

# BADGE.TEAM

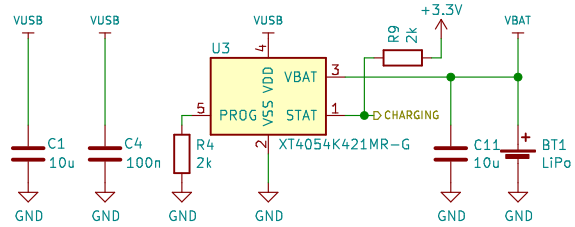
Sheet: /  
 File: mch2021.sch

## Title: MCH2021 badge – Overview

Size: A4  
 Date: 2020-08-10  
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Rev: 1  
 Id: 1/10

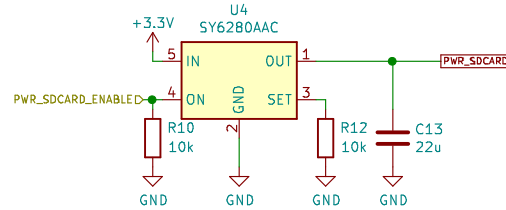
## Battery & battery charger



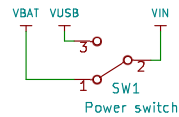
CHARGING is an open-drain output that gets pulled low when the charger is active (charging the battery)

## Switched power: 3.3v for SDCARD

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



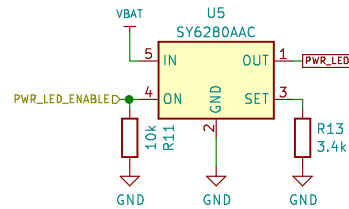
## Power switch



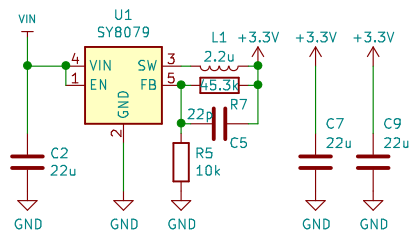
The power switch never really turns the badge off. Instead it lets you choose to bypass the battery when powering the badge from USB. This increases charging speed and turns the badge off completely when USB is not connected

## Switched power: Vin for LEDs

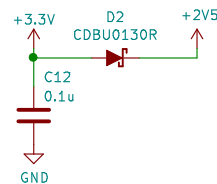
$I_{set} = 2A = 6800 / 3.4k\Omega$



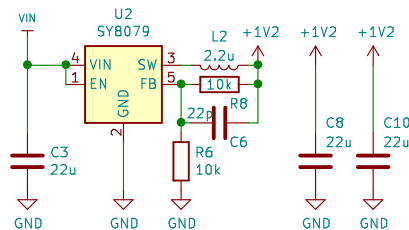
## 3.3v voltage regulator



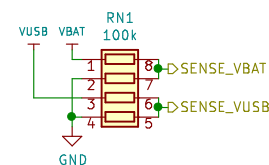
## 2.5v voltage regulator



## 1.2v voltage regulator



## Voltage sensing



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

**BADGE.TEAM**

Sheet: /POWER/

File: power.sch

**Title: MCH2021 badge – Power management**

Size: A4

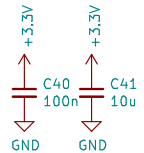
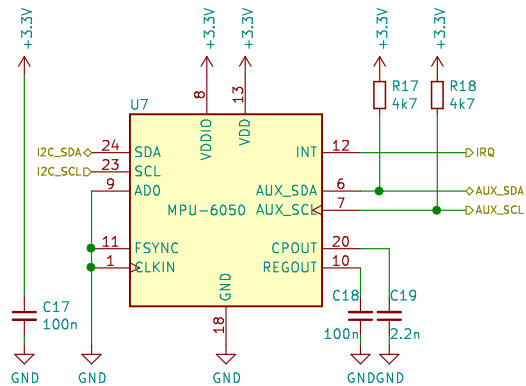
Date: 2020-08-08

Rev: 1

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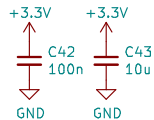
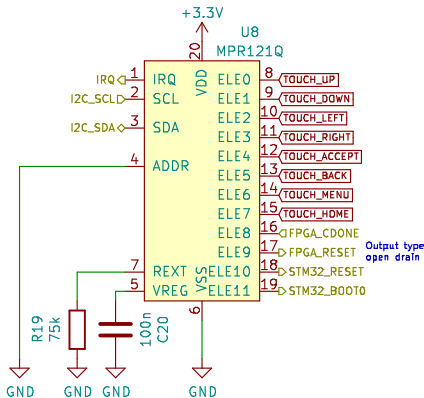
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MPU6050 accelerometer and gyroscope



Sheet: /ACCELEROMETER/		File: accelerometer.sch	
Size: A4		Date:	
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## MPR121 touch button interface



Sheet: /TOUCH/  
File: touch.sch

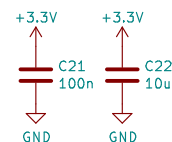
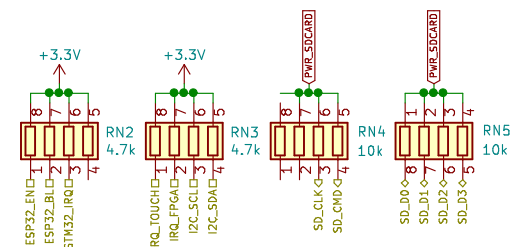
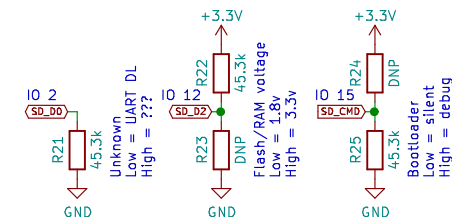
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Size: A4	Date:
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Rev: 1.0  
Id: 4/10

## ESP32 bootstapping pins

- Pull-up resistors for
  - I2C bus
  - IRQ signals
  - Download mode (IO0)
  - SDIO bus

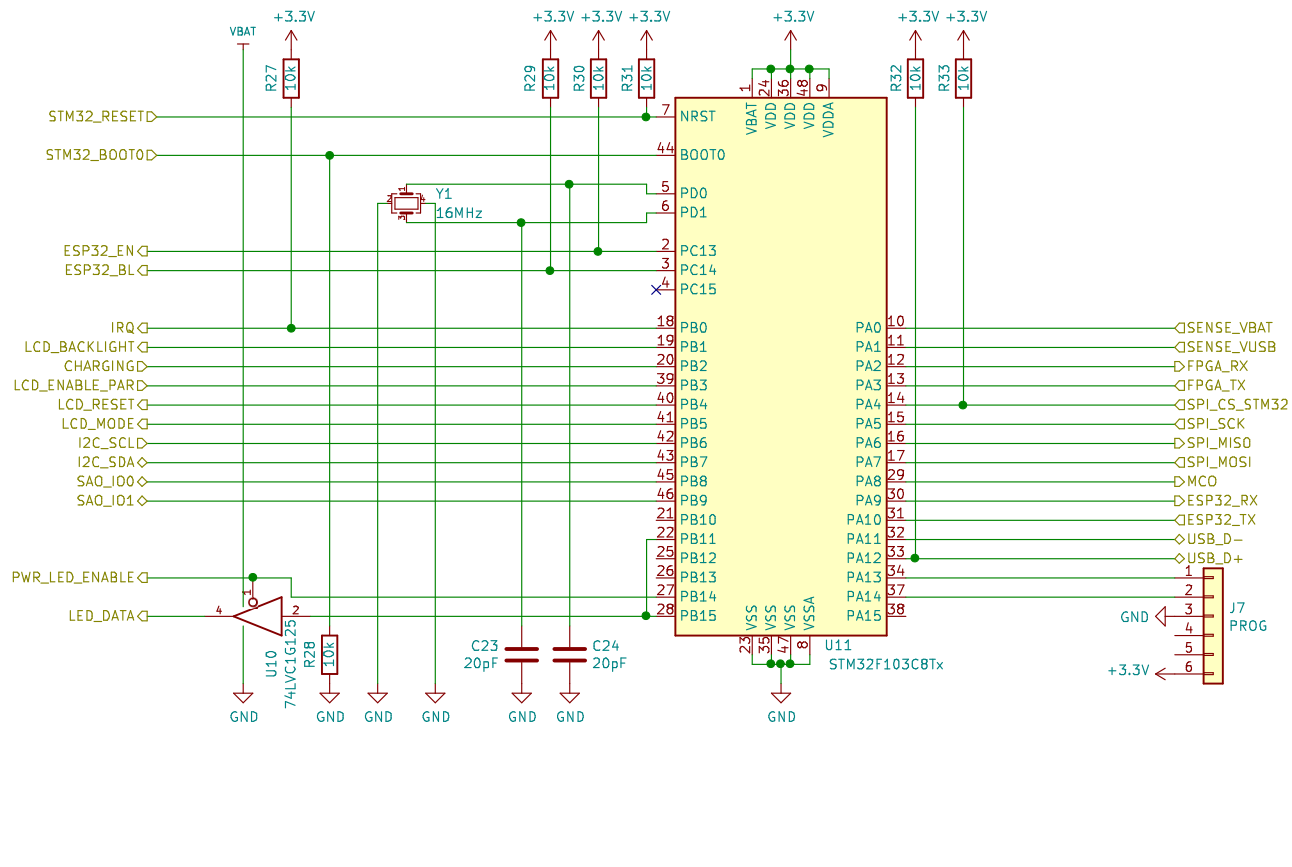


Sheet: /ESP32/  
File: esp32.sch

Size: A4	Date: 2020-08-08
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Rev: 1  
Id: 5/10

# STM32 microcontroller



if using hardware time and the aproach of DMA > TImEr Output  
compare register you will need bridge pb15 and pb11 so we can  
select or spi or tim

## BADGE.TEAM

Sheet: /STM32/

File: stm32.sch

## Title: MCH2021 badge – STM32 microcontroller

Size: A4

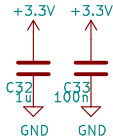
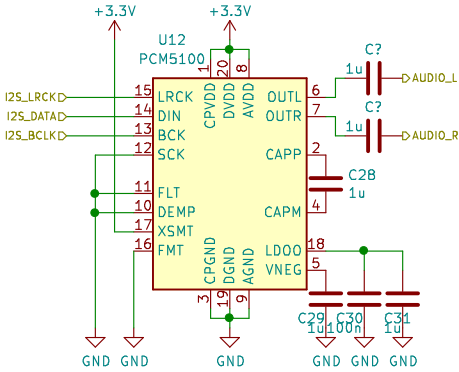
Date: 2020-08-08

Rev: 1

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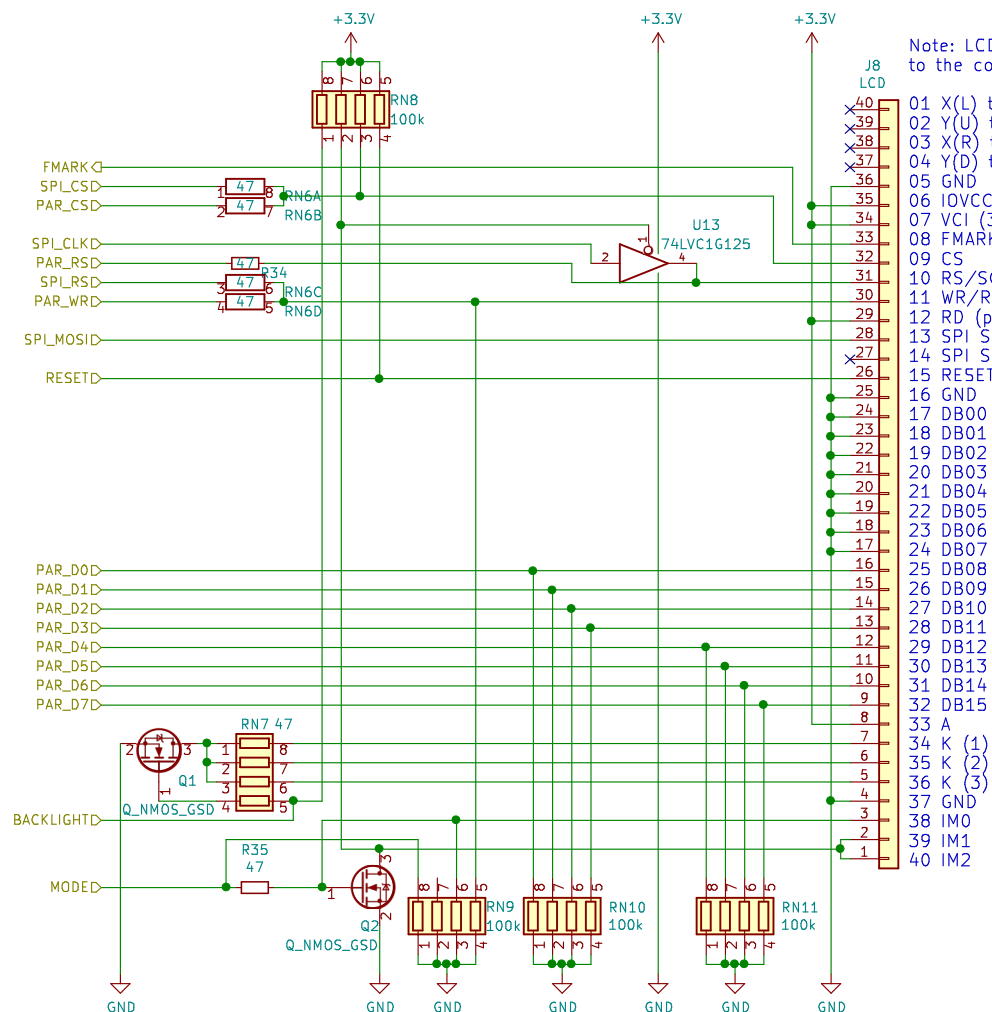
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I2S Audio DAC



Sheet: /AUDIO/ File: audio.sch		
<b>Title:</b>		
Size: A4	Date:	Rev:
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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!

- 01 X(L) touch
- 02 Y(U) touch
- 03 X(R) touch
- 04 Y(D) touch
- 05 GND
- 06 IOVCC (3.3v)
- 07 VCI (3.3v)
- 08 FMARK (frame sync)
- 09 CS
- 10 RS/SCK (paralle; register select, SPI; clock)
- 11 WR/RS (parallel: write at rising edge, SPI: register select)
- 12 RD (parallel: read at rising edge)
- 13 SPI SDI (if not used: pull up/down)
- 14 SPI SDO
- 15 RESET
- 16 GND
- 17 DB00
- 18 DB01
- 19 DB02
- 20 DB03
- 21 DB04
- 22 DB05
- 23 DB06
- 24 DB07
- 25 DB08
- 26 DB09
- 27 DB10
- 28 DB11
- 29 DB12
- 30 DB13
- 31 DB14
- 32 DB15
- 33 A
- 34 K (1)
- 35 K (2)
- 36 K (3)
- 37 GND
- 38 IM0
- 39 IM1
- 40 IM2

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

#### BADGE.TEAM

Sheet: /LCD/

File: lcd.sch

Title: MCH2021 badge - LCD

Size: A4

Date: 2020-08-09

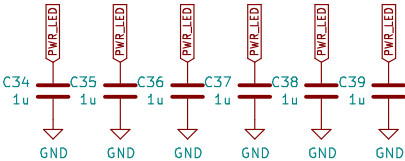
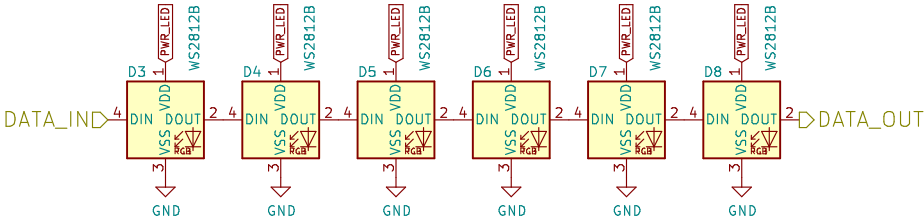
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WS2812B LEDs



Sheet: /LED/		
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