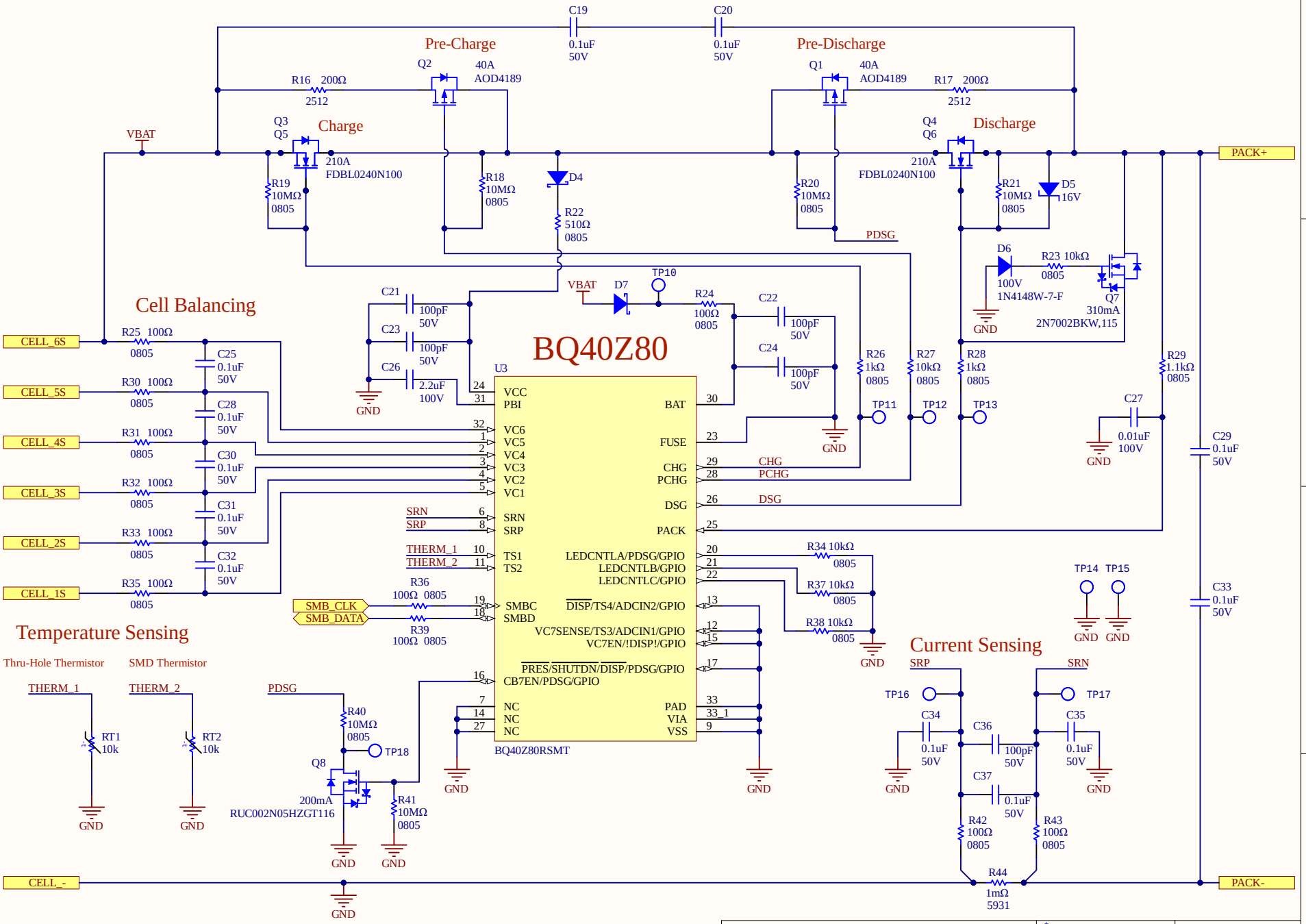
Pre-Charge
Pre-Discharge
Charge
Discharge
Cell Balancing
Temperature Sensing
Current Sensing
BQ40Z80
BQ40Z80RSMT
U3
VBAT
PACK+
PACK-
CELL_6S
CELL_5S
CELL_4S
CELL_3S
CELL_2S
CELL_1S
CELL_-
SRN
SRP
THERM_1
THERM_2
SMB_CLK
SMB_DATA
PDSG
CHG
PCHG
DSG
Thru-Hole Thermistor
SMD Thermistor
C19
C20
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
D4
D5
D6
D7
R16 200Ω
R17 200Ω
R18 10MΩ
R19 10MΩ
R20 10MΩ
R21 10MΩ
R22 510Ω
R23 10kΩ
R24 100Ω
R25 100Ω
R26 1kΩ
R27 10kΩ
R28 1kΩ
R29 1.1kΩ
R30 100Ω
R31 100Ω
R32 100Ω
R33 100Ω
R34 10kΩ
R35 100Ω
R36 100Ω
R37 10kΩ
R38 10kΩ
R39 100Ω
R40 10MΩ
R41 10MΩ
R42 100Ω
R43 100Ω
R44 1mΩ
C21 100pF
C22 100pF
C23 100pF
C24 100pF
C25 0.1uF
C26 2.2uF
C27 0.01uF
C28 0.1uF
C29 0.1uF
C30 0.1uF
C31 0.1uF
C32 0.1uF
C33 0.1uF
C34 0.1uF
C35 0.1uF
C36 100pF
C37 0.1uF
RT1 10k
RT2 10k
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
GND
Title Battery Manager
Size: Letter
Drawn By: Ayesha Ebrahim
Date: 2020-05-23
Sheet * of *
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Battery Manager.SchDoc
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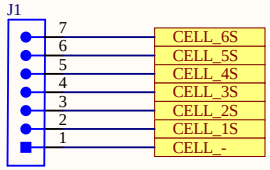
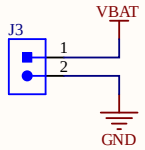
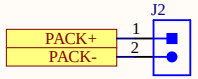
Battery Balancing



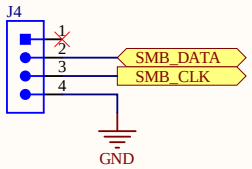
Battery In



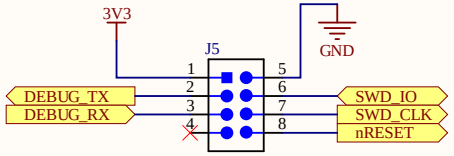
Pack Out



EV2400

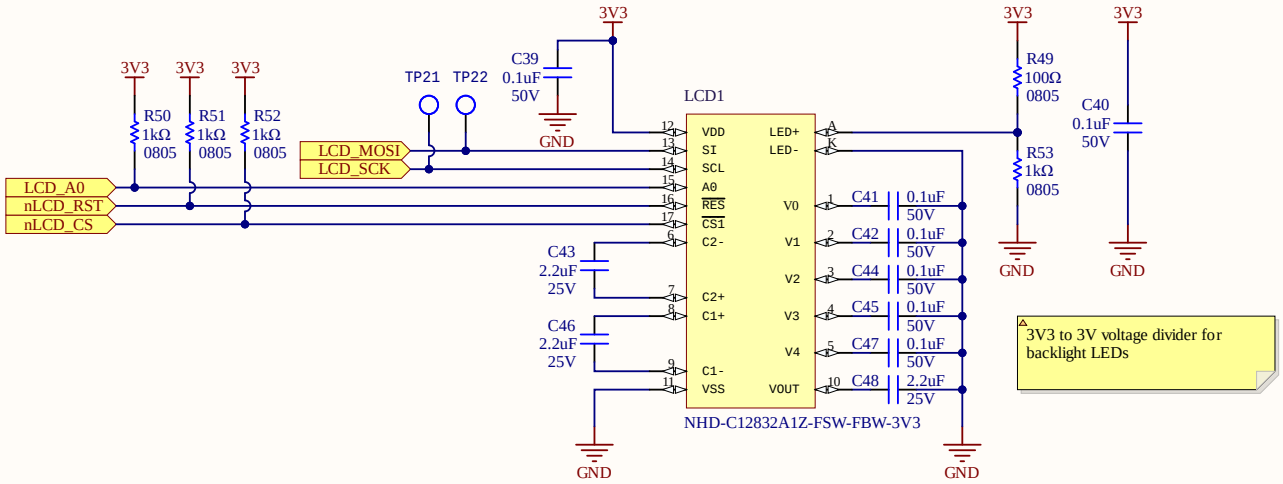


Debug/Programing



Title Connectors		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6
Size: Letter	Drawn By: Ayesha Ebrahim	
Date: 2020-05-23	Sheet of	
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Connectors.SchDoc		

LCD



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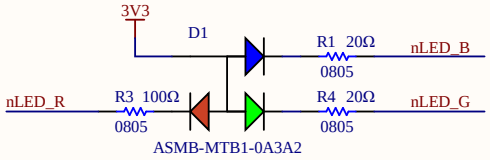
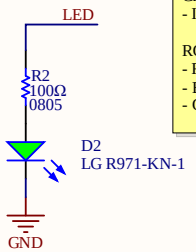
Size: Letter	Drawn By: Ayesha Ebrahim		
Date: 2020-05-23	Sheet * of *		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\LCD.SchDoc			

Test LEDs



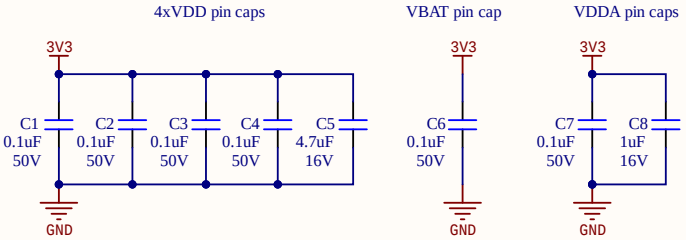


Current Calculations

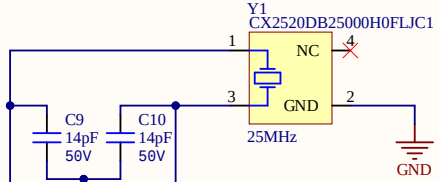
Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/100 = 11mA

RGB LED voltage drops:
- Red: 2.1V: I = (3.3-2.1V)/100 = 12mA
- Blue: 3.1V: I = (3.3-3.1V)/20 = 10mA
- Green: 3.1V: I = (3.3-3.1V)/20 = 10mA

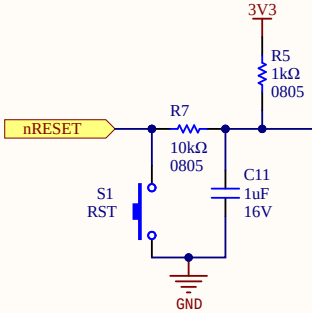
Decoupling Caps



STM32F446RET6



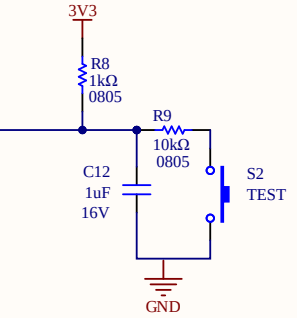
Reset Button



For Debounce Circuit:

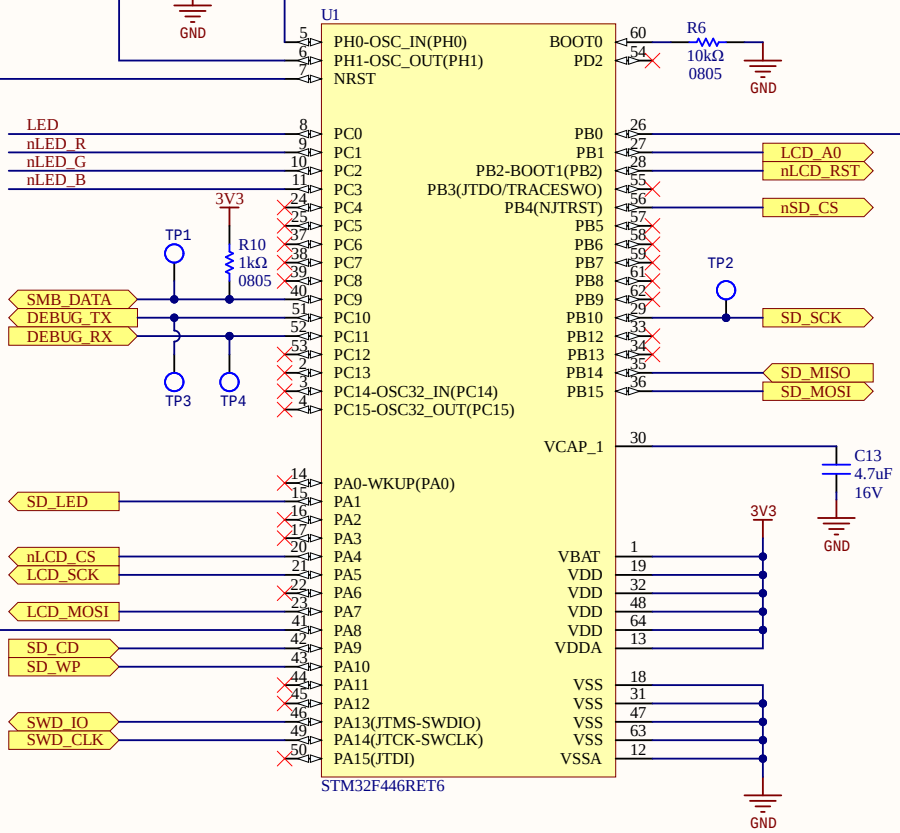
T=RC -> C= T/R
C= 10ms/10kOhms= 1uF

Test Button

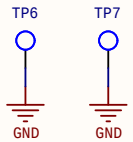


For Debounce Circuit:

T=RC -> C= T/R
C= 10ms/10kOhms= 1uF



GND Test Points



MOUNTING_HOLES

Title MCU		
Size: Letter	Drawn By: Ayesha Ebrahim	
Date: 2020-05-23	Sheet * of *	
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\MCU.SchDoc		

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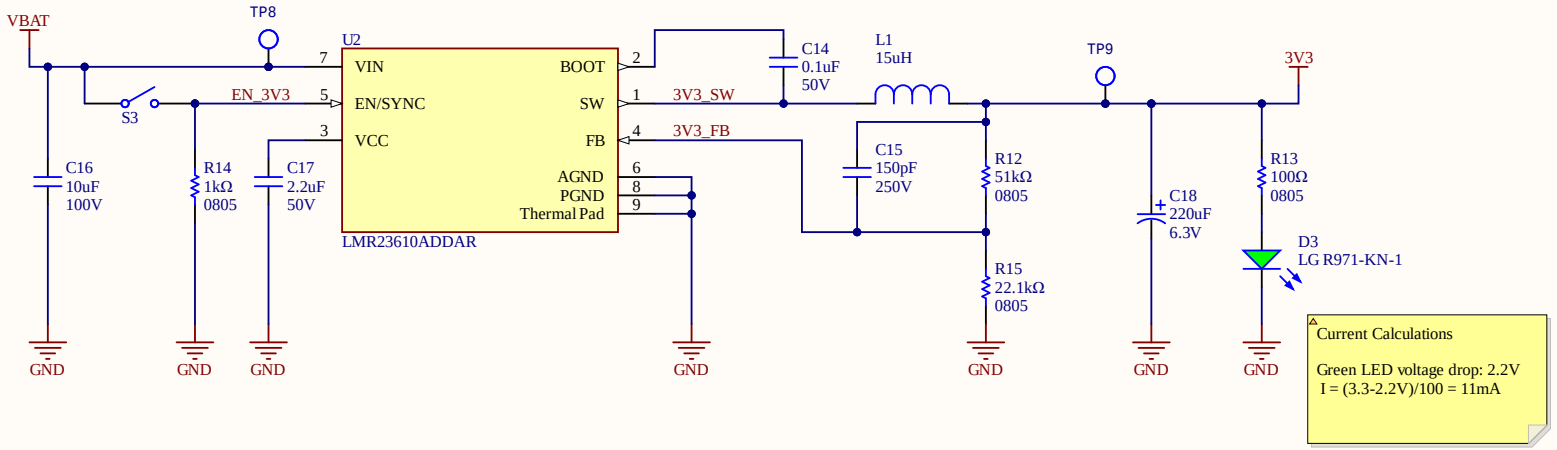
Battery Voltage to 3V3 Buck @ 1A Max

Designed for 15V-25.2V input

Route for 0.5A in

Inductor: SRN6045-150M
15uH, 20%, 95.8mOhm DCR (max)
1.9A (rms), 2.3A (sat), 4.5mm tall

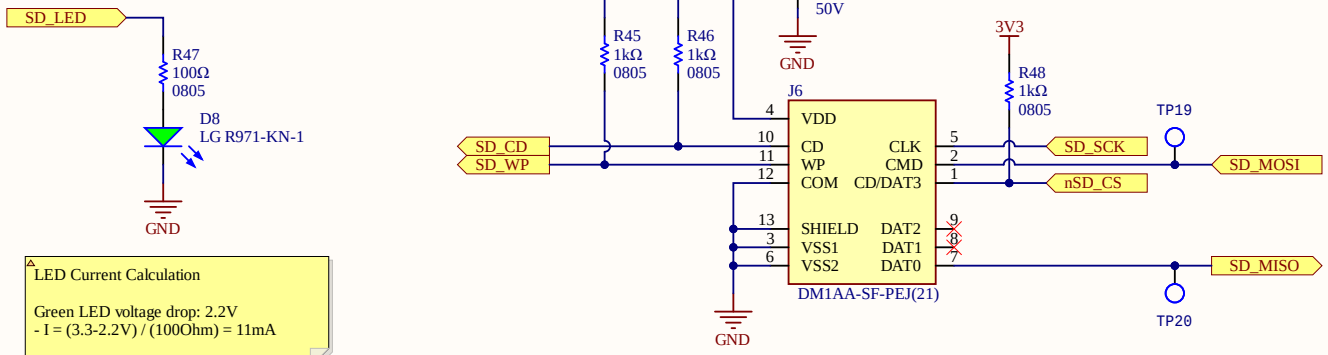
Route for 1A out



Max expected power on output = 1.65W
Max current = 0.5A
Expected Efficiency at 1A > 87.7%

Title Power		
Size: Letter	Drawn By: Ayesha Ebrahim	
Date: 2020-05-23	Sheet * of *	
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Power.SchDoc		

SD Card Connector



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Date: 2020-05-23	Sheet * of *		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\SD Card.SchDoc			