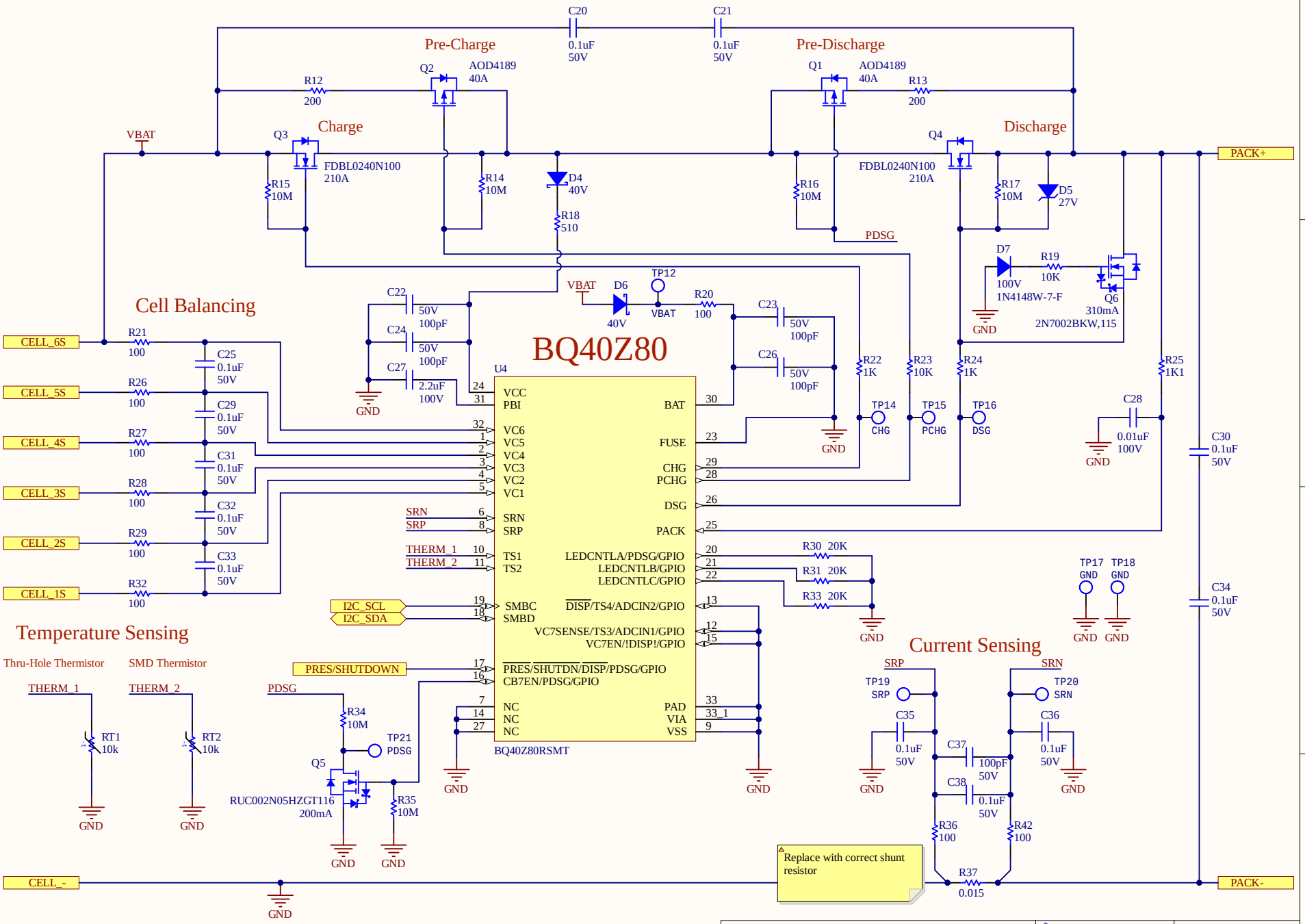
Pre-Charge
Pre-Discharge
Charge
Discharge
Cell Balancing
Temperature Sensing
Current Sensing
BQ40Z80
BQ40Z80RSMT
U4
VBAT
PACK+
PACK-
CELL_6S
CELL_5S
CELL_4S
CELL_3S
CELL_2S
CELL_1S
CELL_-
PDSG
SRN
SRP
THERM_1
THERM_2
I2C_SCL
I2C_SDA
PRES/SHUTDOWN
Thru-Hole Thermistor
SMD Thermistor
FDBL0240N100
210A
AOD4189
40A
RUC002N05HZGT116
200mA
2N7002BKW,115
1N4148W-7-F
VCC
PBI
VC6
VC5
VC4
VC3
VC2
VC1
SRN
SRP
TS1
TS2
SMBC
SMBD
PRES/SHUTDN/DISP/PDSG/GPIO
CB7EN/PDSG/GPIO
NC
NC
NC
BAT
FUSE
CHG
PCHG
DSG
PACK
LEDCNTLA/PDSG/GPIO
LEDCNTLB/GPIO
LEDCNTLC/GPIO
DISP/TS4/ADCIN2/GPIO
VC7SENSE/TS3/ADCIN1/GPIO
VC7EN/!DISP!/GPIO
PAD
VIA
VSS
Replace with correct shunt resistor
GND
Title Battery Manager
Size: Letter
Drawn By: Ayesha Ebrahim
Date: 2020-05-04
Sheet * of *
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Battery Manager.SchDoc
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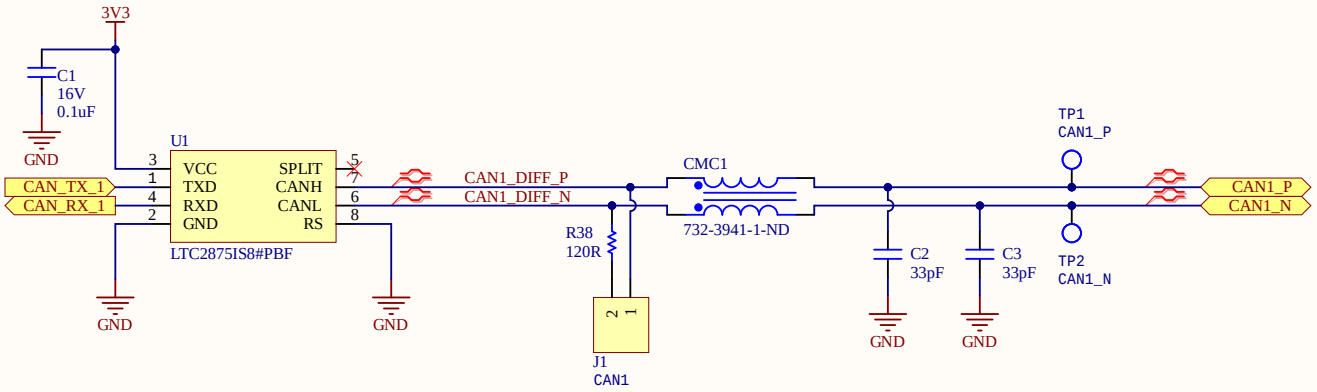
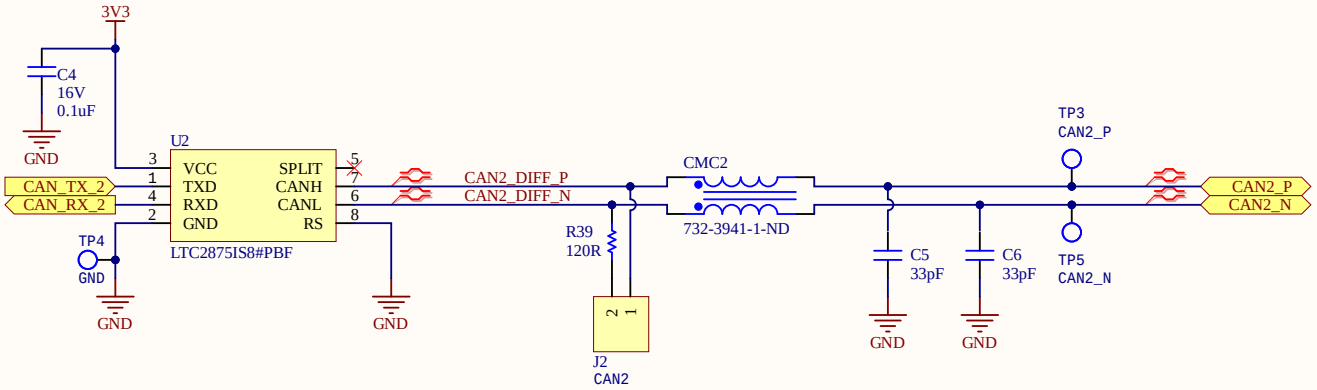
CAN 1



CAN 2

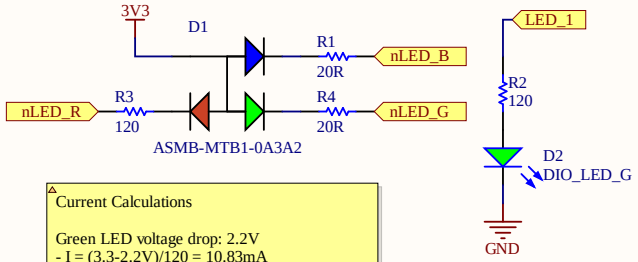


Title CAN			
Size: Letter	Drawn By: Ayesha Ebrahim		
Date: 2020-05-04	Sheet * of *		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\CAN.SchDoc			

Add XTAL Connector and Battery Balancing Connector, CAN Connections, Chip Programmer connector, DEBUG connector

Title Connectors		UW Robotics 200 University Avenue Waterloo Ontario Canada N2L 3G6	UW ROBOTICS TEAM
Size: Letter	Drawn By: Ayesha Ebrahim		
Date: 2020-05-04	Sheet of		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Connectors.SchDoc			

Test LEDs

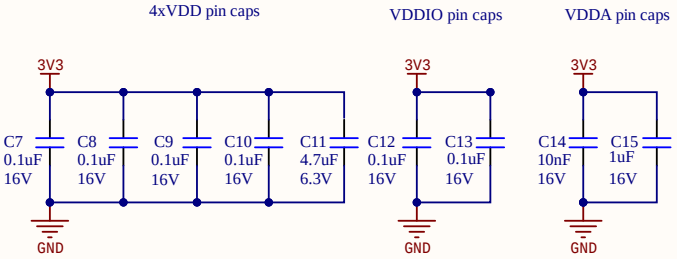


Current Calculations

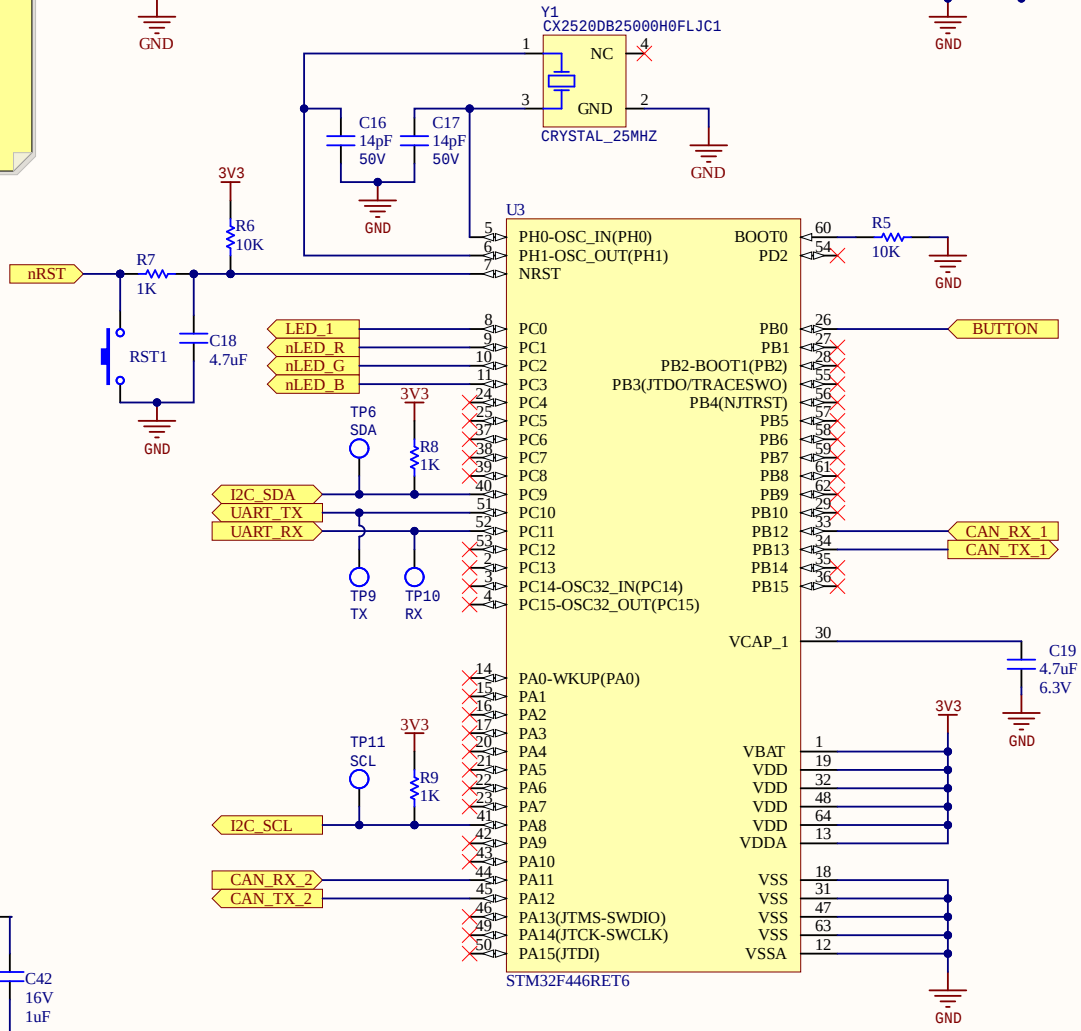
Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/120 = 10.83mA

RGB LED voltage drops:
- Red: 2.1V: I = (3.3-2.1V)/120 = 10mA
- Blue: 3.1V: I = (3.3-3.1V)/20 = 10mA
- Green: 3.1V: I = (3.3-3.1V)/20 = 10mA

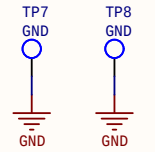
Decoupling Caps



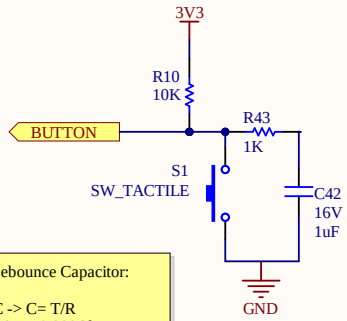
STM32F446RET6



GND Test Points



Test Button



For Debounce Capacitor:

T=RC -> C= T/R
C=0.001ms/1000Ohms= 1uF

MOUNTING_HOLES

Title MCU		
Size: Letter	Drawn By: Ayesha Ebrahim	
Date: 2020-05-04	Sheet * of *	
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\MCU.SchDoc		

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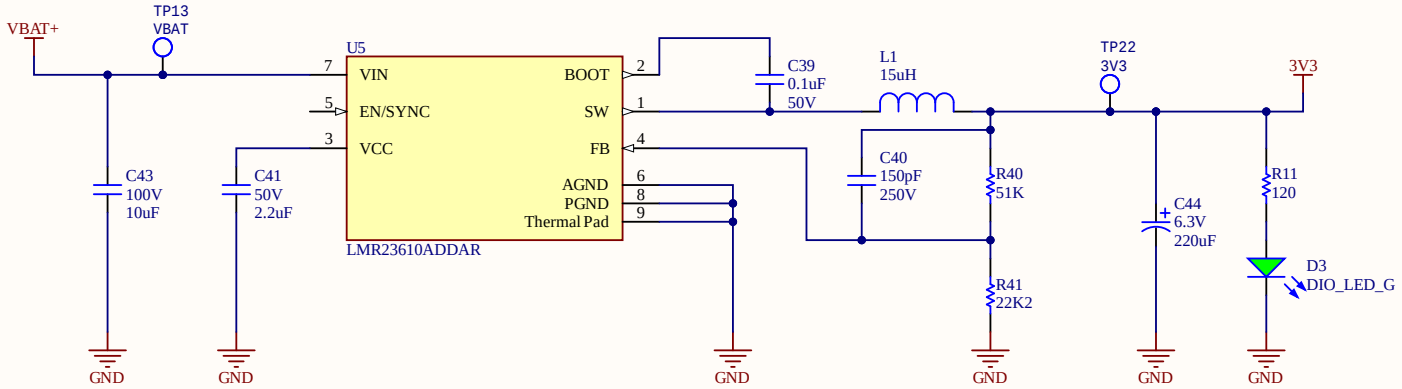
Regulator Characteristics:
Efficiency...

Battery Voltage to 3V3 Buck @ 1A Max

VBAT is the battery voltage not controlled by the battery manager
VBAT max = 25.2V
VBAT min = 18V (assuming no cells fall below 3V)



Current Calculations

Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/120 = 10.83mA

Title Power			
Size: Letter	Drawn By: Ayesha Ebrahim		
Date: 2020-05-04	Sheet * of *		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\Power.SchDoc			