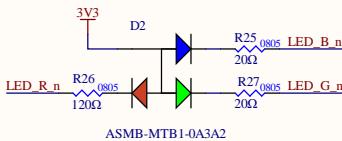
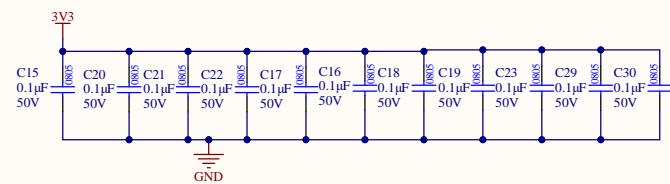
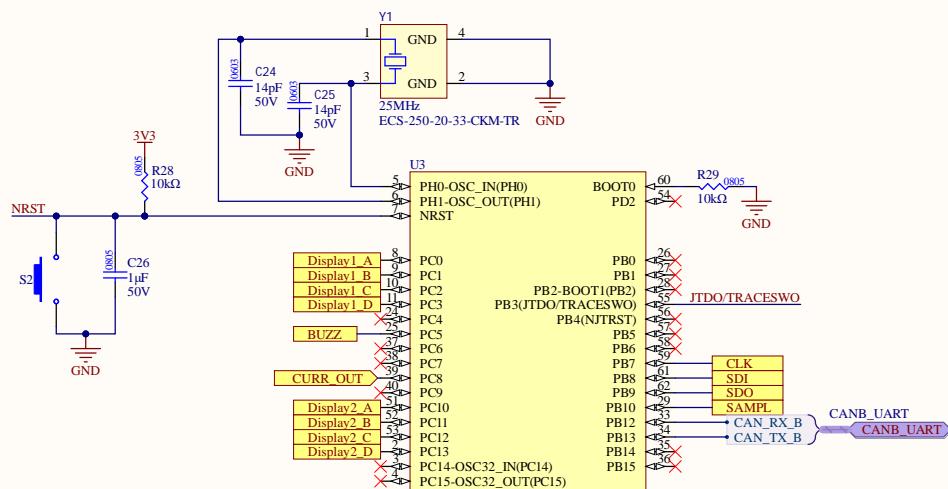
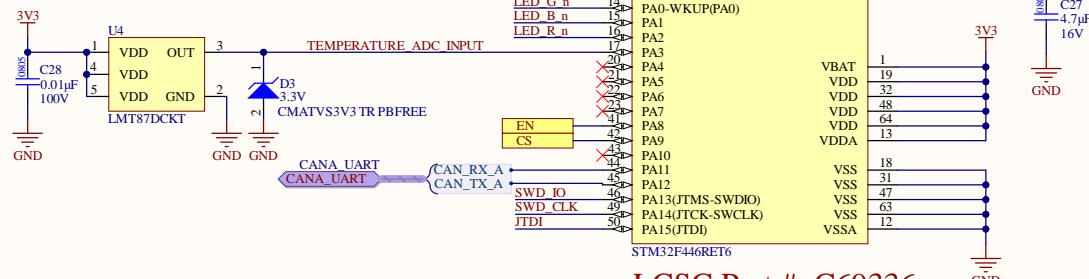


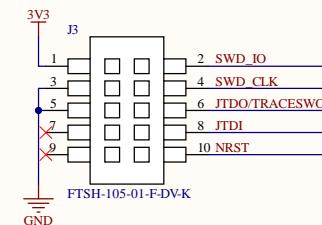
**Status LED****Current Calculations**

RGB LED voltage drops:

- Red: 2.1V:  $I = (3.3-2.1V)/120 = 10\text{mA}$
- Blue: 3.1V:  $I = (3.3-3.1V)/20 = 10\text{mA}$
- Green: 3.1V:  $I = (3.3-3.1V)/20 = 10\text{mA}$

**Decoupling Caps****STM32F446RET6****Temperature Sensor****Mounting Holes**

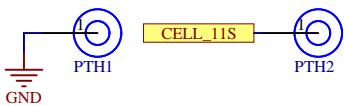
MH1 MOUNTING_HOLE_5/32	MH2 MOUNTING_HOLE_5/32
MH3 MOUNTING_HOLE_5/32	MH4 MOUNTING_HOLE_5/32

**LCSC Part #: C69336****Debug/Programming**

Title: Microcontroller	
Project: Battery Management System Rev3.PrbPcb	
Rev: 3	Reviewer: Cindy Li
Engineer: Farris Matar	
Date: 2022-09-12	Sheet: 1 of 6

# BMS

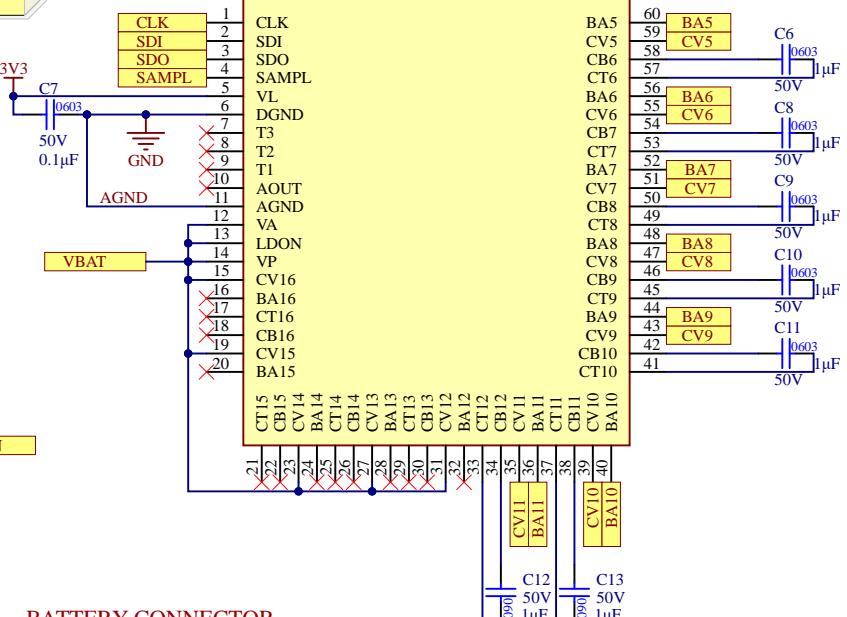
## CUSTOM BATTERY CONNECTION



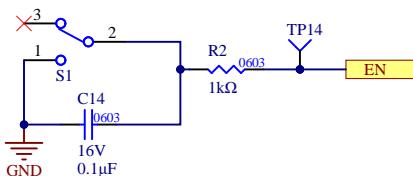
BMS IC

Set EN to low to put device into shutdown and reset SPI registers

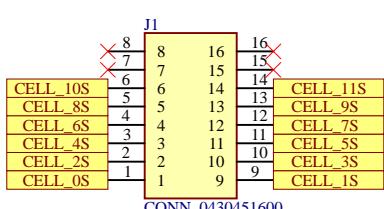
CV<sub>-</sub> voltages are tracked when SAMPL is high



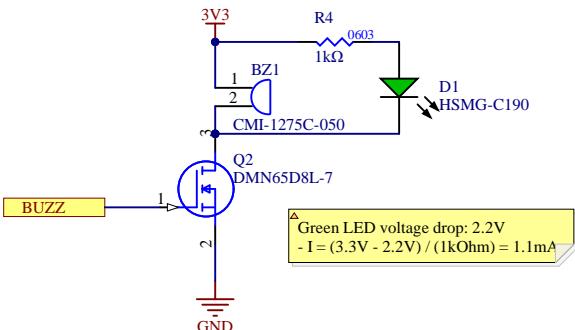
## RESET SWITCH



## BATTERY CONNECTOR



## BUZZER



Green LED voltage drop: 2.2V  
- I = (3.3V - 2.2V) / (1kOhm) = 1.1mA



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200 University Ave W  
Waterloo, Ontario, Canada  
N2L 3G1

REV  
2

PROJECT  
Battery Management System Rev3.PjrPcb, [No Variations]

DOCUMENT  
BMSRev3.SchDoc

MODIFIED  
2022-09-09

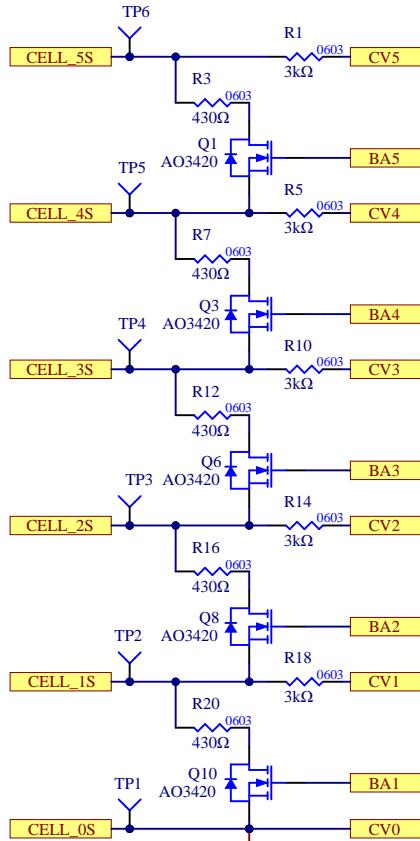
ENGINEER  
Ari Wasch

REVIEWER  
\*

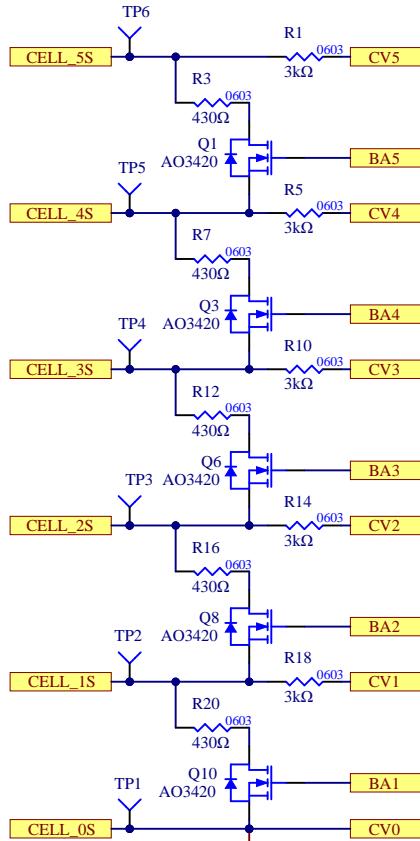
SHEET 2 OF 6

# Passive Cell Balancing Circuit

A

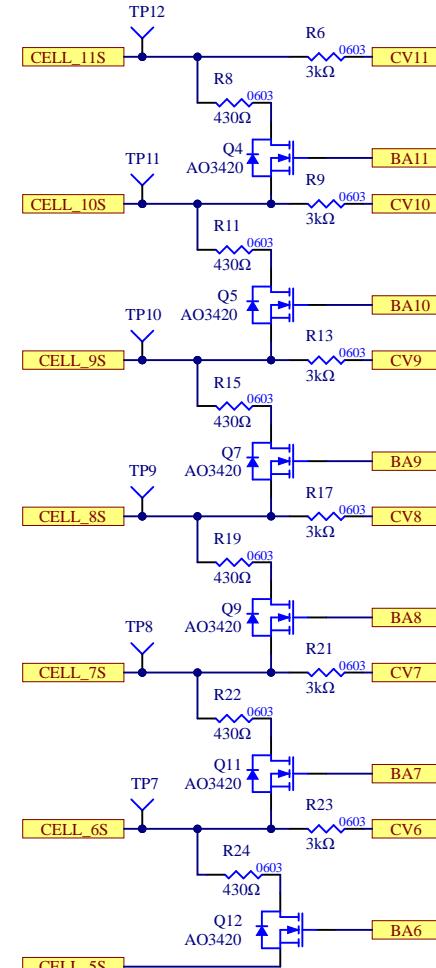


B



$$\Delta V_{cell} = \frac{V_{cell}}{I} \quad RBAL = \frac{V_{cell}}{I} / 10mA \text{ (Max)} \approx 430\Omega$$

C



A

B

C



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Waterloo, Ontario, Canada  
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REV  
2

PROJECT  
**Battery Management System Rev3.PjrPcb, [No Variations]**

DOCUMENT  
**BatteryBalancingRev3.SchDoc**

MODIFIED  
2022-07-28

ENGINEER  
**Ari Wasch**

REVIEWER  
**\***

SHEET **3 OF 6**

A

A

B

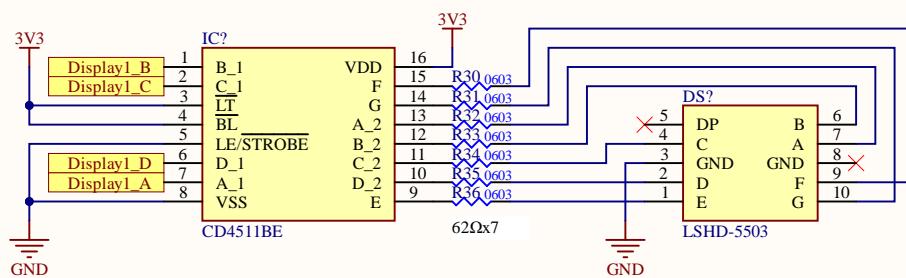
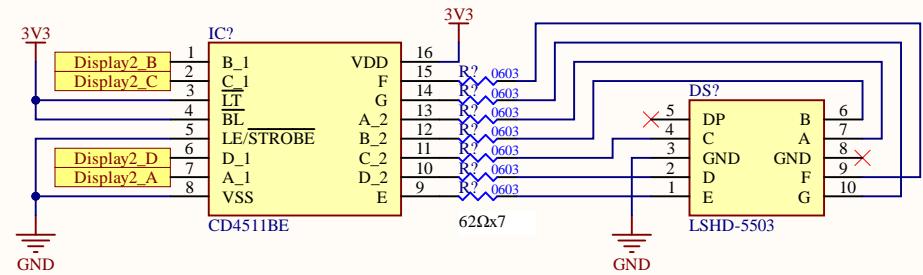
B

C

C

D

D

**DISPLAY 1****DISPLAY 2**

Title

Size  
A4

Number

Revision

Date: 9-12-2022  
File: C:\Users.\Display.SchDocSheet of  
Drawn By:

A

A

B

B

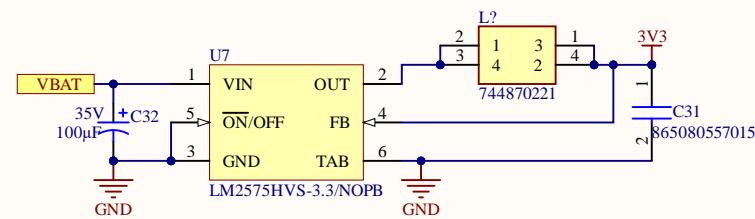
C

C

D

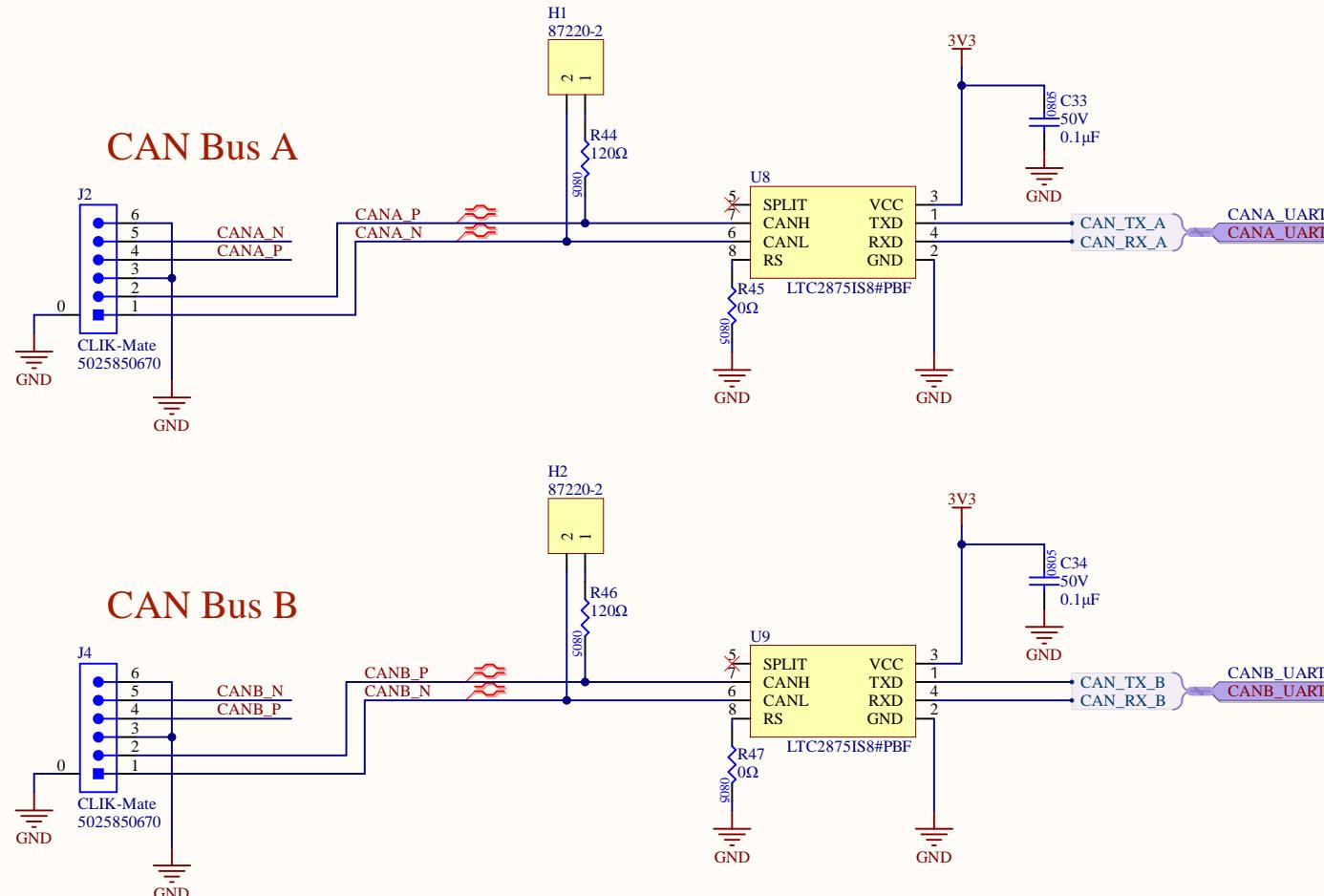
D

### 3.3V BUCK CONVERTER



Title		
Size A4	Number	Revision
Date: 9-12-2022		Sheet of
File: C:\Users\.\Power.SchDoc		Drawn By:

# CAN Transceivers



Title		
Size	Number	Revision
A4		
Date: 9-12-2022	Sheet of	
File: C:\Users\.\CAN.SchDoc		Drawn By:

R11 R5 R9

