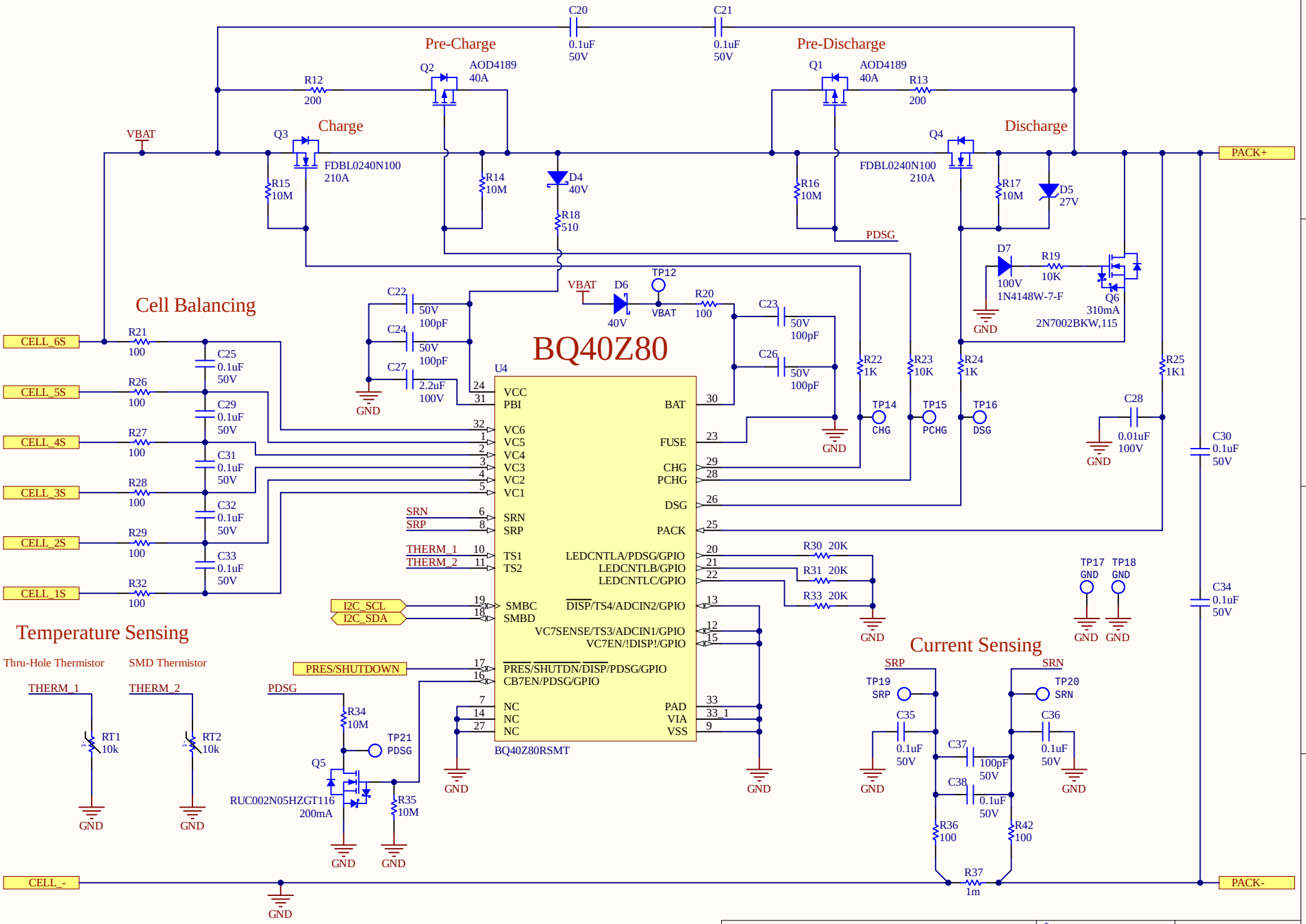
Pre-Charge
Pre-Discharge
Charge
Discharge
Cell Balancing
Temperature Sensing
Current Sensing
BQ40Z80
BQ40Z80RSMT
U4
VBAT
PACK+
PACK-
CELL_6S
CELL_5S
CELL_4S
CELL_3S
CELL_2S
CELL_1S
CELL_-
SRN
SRP
THERM_1
THERM_2
I2C_SCL
I2C_SDA
PRES/SHUTDOWN
PDSG
CHG
PCHG
DSG
PACK
BAT
FUSE
VCC
PBI
VC6
VC5
VC4
VC3
VC2
VC1
TS1
TS2
SMBC
SMBD
NC
NC
NC
LEDCNTLA/PDSG/GPIO
LEDCNTLB/GPIO
LEDCNTLC/GPIO
DISP/TS4/ADCIN2/GPIO
VC7SENSE/TS3/ADCIN1/GPIO
VC7EN/!DISP!/GPIO
PRES/SHUTDN/DISP/PDSG/GPIO
CB7EN/PDSG/GPIO
PAD
VIA
VSS
Q1 AOD4189 40A
Q2 AOD4189 40A
Q3 FDBL0240N100 210A
Q4 FDBL0240N100 210A
Q5 RUC002N05HZGT116 200mA
Q6 310mA 2N7002BKW,115
D4 40V
D5 27V
D6 40V
D7 100V 1N4148W-7-F
R12 200
R13 200
R14 10M
R15 10M
R16 10M
R17 10M
R18 510
R19 10K
R20 100
R21 100
R22 1K
R23 10K
R24 1K
R25 1K1
R26 100
R27 100
R28 100
R29 100
R30 20K
R31 20K
R32 100
R33 20K
R34 10M
R35 10M
R36 100
R37 1m
R42 100
RT1 10k
RT2 10k
C20 0.1uF 50V
C21 0.1uF 50V
C22 50V 100pF
C23 50V 100pF
C24 50V 100pF
C25 0.1uF 50V
C26 50V 100pF
C27 2.2uF 100V
C28 0.01uF 100V
C29 0.1uF 50V
C30 0.1uF 50V
C31 0.1uF 50V
C32 0.1uF 50V
C33 0.1uF 50V
C34 0.1uF 50V
C35 0.1uF 50V
C36 0.1uF 50V
C37 100pF 50V
C38 0.1uF 50V
TP12
TP14 CHG
TP15 PCHG
TP16 DSG
TP17 GND
TP18 GND
TP19 SRP
TP20 SRN
TP21 PDSG
GND
Thru-Hole Thermistor
SMD Thermistor
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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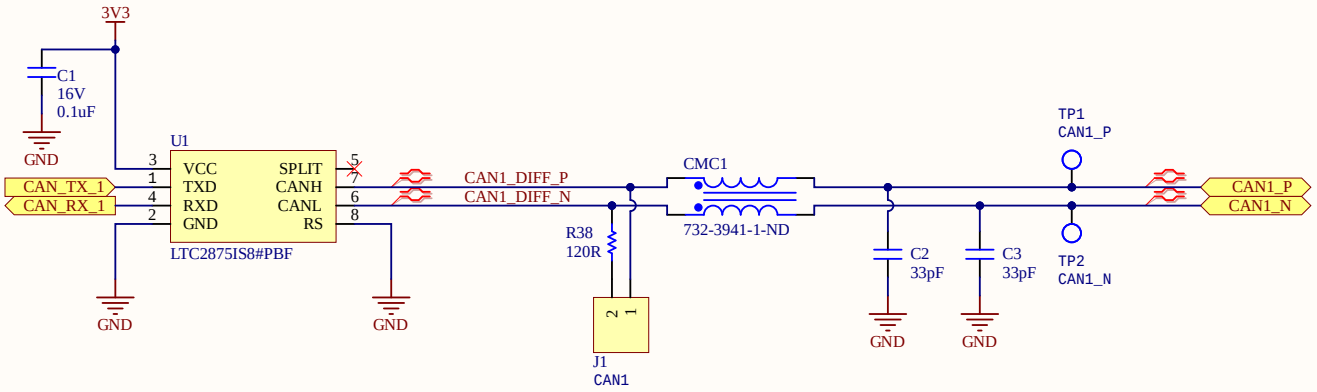
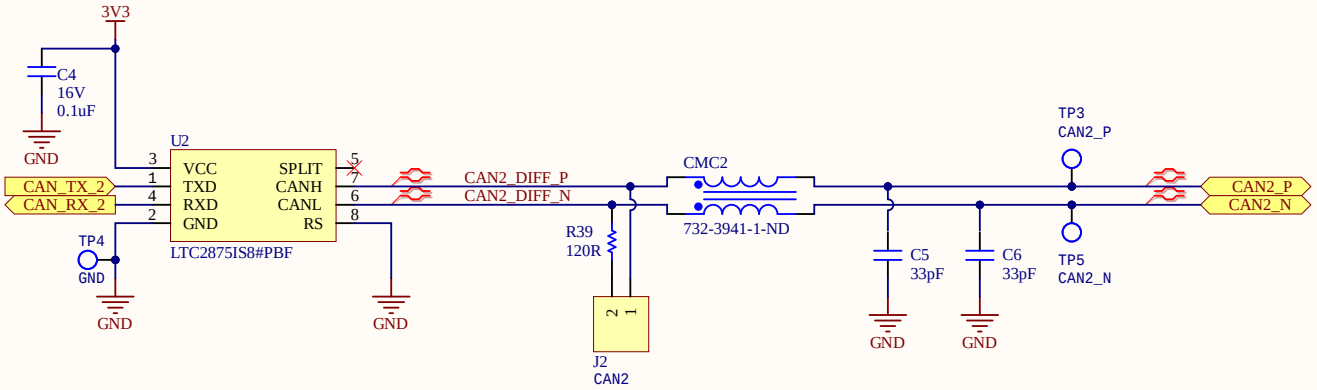
CAN 1



CAN 2

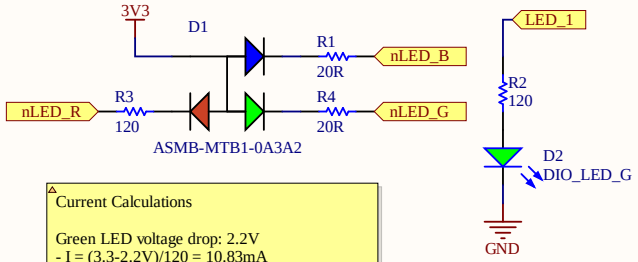


Title CAN			
Size: Letter	Drawn By: Ayesha Ebrahim		
Date: 2020-05-04	Sheet * of *		
File: C:\Users\ayesh\Documents\GitHub\MarsRover2020-PCB\Projects\BMS\Rev1\CAN.SchDoc			

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

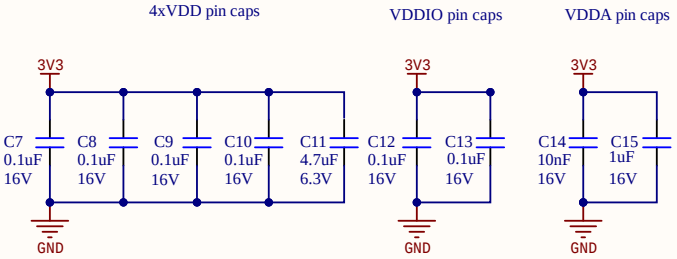


Current Calculations

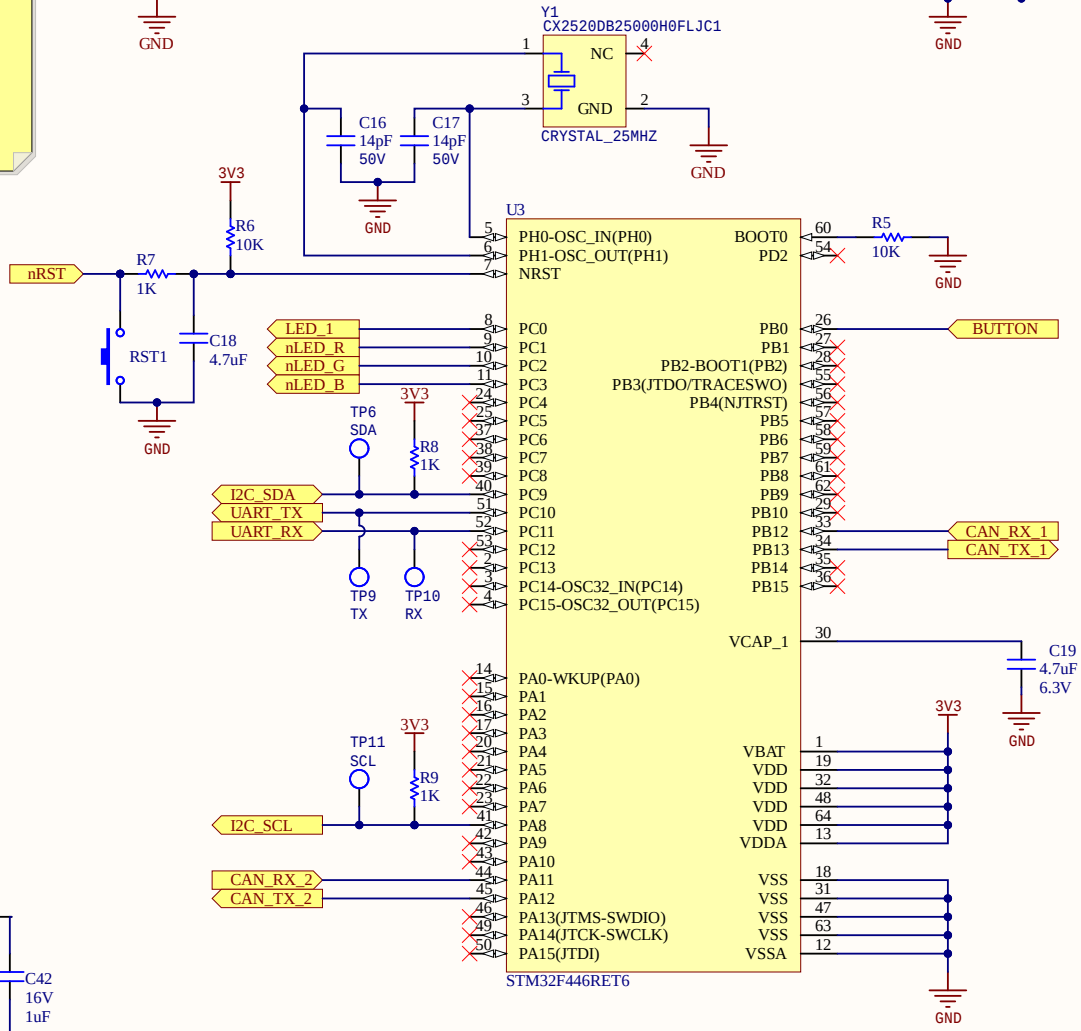
Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/120 = 10.83mA

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

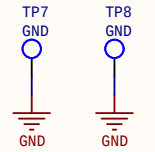
Decoupling Caps



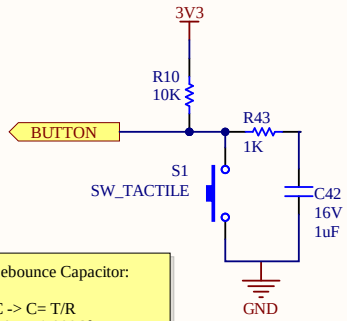
STM32F446RET6



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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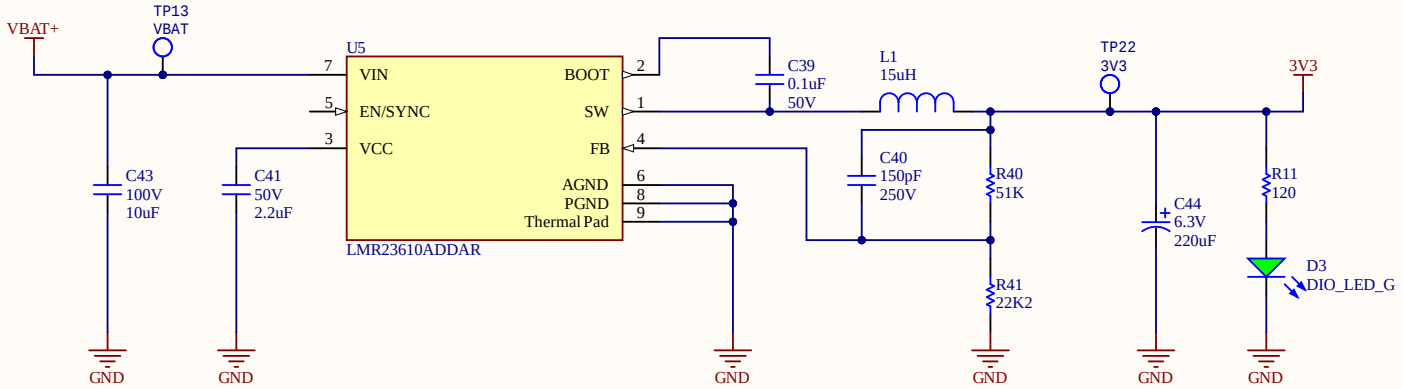
Regulator Characteristics:
Efficiency...

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			