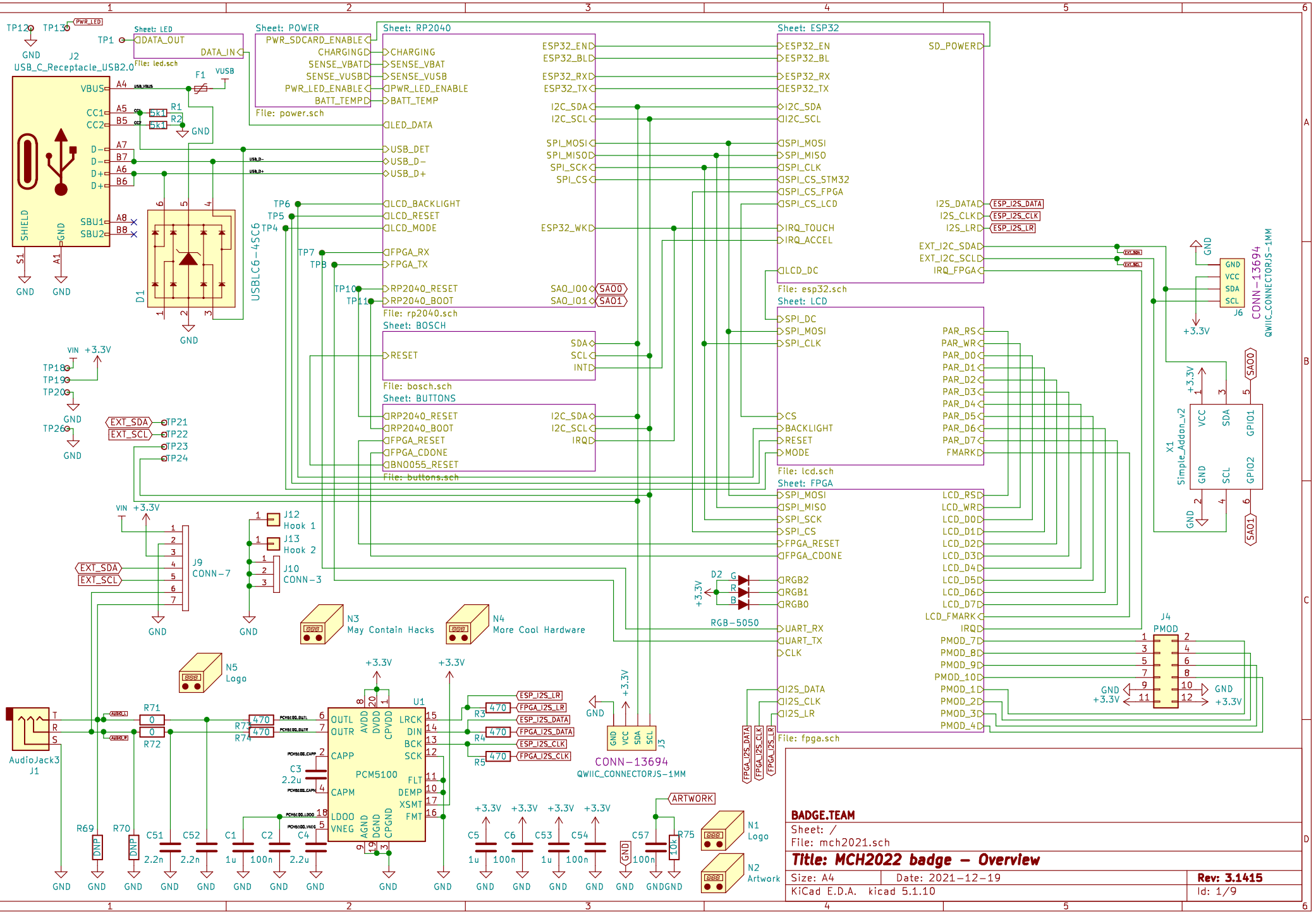
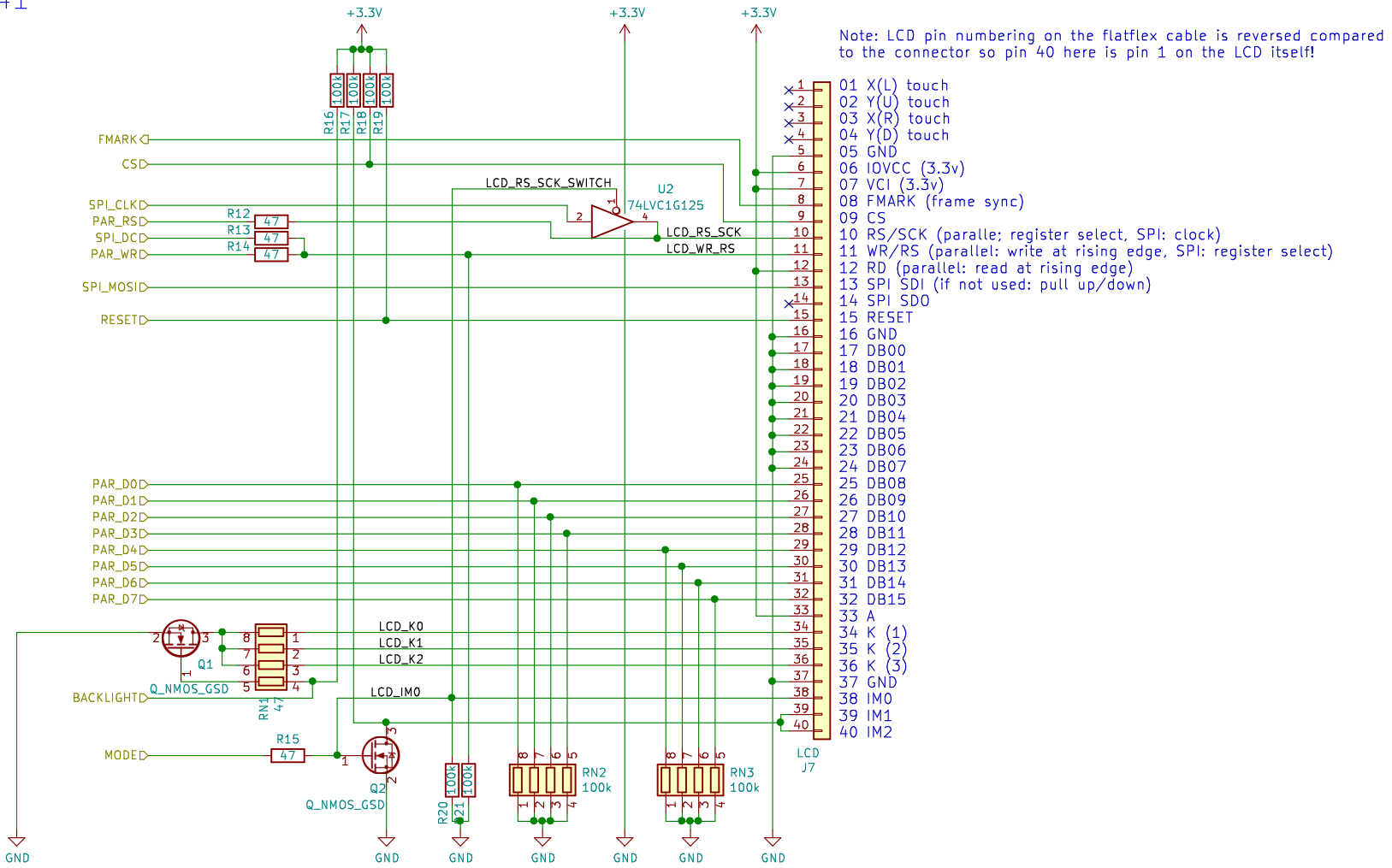

Sheet: LED
DATA_OUT
DATA_IN
File: led.sch
Sheet: POWER
PWR_SDCARD_ENABLE
CHARGING
SENSE_VBAT
SENSE_VUSB
PWR_LED_ENABLE
BATT_TEMP
File: power.sch
Sheet: RP2040
LED_DATA
USB_DET
USB_D-
USB_D+
LCD_BACKLIGHT
LCD_RESET
LCD_MODE
FPGA_RX
FPGA_TX
RP2040_RESET
RP2040_BOOT
File: rp2040.sch
Sheet: BOSCH
RESET
SDA
SCL
INT
File: bosch.sch
Sheet: BUTTONS
RP2040_RESET
RP2040_BOOT
FPGA_RESET
FPGA_CDONE
BNO055_RESET
File: buttons.sch
Sheet: ESP32
ESP32_EN
ESP32_BL
ESP32_RX
ESP32_TX
I2C_SDA
I2C_SCL
SPI_MOSI
SPI_MISO
SPI_CLK
SPI_CS_STM32
SPI_CS_FPGA
SPI_CS_LCD
IRQ_TOUCH
IRQ_ACCEL
LCD_DC
SD_POWER
I2S_DATA
I2S_CLK
I2S_LR
EXT_I2C_SDA
EXT_I2C_SCL
IRQ_FPGA
File: esp32.sch
Sheet: LCD
SPI_DC
SPI_MOSI
SPI_CLK
CS
BACKLIGHT
RESET
MODE
PAR_RS
PAR_WR
PAR_D0
PAR_D1
PAR_D2
PAR_D3
PAR_D4
PAR_D5
PAR_D6
PAR_D7
FMARK
File: lcd.sch
Sheet: FPGA
SPI_MOSI
SPI_MISO
SPI_SCK
SPI_CS
FPGA_RESET
FPGA_CDONE
RGB2
RGB1
RGB0
UART_RX
UART_TX
CLK
I2S_DATA
I2S_CLK
I2S_LR
LCD_RS
LCD_WR
LCD_D0
LCD_D1
LCD_D2
LCD_D3
LCD_D4
LCD_D5
LCD_D6
LCD_D7
LCD_FMARK
IRQ
PMOD_7
PMOD_8
PMOD_9
PMOD_10
PMOD_1
PMOD_2
PMOD_3
PMOD_4
File: fpga.sch
USB_C_Receptacle_USB2.0
AudioJack3
USBLC6-4SC6
PCM5100
CONN-13694
QWIIC_CONNECTORJS-1MM
RGB-5050
Simple_Addon_v2
N1 Logo
N2 Artwork
N3 May Contain Hacks
N4 More Cool Hardware
N5 Logo
Hook 1
Hook 2
CONN-7
CONN-3
PMOD
ARTWORK
BADGE.TEAM
Sheet: /
File: mch2021.sch
Title: MCH2022 badge – Overview
Size: A4
Date: 2021-12-19
Rev: 3.1415
KiCad E.D.A. kicad 5.1.10
Id: 1/9

LCD
Type: Z240IT008
Controller: ILI9341
Size: 2.4 inch



Note: LCD pin numbering on the flatflex cable is reversed compared to the connector so pin 40 here is pin 1 on the LCD itself!

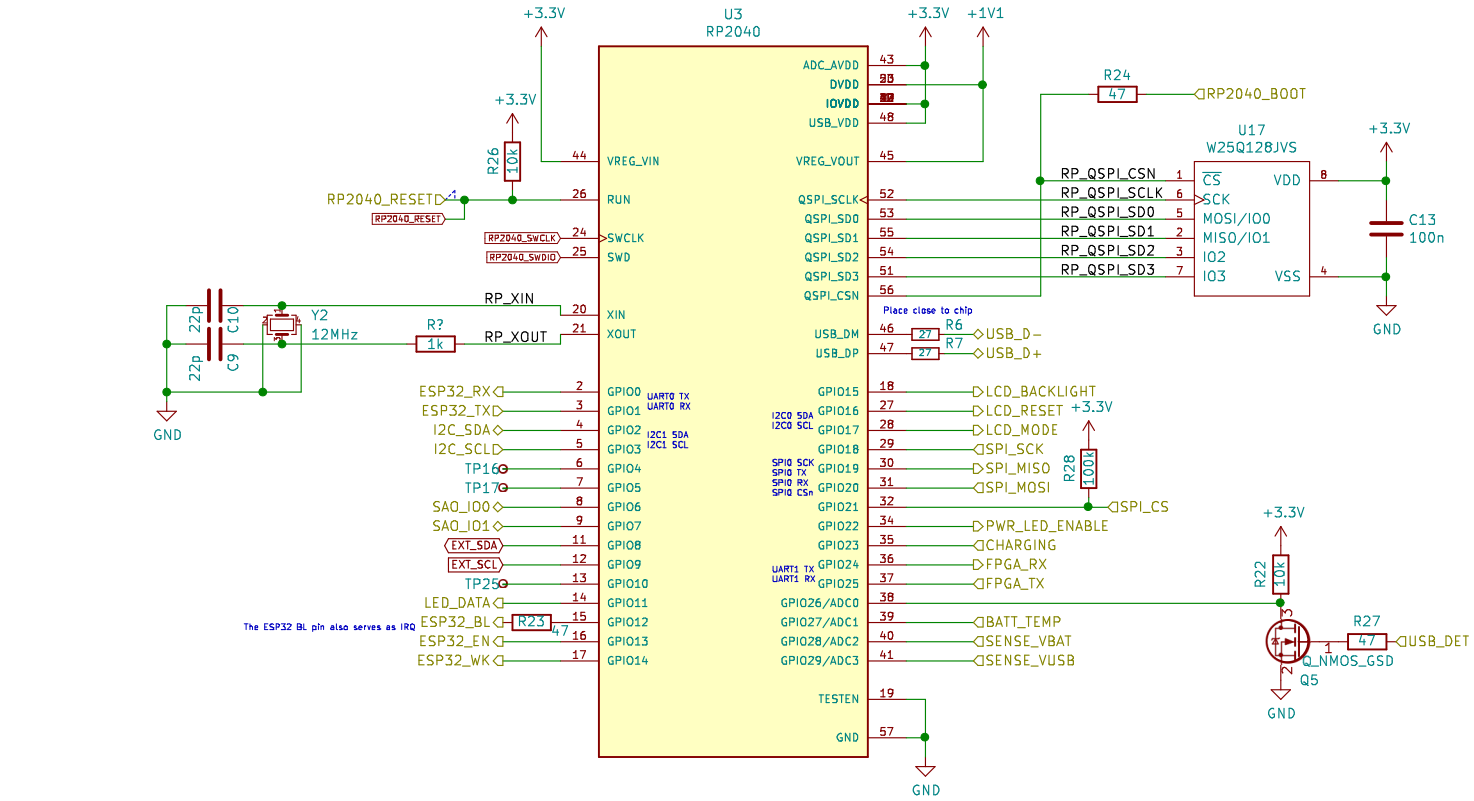
SPI: IM0 = 0, IM1 = 1, IM2 = 1
PAR: IM0 = 1, IM1 = 0, IM2 = 0

BADGE.TEAM
Sheet: /LCD/
File: lcd.sch

Title: MCH2022 badge – LCD

Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 2/9

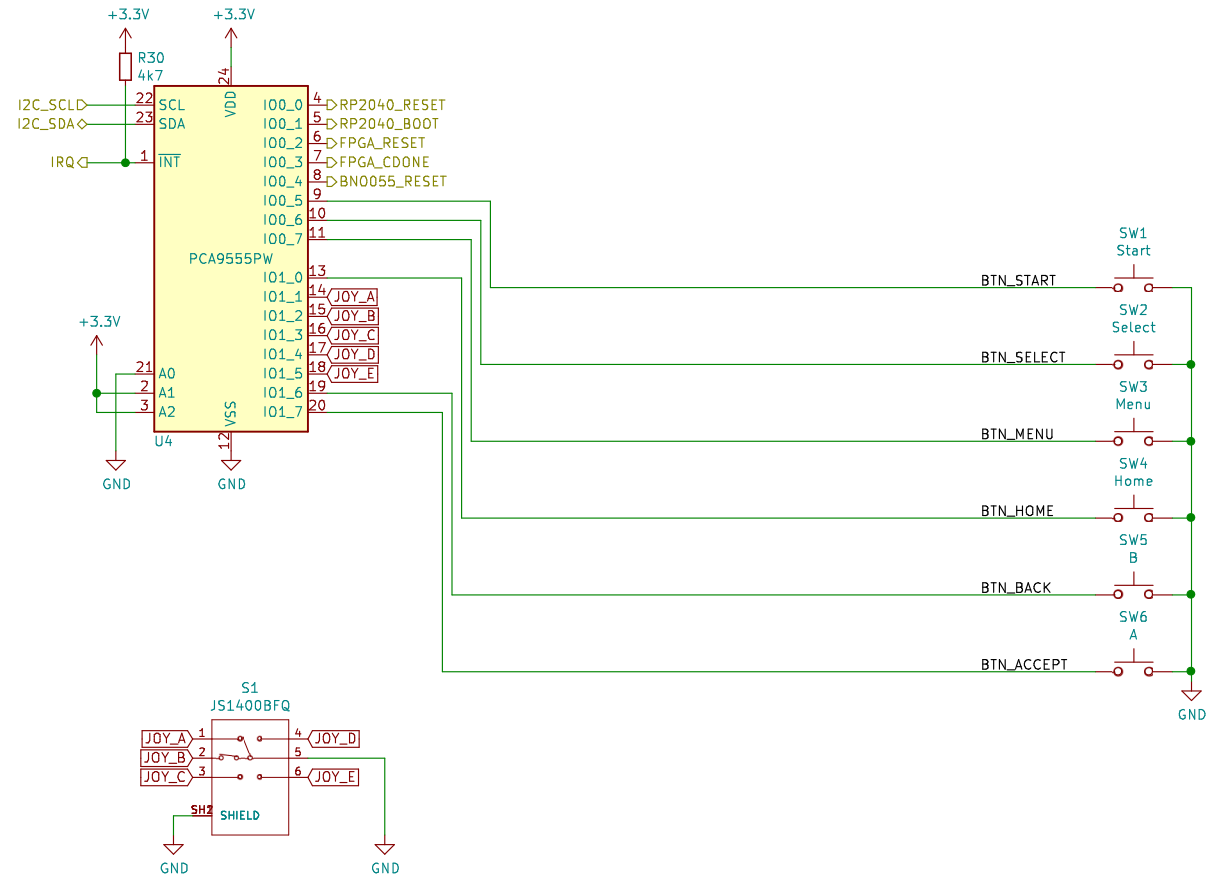
RP2040 microcontroller



BADGE.TEAM	
Sheet: /RP2040/	
File: rp2040.sch	
Title: MCH2022 badge – RP2040 microcontroller	
Size: A4	Date: 2021-12-19
KiCad E.D.A. kicad 5.1.10	Id: 3/9

Rev: 3.1415

I2C I/O expander



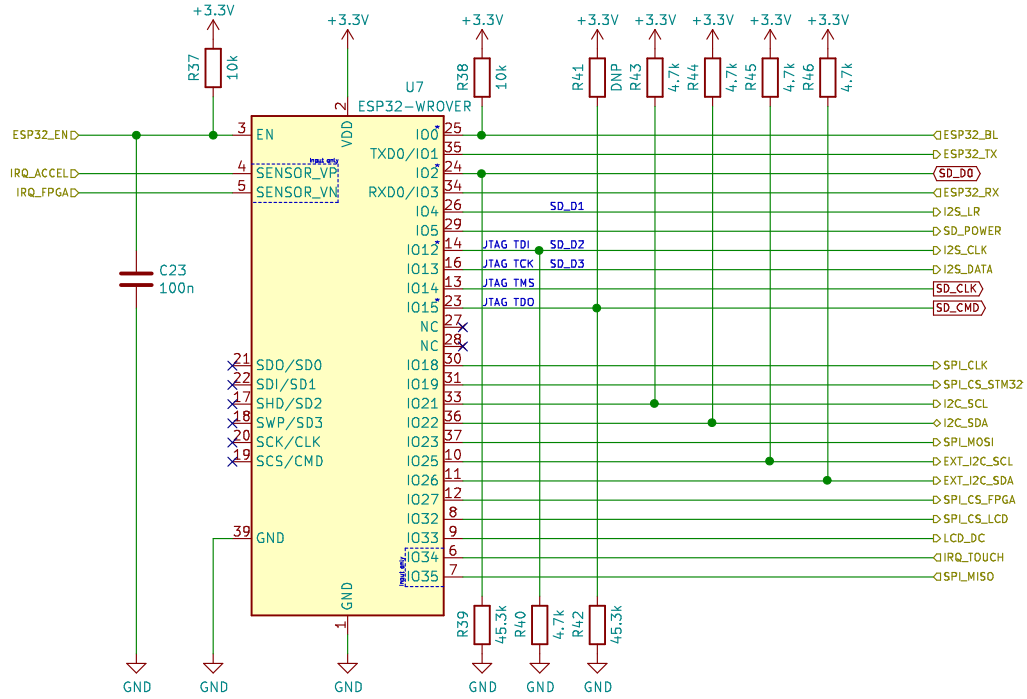
BADGE.TEAM

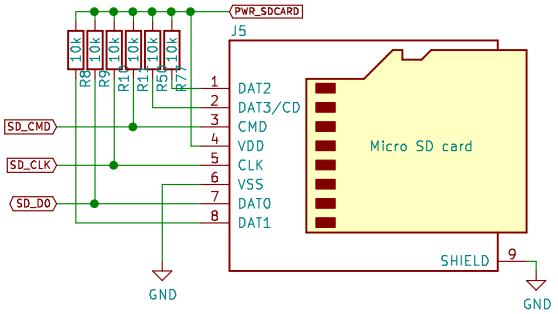
Sheet: /BUTTONS/
File: buttons.sch

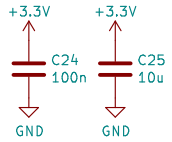
Title: MCH2022 badge – IO expander & buttons

Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 4/9

ESP32 microcontroller







* Bootstrapping pins
IO 0:Low for UART DL mode, pull high for normal boot
IO 2: Pull down to select UART DL mode when GPIO 0 is LOW
IO 12: Selects internal flash/ram voltage. Pull-up for 1.8v, pull-down for 3.3v
IO 15: Pull down for silent bootloader

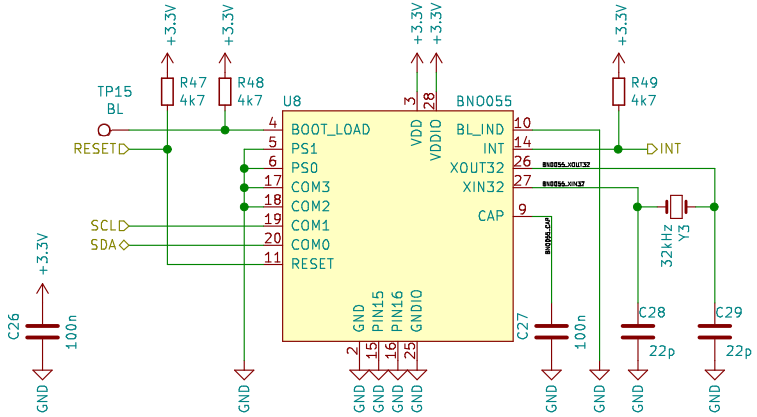
BADGE.TEAM

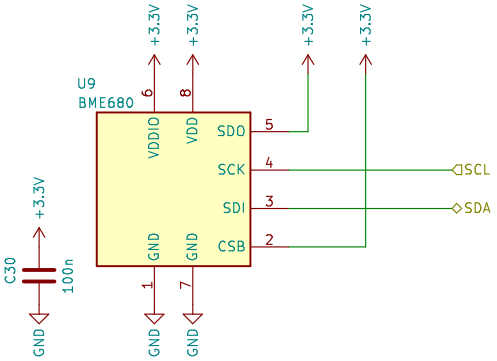
Sheet: /ESP32/
File: esp32.sch

Title: MCH2022 badge - ESP32 microcontroller

Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 5/9

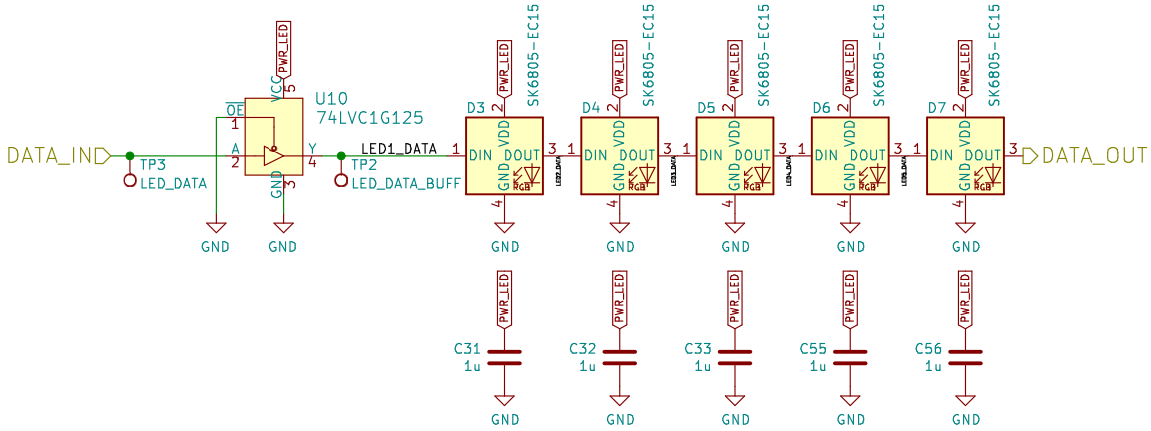
BOSCH BNO055 & BME680 SENSORS





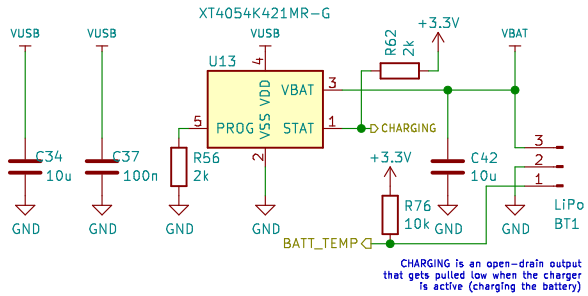
BADGE.TEAM		
Sheet: /BOSCH/ File: bosch.sch		
Title: MCH2022 badge – BOSCH		
Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 6/9

WS2812B LEDs



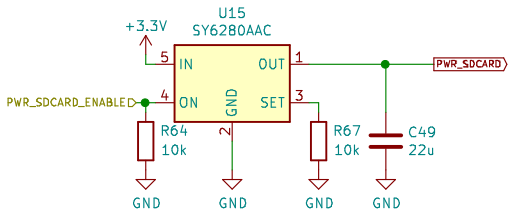
BADGE.TEAM		
Sheet: /LED/		
File: led.sch		
Title:		
Size: A4	Date: 2021-12-19	Rev: 3.1415
KiCad E.D.A. kicad 5.1.10		Id: 7/9

Battery & battery charger



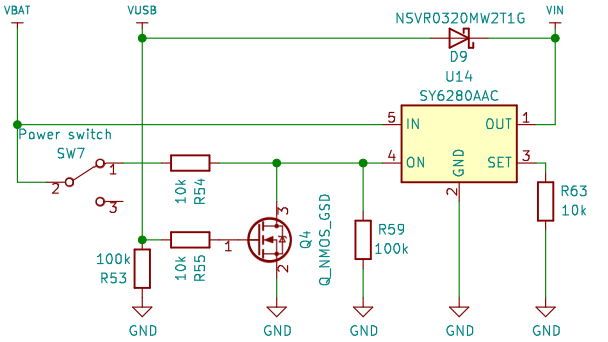
Switched power: 3.3v for SDCARD

Iset = 0.68A = 6800 / 10kOhm



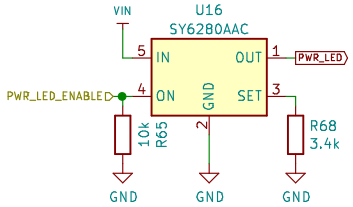
Note:
All control signals are hierarchical labels while all power rails are global

Power switch

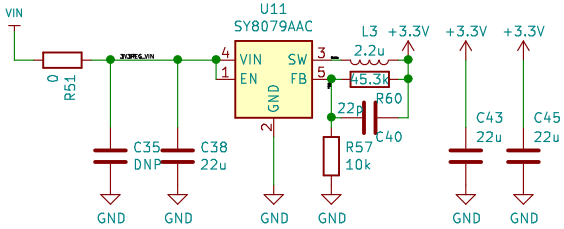


Switched power: Vin for LEDs

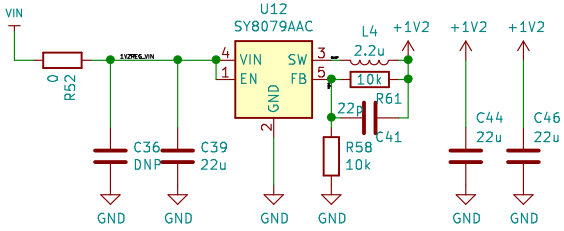
Iset = 2A = 6800 / 3.4kOhm



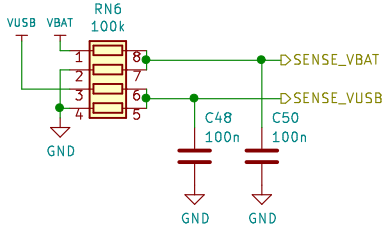
3.3v voltage regulator



1.2v voltage regulator



Voltage sensing

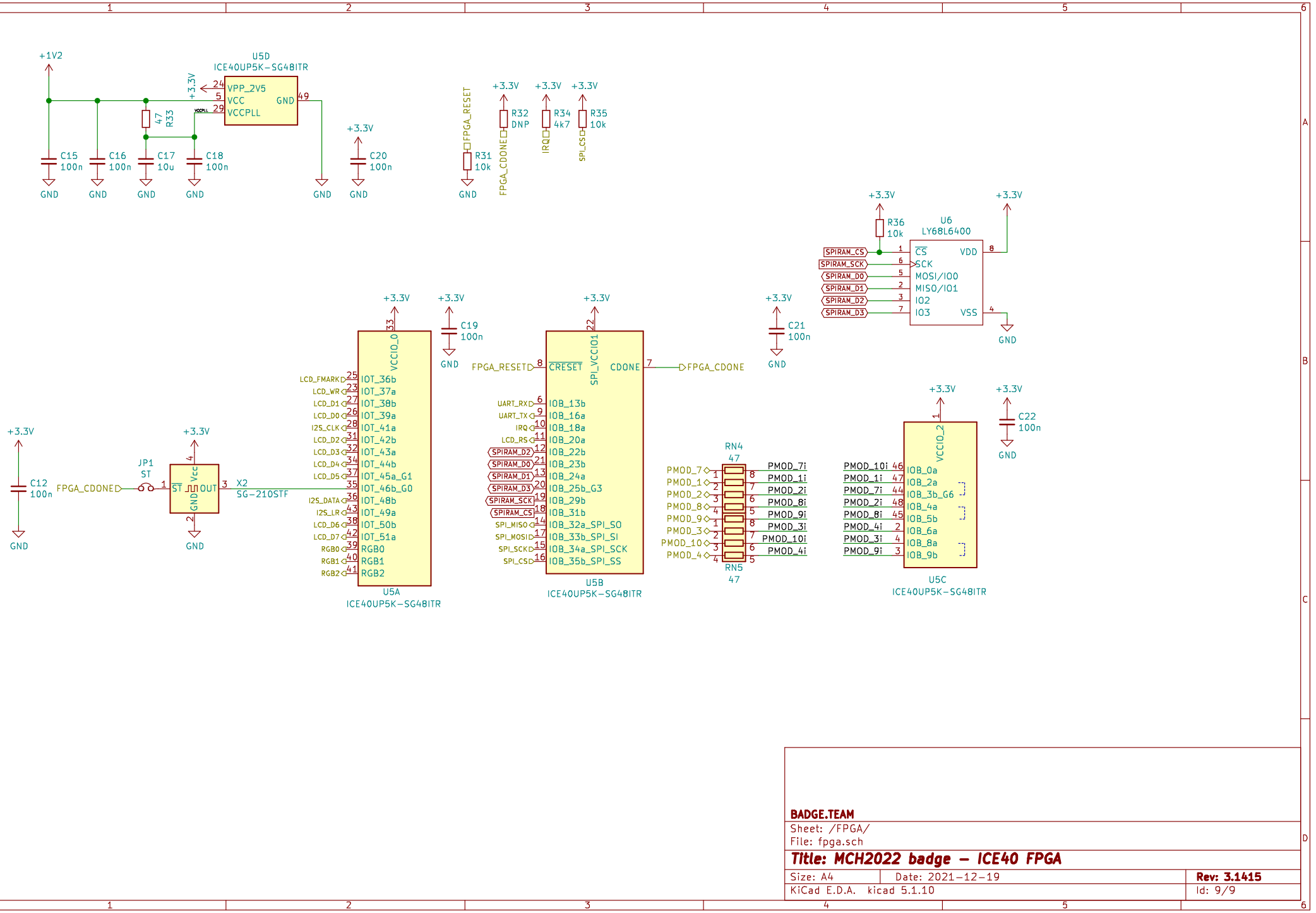


BADGE.TEAM

Sheet: /POWER/
File: power.sch

Title: MCH2021 badge – Power management

Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 8/9



BADGE.TEAM

Sheet: /FPGA/

File: fpga.sch

Title: MCH2022 badge – ICE40 FPGA

Size: A4	Date: 2021-12-19	**Rev: 3.1415**
KiCad E.D.A. kicad 5.1.10		Id: 9/9