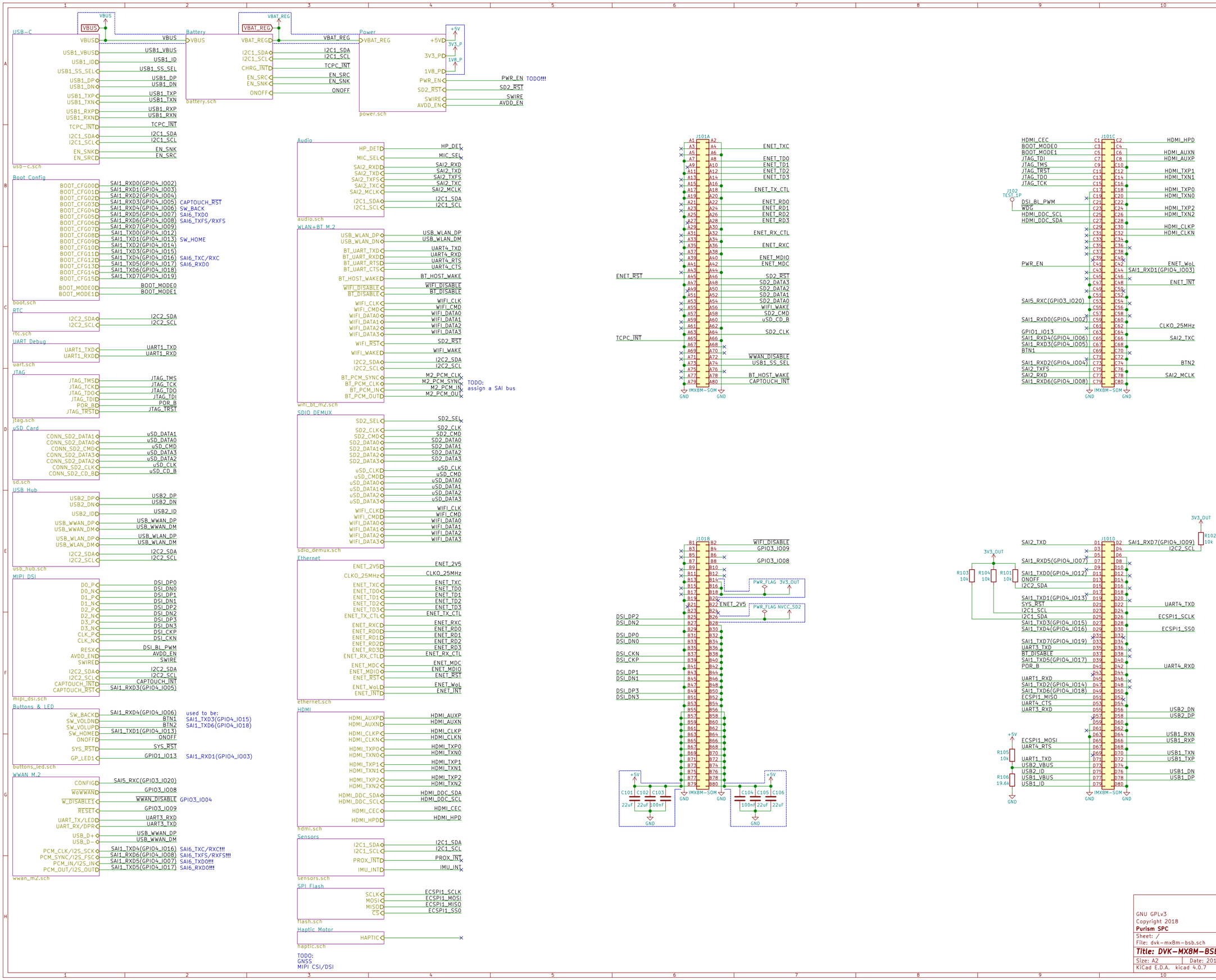
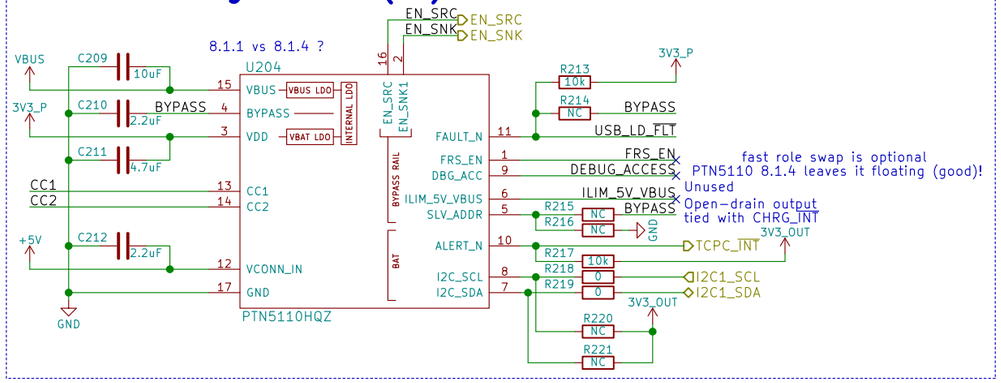
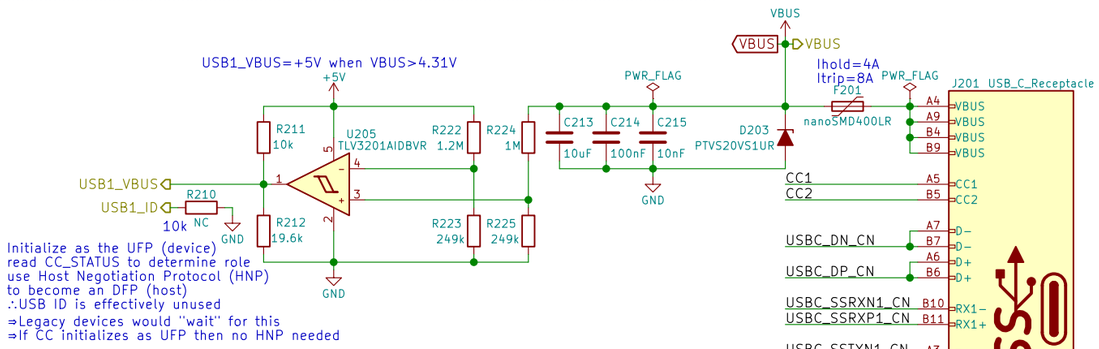
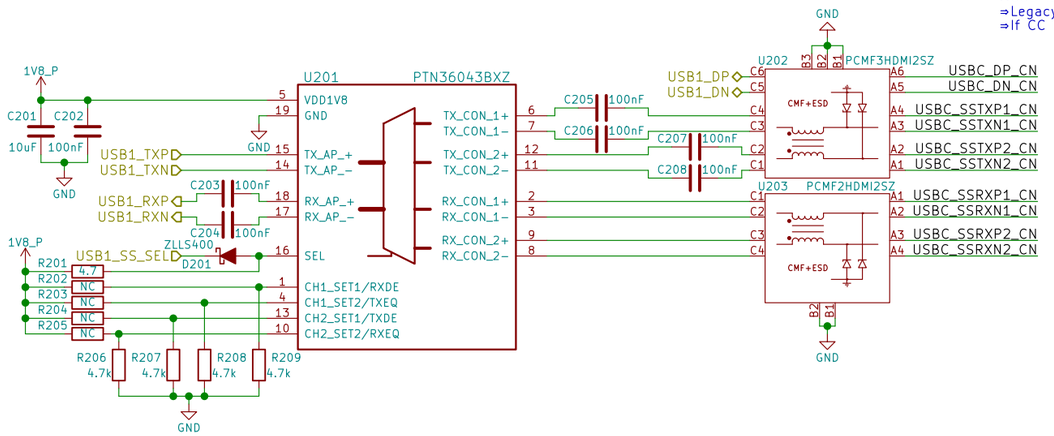

USB-C
VBUS
USB1_VBUS
USB1_ID
USB1_SS_SEL
USB1_DP
USB1_DN
USB1_TXP
USB1_TXN
USB1_RXP
USB1_RXN
TCPC_INT
I2C1_SDA
I2C1_SCL
EN_SNK
EN_SRC
usb-c.sch
Battery
battery.sch
Power
power.sch
+5V
3V3_P
1V8_P
PWR_EN TODO!!!
SD2_RST
SWIRE
AVDD_EN
Boot Config
BOOT_CFG00 SAI1_RXD0(GPIO4_IO02)
BOOT_CFG01 SAI1_RXD1(GPIO4_IO03)
BOOT_CFG02 SAI1_RXD2(GPIO4_IO04)
BOOT_CFG03 SAI1_RXD3(GPIO4_IO05) CAPTOUCH_RST
BOOT_CFG04 SAI1_RXD4(GPIO4_IO06) SW_BACK
BOOT_CFG05 SAI1_RXD5(GPIO4_IO07) SAI6_TXD0
BOOT_CFG06 SAI1_RXD6(GPIO4_IO08) SAI6_TXFS/RXFS
BOOT_CFG07 SAI1_RXD7(GPIO4_IO09)
BOOT_CFG08 SAI1_TXD0(GPIO4_IO12)
BOOT_CFG09 SAI1_TXD1(GPIO4_IO13) SW_HOME
BOOT_CFG10 SAI1_TXD2(GPIO4_IO14)
BOOT_CFG11 SAI1_TXD3(GPIO4_IO15)
BOOT_CFG12 SAI1_TXD4(GPIO4_IO16) SAI6_TXC/RXC
BOOT_CFG13 SAI1_TXD5(GPIO4_IO17) SAI6_RXD0
BOOT_CFG14 SAI1_TXD6(GPIO4_IO18)
BOOT_CFG15 SAI1_TXD7(GPIO4_IO19)
BOOT_MODE0
BOOT_MODE1
boot.sch
RTC
I2C2_SDA
I2C2_SCL
rtc.sch
UART Debug
UART1_TXD
UART1_RXD
uart.sch
JTAG
JTAG_TMS
JTAG_TCK
JTAG_TDO
JTAG_TDI
POR_B
JTAG_TRST
jtag.sch
uSD Card
CONN_SD2_DATA1 uSD_DATA1
CONN_SD2_DATA0 uSD_DATA0
CONN_SD2_CMD uSD_CMD
CONN_SD2_DATA3 uSD_DATA3
CONN_SD2_DATA2 uSD_DATA2
CONN_SD2_CLK uSD_CLK
CONN_SD2_CD_B uSD_CD_B
sd.sch
USB Hub
USB2_DP
USB2_DN
USB2_ID
USB_WWAN_DP
USB_WWAN_DM
USB_WLAN_DP
USB_WLAN_DM
usb_hub.sch
MIPI DSI
D0_P DSI_DP0
D0_N DSI_DN0
D1_P DSI_DP1
D1_N DSI_DN1
D2_P DSI_DP2
D2_N DSI_DN2
D3_P DSI_DP3
D3_N DSI_DN3
CLK_P DSI_CKP
CLK_N DSI_CKN
RESX DSI_BL_PWM
AVDD_EN
SWIRE
CAPTOUCH_INT
CAPTOUCH_RST SAI1_RXD3(GPIO4_IO05)
mipi_dsi.sch
Buttons & LED
SW_BACK SAI1_RXD4(GPIO4_IO06) used to be:
SW_VOLDN BTN1 SAI1_TXD3(GPIO4_IO15)
SW_VOLUP BTN2 SAI1_TXD6(GPIO4_IO18)
SW_HOME SAI1_TXD1(GPIO4_IO13)
ONOFF
SYS_RST
GP_LED1 GPIO1_IO13 SAI1_RXD1(GPIO4_IO03)
buttons_led.sch
WWAN M.2
CONFIG0 SAI5_RXC(GPIO3_IO20)
WoWWAN GPIO3_IO08
W_DISABLE1 WWAN_DISABLE GPIO3_IO04
RESET GPIO3_IO09
UART_TX/LED UART3_RXD
UART_RX/DPR UART3_TXD
USB_D+ USB_WWAN_DP
USB_D- USB_WWAN_DM
PCM_CLK/I2S_SCK SAI1_TXD4(GPIO4_IO16) SAI6_TXC/RXC!!!
PCM_SYNC/I2S_FSC SAI1_RXD6(GPIO4_IO08) SAI6_TXFS/RXFS!!!
PCM_IN/I2S_IN SAI1_RXD5(GPIO4_IO07) SAI6_TXD0!!!
PCM_OUT/I2S_OUT SAI1_TXD5(GPIO4_IO17) SAI6_RXD0!!!
wwan_m2.sch
Audio
HP_DET
MIC_SEL
SAI2_RXD
SAI2_TXD
SAI2_TXFS
SAI2_TXC
SAI2_MCLK
I2C1_SDA
I2C1_SCL
audio.sch
WLAN+BT M.2
USB_WLAN_DP
USB_WLAN_DM
UART4_TXD
UART4_RXD
UART4_RTS
UART4_CTS
BT_HOST_WAKE
WIFI_DISABLE
BT_DISABLE
WIFI_CLK
WIFI_CMD
WIFI_DATA0
WIFI_DATA1
WIFI_DATA2
WIFI_DATA3
SD2_RST
WIFI_WAKE
I2C2_SDA
I2C2_SCL
M2_PCM_CLK
M2_PCM_SYNC
M2_PCM_IN
M2_PCM_OUT
TODO:
assign a SAI bus
wifi_bt_m2.sch
SDIO DEMUX
SD2_SEL
SD2_CLK
SD2_CMD
SD2_DATA0
SD2_DATA1
SD2_DATA2
SD2_DATA3
uSD_CLK
uSD_CMD
uSD_DATA0
uSD_DATA1
uSD_DATA2
uSD_DATA3
WIFI_CLK
WIFI_CMD
WIFI_DATA0
WIFI_DATA1
WIFI_DATA2
WIFI_DATA3
sdio_demux.sch
Ethernet
ENET_2V5
CLKO_25MHz
ENET_TXC
ENET_TD0
ENET_TD1
ENET_TD2
ENET_TD3
ENET_TX_CTL
ENET_RXC
ENET_RD0
ENET_RD1
ENET_RD2
ENET_RD3
ENET_RX_CTL
ENET_MDC
ENET_MDIO
ENET_RST
ENET_WoL
ENET_INT
ethernet.sch
HDMI
HDMI_AUXP
HDMI_AUXN
HDMI_CLKP
HDMI_CLKN
HDMI_TXP0
HDMI_TXN0
HDMI_TXP1
HDMI_TXN1
HDMI_TXP2
HDMI_TXN2
HDMI_DDC_SDA
HDMI_DDC_SCL
HDMI_CEC
HDMI_HPD
hdmi.sch
Sensors
I2C1_SDA
I2C1_SCL
PROX_INT
IMU_INT
sensors.sch
SPI Flash
SCLK ECSPI1_SCLK
MOSI ECSPI1_MOSI
MISO ECSPI1_MISO
CS ECSPI1_SS0
flash.sch
Haptic Motor
HAPTIC
haptic.sch
TODO:
GNSS
MIPI CSI/DSI
J101A
ENET_TXC
ENET_TD0
ENET_TD1
ENET_TD2
ENET_TD3
ENET_TX_CTL
ENET_RD0
ENET_RD1
ENET_RD2
ENET_RD3
ENET_RX_CTL
ENET_RXC
ENET_MDIO
ENET_MDC
ENET_RST
SD2_RST
SD2_DATA3
SD2_DATA2
SD2_DATA1
SD2_DATA0
WIFI_WAKE
SD2_CMD
uSD_CD_B
SD2_CLK
WWAN_DISABLE
USB1_SS_SEL
BT_HOST_WAKE
CAPTOUCH_INT
ENET_RST
TCPC_INT
IMX8M-SOM
GND
J101C
HDMI_CEC
BOOT_MODE0
BOOT_MODE1
JTAG_TDI
JTAG_TMS
JTAG_TRST
JTAG_TDO
JTAG_TCK
HDMI_HPD
HDMI_AUXN
HDMI_AUXP
HDMI_TXP1
HDMI_TXN1
HDMI_TXP0
HDMI_TXN0
HDMI_CLKP
HDMI_CLKN
J102
TEST_1P
DSI_BL_PWM
WDG
HDMI_DDC_SCL
HDMI_DDC_SDA
HDMI_TXP2
HDMI_TXN2
PWR_EN
ENET_WoL
SAI1_RXD1(GPIO4_IO03)
ENET_INT
SAI5_RXC(GPIO3_IO20)
SAI1_RXD0(GPIO4_IO02)
CLKO_25MHz
GPIO1_IO13
SAI1_RXD4(GPIO4_IO06)
SAI1_RXD3(GPIO4_IO05)
SAI2_TXC
BTN1
BTN2
SAI1_RXD2(GPIO4_IO04)
SAI2_TXFS
SAI2_RXD
SAI2_MCLK
SAI1_RXD6(GPIO4_IO08)
J101B
WIFI_DISABLE
GPIO3_IO09
GPIO3_IO08
PWR_FLAG
3V3_OUT
ENET_2V5
PWR_FLAG
NVCC_SD2
DSI_DP2
DSI_DN2
DSI_DP0
DSI_DN0
DSI_CKN
DSI_CKP
DSI_DP1
DSI_DN1
DSI_DP3
DSI_DN3
C101
C102
C103
22uF
100nF
C104
C105
C106
J101D
SAI2_TXD
SAI1_RXD7(GPIO4_IO09)
I2C2_SCL
SAI1_RXD5(GPIO4_IO07)
SAI1_TXD0(GPIO4_IO12)
ONOFF
I2C2_SDA
SAI1_TXD1(GPIO4_IO13)
SYS_RST
I2C1_SCL
I2C1_SDA
SAI1_TXD3(GPIO4_IO15)
SAI1_TXD4(GPIO4_IO16)
SAI1_TXD7(GPIO4_IO19)
UART3_TXD
BT_DISABLE
SAI1_TXD5(GPIO4_IO17)
POR_B
UART1_RXD
SAI1_TXD2(GPIO4_IO14)
SAI1_TXD6(GPIO4_IO18)
ECSPI1_MISO
UART4_CTS
UART3_RXD
ECSPI1_MOSI
UART4_RTS
UART1_TXD
USB2_VBUS
USB2_ID
USB1_VBUS
USB1_ID
UART4_TXD
ECSPI1_SCLK
ECSPI1_SS0
UART4_RXD
USB2_DN
USB2_DP
USB1_RXN
USB1_RXP
USB1_TXN
USB1_TXP
BTN2
SAI2_MCLK
R101
R102
R103
R104
R105
R106
10k
19.6k
3V3_OUT
+5V
GND
GNU GPLv3
Copyright 2018
Purism SPC
Sheet: /
File: dvk-mx8m-bsb.sch
Title: DVK-MX8M-BSB
Size: A2
Date: 2018-05-15
Rev: v0.1.0
KiCad E.D.A. kicad 4.0.7
Id: 1/21

"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)."

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

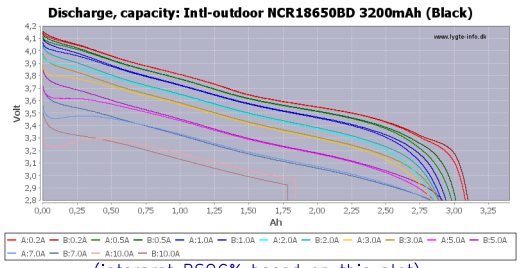






Sheet: /USB-C/		
File: usb-c.sch		
Title: USB Type C		
Size: A3	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 2/21

Battery Charge Controller



(interpret RSOC% based on this plot)

use AUTO_DPDM_EN
to auto-detect IINLIM

1.658≤ILIM≤2.063
ILIM(nom)≅1.859
3.9≤VIN≤14

U301 BQ25896

I(Lsat)=7A

3.5~4.25V

~110uF

Default LOW:
adapter source

Open-drain output
tied with TCPC_INT

If enough I/O is available then
separate CHRG_INT & TCPC_INT

This disables charging
but maybe not VBUS->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)

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

Ihold=3.5A
Itrip=6.3A
Ttrip(max)=5s@8A

VBAT(DPL)=2.15~2.5V

NCR18650BD is recommended

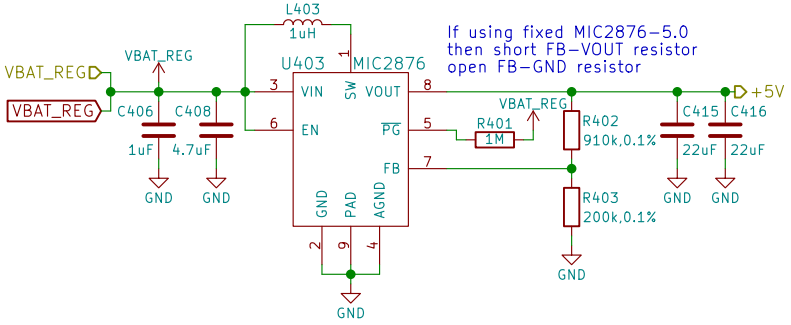
VBAT(nom)=REG06[7:2]
VBAT(default_max_ovp)=(REG06[7:2]×1.005)×1.04=4.3982016V
REG06[7:2]=010111⇒VBAT(max_ovp)=4.3814784
BQ29705 provides 4.425V as OVP!!!

reference design: http://www.ti.com/lit/ug/sluuba2b/sluuba2b.pdf

may want to include BQ29705 protection as in:
http://www.ti.com/lit/ug/tiducl1/tiducl1.pdf
schematic: http://www.ti.com/lit/df/tidrp70/tidrp70.pdf
(PTC may be good enough)

Sheet: /Battery/		
File: battery.sch		
Title: Battery		
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 3/21

5.0V/3.8A

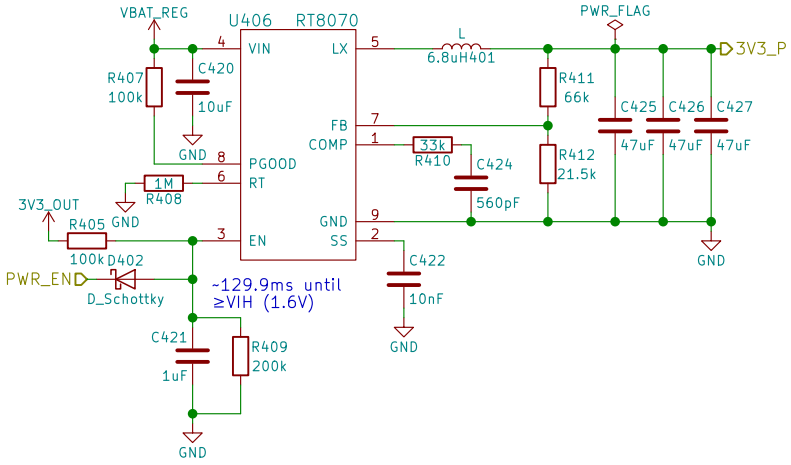


If using fixed MIC2876-5.0
then short FB-VOUT resistor
open FB-GND resistor

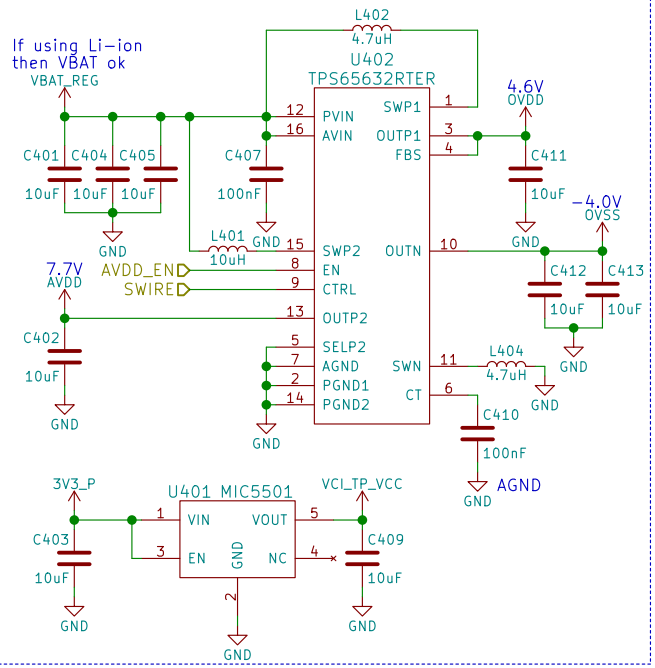
Cheaper, more efficient, smaller, and simpler than RT6150A
Explicitly mentions USB/smartphone application

3.3V/3A

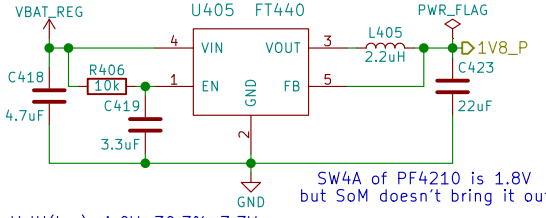
When VBAT can fall below
3.3V use TPS63020 instead!



AMOLED POWER



1.8V/600mA

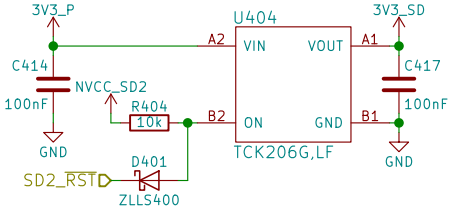


SW4A of PF4210 is 1.8V
but SoM doesn't bring it out

V_IH(typ)=1.0V≅30.3%×3.3V
t(0-30.3%)≈0.361RC
⇒0.361RC≈10ms
∴ R=10k
C=2.77uF≅3.3uF

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

SD POWER



TODO:
add parallel 100nF bulk caps!
& spread all over the power plane

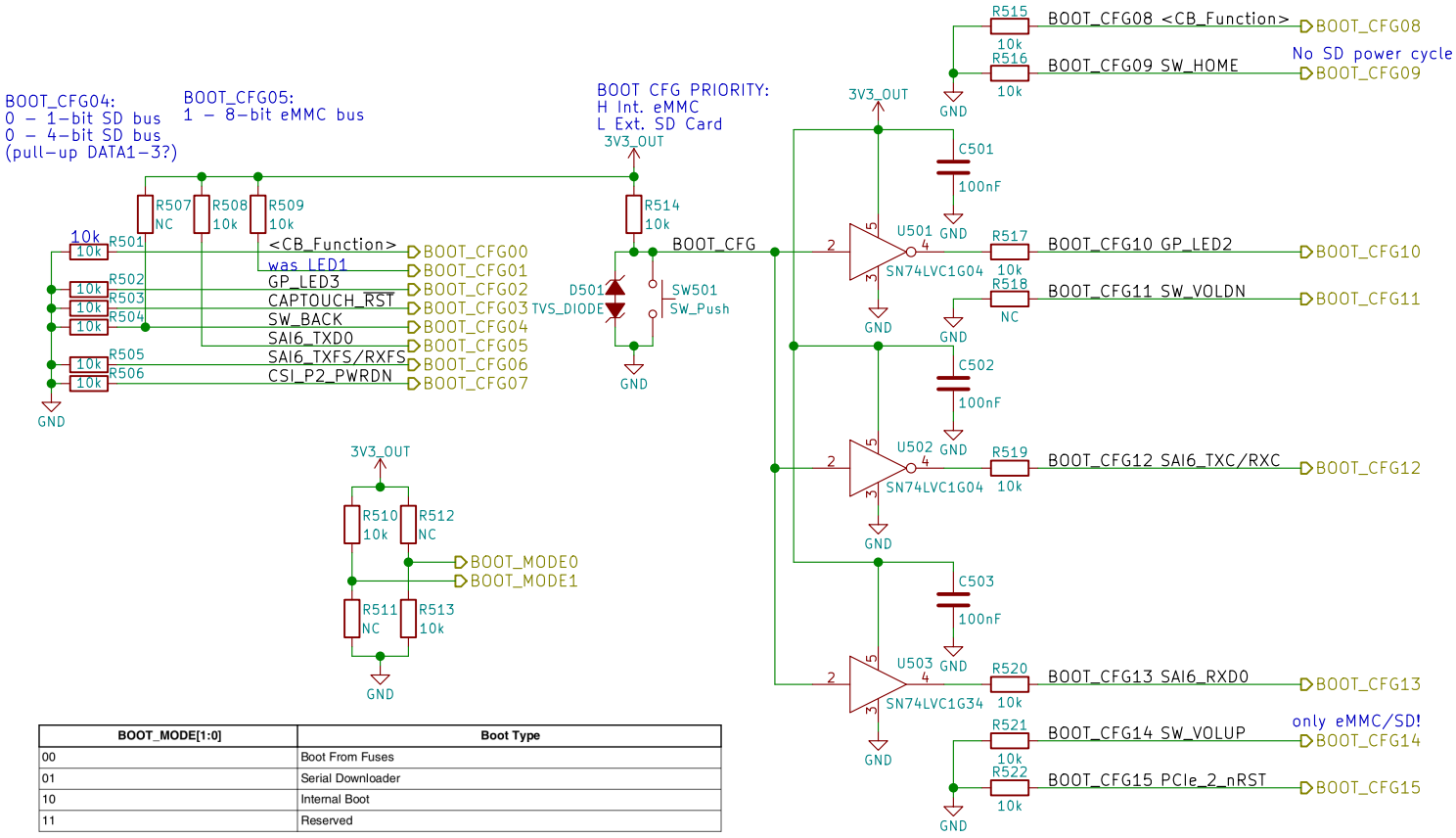
Sheet: /Power/
File: power.sch

Title: Power

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 4/21

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

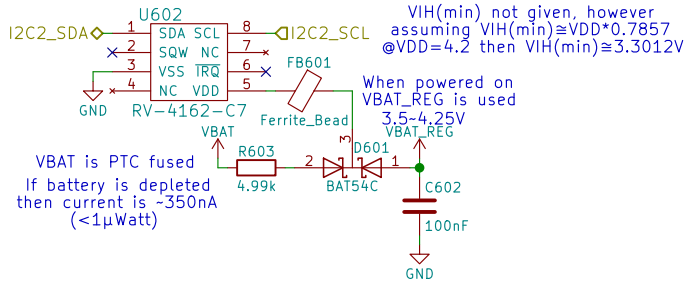


BOOT_MODE[1:0]	Boot Type
00	Boot From Fuses
01	Serial Downloader
10	Internal Boot
11	Reserved

Sheet: /Boot Config/
File: boot.sch

Title: Boot Configuration

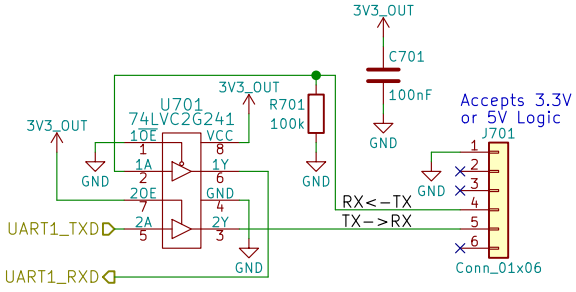
Size: A4	Date: 2018–05–15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 5/21



Sheet: /RTC/
File: rtc.sch

Title: RTC

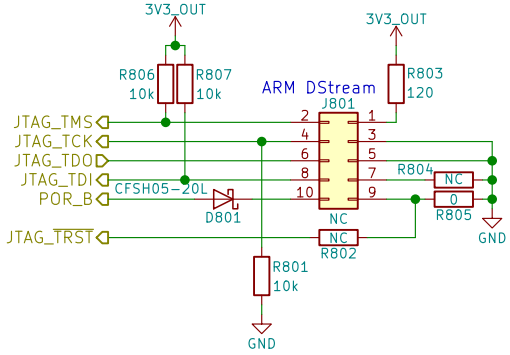
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 6/21



Sheet: /UART Debug/
File: uart.sch

Title: UART Debug

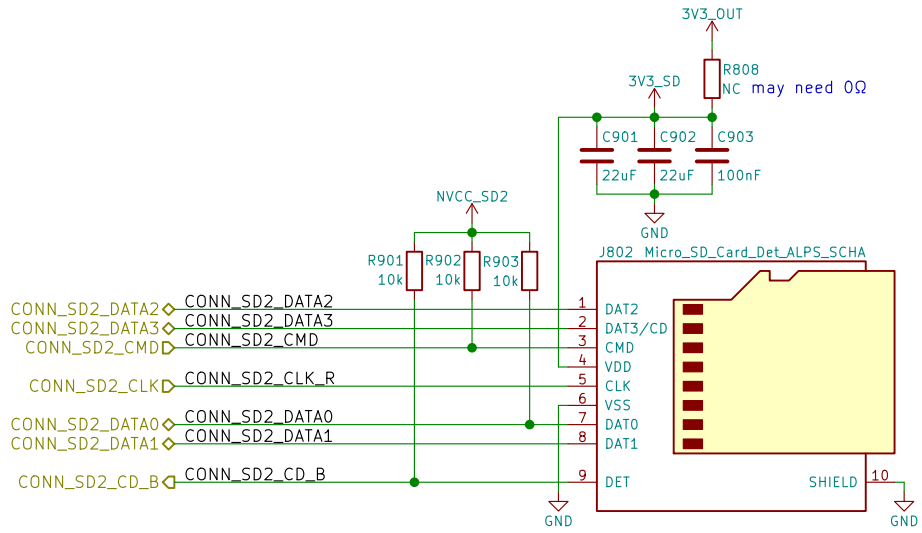
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 7/21

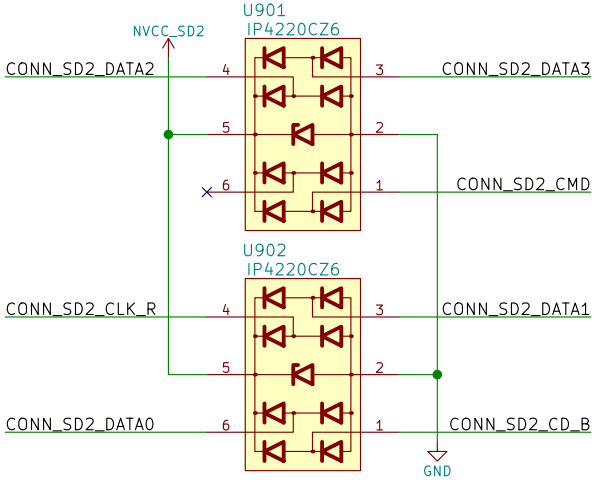


Sheet: /JTAG/
File: jtag.sch

Title: JTAG

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 8/21



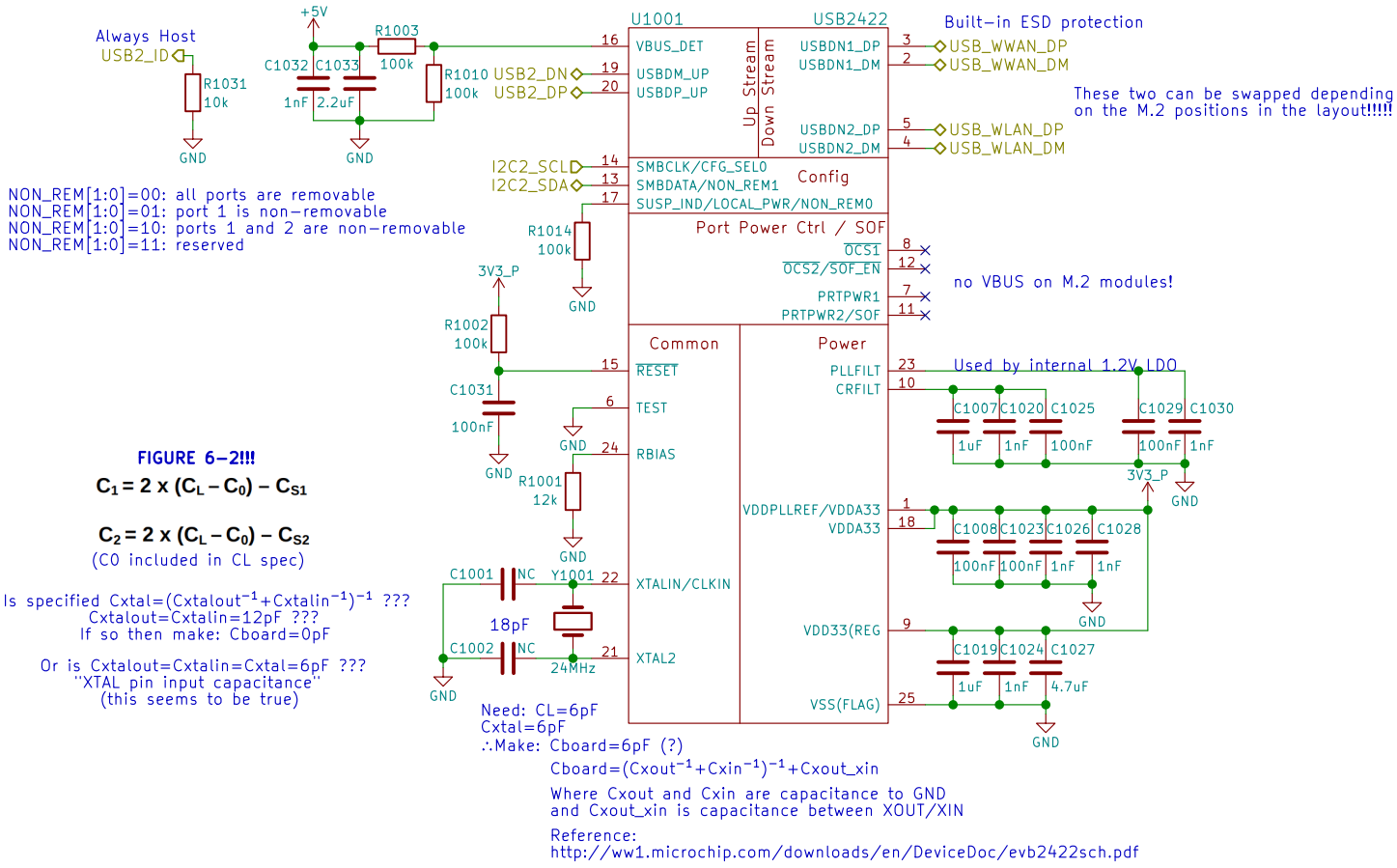


Sheet: /uSD Card/
File: sd.sch

Title: uSD Card

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 9/21

TODO:
Use USB4640???



NON_REM[1:0]=00: all ports are removable
NON_REM[1:0]=01: port 1 is non-removable
NON_REM[1:0]=10: ports 1 and 2 are non-removable
NON_REM[1:0]=11: reserved

FIGURE 6-2!!!

$$C_1 = 2 \times (C_L - C_0) - C_{S1}$$

$$C_2 = 2 \times (C_L - C_0) - C_{S2}$$

(C0 included in CL spec)

Is specified Cxtal=$(Cxtalout^{-1}+Cxtalin^{-1})^{-1}$???
Cxtalout=Cxtalin=12pF ???
If so then make: Cboard=0pF

Or is Cxtalout=Cxtalin=Cxtal=6pF ???
"XTAL pin input capacitance"
(this seems to be true)

Need: CL=6pF
Cxtal=6pF
∴Make: Cboard=6pF (?)
Cboard=$(Cxout^{-1}+Cxin^{-1})^{-1}+Cxout\_xin$

Where Cxout and Cxin are capacitance to GND
and Cxout_xin is capacitance between XOUT/XIN

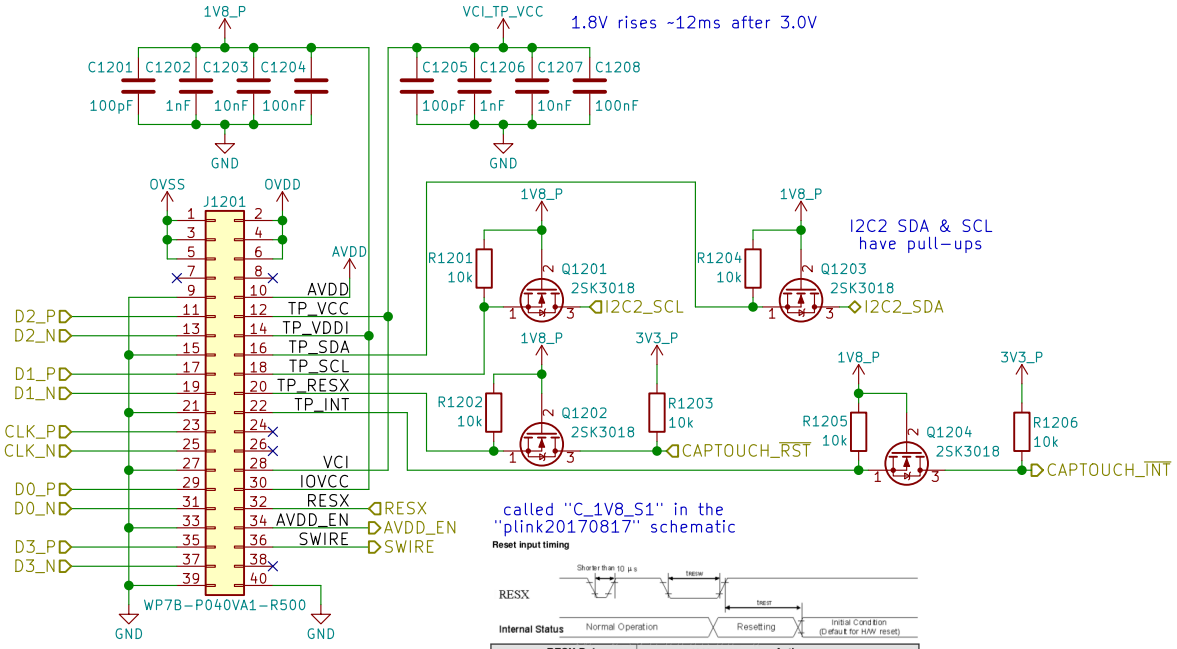
Reference:
http://ww1.microchip.com/downloads/en/DeviceDoc/evb2422sch.pdf

Sheet: /USB Hub/
File: usb_hub.sch

Title:

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 10/21

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



called "C_1V8_S1" in the
"plink20170817" schematic

Reset input timing

RESX Puise	Action
Shorter than 5µs	Invalid Reset
Longer than 10µs	Valid Reset
Between 5µs and 10µs	Reset Initialization Precedure

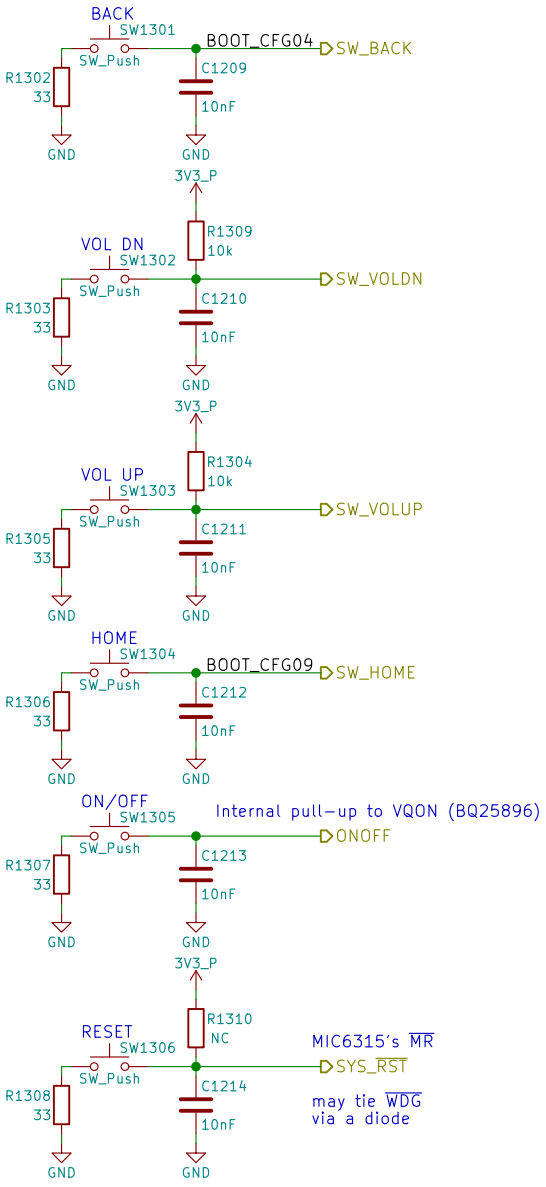
TODO: low power state signal??

Sheet: /MIPI DSI/
File: mipi_dsi.sch

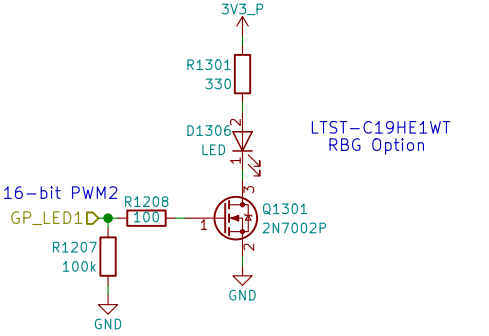
Title: MIPI DSI

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 11/21

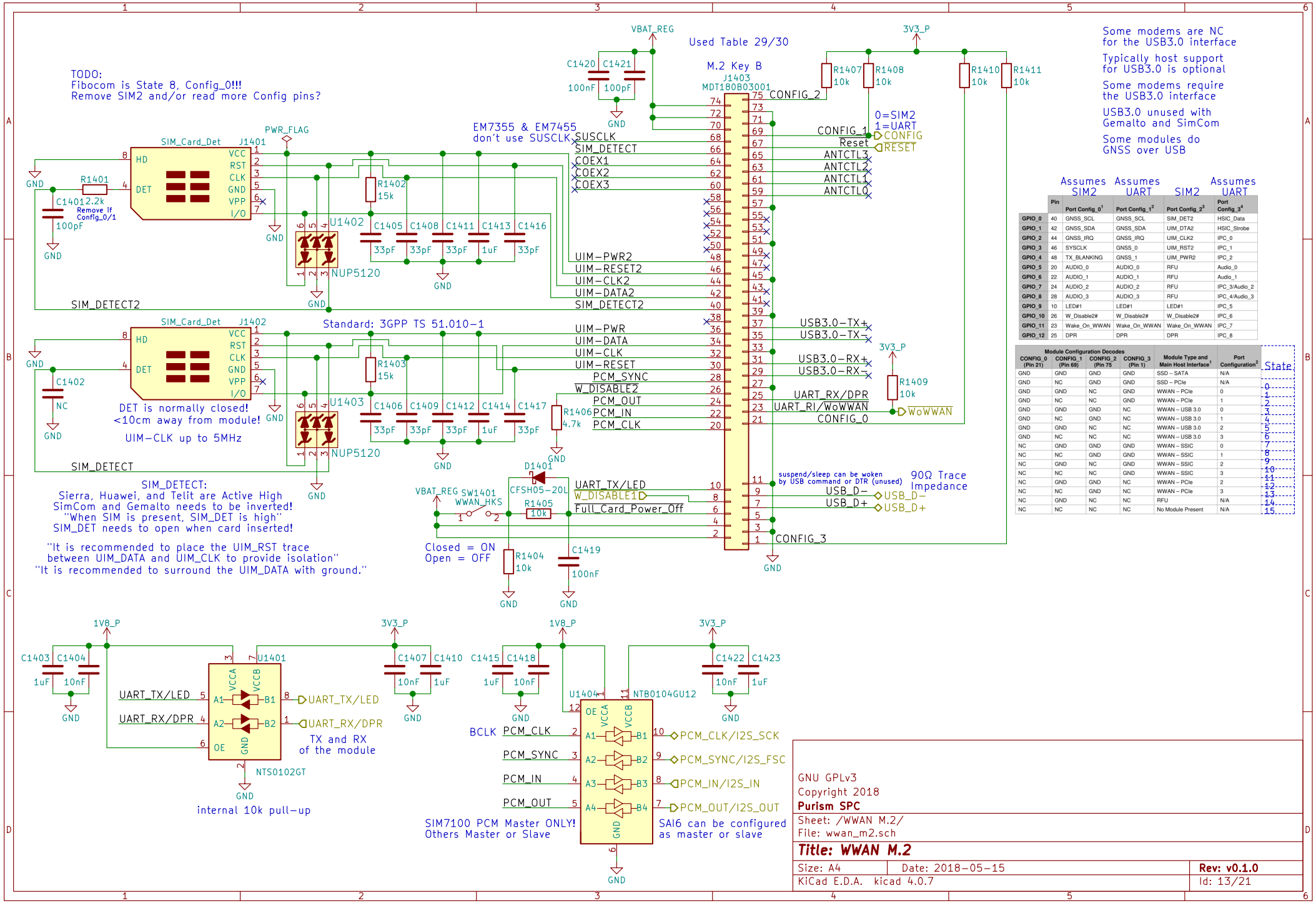
SW NOTE:
Need to set Int. PU in SOC
on SW_BACK and SW_HOME



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)



Sheet: /Buttons & LED/		
File: buttons_led.sch		
Title: Buttons & LED		
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 12/21



	Pin	Assumes SIM2 Port Config_0[1]	Assumes UART Port Config_1[2]	SIM2 Port Config_2[3]	UART Port Config_3[4]
GPIO_0	40	GNSS_SCL	GNSS_SCL	SIM_DET2	HSIC_Data
GPIO_1	42	GNSS_SDA	GNSS_SDA	UIM_DTA2	HSIC_Strobe
GPIO_2	44	GNSS_IRQ	GNSS_IRQ	UIM_CLK2	IPC_0
GPIO_3	46	SYSCLK	GNSS_0	UIM_RST2	IPC_1
GPIO_4	48	TX_BLANKING	GNSS_1	UIM_PWR2	IPC_2
GPIO_5	20	AUDIO_0	AUDIO_0	RFU	Audio_0
GPIO_6	22	AUDIO_1	AUDIO_1	RFU	Audio_1
GPIO_7	24	AUDIO_2	AUDIO_2	RFU	IPC_3/Audio_2
GPIO_8	28	AUDIO_3	AUDIO_3	RFU	IPC_4/Audio_3
GPIO_9	10	LED#1	LED#1	LED#1	IPC_5
GPIO_10	26	W_Disable2#	W_Disable2#	W_Disable2#	IPC_6
GPIO_11	23	Wake_On_WWAN	Wake_On_WWAN	Wake_On_WWAN	IPC_7
GPIO_12	25	DPR	DPR	DPR	IPC_8

Module Configuration Decodes CONFIG_0 (Pin 21)	CONFIG_1 (Pin 69)	CONFIG_2 (Pin 75)	CONFIG_3 (Pin 1)	Module Type and Main Host Interface[1]	Port Configuration[2]	State
GND	GND	GND	GND	SSD – SATA	N/A	
GND	NC	GND	GND	SSD – PCIe	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	3
GND	GND	NC	NC	WWAN – USB 3.0	2	4
GND	NC	NC	NC	WWAN – USB 3.0	3	5
NC	GND	GND	GND	WWAN – SSIC	0	6
NC	NC	GND	GND	WWAN – SSIC	1	7
NC	GND	NC	GND	WWAN – SSIC	2	8
NC	NC	NC	GND	WWAN – SSIC	3	9
NC	GND	GND	NC	WWAN – PCIe	2	10
NC	NC	GND	NC	WWAN – PCIe	3	11
NC	GND	NC	NC	RFU	N/A	12
NC	NC	NC	NC	No Module Present	N/A	13
						14
						15

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-cre
(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"
⇒ $(1V)^2/(16Ω)=62.5mW$
∴ Vrms=1V ⇒ Vp(amplitude)=1.414V
∴ Irms(max)=62.5mA

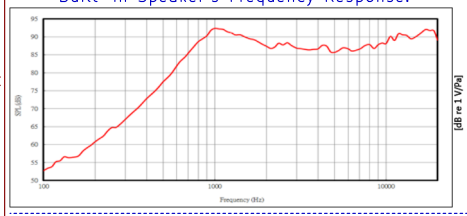
If HP_DET is HIGH for >100ms then HPs are present

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

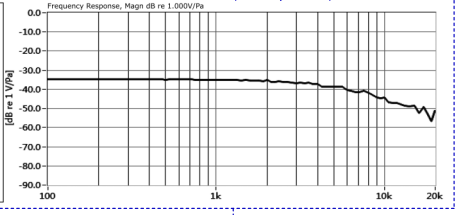
Could use FSA8008 to detect mic

CTIA/AHJ

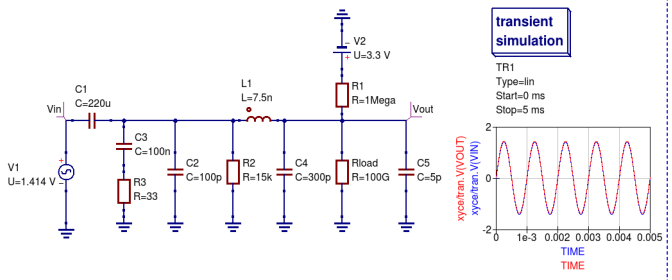
Built-In Speaker's Frequency Response:



Built-In Mic's Frequency Response:



Simulation of 1kHz output
without HP jack inserted:



LCR Measurements:

Earbud Microphone:	Headset Speaker:	Headphone 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 = 36.860hms	Rs = 17.0300hms
Rp = 1.5478kOhms	Rp = 36.860hms	Rp = 17.0340hms
θ = −0.8deg	θ = −2.3deg	θ = 0.5deg

−37dB=14.1254mV/Pa
∴ mic produces 14.1254mVrms when exposed to a 1kHz tone of 94dB-SPL at the capsule (or 19.98mV amplitude)

⇒ 40dB gain would produce ~2V amplitude (4Vpp, clipping)
30dB gain would produce ~0.632V amplitude (1.264Vpp)
38.33dB gain would yield 3.3Vpp

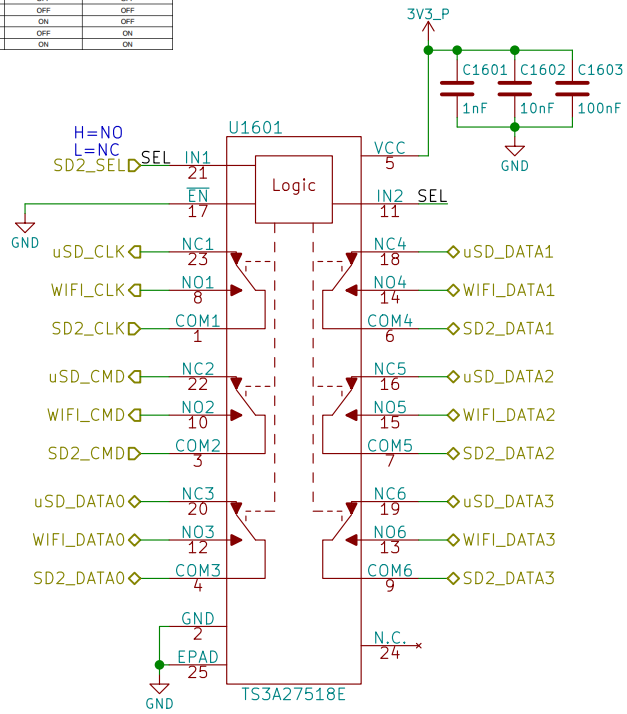
Sheet: /Audio/
File: audio.sch

Title: Audio

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 14/21

Can swap around signals in the layout:

EN	IN1	IN2	NC1/2/3 TO COM1/2/3, COM1/2/3 TO NC1/2/3	NC4/5/6 TO COM4/5/6, COM4/5/6 TO NC4/5/6	NO1/2/3 TO COM1/2/3, COM1/2/3 TO NO1/2/3	NO4/5/6 TO COM4/5/6, COM4/5/6 TO NO4/5/6
H	X	X	OFF	OFF	OFF	OFF
L	L	L	ON	ON	OFF	OFF
L	H	L	OFF	OFF	ON	OFF
L	L	H	ON	OFF	OFF	ON
L	H	H	OFF	OFF	ON	ON

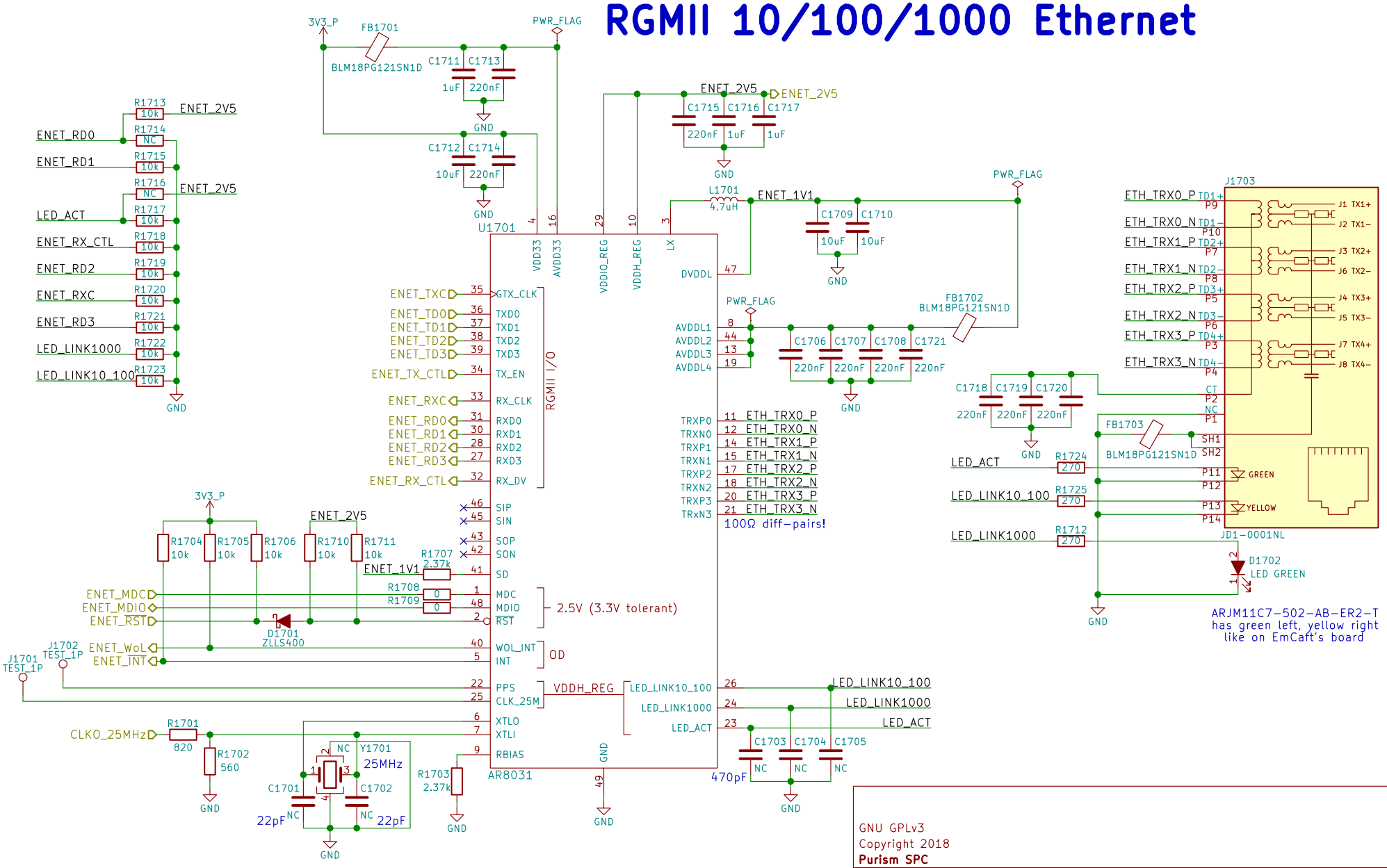


Sheet: /SDIO DEMUX/
File: sdio_demux.sch

Title: SDIO Demultiplexer

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 15/21

RGMII 10/100/1000 Ethernet



GNU GPLv3
Copyright 2018
Purism SPC

Sheet: /Ethernet/
File: ethernet.sch

Title: Ethernet

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 16/21

6.2 M.2 Signal Directions

Module: Table 23
Socket: Table 46

RS9116 NC:
RTS, CTS, BT_HOST_WAKE

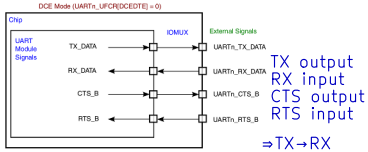
RS9116 datasheet says
no WIFI_WAKE
but the schematic has it

RedPine RS9116 MB0
Requires +5V on
Pin 54 for USB!

J1502

USB_WLAN_DP
USB_WLAN_DN
WIFI_CLK
WIFI_CMD
WIFI_DATA0
WIFI_DATA1
WIFI_DATA2
WIFI_DATA3
WIFI_WAKE
WIFI_RST
W_DISABLE1
R1506 10k
D1503 ZLLS400
D1504 ZLLS400
1V8_P
3V3_P
M2_PCM_CLK
M2_PCM_SYNC
M2_PCM_IN
M2_PCM_OUT
BT_HOST_WAKE
BT_UART_RXD
SoC's RX
Module's TX
SoC's TX
Module's RX
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS
RS9116 SUSCLK
is a GPIO (unused)
SUSCLK
W_DISABLE2
W_DISABLE1
M2_I2C_SDA
M2_I2C_SCL
M.2_Key_E
GND

UARTn_UFCR[DCEDTE]=0 on POR



TX output
RX input
CTS output
RTS input

⇒TX→RX
RX←TX
CTS→CTS
RTS←RTS

i.MX8M in DCE mode has
CTS output, RTS input

TODO:
Pin 54 on RS9116 is USB_VBUS Sink!!!

U1502A 74AUP2G00
U1502B 74AUP2G00
BT_DISABLE
WIFI_DISABLE
D1505 CFSH05-20L
Closed = ON (*_DISABLE HIGH)
Open = OFF
SW1501 WWAN_HKS
R1508 10k
C1515 100nF
R1510 10k

TODO!!!
verify if translators
with PWR_EN is needed!

R1507 10k
M2_I2C_SDA
I2C2_SDA
Q1501 FDV301N

R1509 10k
M2_I2C_SCL
I2C2_SCL
Q1502 FDV301N

RS9116 has SCL as output
⇒master?
(only device on I2C2 bus)

U1702 NTB0104GU12
C1722 C1723 1uF 10nF
C1724 C1725 10nF 1uF
BT_UART_RXD
BT_UART_TXD
BT_UART_RTS
BT_UART_CTS
RX, TX, RTS, CTS
of the SoC
internal 10k pull-up

U1504 NTB0104GU12
C1520 C1521 1uF 10nF
C1522 C1523 10nF 1uF
BCLK
M2_PCM_CLK
M2_PCM_SYNC
M2_PCM_IN
M2_PCM_OUT
BT_PCM_CLK
BT_PCM_SYNC
BT_PCM_IN
BT_PCM_OUT
configure as slave

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

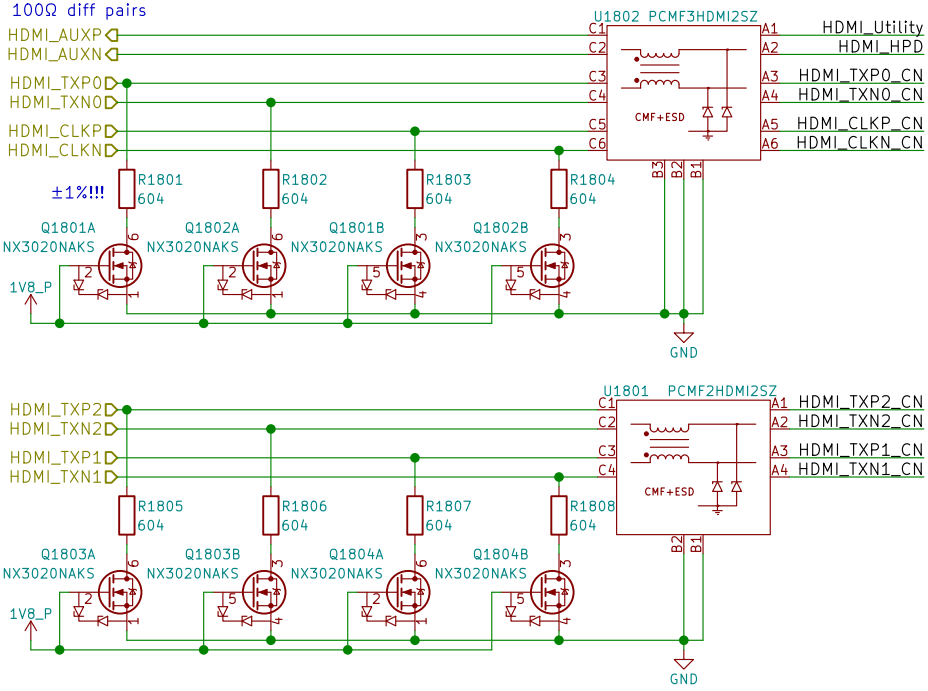
Title: WLAN+BT M.2

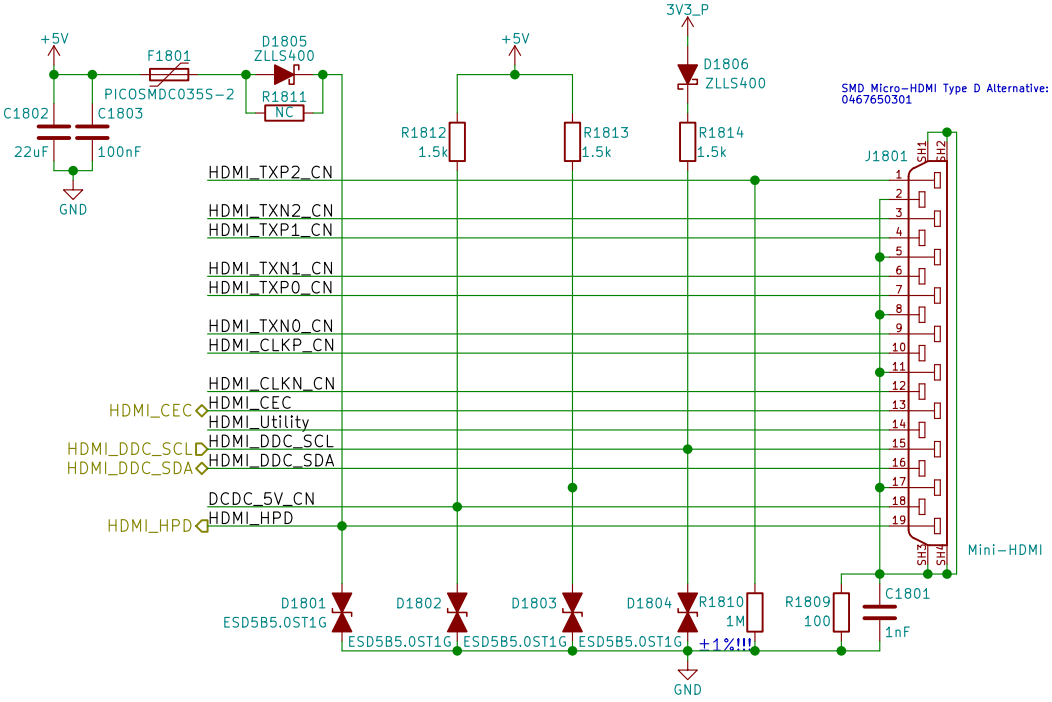
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 17/21

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

100Ω diff pairs



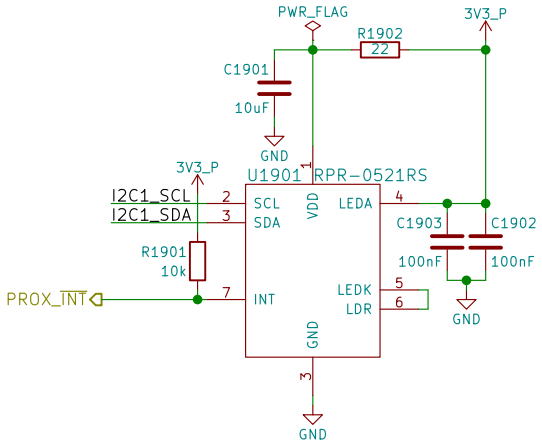


Sheet: /HDMI/
File: hdmi.sch

Title: HDMI

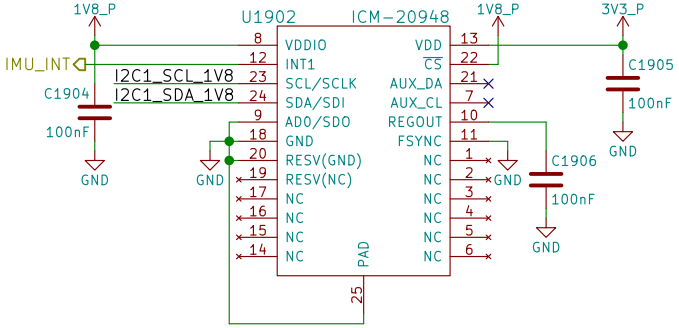
Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 18/21

Proximity & Ambient Light



Reference:
http://www.rohm.com/web/global/sensor-shield-support/ps-als-sensor

9-Axis IMU



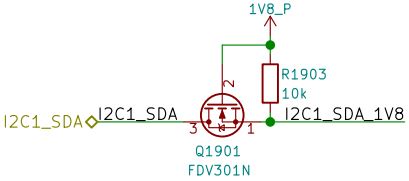
Reference:
https://store.invensense.com/datasheets/invensense/AN-IVS-0001EVB-00%20v1%202.pdf

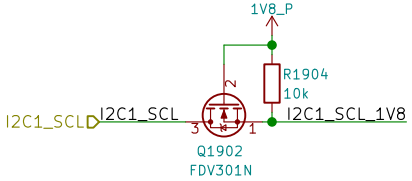
AD0 sets the slave address's LSB (110100X)

INT1_ACTL sets if IMU_INT
is active-high or active-low

"FSYNC - Connect to GND if unused"

I2C's VIH=1.8V





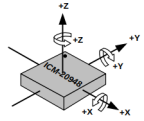


Figure 12. Orientation of Axes of Sensitivity and Polarity of Rotation

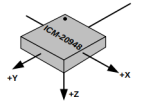
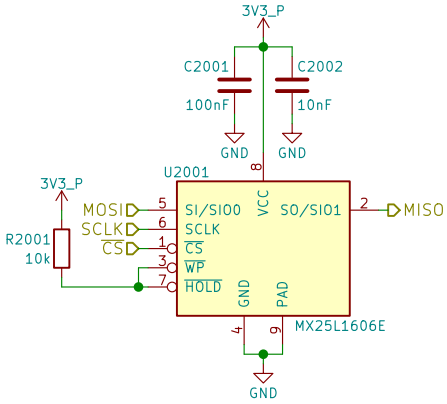


Figure 13. Orientation of Axes of Sensitivity for Magnetometer

Sheet: /Sensors/
File: sensors.sch

Title: Sensors

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 19/21



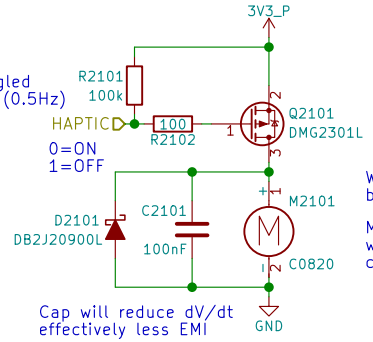
Sheet: /SPI Flash/
File: flash.sch

Title: SPI NOR Flash

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 20/21

PWM pins occupied:
GPIO1_IO01 – DSI (DSI_BL_PWM??)
GPIO1_IO13 – LED
GPIO1_IO14 – Ethernet (CLKO_25MHz)
GPIO1_IO15 – CSI (CLKO2)

PWM needed?
Only needs to be toggled
ON 1 sec, OFF 1 sec (0.5Hz)



When the motor is off
both terminals are at GND

Motor will have wire leads
with a 2-pin Molex or JST
connector installed (by request)!

Cap will reduce dV/dt
effectively less EMI

Sheet: /Haptic Motor/
File: haptic.sch

Title: Haptic/Vibration Motor

Size: A4	Date: 2018-05-15	**Rev: v0.1.0**
KiCad E.D.A. kicad 4.0.7		Id: 21/21