

A

B

C

D

A

B

C

D

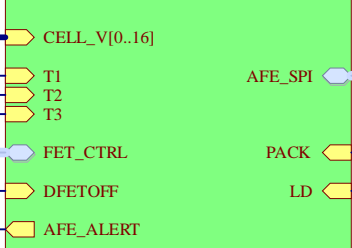
Battery Interface  
Battery\_Interface.SchDoc



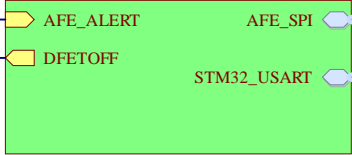
Temperature Sense  
Temperature\_Sense.SchDoc



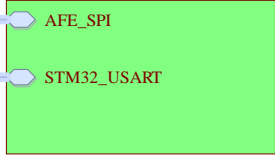
AFE  
BQ76952\_AFE.SchDoc



STM32 MCU  
STM32\_MCU.SchDoc



Pack Interface  
Pack\_Interface.SchDoc



VBAT+

High Side FETs  
High\_Side\_FETs.SchDoc



VPACK+

Mounting Holes

MH1      MH2

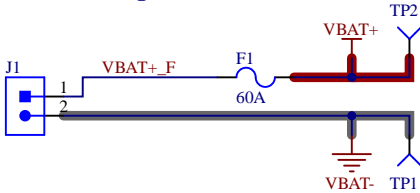
MH3      MH4

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PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT Top.SchDoc		MODIFIED 2023-08-03
ENGINEER Farris Matar	REVIEWER *	SHEET 1 OF 8

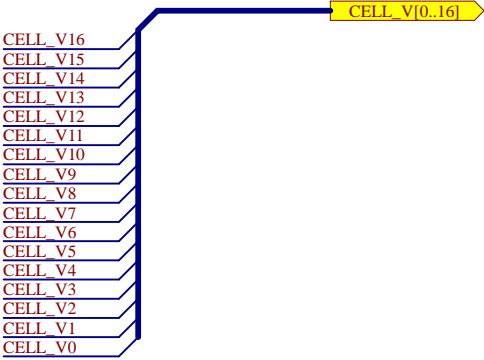
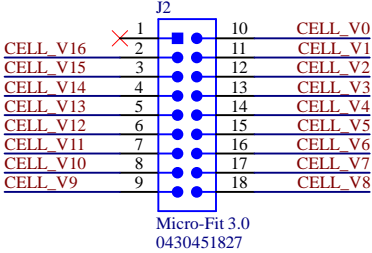
# BATTERY INTERFACE

**Battery specs:**  
- 16s1p 20Ah LTO battery  
- 1.5V - 2.7V cell voltage range, 2.3V nominal

## Power Input



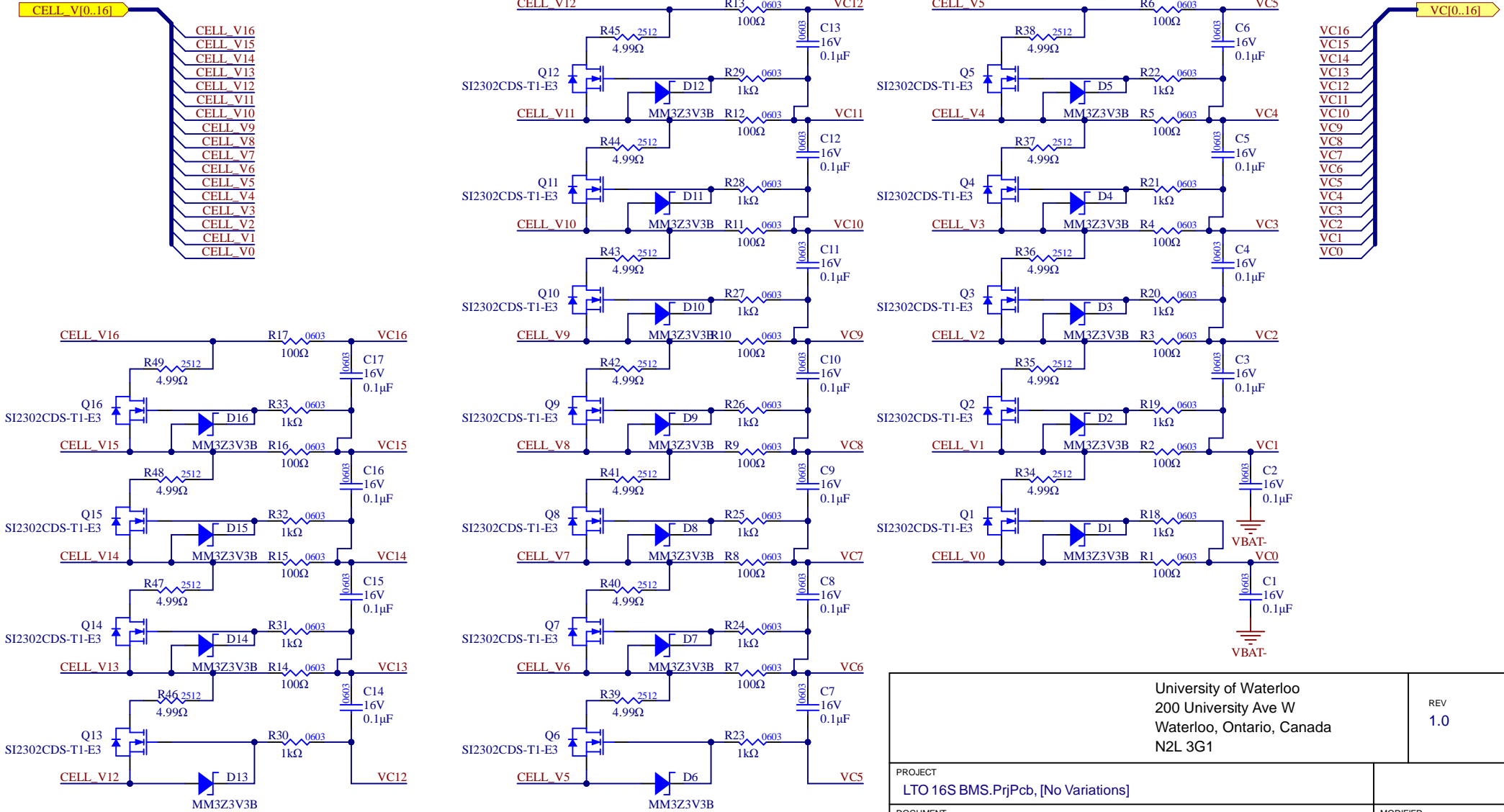
## Cell Sensing Inputs



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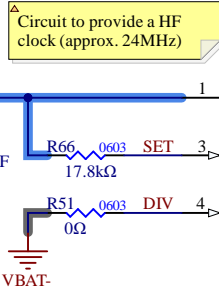
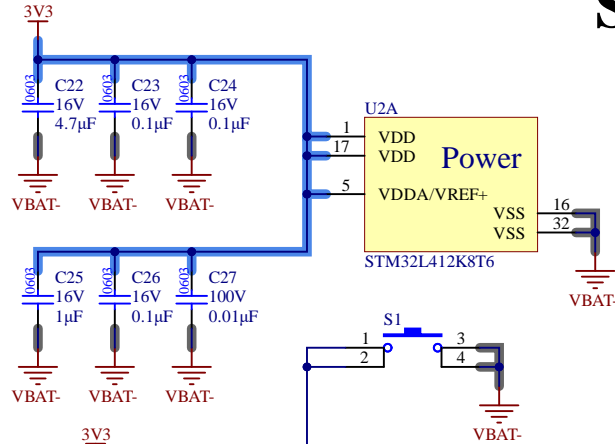
# BALANCING FETS



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DOCUMENT Balancing_FETs.SchDoc		MODIFIED 2023-08-03
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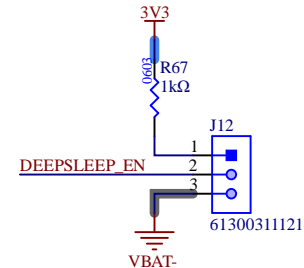
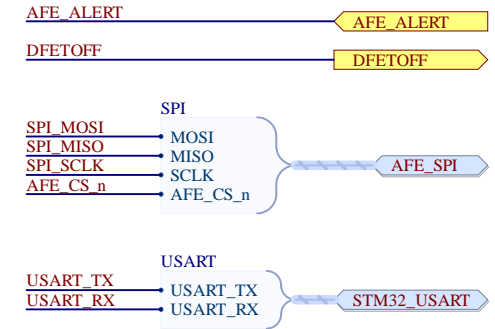
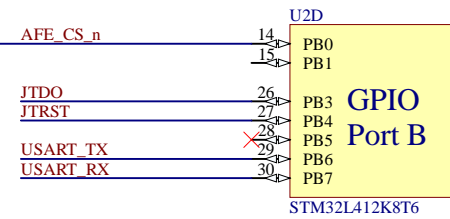
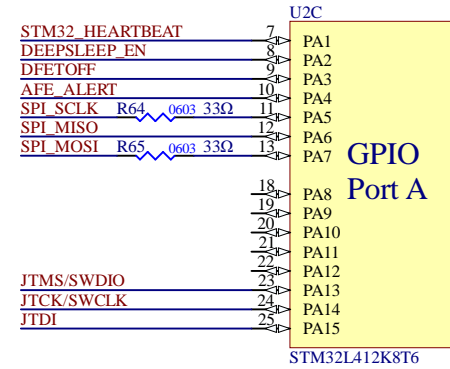
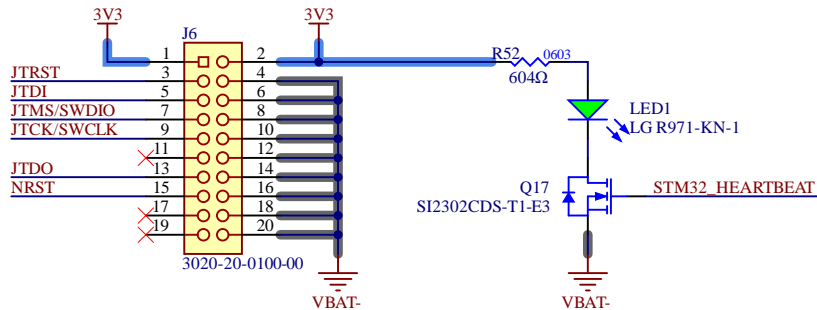
# STM32 MCU

Follows reference design provided in [https://www.st.com/resource/en/application\\_note/an4555-getting-started-with-stm32l4-series-and-stm32l4-series-hardware-development-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4555-getting-started-with-stm32l4-series-and-stm32l4-series-hardware-development-stmicroelectronics.pdf) (Figure 14), minor modifications made to fit selected package



Is this external oscillator needed? It consumes 4mA, which is quite a bit of power for the BMS that could be saved if the internal 16MHz or 48MHz oscillators will work, though I'm worried the lower stability of the internal oscillator will affect UART communication, would appreciate your input

## Debug / Programming Connector



Header pins to connect to a toggle switch that will trigger STM32 to put AFE in DEEPSLEEP (very low current consumption) and also put STM32 in SHUTDOWN mode until switch is flipped to wake it back up

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DOCUMENT  
STM32\_MCU.SchDoc

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Farris Matar

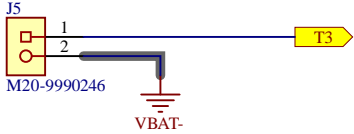
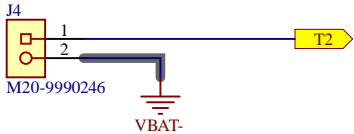
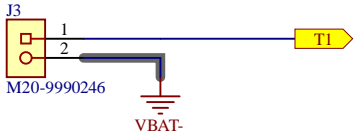
REVIEWER  
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2023-08-03

SHEET 5 OF 8

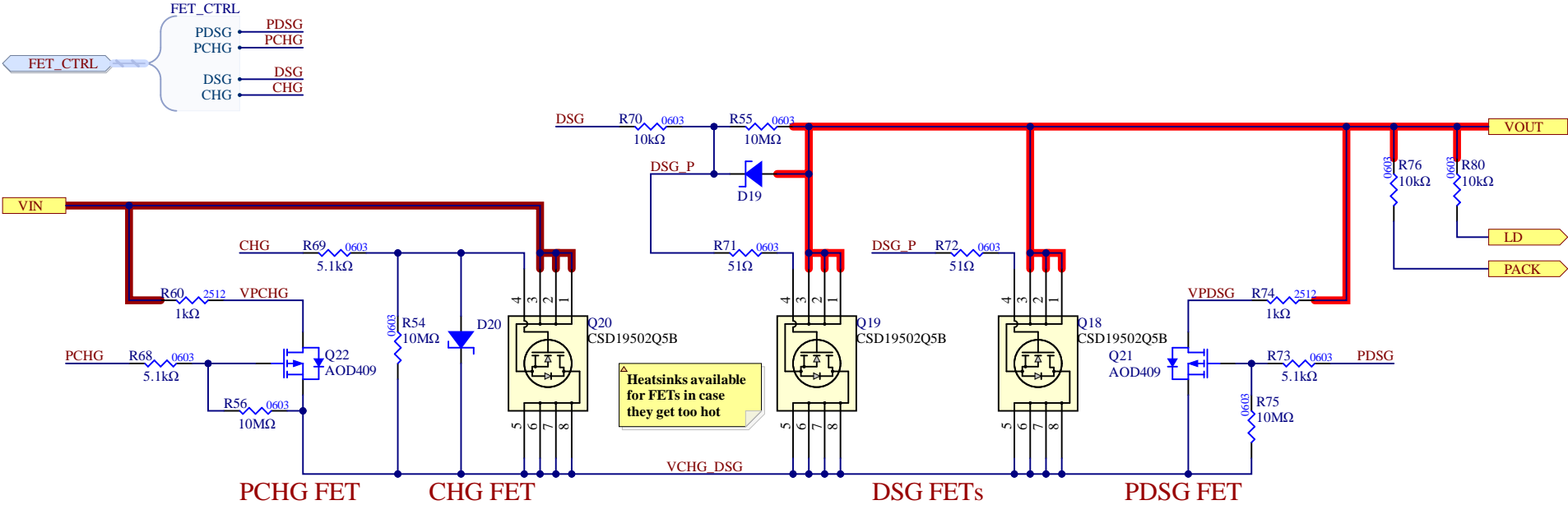
# TEMPERATURE SENSING

103-AT thermistors to be connected here, will use 18k internal pull-up on AFE inputs



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# HIGH SIDE POWER FETS



Parallel DSG FETs configured based on TI app note:  
[https://www.ti.com/lit/an/slua952/slua952.pdf?ts=1690753454146&ref\\_url=https%253A%252F%252Fwww.google.com%252F](https://www.ti.com/lit/an/slua952/slua952.pdf?ts=1690753454146&ref_url=https%253A%252F%252Fwww.google.com%252F)

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DOCUMENT High_Side_FETs.SchDoc		MODIFIED 2023-08-03
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