

BADGE.TEAM

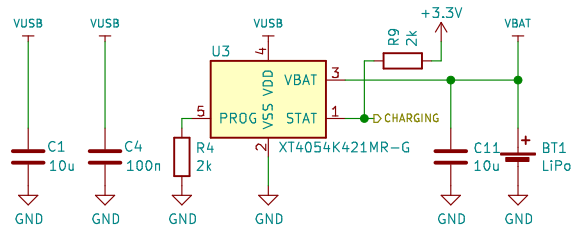
Sheet: /
File: mch2021.sch

Title: MCH2021 badge – Overview

Size: A4 Date: 2020-08-10
KiCad E.D.A. kicad 5.1.6

Rev: 1
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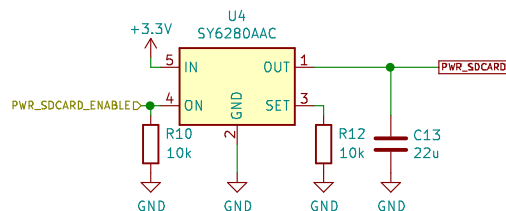
Battery & battery charger



CHARGING is an open-drain output that gets pulled low when the charger is active (charging the battery)

Switched power: 3.3v for SDCARD

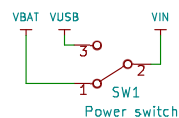
$I_{set} = 0.58A = 6800 / 10k\Omega$



Note:

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

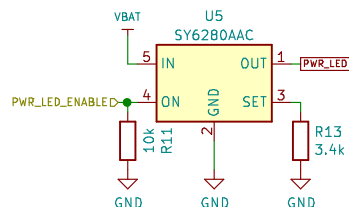
Power switch



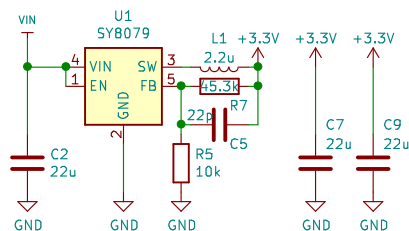
The power switch never really turns the badge off. Instead it lets you choose to bypass the battery when powering the badge from USB. This increases charging speed and turns the badge off completely when USB is not connected

Switched power: Vin for LEDs

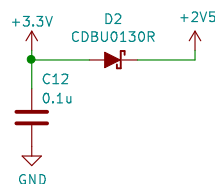
$I_{set} = 2A = 6800 / 3.4k\Omega$



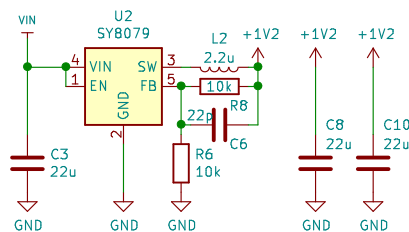
3.3v voltage regulator



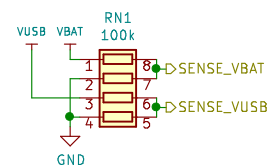
2.5v voltage regulator



1.2v voltage regulator



Voltage sensing



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Sheet: /POWER/

File: power.sch

Title: MCH2021 badge – Power management

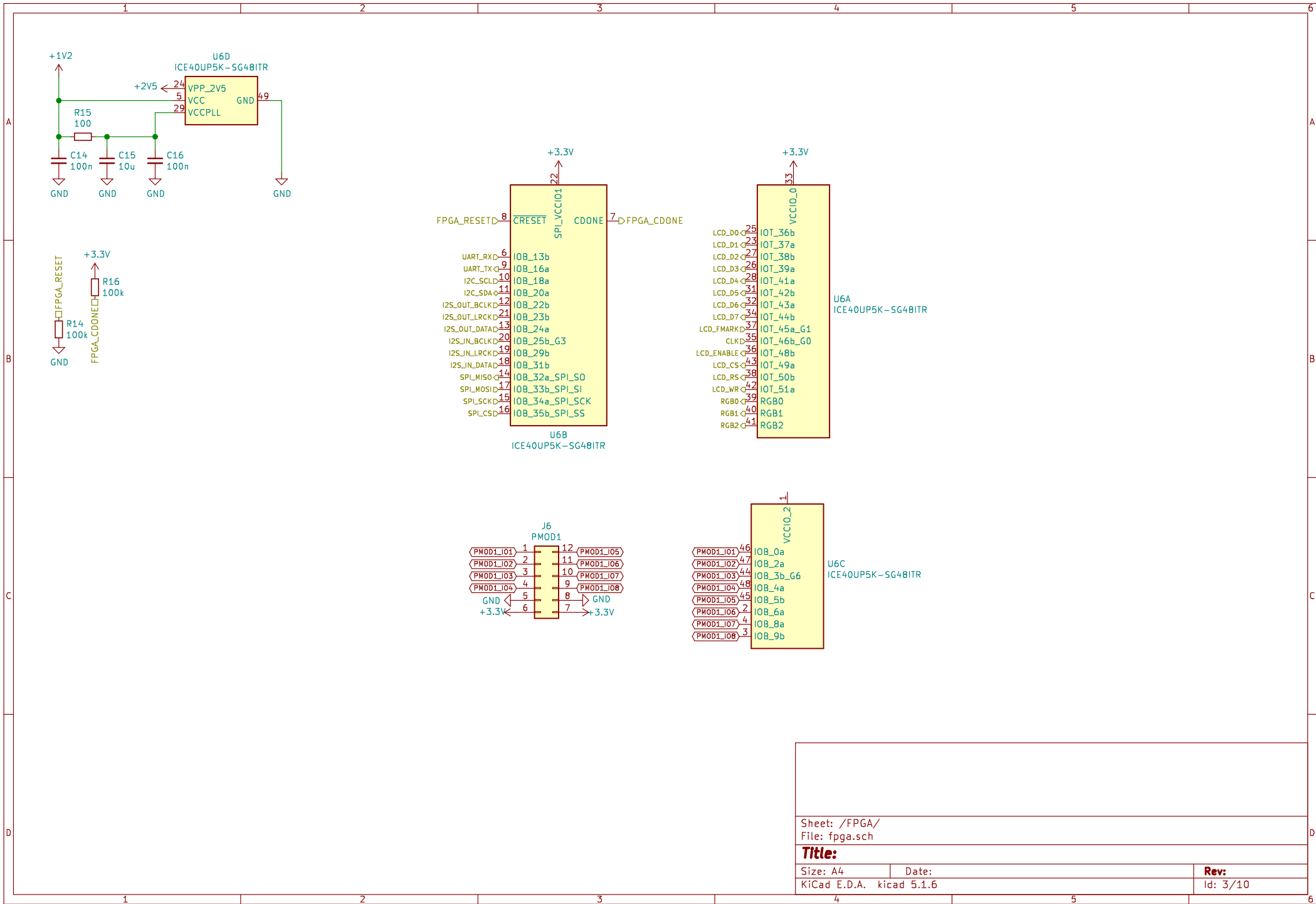
Size: A4

Date: 2020-08-08

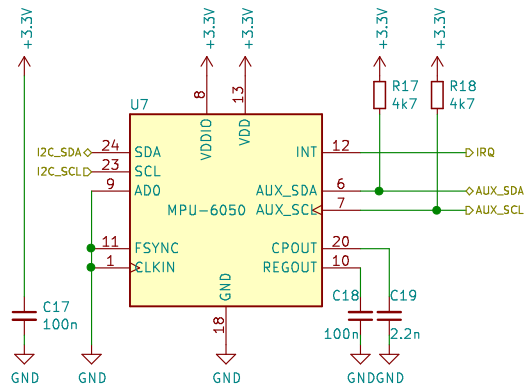
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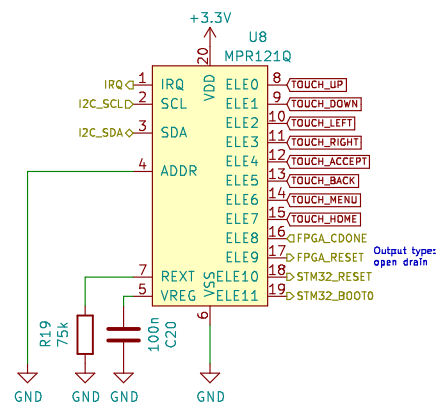
Id: 2/10



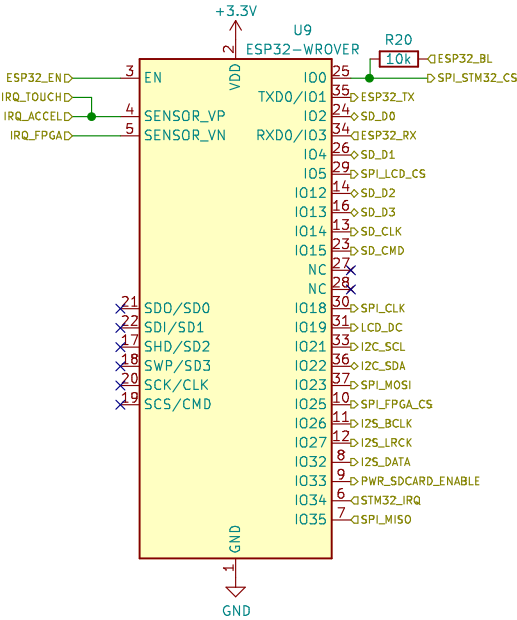
MPU6050 accelerometer and gyroscope



MPR121 touch button interface

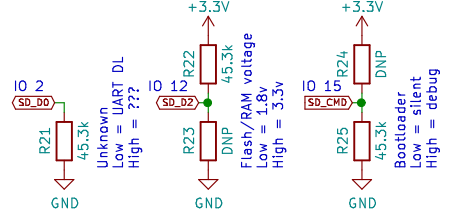


ESP32 microcontroller



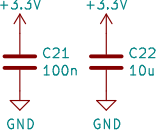
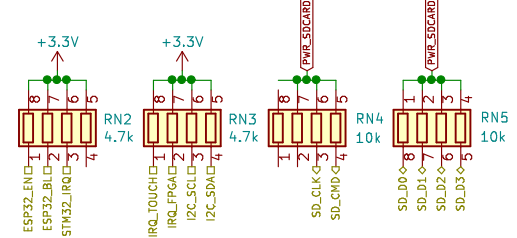
ESP32 bootstapping pins

IO 0: Low for uart dl, high for normal boot
IO 2: Always pull-down during boot
IO 12: Selects internal flash/ram voltage. Pull-up for 3.3v, pull-down for 1.8v
IO 15: Pull down for silent bootloader



Pull-up resistors for

- I2C bus
- IRQ signals
- Download mode (100)
- SDIO bus



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Sheet: /ESP32/
File: esp32.sch

Title: MCH2021 badge – ESP32 microcontroller

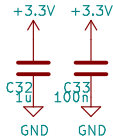
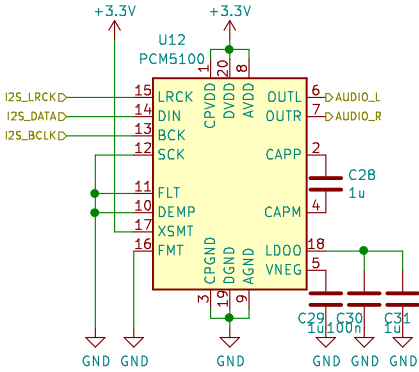
Size: A4
Date: 2020-08-08
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[illegible]

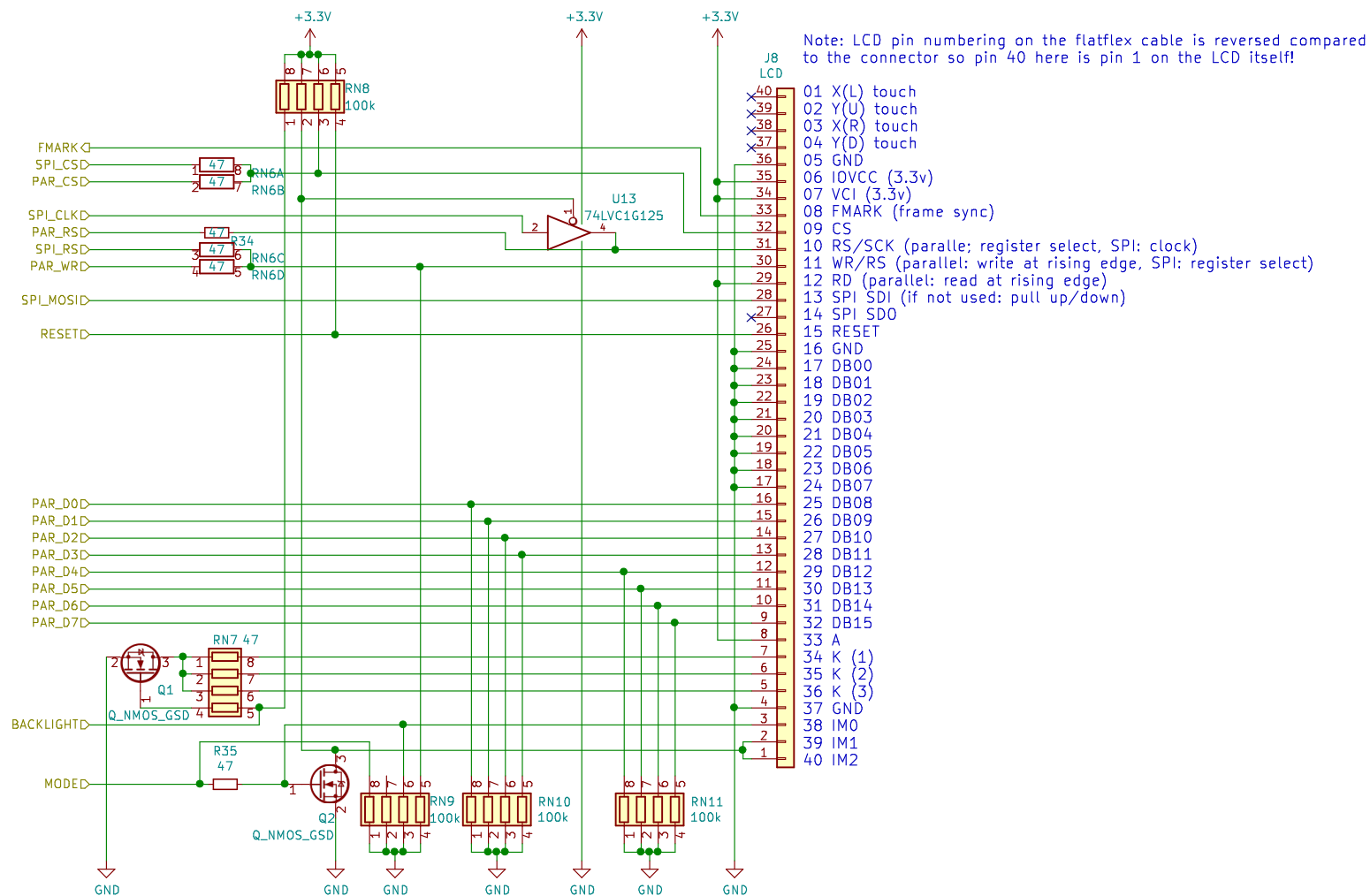
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I2S Audio DAC



Sheet: /AUDIO/ File: audio.sch		
Title:		
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LCD
Type: Z240IT008
Controller: ILI9341
Size: 2.4 inch



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

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Sheet: /LCD/

File: lcd.sch

Title: MCH2021 badge – LCD

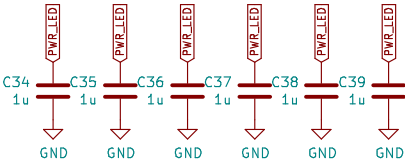
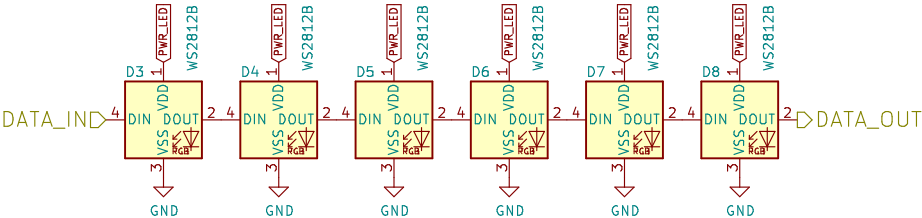
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WS2812B LEDs



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