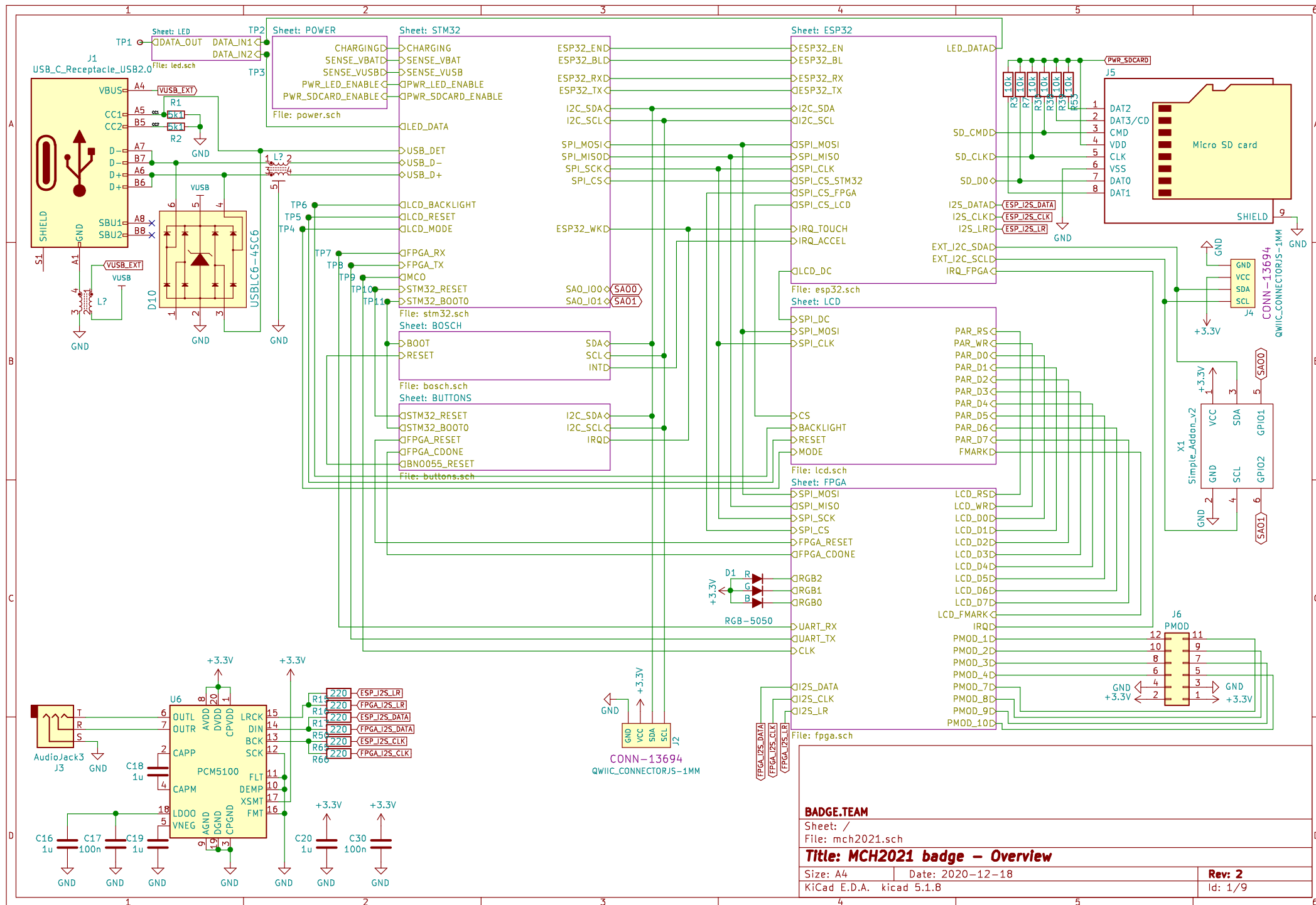


3ND



BADGE.TEAM

Sheet: /
File: mch2021.sch

Title: MCH2021 badge - Overview

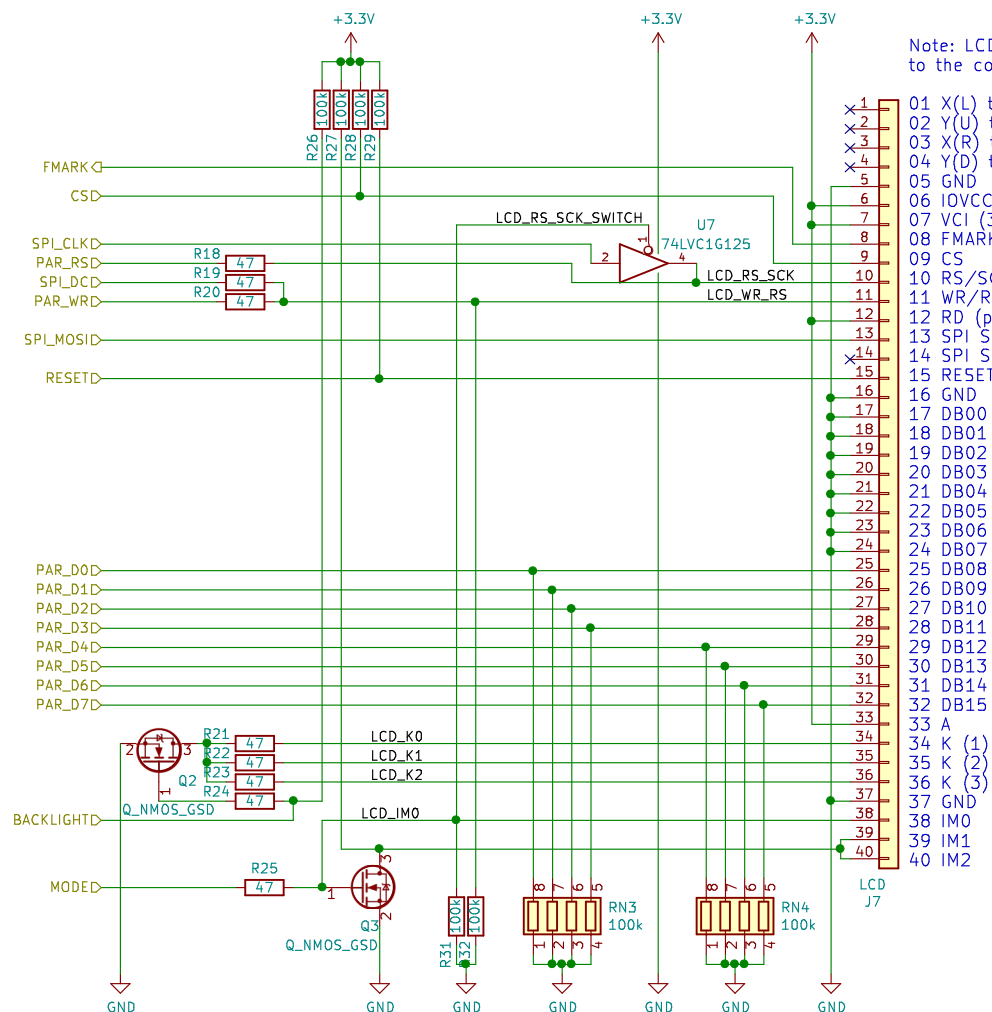
Size: A4 Date: 2020-12-18

KiCad E.D.A. kicad 5.1.8

Rev: 2

Id: 1/9

LCD
Type: Z240IT008
Controller: ILI9341
Size: 2.4 inch



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: 2020-12-13

KiCad E.D.A. kicad 5.1.8

Rev: 2

Id: 2/9

STM32 microcontroller

The ESP32 BL pin also serves as IRQ

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: 2020–12–13	Rev: 2
KiCad E.D.A. kicad 5.1.8		Id: 3/9

STM32 microcontroller

The ESP32 BL pin also serves as IRQ

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

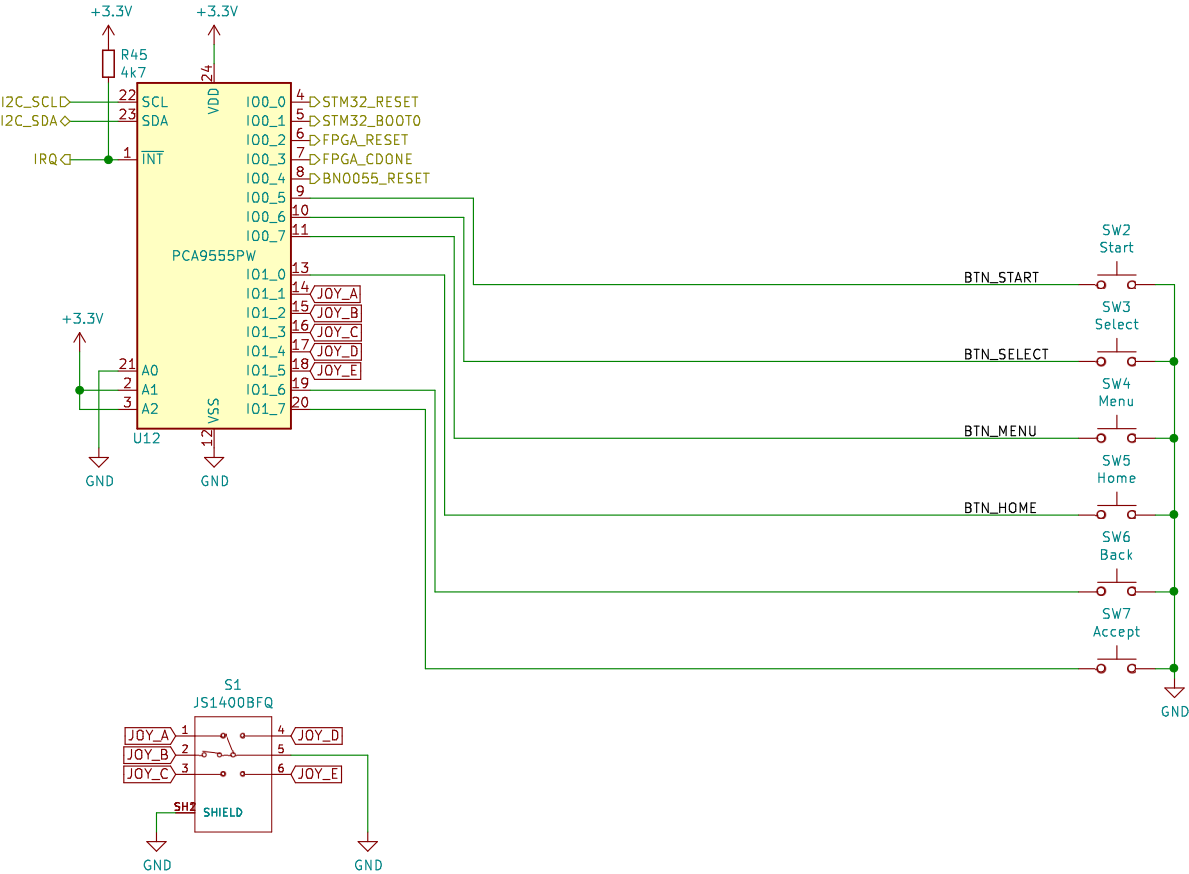
BADGE.TEAM
Sheet: /STM32/
File: stm32.sch

Title: MCH2021 badge – STM32 microcontroller

Size: A4	Date: 2020–12–13	Rev: 2
KiCad E.D.A. kicad 5.1.8		Id: 3/9

Id: 3/9

MPR121 touch button interface





BADGE.TEAM

Sheet: /BOSCH/

File: bosch.sch

Title: MCH2021 badge – BOSCH

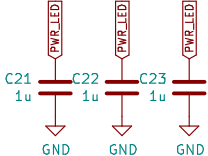
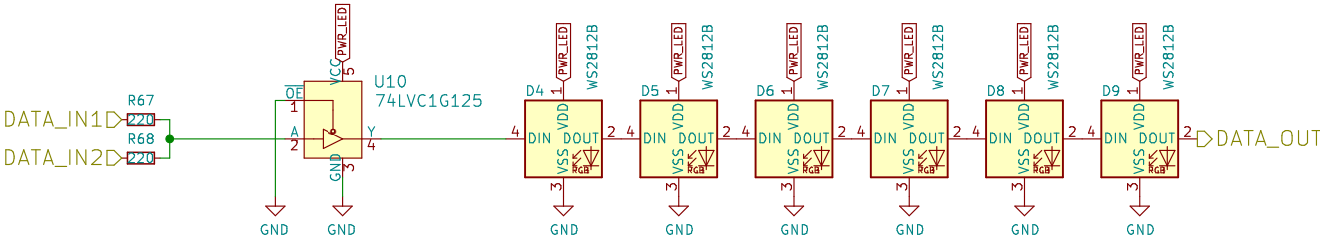
Size: A4	Date: 2020-12-13
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KiCad E.D.A. kicad 5.1.8

Rev: 2

Id: 7/9

WS2812B LEDs



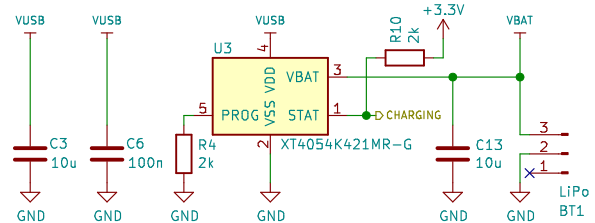
BADGE.TEAM		
Sheet: /LED/		
File: led.sch		
Title:		
Size: A4	Date: 2020-12-13	Rev: 2
KiCad E.D.A. kicad 5.1.8		Id: 8/9

Battery & battery charger

The diagram illustrates a battery and battery charger circuit. It features a USB-to-battery charging IC (U3, XT4054K421MR-G) which manages charging from a USB source (VUSB) to a battery (VBAT). The circuit includes several components:

- USB Inputs:** Two VUSB lines connected to the IC.
- Capacitors:** C3 (10uF) and C6 (100nF) are connected to the USB inputs. C13 (10uF) is connected to the 3.3V output.
- Resistor:** R4 (2k) is connected between the IC and ground. R10 (2k) is connected between the 3.3V output and ground.
- IC Pins:** The IC has pins for PROG, VSS, VDD, STAT, and XT4054K421MR-G.
- Output:** The 3.3V output is connected to the VBAT pin of the LiPo BT1 module.
- Charging Indicator:** A green arrow labeled 'CHARGING' points to the STAT pin of the IC.
- Module Pins:** The LiPo BT1 module has pins 1, 2, and 3, which are connected to the 3.3V output and ground.

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

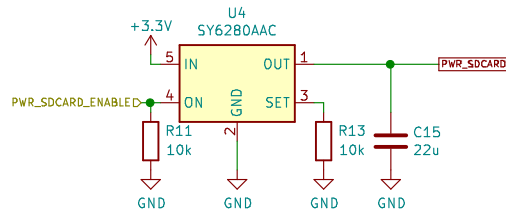


CHARGING is an open-drain output that gets pulled low when the charger is active (charging the battery)

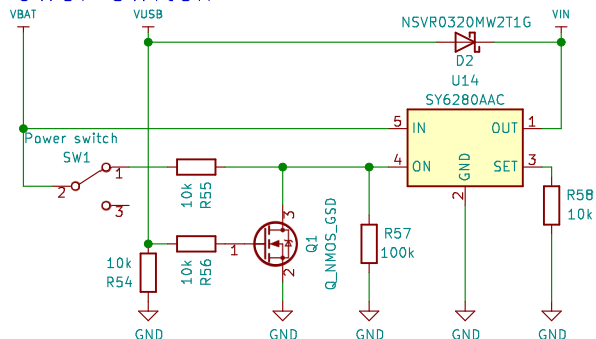
Switched power: 3.3v for SDCARD

$I_{set} = 0.68A = 6800 / 10k\Omega m$

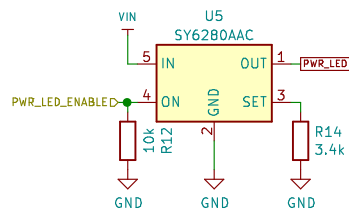
The diagram shows a MOSFET (U4, SY6280AAC) used as a switch for a 3.3V power supply. The MOSFET's gate (pin 4, ON) is controlled by the PWR_SDCARD_ENABLED signal through a 10kΩ resistor (R11). The drain (pin 5, IN) is connected to a 3.3V source. The source (pin 2, GND) is connected to ground. The MOSFET's output (pin 1, OUT) is connected to the PWR_SDCARD line through a 10kΩ resistor (R13). The PWR_SDCARD line also has a 22μF capacitor (C15) connected to ground. The MOSFET's SET pin (pin 3) is connected to ground.

$$I_{set} = 0.68A = 6800 / 10k\Omega$$


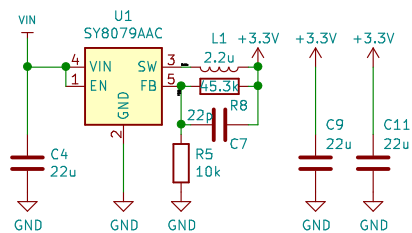
Note:
All control signals are hierarchical labels while all power rails are global

[illegible]

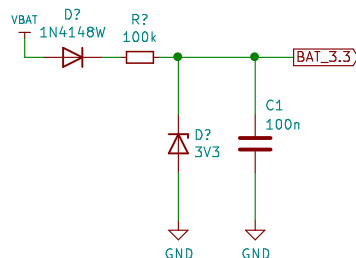
Switched power: Vin for LEDs

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


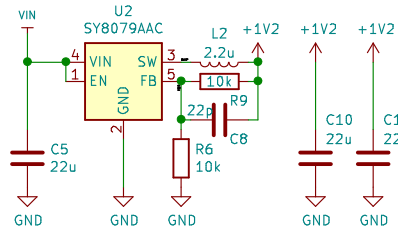
3.3v voltage regulator



3.3v voltage regulator for RTC backup

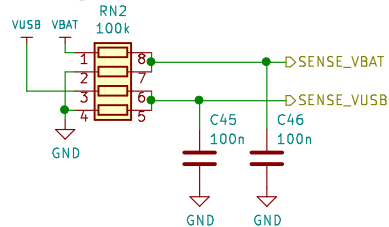


1.2v voltage regulator



Voltage sensing

The diagram illustrates a voltage sensing circuit. It features a resistor network labeled RN2 with a value of 100k. The network consists of five resistors connected in a ladder configuration. The input voltages are VUSB and VBAT. The output signals are SENSE_VBAT and SENSE_VUSB. Two capacitors, C45 and C46, both with a value of 100n, are connected to ground (GND) to filter the signals. The circuit is shown with a blue dashed border.



BADGE.TEAM		
Sheet: /POWER/ File: power.sch		
Title: MCH2021 badge – Power management		
Size: A4	Date: 2020–12–13	Rev: 2
KiCad E.D.A. kicad 5.1.8		Id: 9/9

Id: 9/9