

1

2

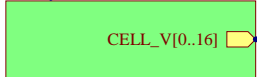
3

4

A

A

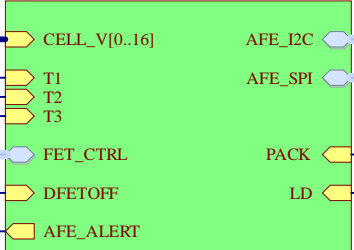
Battery Interface
Battery_Interface.SchDoc



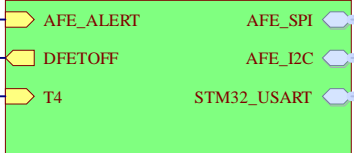
Temperature Sense
Temperature_Sense.SchDoc



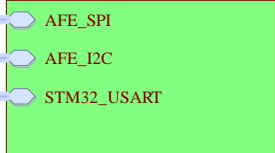
AFE
BQ76952_AFE.SchDoc



STM32 MCU
STM32_MCU.SchDoc

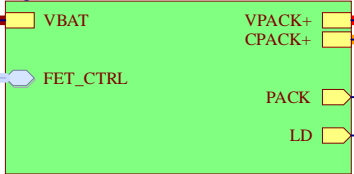


Pack Interface
Pack_Interface.SchDoc



VBAT+

High Side FETs
High_Side_FETs.SchDoc



VPACK+

CPACK+

Mounting Holes



MH1



MH2



MH3



MH4

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

REV
1.0

PROJECT
LTO 16S BMS.PrjPcb, [No Variations]

DOCUMENT
Top.SchDoc

ENGINEER
Farris Matar

REVIEWER
*

MODIFIED
2023-08-13

SHEET 1 OF 8

1

2

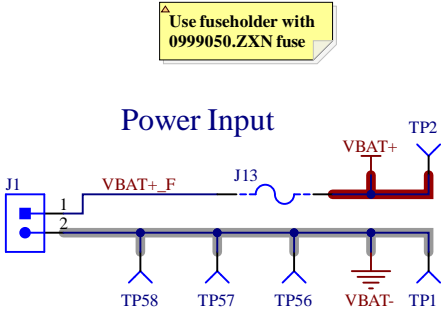
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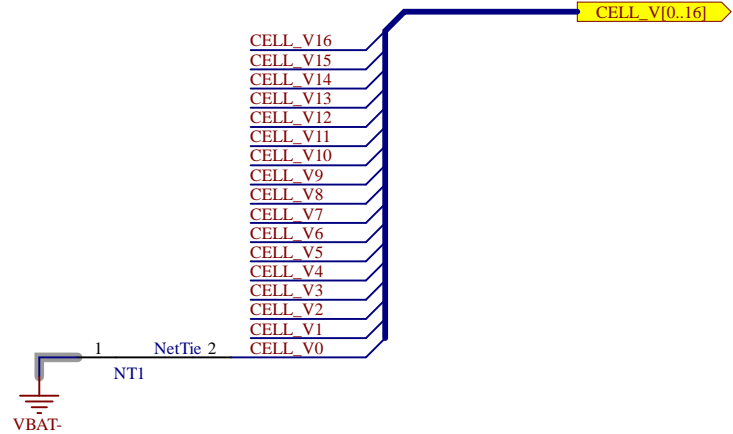
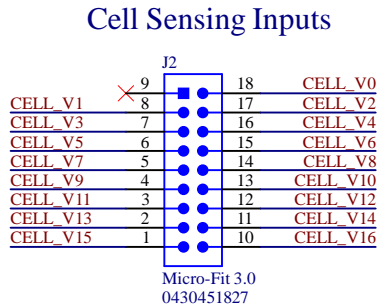
D

D

BATTERY INTERFACE

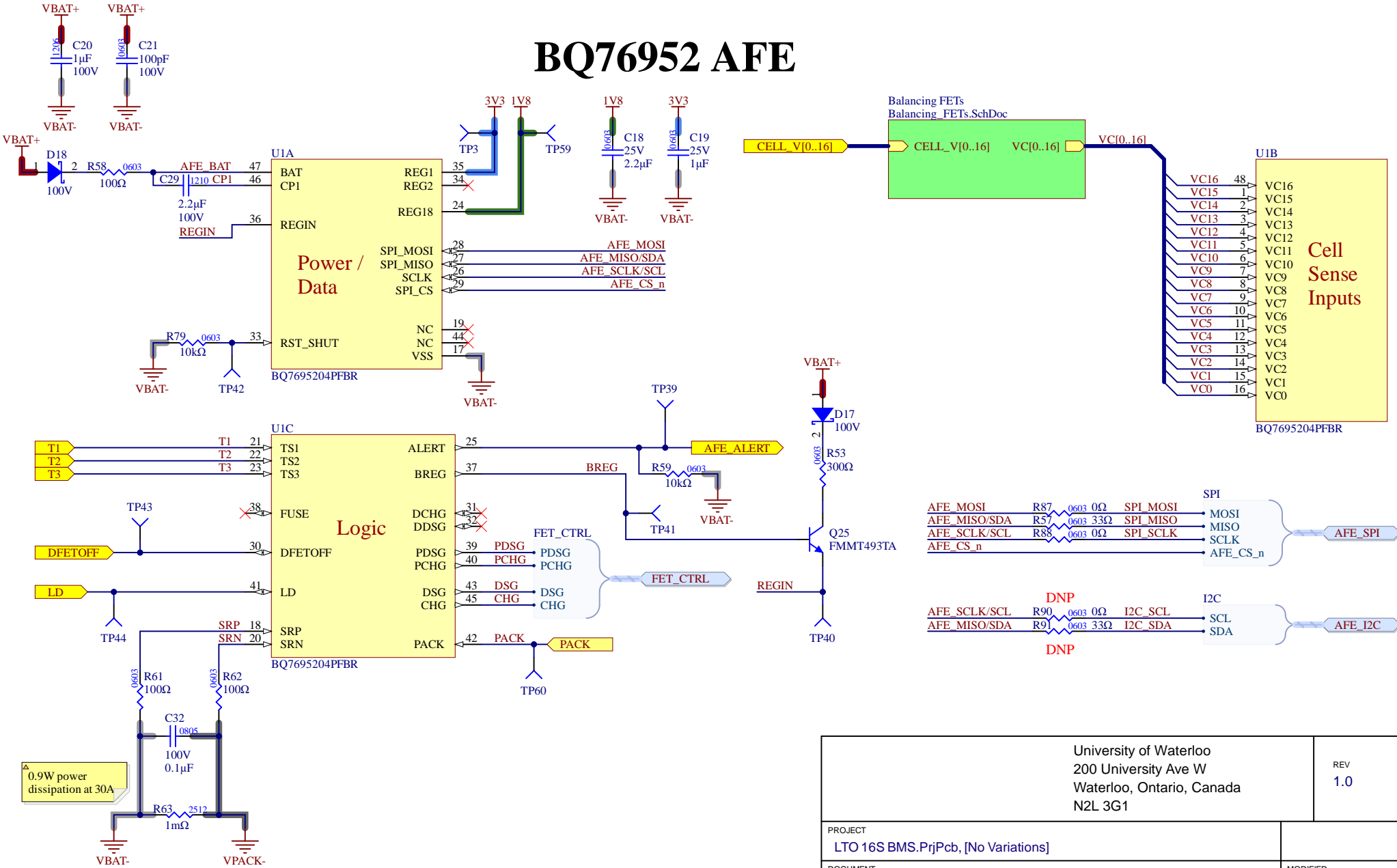


Battery specs:
- 16s1p 20Ah LTO battery
- 1.5V - 2.7V cell voltage range, 2.3V nominal



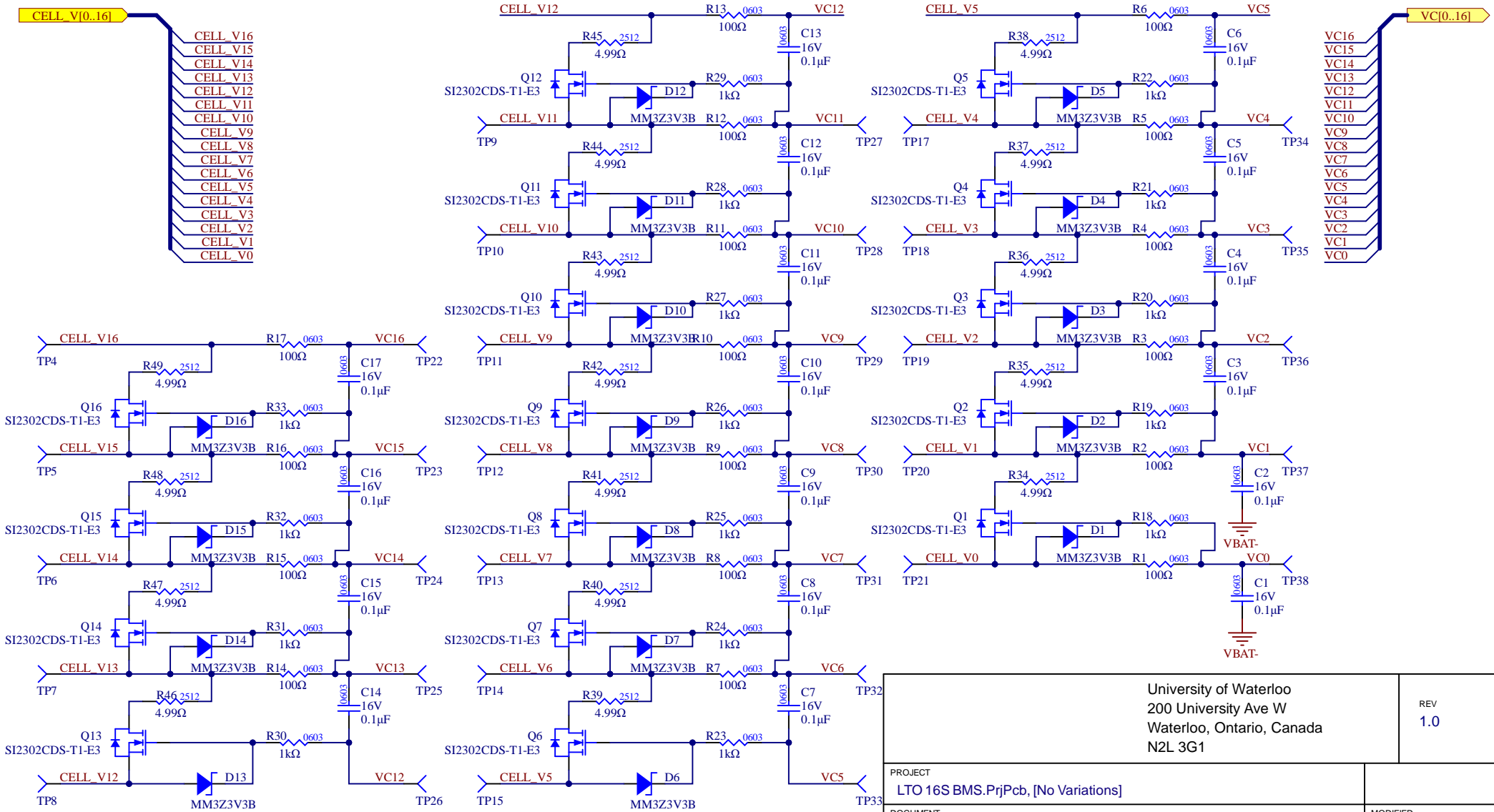
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT Battery_Interface.SchDoc		MODIFIED 2023-09-30
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BQ76952 AFE



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT BQ76952_AFE.SchDoc		MODIFIED 2024-12-17
ENGINEER Farris Matar	REVIEWER *	SHEET 3 OF 8

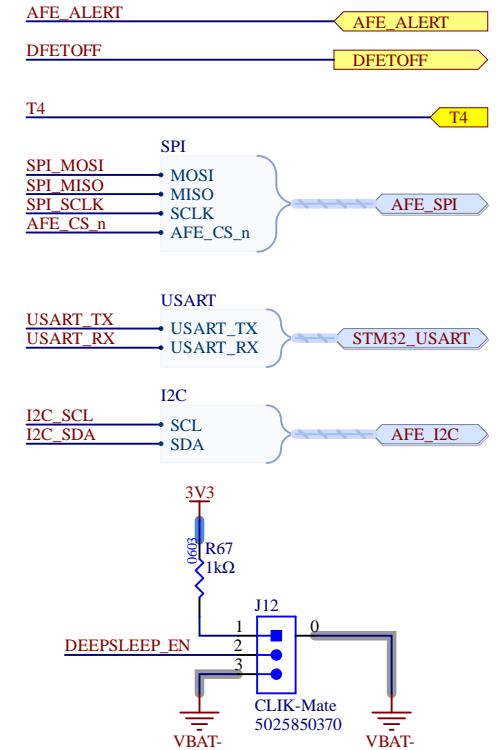
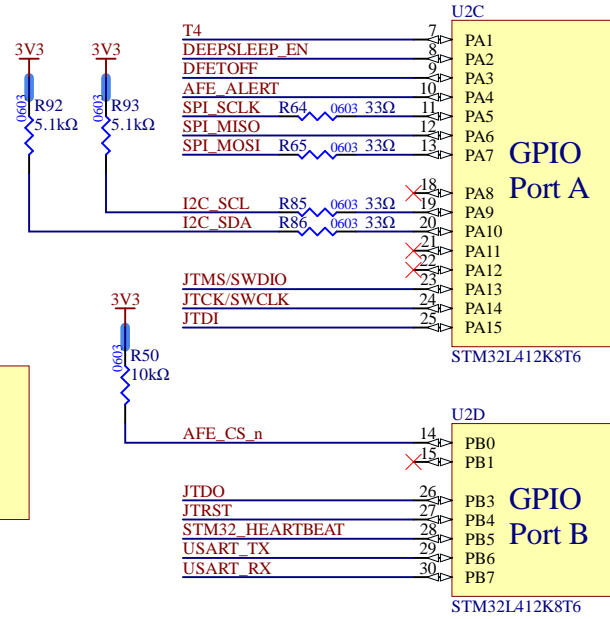
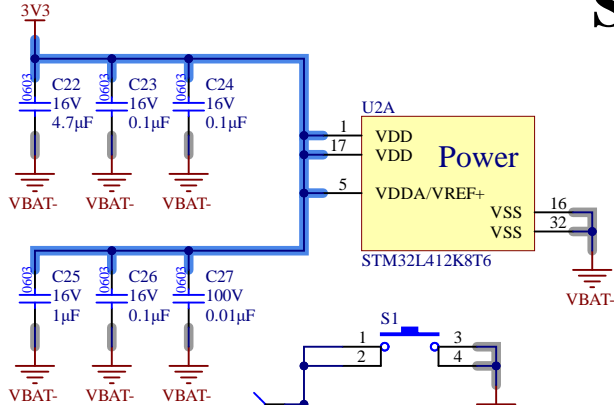
BALANCING FETS



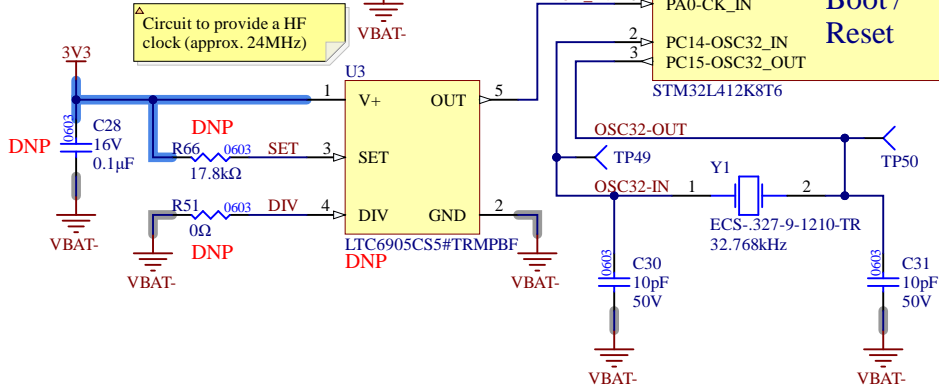
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT Balancing_FETs.SchDoc		MODIFIED 2023-09-16
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STM32 MCU

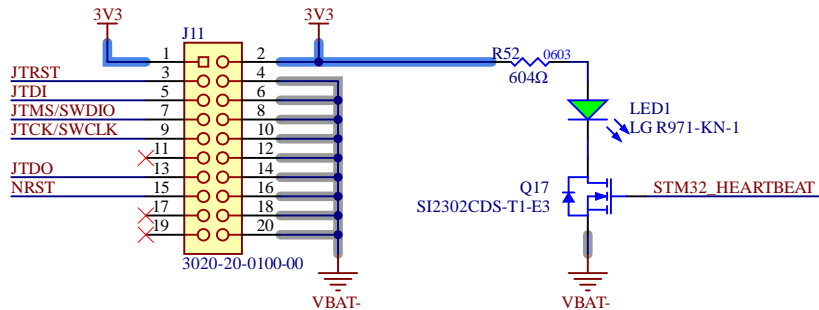
Follows reference design provided in
https://www.st.com/resource/en/application_note/an4555-getting-started-with-stm32l4-series-and-stm32l4-series-hard-ware-development-stmicroelectronics.pdf (Figure 14),
 minor modifications made to fit selected package



Connector 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



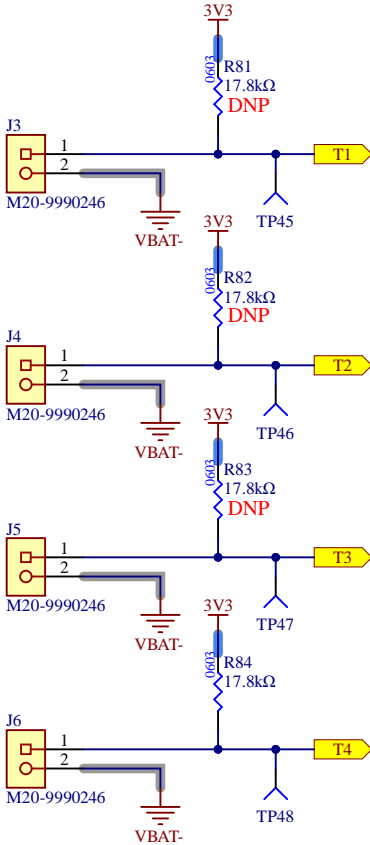
Debug / Programming Connector



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PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT STM32_MCU.SchDoc		MODIFIED 2024-12-17
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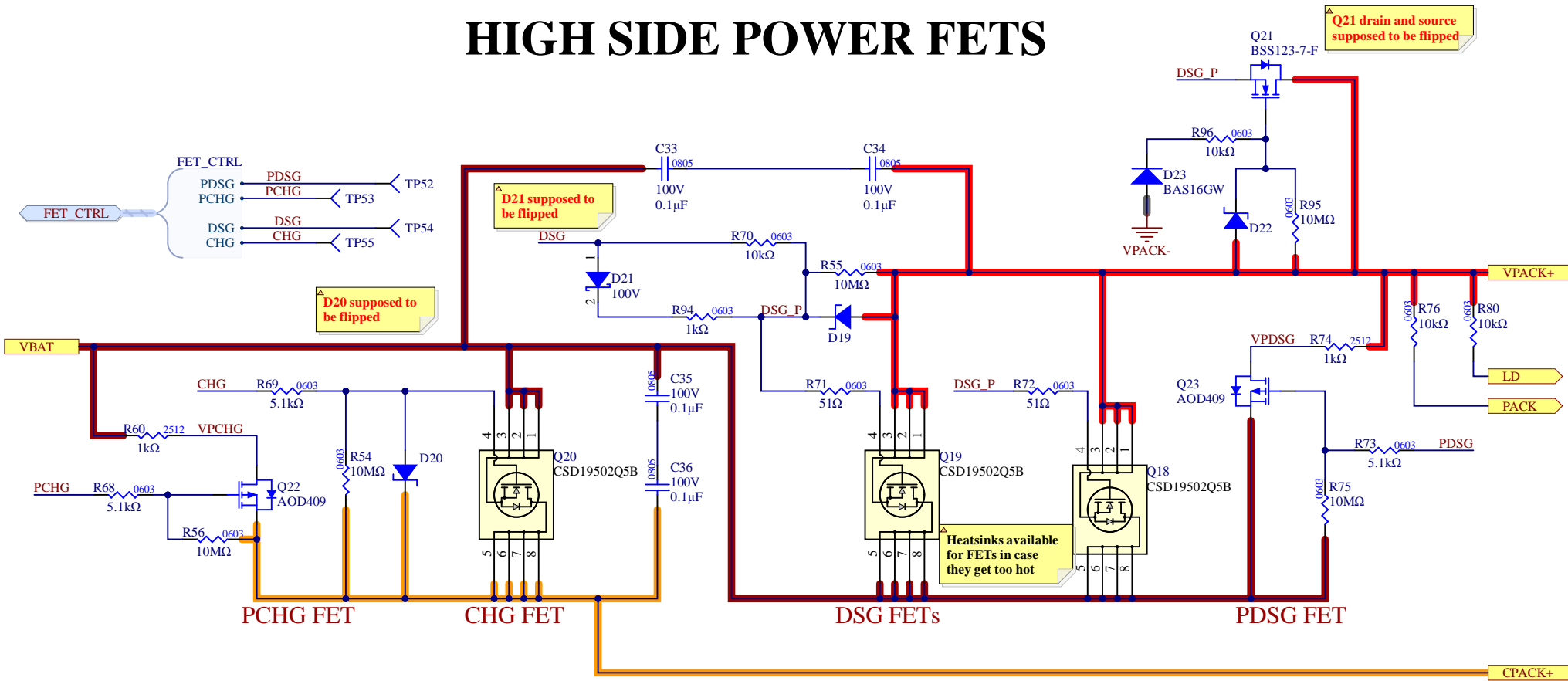
TEMPERATURE SENSING

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



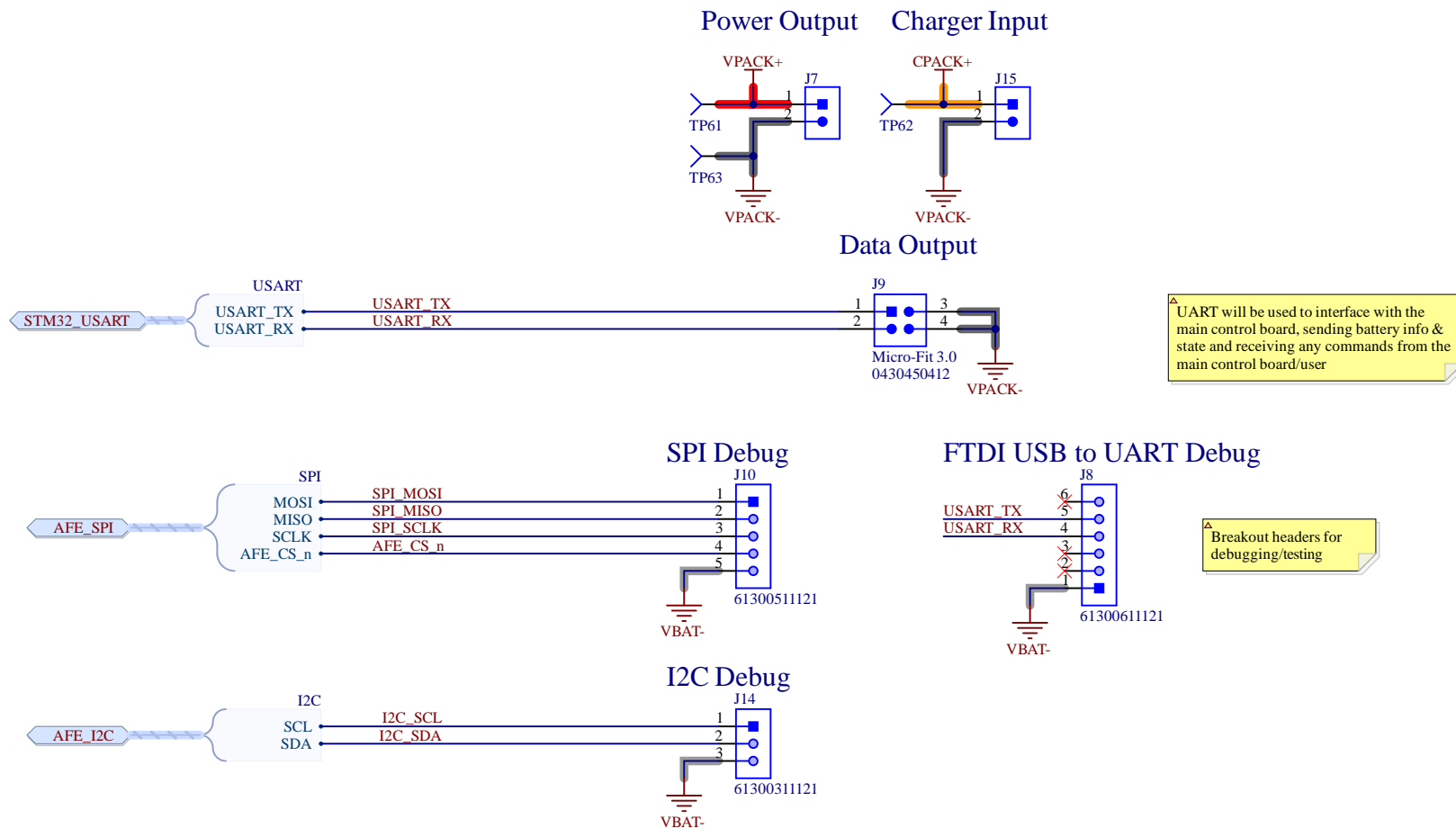
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT Temperature_Sense.SchDoc		MODIFIED 2024-12-17
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HIGH SIDE POWER FETS



△ Parallel 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

University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1.0
PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT High_Side_FETs.SchDoc		MODIFIED 2024-07-13
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PROJECT LTO 16S BMS.PrjPcb, [No Variations]		
DOCUMENT Pack_Interface.SchDoc		MODIFIED 2023-09-30
ENGINEER Farris Matar	REVIEWER *	SHEET 8 OF 8