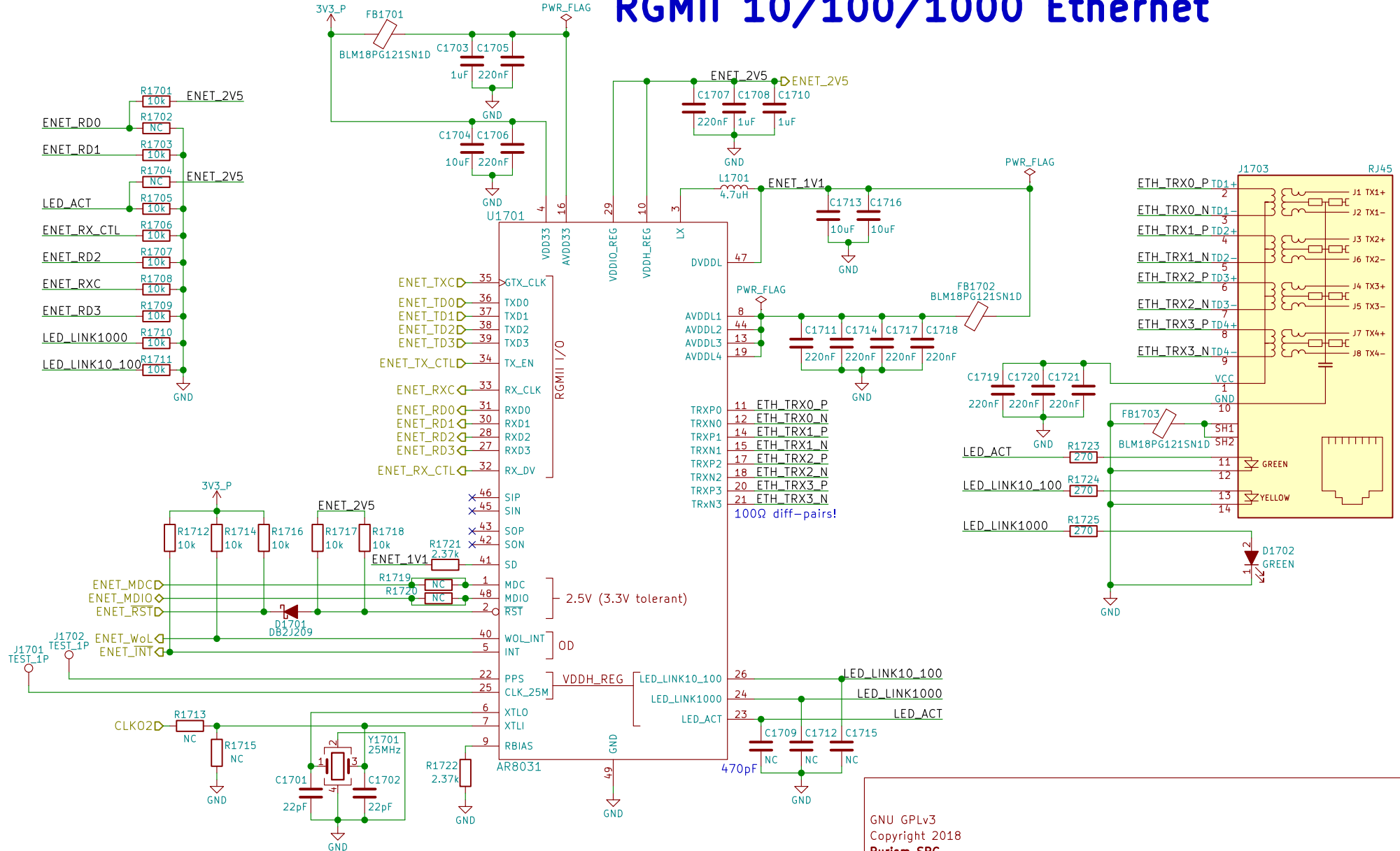
Rev: v0.1.0

Id: 14/24





RGMII 10/100/1000 Ethernet



GNU GPLv3
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Purism SPC

Sheet: /Ethernet/
File: ethernet.sch

Title: Ethernet

Size: A4 Date: 2018-06-07
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0
Id: 17/24

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 for USB!

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

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

3V3_P

J1803 NC

Key E

1 2

3 4

5 6

7 8

9 10

11 12

13 14

15 16

17 18

19 20

21 22

23 24

25 26

27 28

29 30

31 32

33 34

35 36

37 38

39 40

41 42

43 44

45 46

47 48

49 50

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481 482

483 484

485 486

487 488

489 490

491 492

493 494

495 496

497 498

499 500

501 502

503 504

505 506

507 508

509 510

511 512

513 514

515 516

517 518

519 520

521 522

523 524

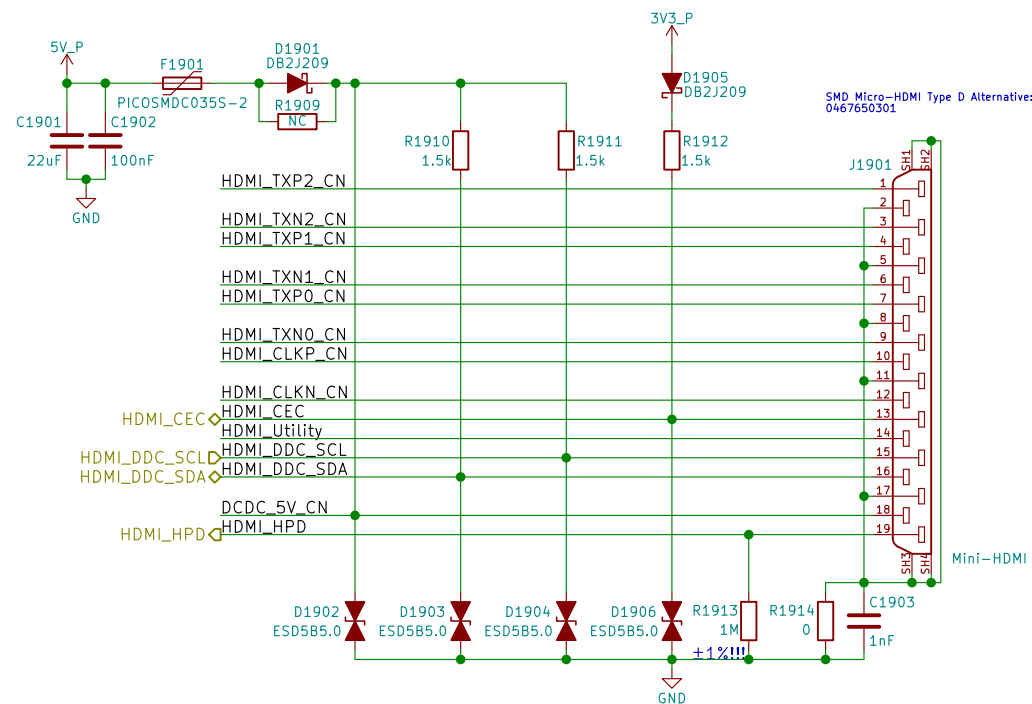
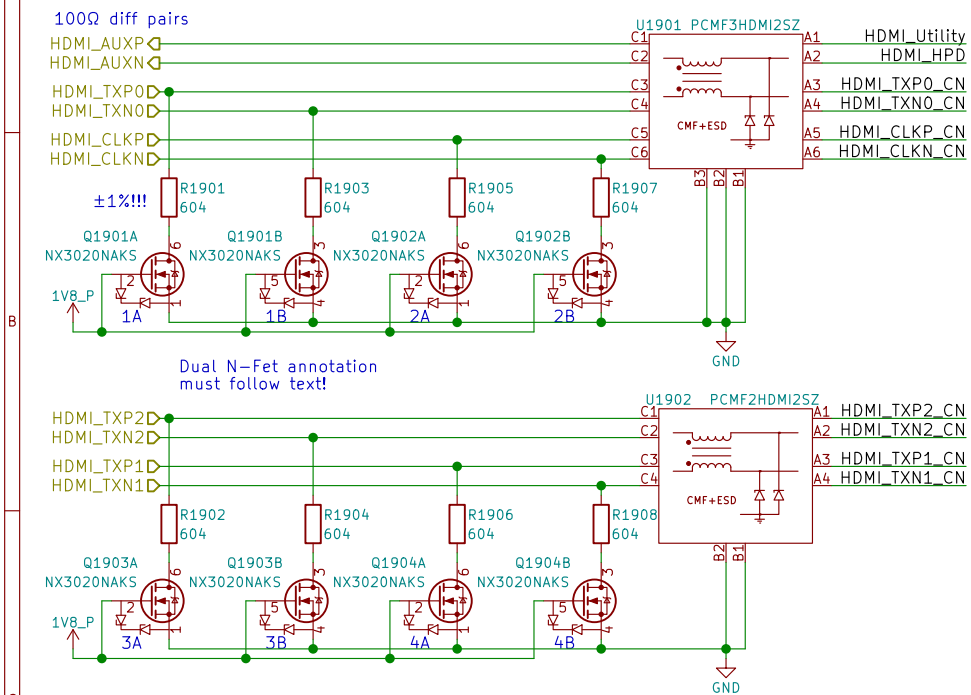
525 526

527 528

529 530

TUSB1046 can be used for DP over USB-C

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



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Purism SPC

Sheet: /HDMI/
File: hdmi.sch

Title: HDMI	
Size: A4	Date: 2018-06-07
KiCad E.D.A. kicad 4.0.7	

Rev: v0.1.0
Id: 19/24

D

[illegible]

Accel/Gyro: 7-bit Slave Address: 0x6A (1101 010x)
Read: 0xD5
Write: 0xD4

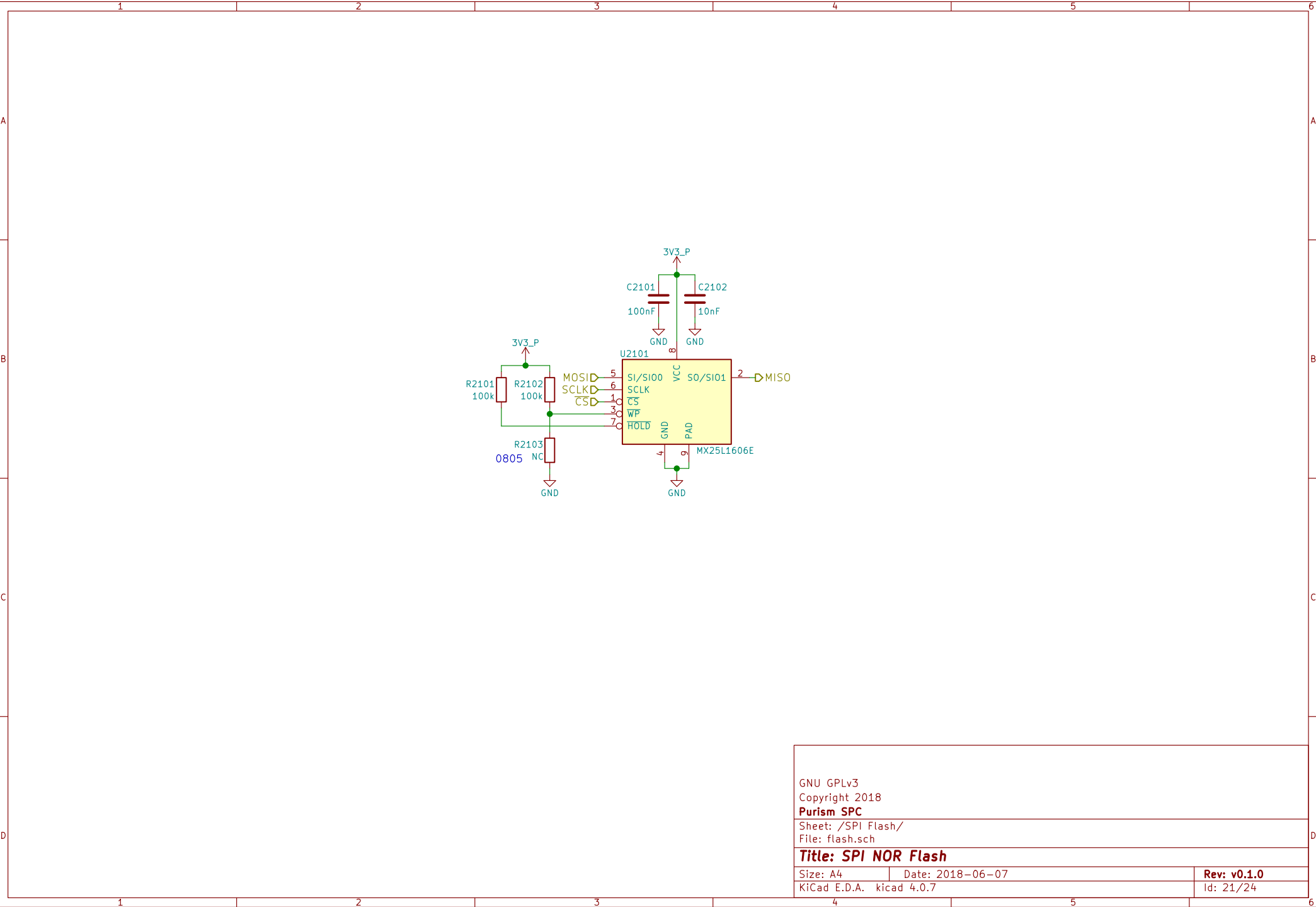
SDO_A/G Address:
0 0x6B
0 0x6A
(0x6B conflicts with charge controller IC)

3V3_P
3V3
GND

[illegible]

Command	SAD[6:2]	SAD[1] = SDO/SA1	SAD[0]	R/W	SAD+R/W
Read	00111	0	0	1	00111001 (39h)
Write	00111	0	0	0	00111000 (38h)
Read	00111	1	0	1	00111101 (3Dh)
Write	00111	1	0	0	00111100 (3Ch)

Id: 20/24



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Purism SPC

Sheet: /SPI Flash/
File: flash.sch

Title: SPI NOR Flash

Size: A4 Date: 2018-06-07

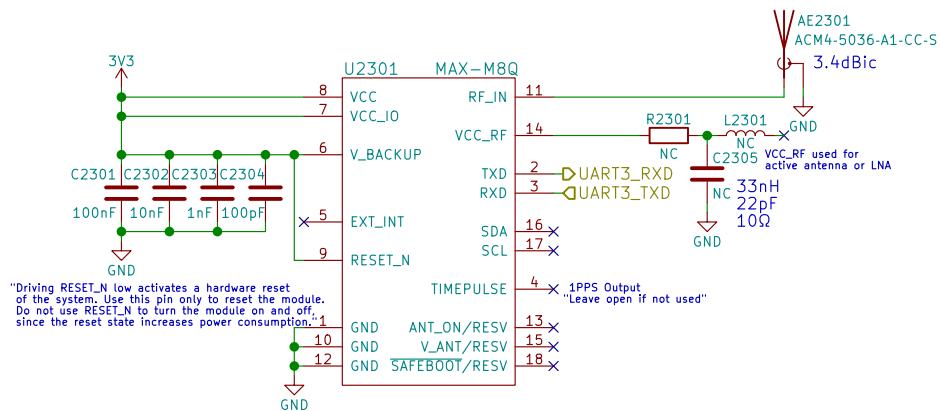
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 21/24



Id: 22/24



Reference:
https://www.u-blox.com/sites/default/files/MAX-8-M8-FW3_HardwareIntegrationManual_1503005929.pdf

GNU GPLv3
 Copyright 2018

Purism SPC

Sheet: /GNSS/
 File: gnss.sch

Title: GNSS

Size: A4 Date: 2018-06-07

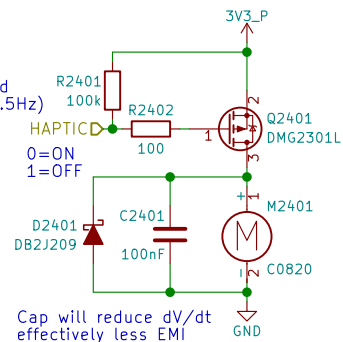
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PWM pins occupied:
 GPIO1_I001 - LCD Backlight
 GPIO1_I013 - LED
 GPIO1_I014 - Ethernet (CLKO_25MHz)
 GPIO1_I015 - CSI (CLKO2)

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)!

Cheaper Motor Connector:
https://lcsc.com/product-detail/1-25T-Connectors_1-25T-1-2AW_C10832.html

Motor Source:
https://www.alibaba.com/product-detail/Coin-motor-vibration-dc-motor-cellphone_1994583657.html?spm=a2700.8443308.0.0.5aa13e5f1wxHgs

Motor Datasheet:
<https://cloud.puri.sm/s/z8JR6DJ4KrJYzoW>

Motor PN:
 BY0820Z021L20

GNU GPLv3
 Copyright 2018

Purism SPC

Sheet: /Haptic Motor/
 File: haptic.sch

Title: Haptic/Vibration Motor

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