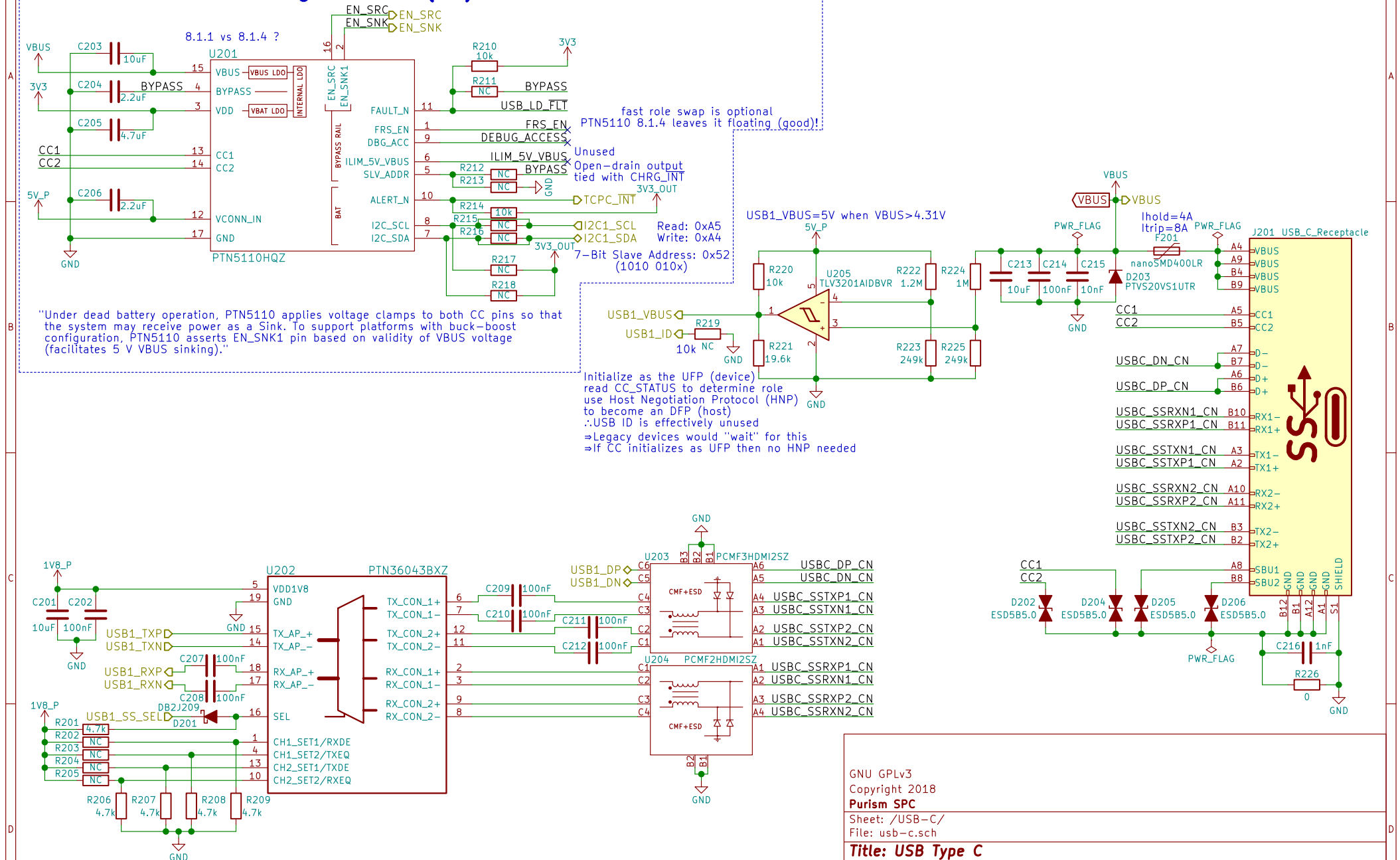


USB-C TCPC – Config Channel (CC) and PD Role Controller



Purism SPC

Title: USB Tv

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

Rev: v0.1.0
Id: 2/24



(interpret RSOC% based on this plot)

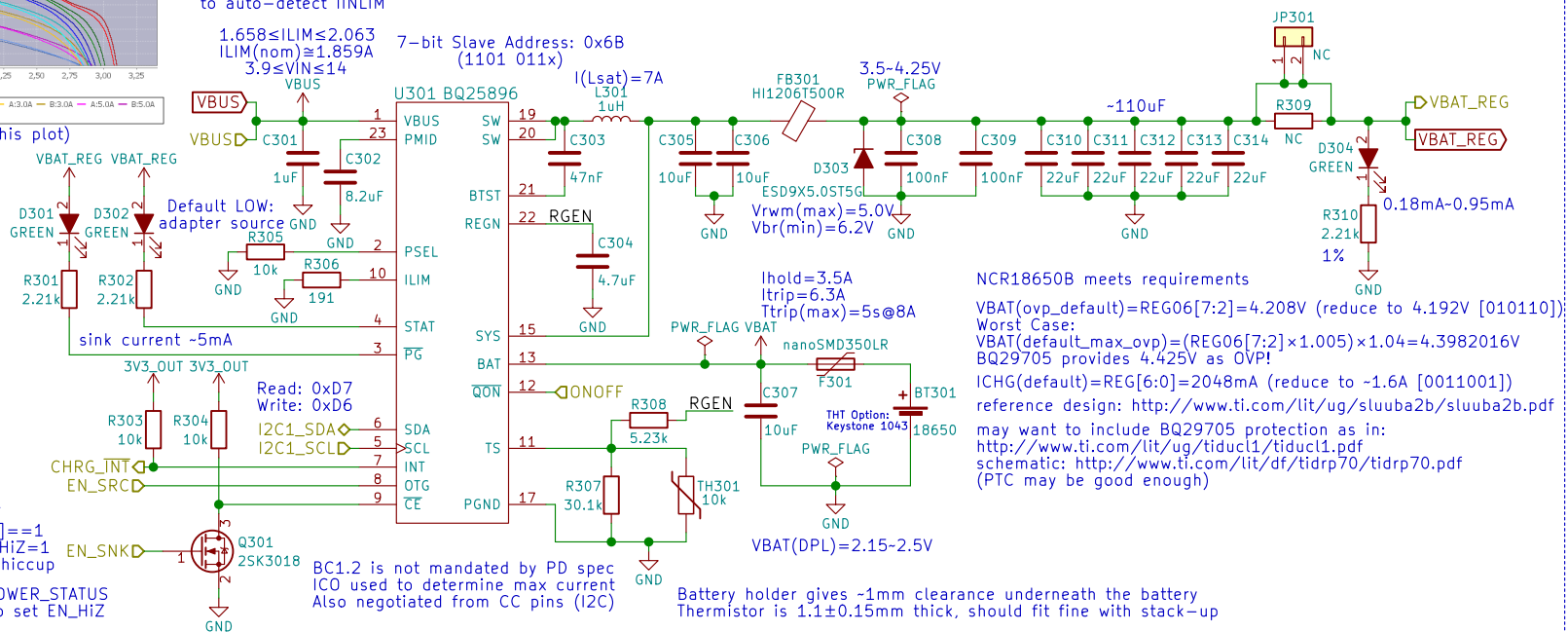
Drawing ~333.33mA, or consuming <1.2W, should give close to 10 hours going from 100% to 0% charge

use AUTO_DPDM_EN to auto-detect IINLIM

$1.658 \leq I_{LIM} \leq 2.063$
 $I_{LIM(nom)} \approx 1.859A$
 $3.9 \leq V_{IN} \leq 14$

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_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)

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Purism SPC

Sheet: /Battery/

File: battery.sch

Title: Battery

Size: A4

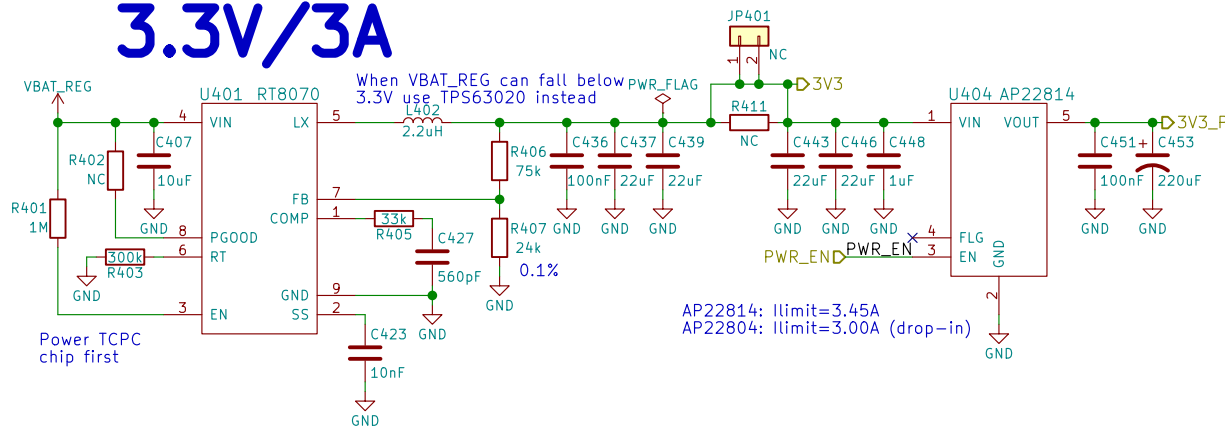
Date: 2018-06-06

KiCad E.D.A. kicad 4.0.7

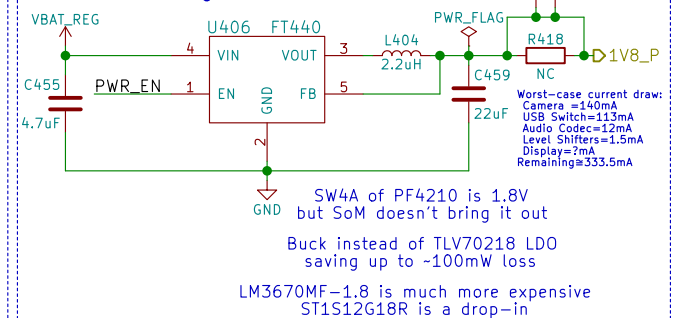
Rev: v0.1.0

Id: 3/24

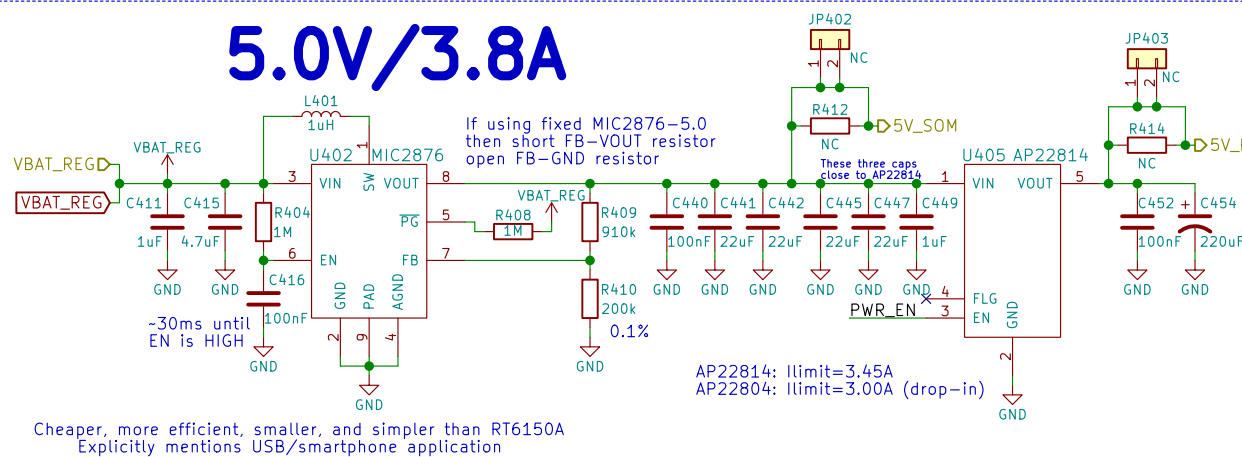
3.3V/3A



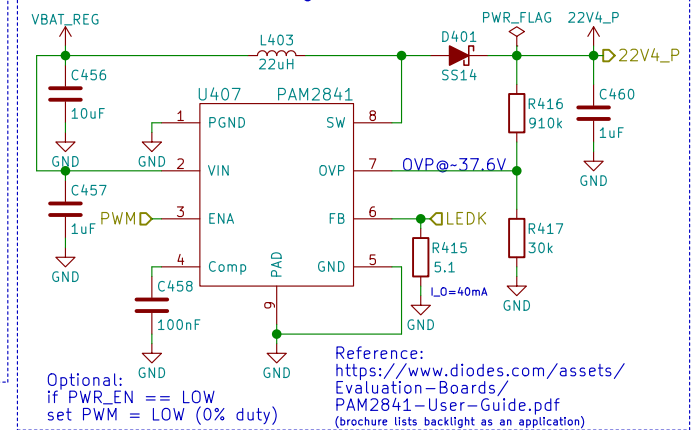
1.8V/600mA



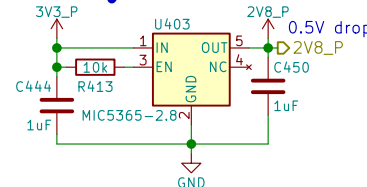
5.0V/3.8A



22.4V/40mA



2.8V/150mA



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Sheet: /Power/
File: power.sch

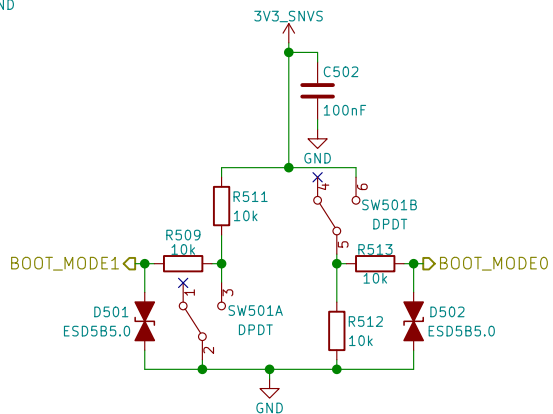
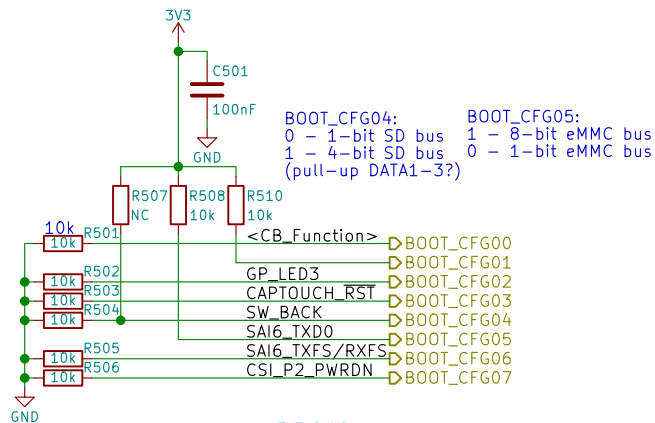
Title: Power

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

Date: 2018-06-06

Rev: v0.1.0

Id: 4/24

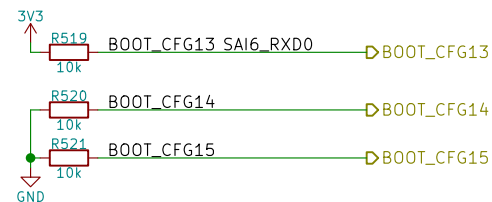
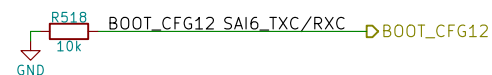
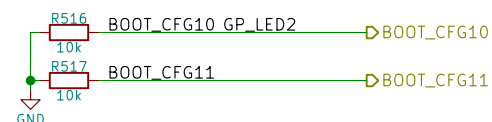
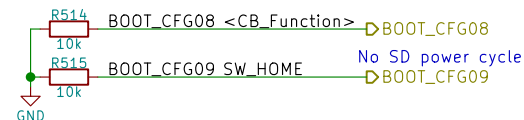


2->1: eMMC 2->3: USB (Serial Downloader)	
BOOT_MODE[1:0]	Boot Type
00	Boot From Fuses
01	Serial Downloader
10	Internal Boot
11	Reserved

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



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Sheet: /Boot Config/
 File: boot.sch

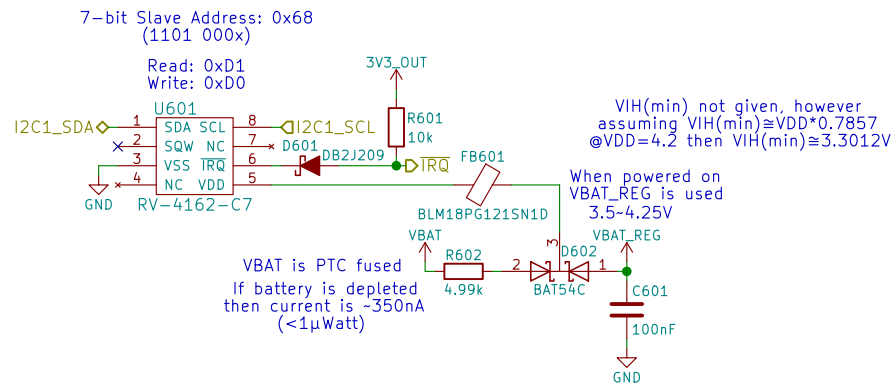
Title: Boot Configuration

Size: A4 Date: 2018-06-06

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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

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Sheet: /RTC/
File: rtc.sch

Title: RTC

Size: A4 Date: 2018-06-06

KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 6/24

Id: 7/24



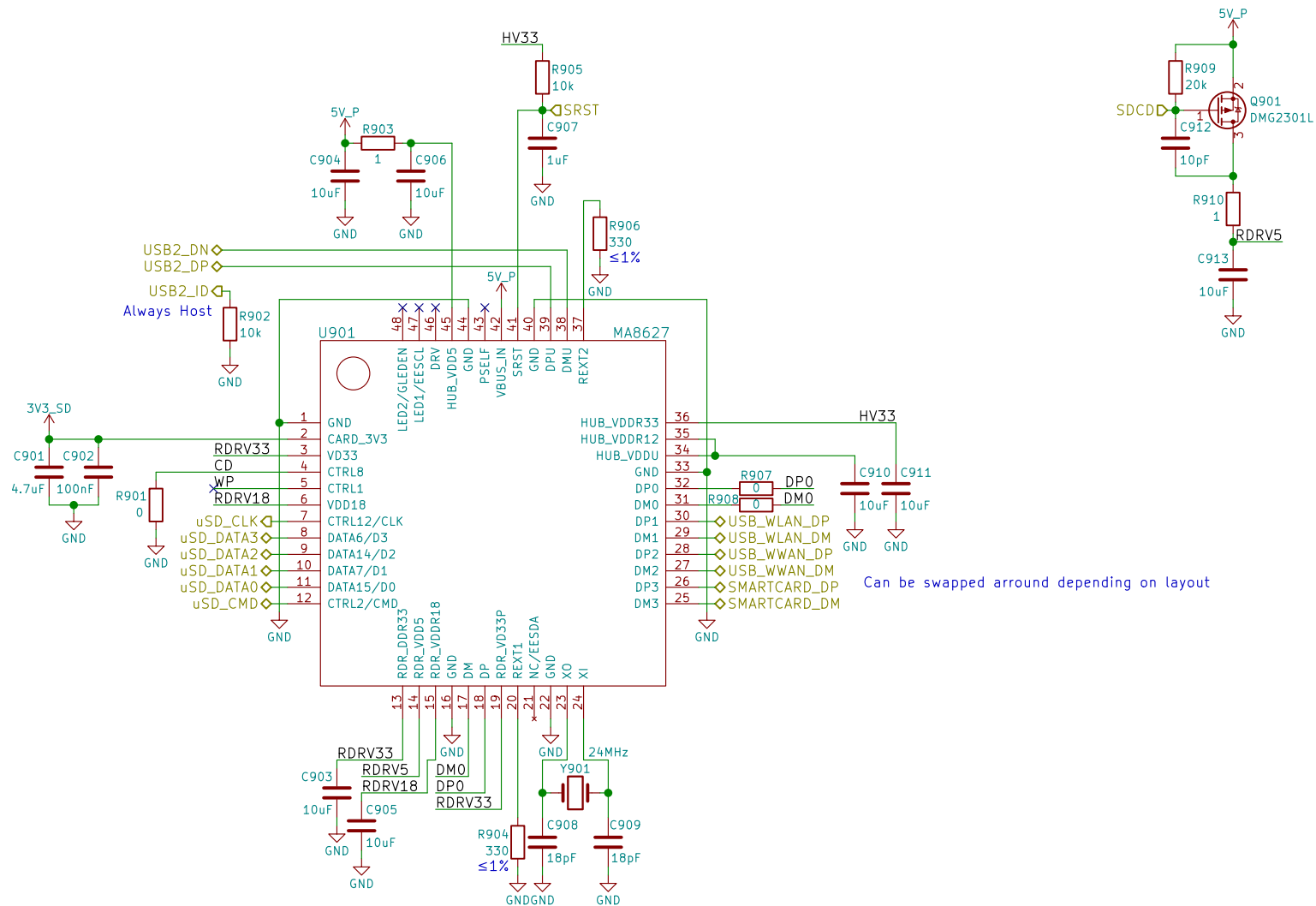
GNU GPLv3
Copyright 2018
Purism SPC
Sheet: /JTAG/
File: jtag.sch

Title: JTAG

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

Date: 2018-06-06

Rev: v0.1.0
Id: 8/24



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Purism SPC

Sheet: /USB Hub + SDIO Bridge/

File: usb_hub_sdio.sch

Title:

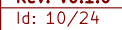
Size: A4

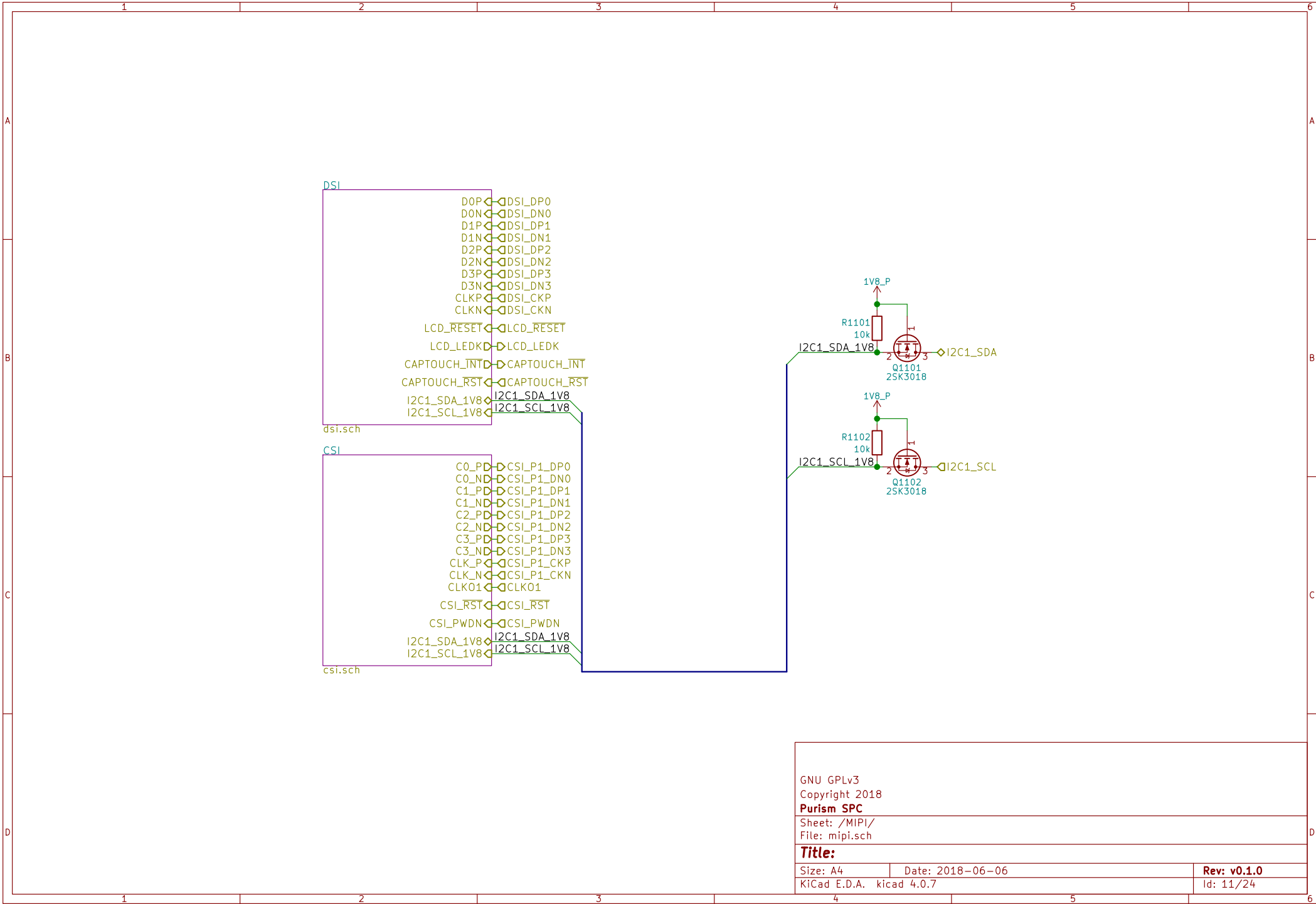
Date: 2018-06-06

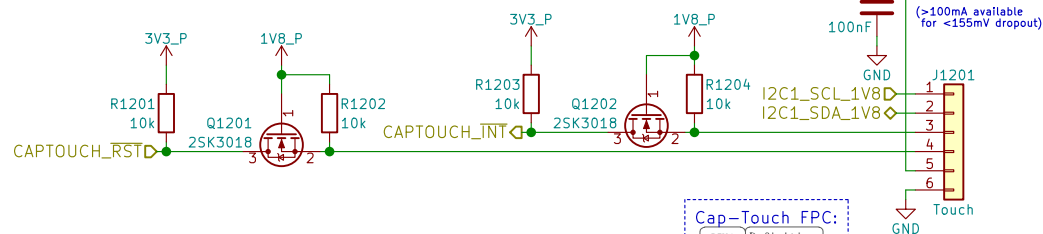
Rev: v0.1.0

KiCad E.D.A. kicad 4.0.7

Id: 9/24



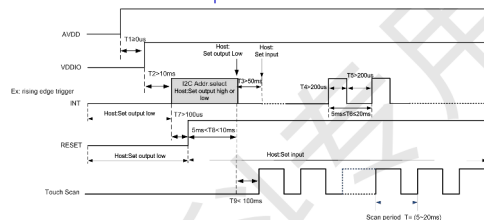




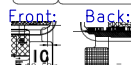
The upper 7 bits are the address, and bit 0 is used to select read or write. GT5688 has two slave device addresses to choose from:

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:

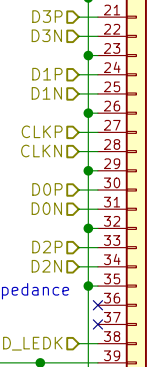
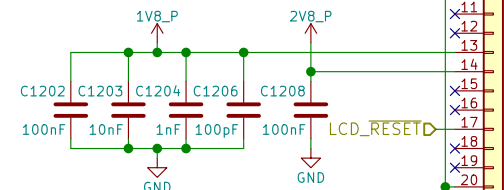


Pin#	Definition
1	SCL
2	SDA
3	INT
4	RESET
5	VDD2, R5
6	GND

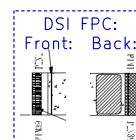
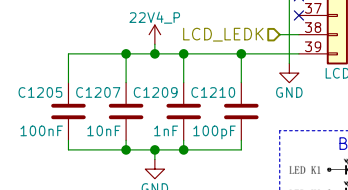


LCD PN:
Shenzhen Jinghong Electronics Co., Ltd.
JH057N00900

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

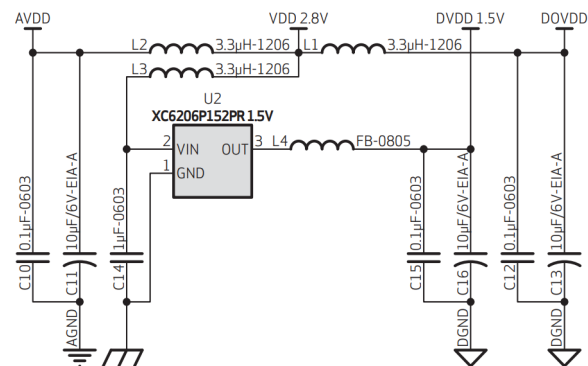
Size: A4 Date: 2018-06-06

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:

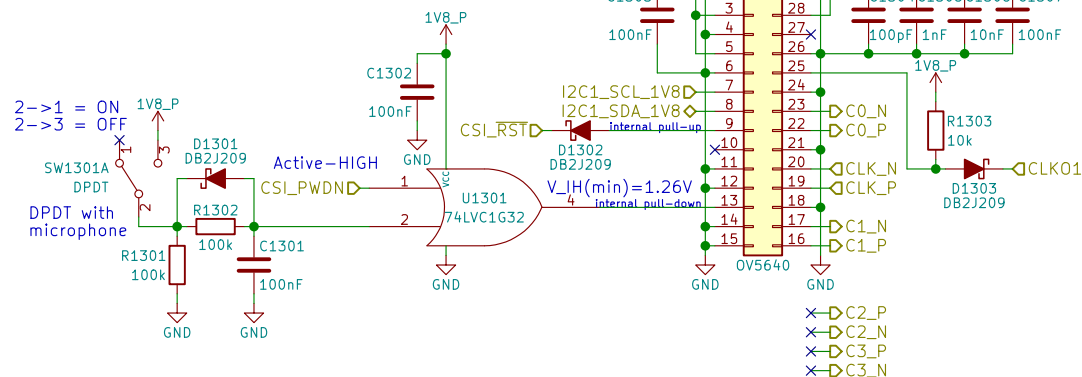
1. when DOVDD and AVDD are turned ON, make sure DOVDD becomes stable before AVDD becomes stable
2. PWDN is active high with an asynchronous design (does not need clock)
3. PWDN pin tied to digital ground if it is not controlled.
4. if PWDN pin is controlled as below, for PWDN to go low, power must first become stable (AVDD to PWDN ≥ 5 ms)
5. RESETB is active low with an asynchronous 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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Sheet: /MIPI/CSI/
 File: csi.sch

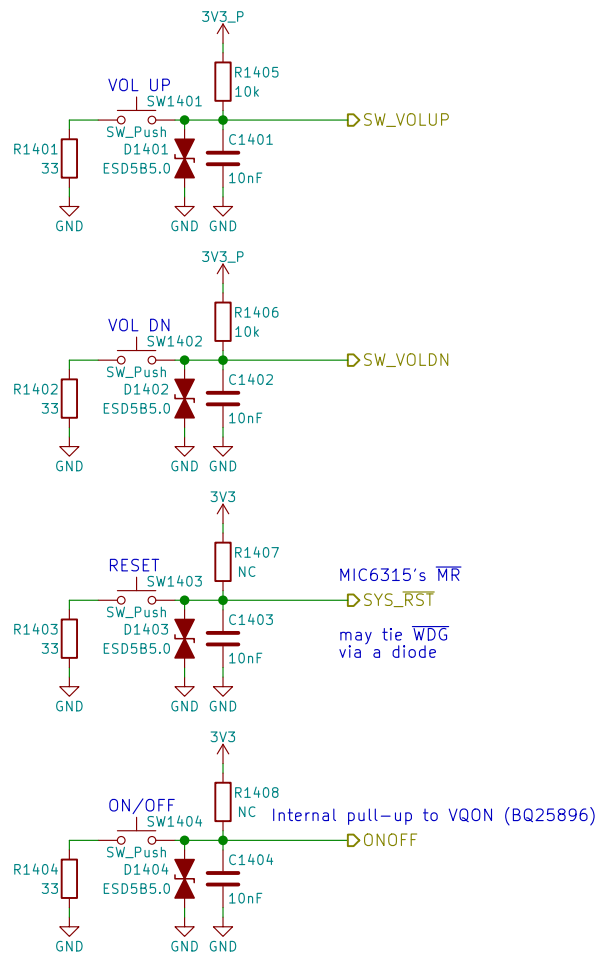
Title:

Size: A4 Date: 2018-06-06

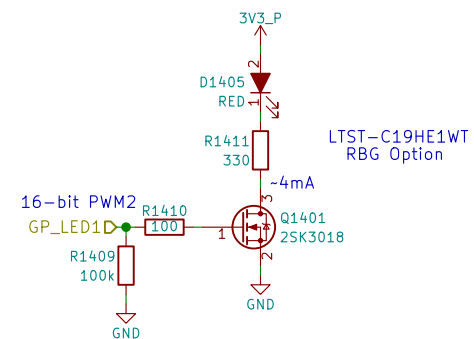
KiCad E.D.A. kicad 4.0.7

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: 2018-06-06

KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 14/24

RGMII 10/100/1000 Ethernet

3V3_P FB1701 BLM18PG121SN1D C1703 1uF C1705 220nF PWR_FLAG

ENET_2V5 ENET_2V5 C1707 220nF C1708 1uF C1710 1uF

ENET_RD0 R1701 10k R1702 NC R1703 10k R1704 NC R1705 10k ENET_2V5

ENET_RD1 R1706 10k ENET_RX_CTL R1707 10k ENET_RD2 R1708 10k ENET_RXC R1709 10k ENET_RD3 R1710 10k LED_LINK1000 R1711 10k LED_LINK10_100 R1712 10k

3V3_P ENET_2V5 R1713 10k R1714 10k R1716 10k R1717 10k R1718 10k R1721 2.37k ENET_1V1 R1719 NC R1720 NC

ENET_TXC 35 GTX_CLK 36 TXD0 37 TXD1 38 TXD2 39 TXD3 34 TX_EN 33 RX_CLK 31 RXD0 30 RXD1 28 RXD2 27 RXD3 32 RX_DV

ENET_TX_CTL 33 ENET_RXC 31 ENET_RD0 30 ENET_RD1 28 ENET_RD2 27 ENET_RD3 32 ENET_RX_CTL 32

46 SIP 45 SIN 43 SOP 42 SON 41 SD 1 MDC 48 MDIO 2 RST 40 WOL_INT 5 INT 22 PPS 25 CLK_25M 6 XTLO 7 XTLO 9 RBIAS

ENET_MDCC ENET_MDIO ENET_RST ENET_WoL ENET_INT

J1701 TEST_1P J1702 TEST_1P

CLK02 R1713 NC R1715 NC Y1701 25MHz C1701 22pF C1702 22pF R1722 2.37k

ENET_1V1 47 PWR_FLAG 8 AVDDL1 44 AVDDL2 13 AVDDL3 19 AVDDL4 11 ETH_TRX0_P 12 ETH_TRX0_N 14 ETH_TRX1_P 15 ETH_TRX1_N 17 ETH_TRX2_P 18 ETH_TRX2_N 20 ETH_TRX3_P 21 ETH_TRX3_N

100Ω diff-pairs!

LED_LINK10_100 LED_LINK1000 LED_ACT

J1703 RJ45 ETH_TRX0_P TD1+ 2 ETH_TRX0_N TD1- 3 ETH_TRX1_P TD2+ 4 ETH_TRX1_N TD2- 5 ETH_TRX2_P TD3+ 6 ETH_TRX2_N TD3- 7 ETH_TRX3_P TD4+ 8 ETH_TRX3_N TD4- 9 VCC 1 GND 10 SH1 SH2 BLM18PG121SN1D FB1703 GREEN YELLOW D1702 GREEN

LED_ACT R1723 270 LED_LINK10_100 R1724 270 LED_LINK1000 R1725 270

LED_LINK10_100 LED_LINK1000 LED_ACT

C1719 220nF C1720 220nF C1721 220nF FB1703 BLM18PG121SN1D

LED_ACT R1723 270 LED_LINK10_100 R1724 270 LED_LINK1000 R1725 270

LED_LINK10_100 LED_LINK1000 LED_ACT

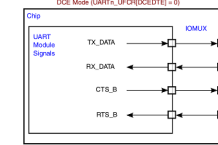
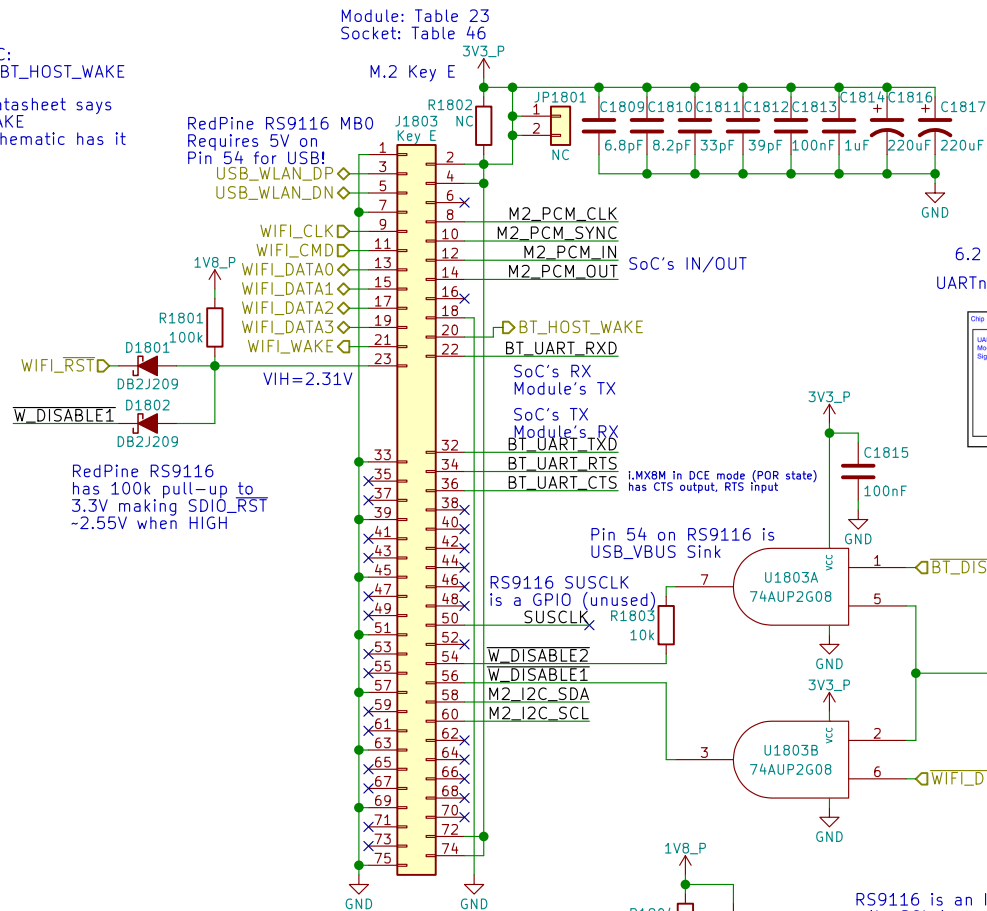
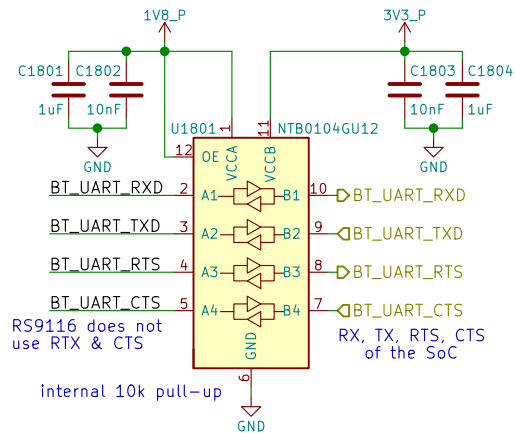
C1709 NC C1712 NC C1715 NC

470pF

AR8031

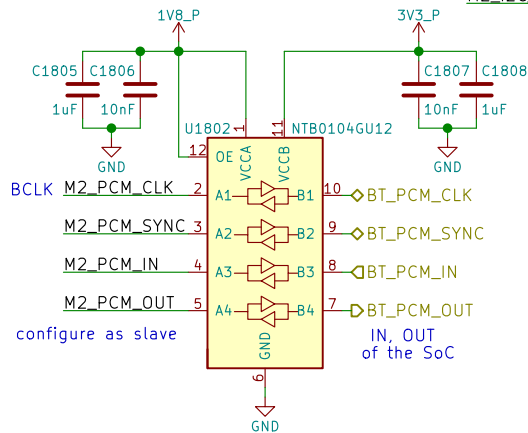
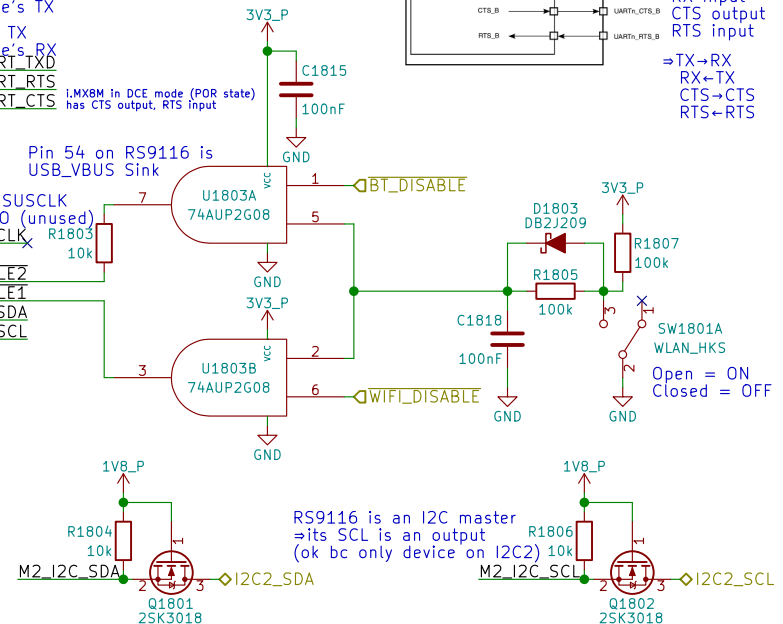
GNU GPLv3
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Purism SPC
Sheet: /Ethernet/
File: ethernet.sch
Title: Ethernet
Size: A4 Date: 2018-06-06 Rev: v0.1.0
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Id: 17/24



TX output
RX input
CTS output
RTS input

⇒ TX → RX
RX ← TX
CTS → CTS
RTS ← RTS

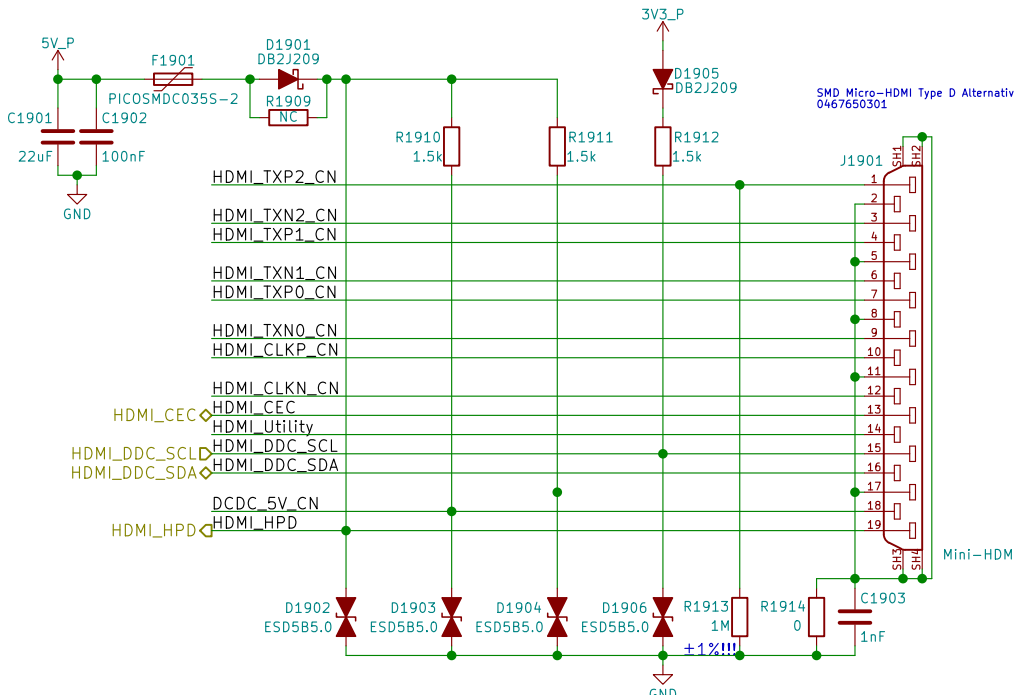
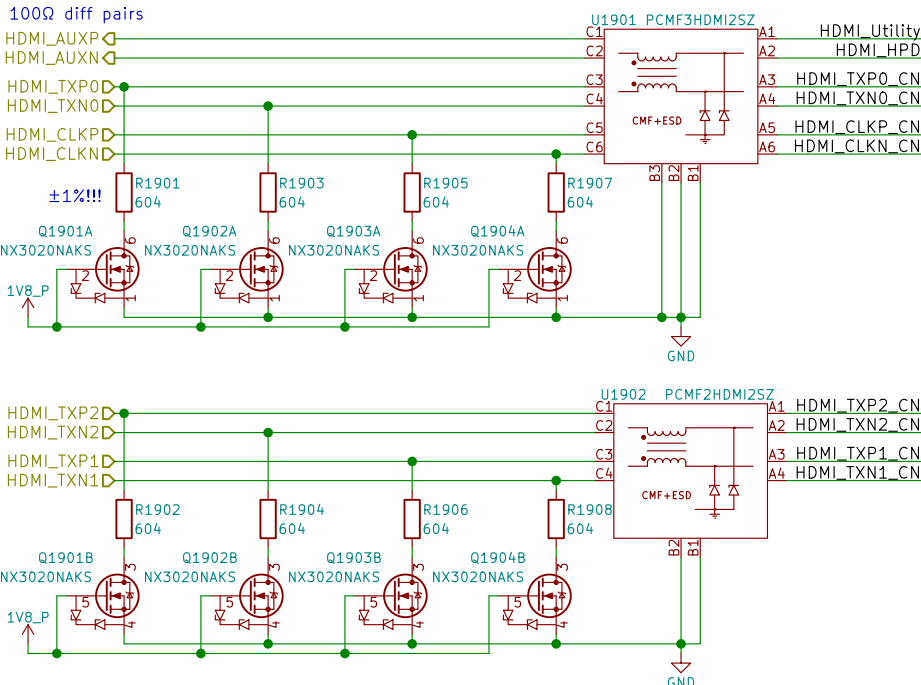


Size: A4	Date: 2018-06-06
KiCad E.D.A. kicad 4.0.7	

Rev: v0.1.0
Id: 18/24

HD3SS460 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: HDMM

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

Rev: v0.1.0

Id: 19/24



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Purism SPC

Sheet: /SPI Flash/

File: flash.sch

Title: SPI NOR Flash

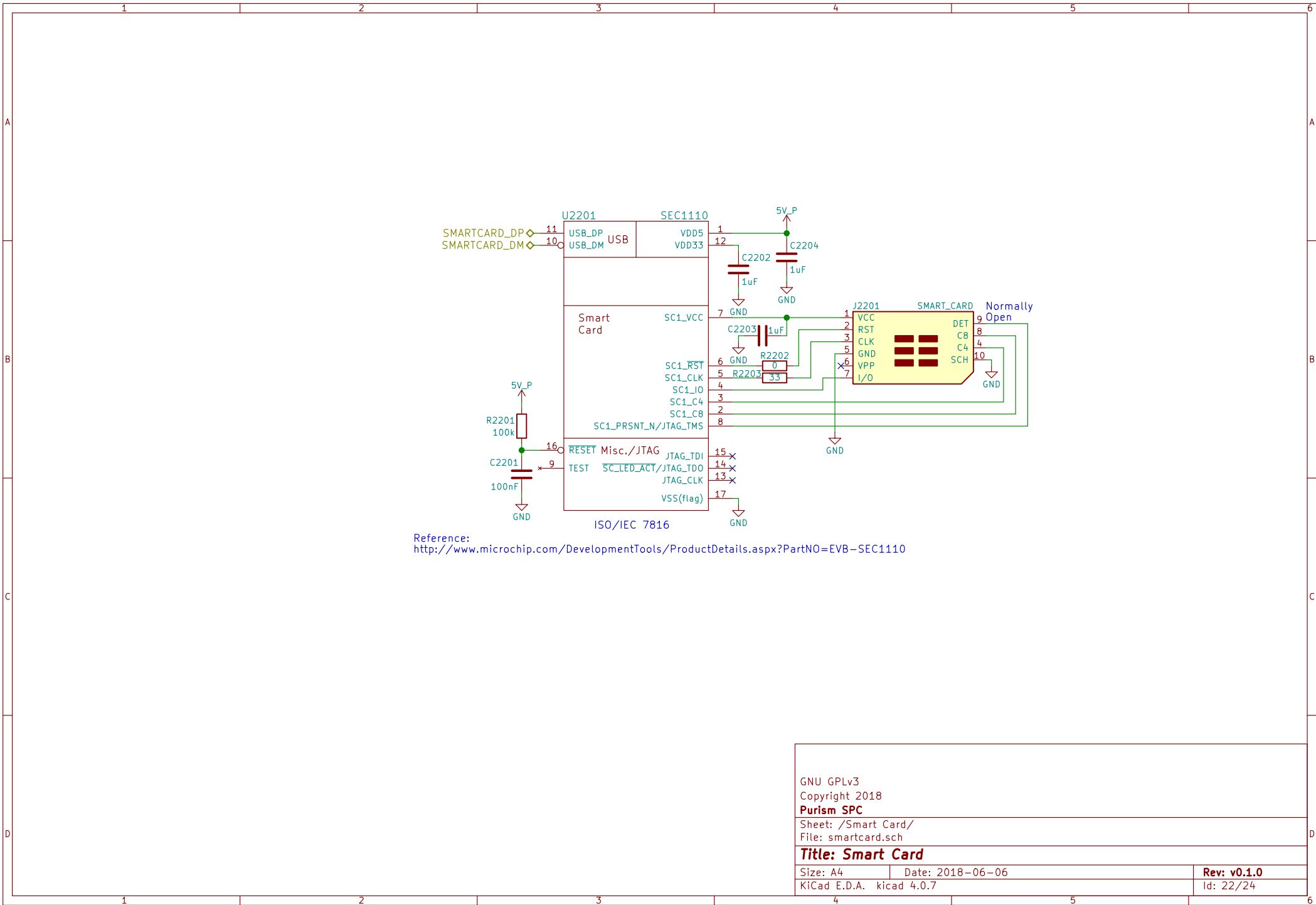
Size: A4

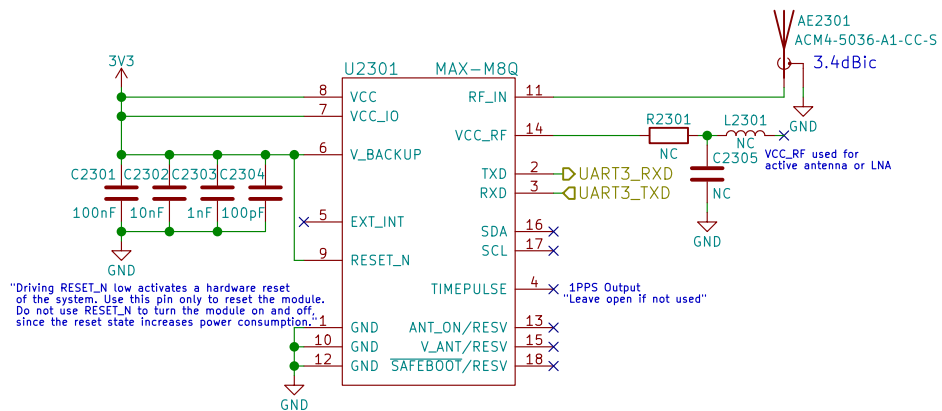
Date: 2018-06-06

Rev: v0.1.0

KiCad E.D.A. kicad 4.0.7

Id: 21/24





Reference:
https://www.u-blox.com/sites/default/files/MAX-8-M8-FW3_HardwareIntegrationManual_15030059.pdf

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Purism SPC

Sheet: /GNSS/

File: gnss.sch

Title: GNSS

Size: A4 Date: 2018-06-06

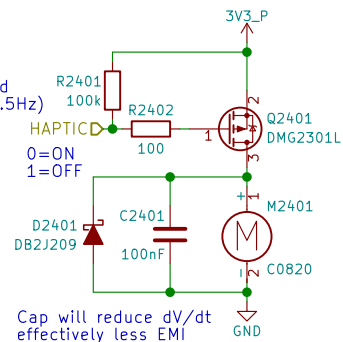
KiCad E.D.A. kicad 4.0.7

Rev: v0.1.0

Id: 23/24

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>

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Purism SPC

Sheet: /Haptic Motor/
 File: haptic.sch

Title: Haptic/Vibration Motor

Size: A4 Date: 2018-06-06

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Rev: v0.1.0

Id: 24/24