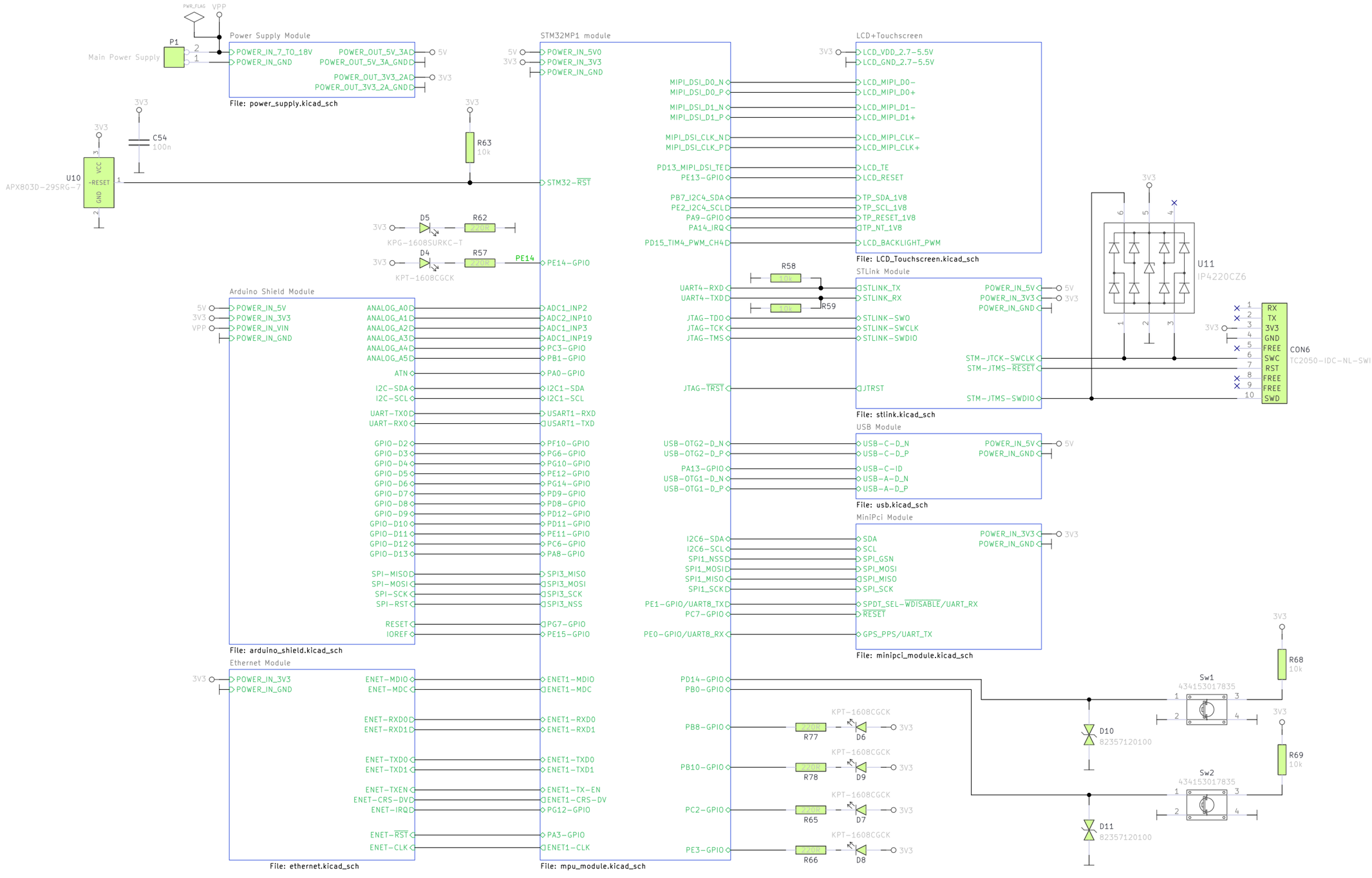


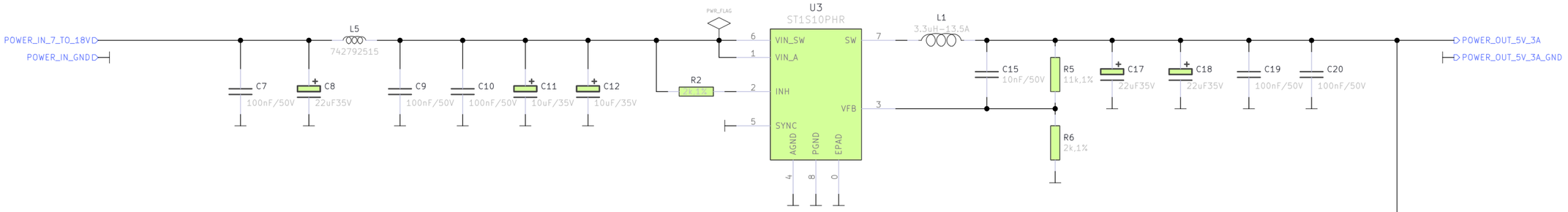
Embedded System Labs

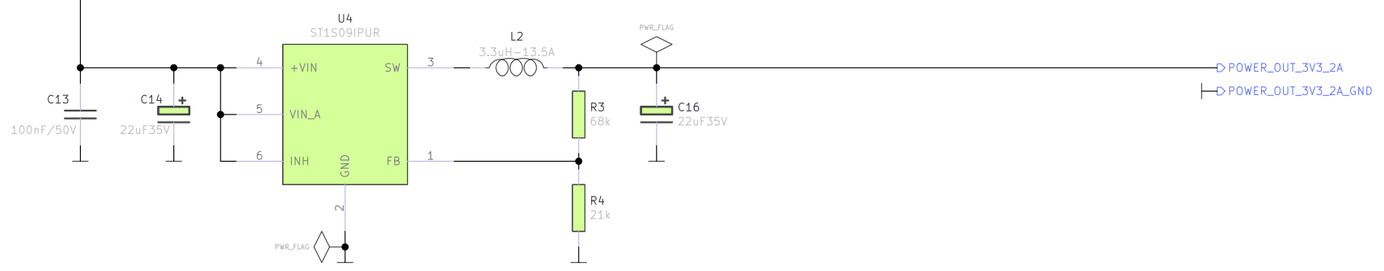
Sheet: /

File: stm32mp1-custom-devboard.kicad_sch

Title: stm32mp1-custom-devboard

Size: A3	Date: 2020-12-19	**Rev: V1.0**
KiCad E.D.A.	kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1	Id: 1/11



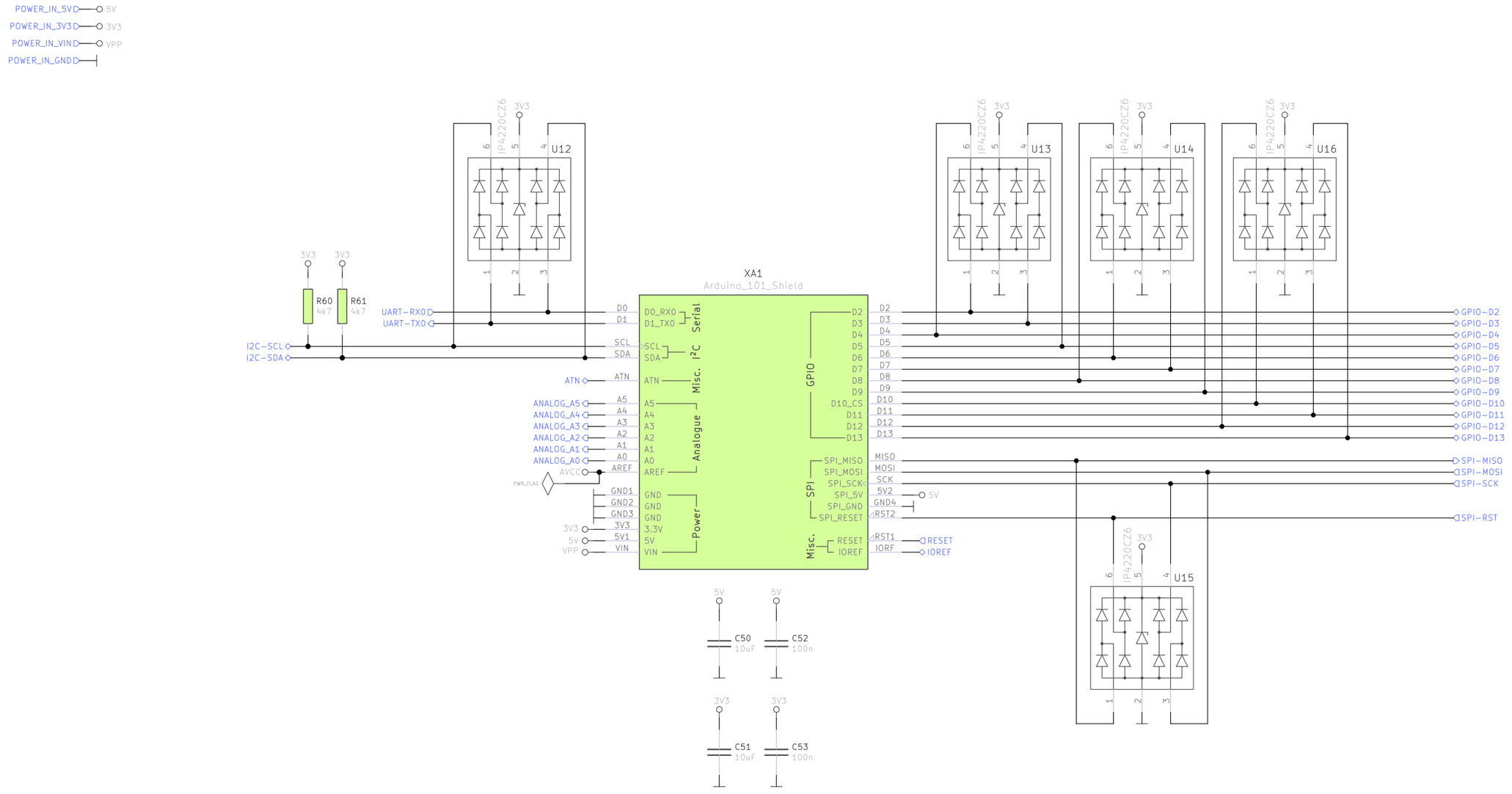


Embedded System Labs

Sheet: /Power Supply Module/
File: power_supply.kicad_sch

Title: Power Supply Module 5V/3V3

Size: A3	Date: 2020-12-19	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1		Id: 2/11

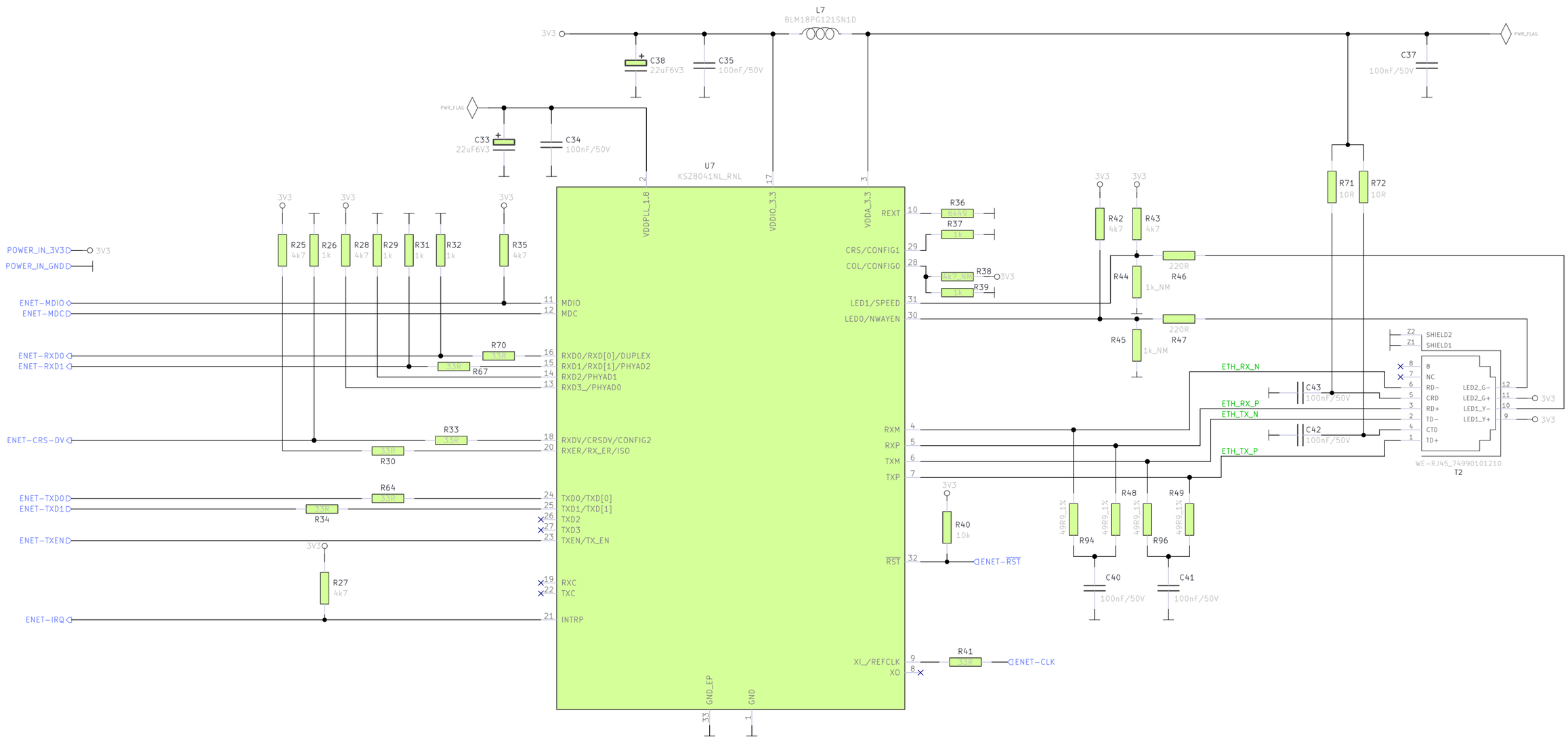


Embedded System Module

Sheet: /Arduino Shield Module/
File: arduino_shield.kicad_sch

Title: Arduino Shield Module

Size: A3	Date: 2020-12-20	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1		Id: 3/11



Track width 4.75mil for all

PHYAD2	Ipd/O	The PHY Address is latched at power-up or reset and is configurable to any value from 1 to 7. The default PHY Address is 00001. PHY Address bits [4:3] are always set to '00'.
PHYAD1	Ipd/O	
PHYAD0	Ipu/O	

MII and RMII Routing Guidelines

All connections on a PCB in MII and RMII routing are point-to-point connections. Although MII and RMII use relatively low data rates, the limiting parameter that determines whether a trace can act as a transmission line is the signal rise/fall time. Unless your board is very large or your signal switching speed is very fast, reflections at the end of each connection can be ignored.
The recommended trace impedance in MII is 50 Ohms +/- 10%.
Although the trace length between the PHY and MAC is generally short enough to ignore transmission line effects, you should pay attention to impedance when routing the signal and clock traces when the traces are electrically long.
Since MII and RMII require clock signals between the PHY and MAC, best practices for routing clock signals should be used with longer traces. Generally, you should avoid the use of vias on traces carrying clock signals on board with impedance control as the trace impedance can be different between layers. However, as long as the impedance in each layer is carefully controlled to the right value, then the clock signals can certainly be routed through vias. This will prevent signal reflections on longer clock traces.
For the above reasons, all MII/RMII signal traces should be routed as short as possible on a single layer, and traces should be routed in a straight path. If you must turn a corner with a signal trace, the trace should bend by no more than 45 degrees.
Clock lines should also be shielded with GND lines to prevent crosstalk through capacitive coupling, especially when longer traces are necessary. Because the TX and RX data signals are triggered by the rising edge of the clock, communication in MII and RMII is synchronous. Thus, the data lines and the clock line between the MAC and PHY should be length matched. The allowed deviation in length matching depends on the rise/fall time for digital signals between these two elements, although it is generally recommended that any deviation be less than 10 mm as MII and RMII use TTL logic.
Again, the allowed trace length mismatch depends on the rise/fall time of digital signals.

CONFIG[2:0]	Mode
000	MII (default)
001	RMII
010	Reserved - not used
011	Reserved - not used
100	MII 100 Mbps Preamble Restore
101	Reserved - not used
110	Reserved - not used
111	Reserved - not used

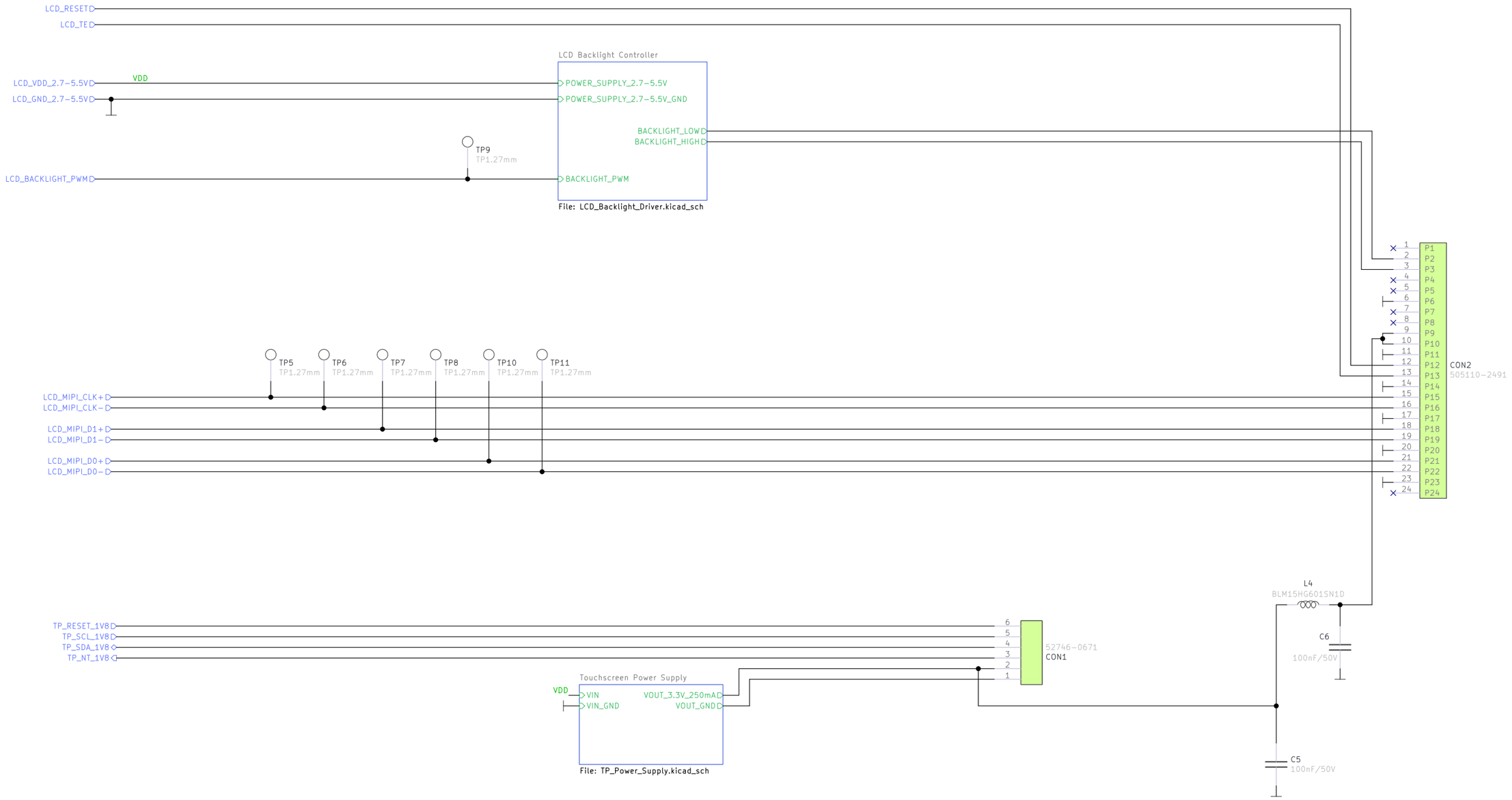
Embedded System Labs

Sheet: /Ethernet Module/
File: ethernet.kicad_sch

Title: Ethernet

Size: A3	Date: 2021-01-13	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1		Id: 4/11

SOM1A
VisionSOM-STM32MP1
POWER_IN_5V0
POWER_IN_3V3
POWER_IN_GND
5V
3V3
NC
GND
VDD_3V3
VDD_COIN_3V
+3.3VOUT
+5VIN
PWR_FLAG
C55
100n
C56
100n
F1
FF_PW_1A0
Boot Mode | BOOT2 | BOOT1 | BOOT0
Recovery | 0 | 0 | 0
NOR | 0 | 0 | 1
eMMC | 0 | 1 | 0
NAND | 0 | 1 | 1
Reserved | 1 | 0 | 0
SD-Card | 1 | 0 | 1
Recovery | 1 | 1 | 0
SPI-NAND | 1 | 1 | 1
R51 10k
R53 10k
R55 10k
R52 10k
R54 10k
R56 10k
BOOT0
BOOT1
BOOT2
PWR_ON
PWR_LP
JTAG_TDI
JTAG_TMS
JTAG_nTRST
JTAG_TDO
JTAG_TCK
STM32_nRST
SOM1B
VisionSOM-STM32MP1
SOM1D
VisionSOM-STM32MP1
ENET1_MDIO
ENET1_CRS_DV
ENET1_CLK
PA3_GPIO
PA8_GPIO
PA9_GPIO
PA14_IRQ
PA13_GPIO
SPI3_NSS
SPI1_NSS
ADC1_INP3
ADC1_INP19
I2C6_SDA
I2C6_SCL
PA0_GPIO
SOM1E
VisionSOM-STM32MP1
SPI1_SCK
USART1_RXD
SPI1_MISO
USART1_TXD
PB8_GPIO
UART4_RXD
I2C1_SCL
I2C1_SDA
PB10_GPIO
PB0_GPIO
ENET1_TXD1
SPI1_MOSI
ENET1_TX_EN
PB1_GPIO
PB7_I2C4_SDA
R7
4k7
SOM1F
VisionSOM-STM32MP1
PC7_GPIO
SPI3_SCK
PC2_GPIO
ENET1_RXD1
ENET1_RXD0
ADC2_INP10
ENET1_MDC
PC3_GPIO
PC6_GPIO
R8
4k7
PE2_I2C4_SCL
PE3_GPIO
PE13_GPIO
PE14_GPIO
PE0_GPIO/UART8_RX
PE1_GPIO/UART8_TX
PE12_GPIO
PE11_GPIO
PE15_GPIO
SOM1H
VisionSOM-STM32MP1
SOM1C
VisionSOM-STM32MP1
USB_OTG2_VBUS
USB_OTG2_DP
USB_OTG2_DN
USB_OTG1_DP
USB_OTG1_DN
SOM1I
VisionSOM-STM32MP1
ADC1_INP2
PF10_GPIO
PG6_GPIO
PG10_GPIO
PG7_GPIO
UART4_TXD
PG12_GPIO
ENET1_TXD0
PG14_GPIO
SOM1J
VisionSOM-STM32MP1
MIPI_DSI_CLK_P
MIPI_DSI_CLK_N
MIPI_DSI_D1_P
MIPI_DSI_D1_N
MIPI_DSI_D0_P
MIPI_DSI_D0_N
DSI_CKP
DSI_CKN
DSI_D1P
DSI_D1N
DSI_D0P
DSI_D0N
SOM1G
VisionSOM-STM32MP1
PD15_TIM4_PWM_CH4
PD9_GPIO
PD8_GPIO
PD13_MIPI_DSI_TE
SPI3_MOSI
SPI3_MISO
PD12_GPIO
PD11_GPIO
PD14_GPIO
Embedded System Labs
Sheet: /STM32MP1 module/
File: mpu_module.kicad_sch
Title: STM32MP1 Module
Size: A3
Date: 2020-12-19
Rev: V1.0
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1
Id: 5/11

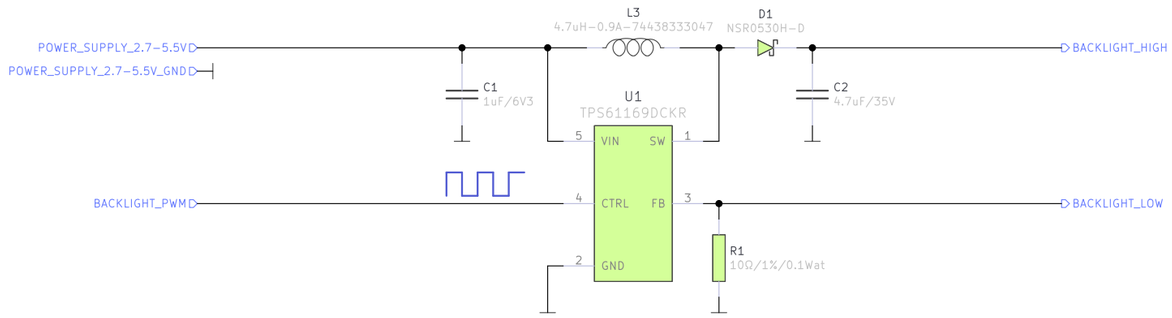


5.0 IPS 720X1280 MIPI +CTP
PH720128T004-ZBC02
Embedded System Labs

Sheet: /LCD+Touchscreen/
File: LCD_Touchscreen.kicad_sch

Title: LCD MiPi and Touchscreen module

Size: A3	Date: 2020-12-19	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144~ubuntu20.04.1		Id: 6/11

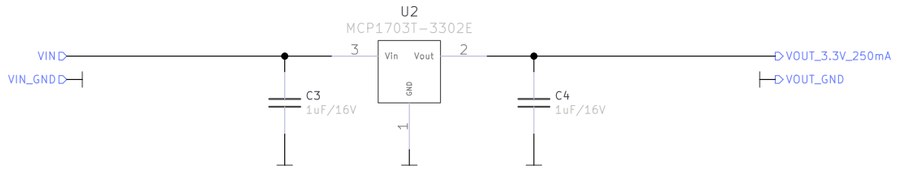


Embedded System Labs

Sheet: /LCD+Touchscreen/LCD Backlight Controller/
File: LCD_Backlight_Driver.kicad_sch

Title: LCD Backlight Controller

Size: A3	Date: 2020-12-19	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef~144~ubuntu20.04.1		Id: 7/11

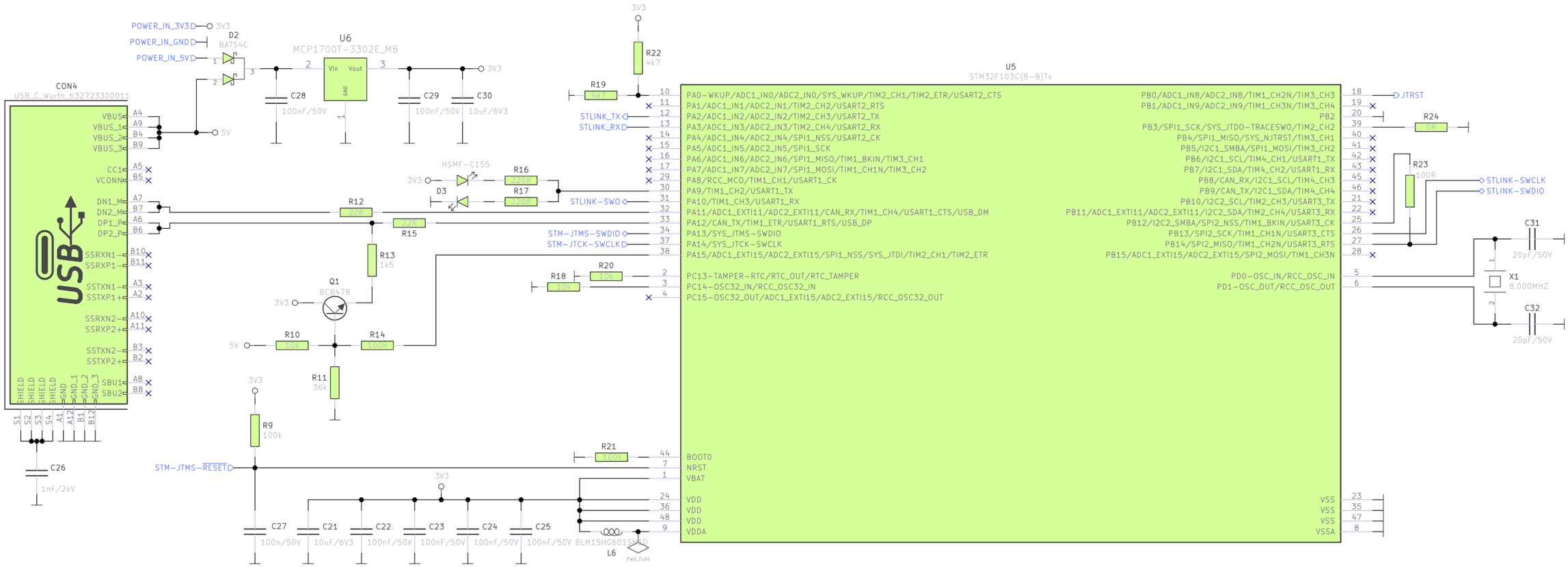


Embedded System Labs

Sheet: /LCD+Touchscreen/Touchscreen Power Supply/
File: TP_Power_Supply.kicad_sch

Title: 2.8V LDO Regulator

Size: A3	Date: 2020-12-19	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef~144~ubuntu20.04.1		Id: 8/11

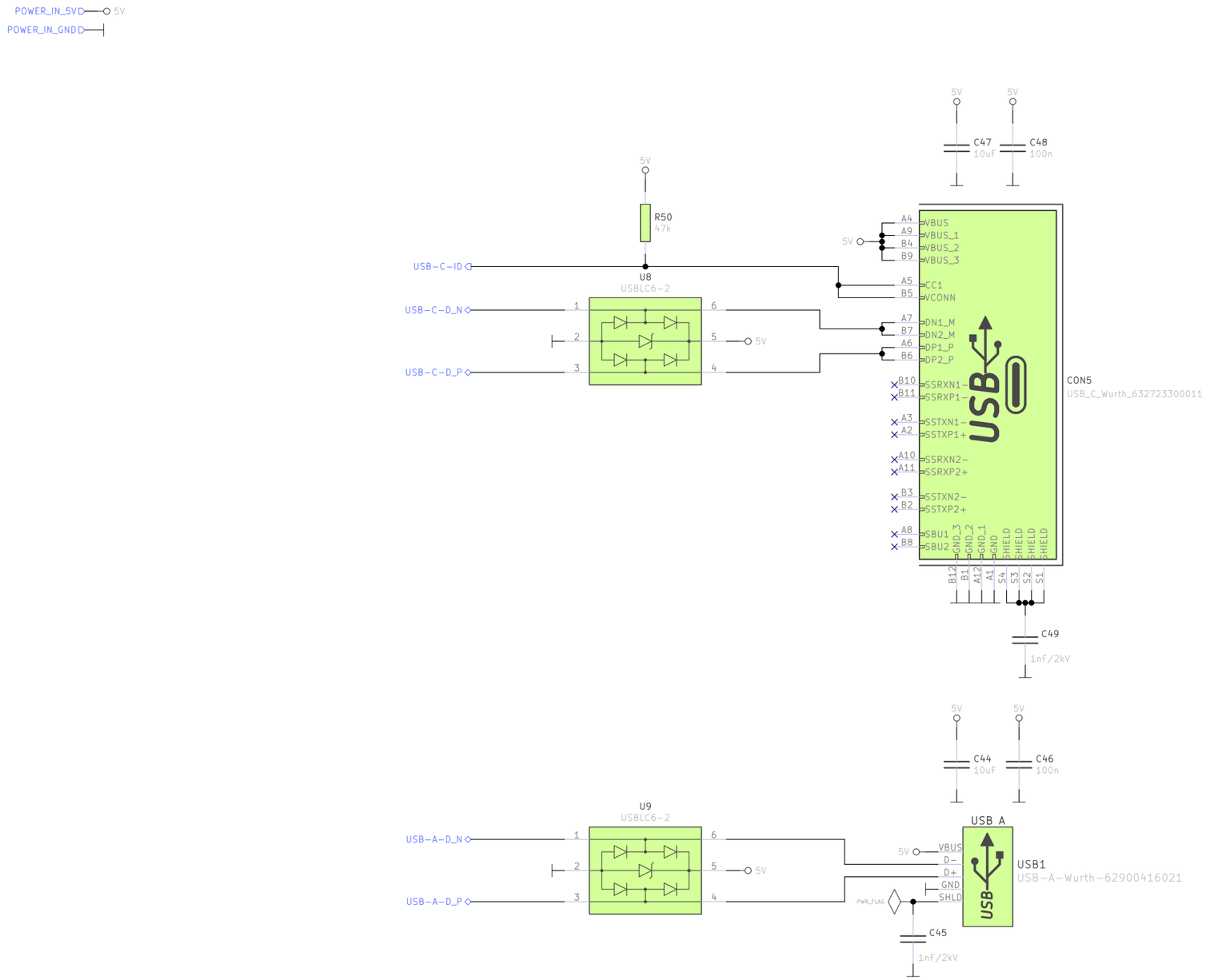


Embedded System Labs

Sheet: /STLink Module/
File: stlink.kicad_sch

Title: STLink Module

Size: A3	Date: 2020-12-20	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef~144~ubuntu20.04.1		Id: 9/11



Embedded System Labs		
Sheet: /USB Module/		
File: usb.kicad_sch		
Title: USB Section		
Size: A3	Date: 2021-01-13	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1		Id: 10/11

POWER_IN_3V3 — 3V3

POWER_IN_GND

CON3
2041119-1

U17
IP4220CZ6

U18
IP4220CZ6

SPDT_SEL-$\overline{\text{WDISABLE}}$/UART_RX

GPS_PPS/UART_TX

SCL

SDA

SPI_SCK

SPI_MISO

SPI_MOSI

SPI_GSN

RESET

R73 4k7

R74 4k7

R75 1k

R76 1k

Embedded System Labs		
Sheet: /MiniPci Module/ File: minipci_module.kicad_sch		
Title: Minipci Module		
Size: A3	Date: 2021-01-10	**Rev: V1.0**
KiCad E.D.A. kicad 6.0.0-rc2-64f06cc7ef-144-ubuntu20.04.1		Id: 11/11