Electrical power system battery module 4 cells Hardware:

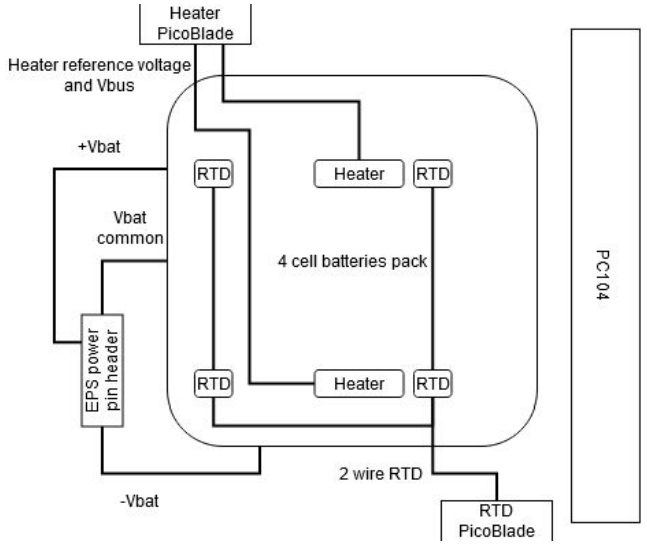
- Designed by: Amanda Batista Medeiros
- Based on FloripaSat-I Battery Board
- Reviewers: André M. P. Mattos
- Support: Gabriel M. Marcelino and Yan C. de Azeredo

Project github repository: https://github.com/spacelab-ufsc/battery-module-4c

Project info

Rev	Description	Date	Author
0.1	- Initial release - Hardware improvements and fixes based on the first EPS batteries board - Charge capacity increase, from 2 batteries (series) to 4 baterries (series/parallel)	04-Oct-2020	Andre M. P. Mattos

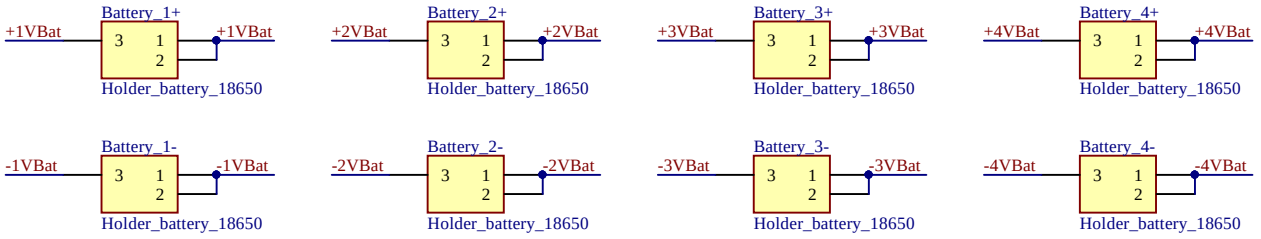
Revision History



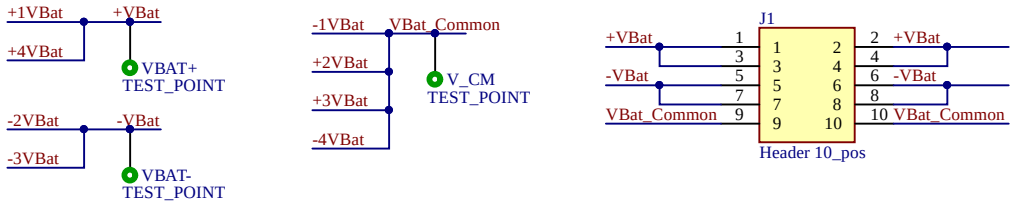
Block Diagram

SpaceLab - Federal University of Santa Catarina			
Project: *bat2_project.prjpcb / [No Variations]*			
Title: *Poject's info and block diagram*			
Designed by: *Amanda Batista Medeiros*			Project Code: *BAT4C*
Date: 1/22/2021	Revision: *v0.1*	Sheet *1* of *2*	Size: A4

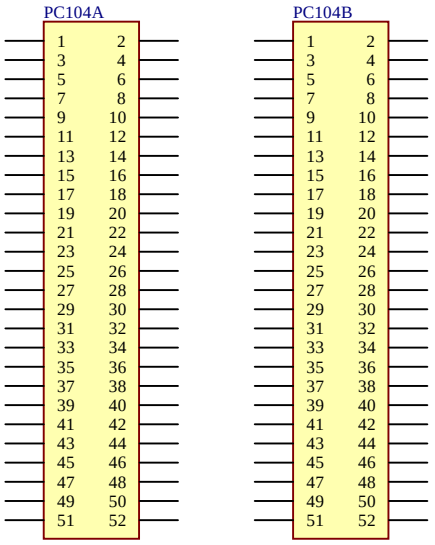
BATTERIES' CONNECTORS



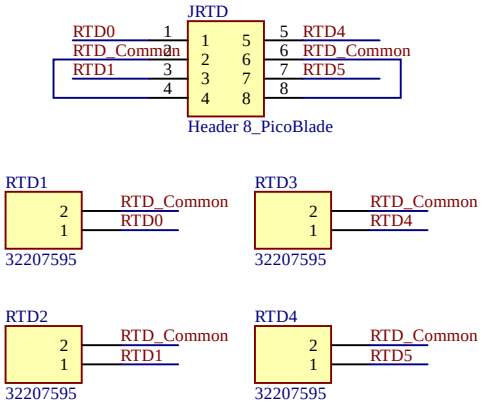
BATTERY CONNECTIONS



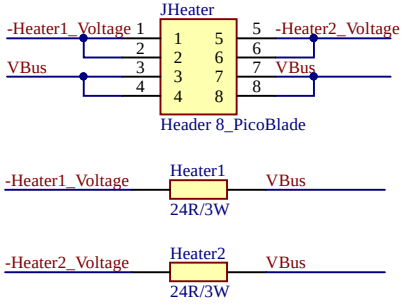
PC104 CONNECTIONS



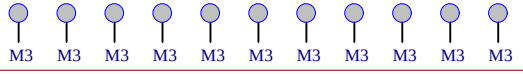
RTD SENSORS CONNECTIONS



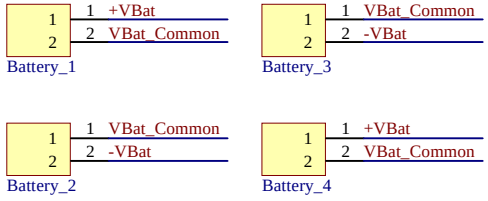
HEATER CONNECTION



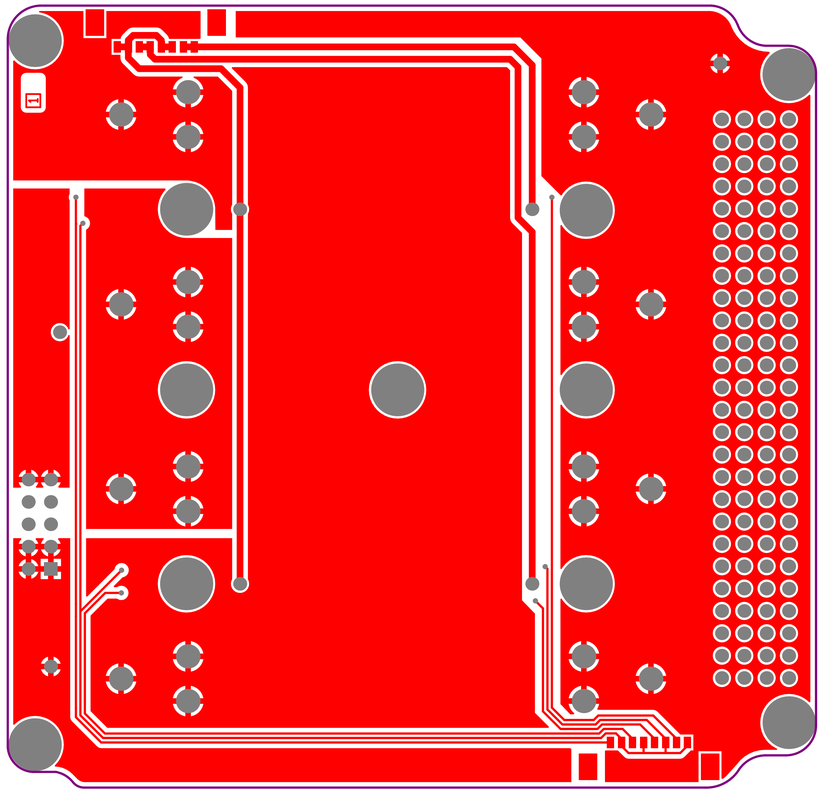
MECHANICAL HOLES



BATTERIES' PADS



SpaceLab - Federal University of Santa Catarina			
Project: *bat2_project.prjpcb / [No Variations]*			
Title: *Batteries pads and connectors*			
Designed by: *Amanda Batista Medeiros*			Project Code: *BAT4C*
Date: 1/22/2021	Revision: *v0.1*	Sheet *2* of *2*	Size: A4



Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.39mil	3.5	
3	Top Layer	Copper	1.38mil		
4	Dielectric Core	FR-4	59.06mil	4.2	
5	Bottom Layer	Copper	1.38mil		
6	Bottom Solder	Solder Resist	0.39mil	3.5	
7	Bottom Overlay				

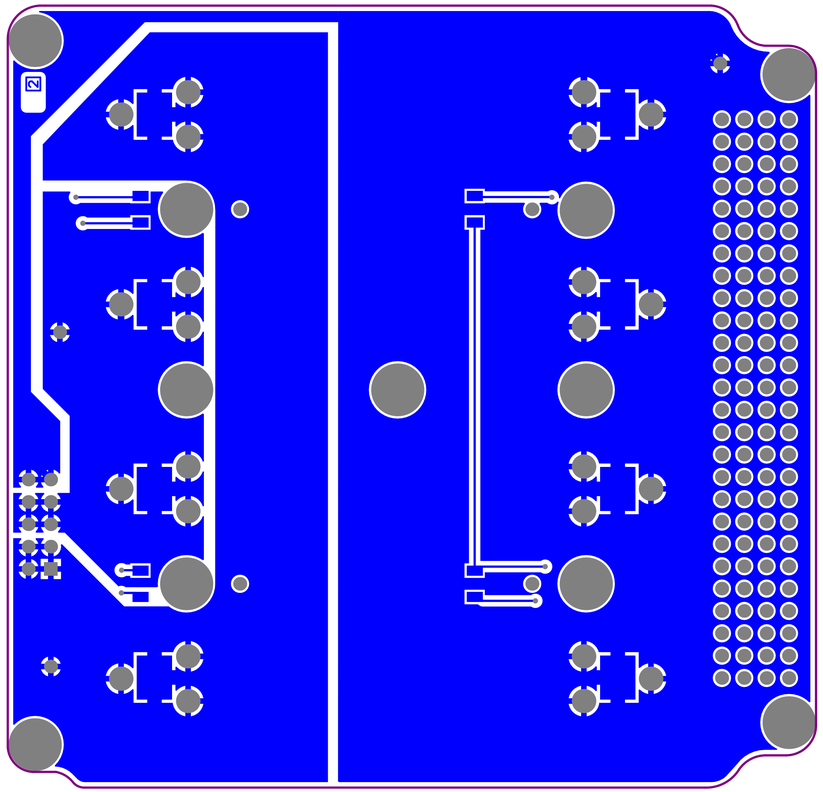
Fabrication specifications:

- Copper base 1OZ:
- PCB Material: Prepeg FR4–Standard
- PCB Tickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack–up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom avaliable
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina		SPACE LAB
Project: Battery Board 4 cells		
Layer: Top Layer		
Designed by: Amanda B. Medeiros (based on FSat-I Bat)		Project Code: BAT4C
Date: 1/22/2021	Version: v0.1	Size: A4



Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.39mil	3.5	
3	Top Layer	Copper	1.38mil		
4	Dielectric Core	FR-4	59.06mil	4.2	
5	Bottom Layer	Copper	1.38mil		
6	Bottom Solder	Solder Resist	0.39mil	3.5	
7	Bottom Overlay				

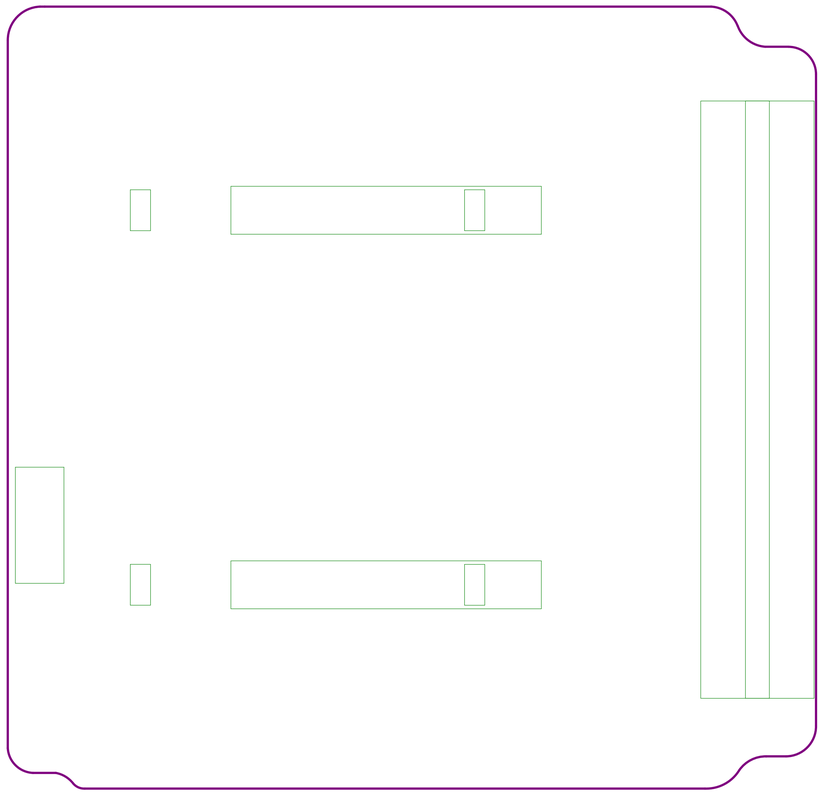
Fabrication specifications:

- Copper base 1OZ:
- PCB Material: Prepeg FR4–Standard
- PCB Tickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack–up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom avaliable
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina		SPACE LAB
Project: Battery Board 4 cells		
Layer: Bottom Layer		
Designed by: Amanda B. Medeiros (based on FSat-I Bat)		Project Code: BAT4C
Date: 1/22/2021	Version: v0.1	Size: A4



Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.39mil	3.5	
3	Top Layer	Copper	1.38mil		
4	Dielectric Core	FR-4	59.06mil	4.2	
5	Bottom Layer	Copper	1.38mil		
6	Bottom Solder	Solder Resist	0.39mil	3.5	
7	Bottom Overlay				

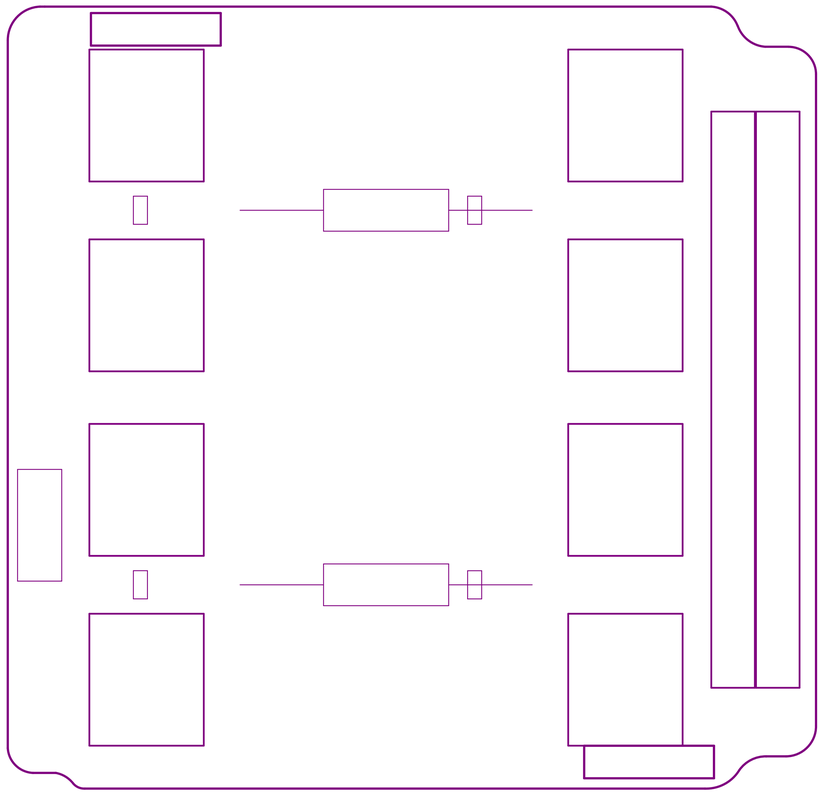
Fabrication specifications:

- Copper base 1OZ:
- PCB Material: Prepeg FR4–Standard
- PCB Tickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack–up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom avaliable
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina		SPACE LAB
Project: Battery Board 4 cells		
Layer: Mechanical 15		
Designed by: Amanda B. Medeiros (based on FSat-I Bat)		Project Code: BAT4C
Date: 1/22/2021	Version: v0.1	Size: A4



Layer	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.39mil	3.5	
3	Top Layer	Copper	1.38mil		
4	Dielectric Core	FR-4	59.06mil	4.2	
5	Bottom Layer	Copper	1.38mil		
6	Bottom Solder	Solder Resist	0.39mil	3.5	
7	Bottom Overlay				

Fabrication specifications:

- Copper base 1OZ:
- PCB Material: Prepeg FR4–Standard
- PCB Tickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack–up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom avaliable
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina		SPACE LAB
Project: Battery Board 4 cells		
Layer: Mechanical 13		
Designed by: Amanda B. Medeiros (based on FSat-I Bat)		Project Code: BAT4C
Date: 1/22/2021	Version: v0.1	Size: A4

JHeater
H2+
H2-
H1+
H1-
SPACELAB
BATTERY BOARD v0.1
VBAT-
J1
VBAT+ VBAT- V_CM
VBAT+
Battery_1
Heater1
Battery_2
Heater2
Battery_3
Battery_4
V_CM
H1
H2
JRTD
RTD0
RTD1
RTD4
RTD5

V_CM
Battery_1-
Battery_1+
H1-
H1+
RTD1
SAMSUNG SDI
6 2H75
Battery_2+
Battery_2-
VBAT-
Battery_3+
Battery_3-
V_CM
VBAT-
VBAT+
J1
H2-
H2+
RTD2
Battery_4-
Battery_4+
VBAT+

Comment	Description	Quantity	Designator	Fitted
Holder_battery_18650	Cylindrical Battery Contacts, Clips, Holders & Springs 16-19mm PC BATTERY CLIP	8	Battery_1-, Battery_1+, Battery_2-, Battery_2+, Battery_3-, Battery_3+, Battery_4-, Battery_4+	Fitted
32207595	Board Mount Temperature Sensors SMD1206(V) Pt 1000 Class B -50 to +130C	4	RTD1, RTD2, RTD3, RTD4	Fitted
TEST_POINT	Test Point - Headers & Wire Housings .100" Terminal Strip	3	V_CM, VBAT-, VBAT+	Fitted
24R/3W	Wirewound Resistors - Through Hole 3watts 24ohms 1%	2	Heater1, Heater2	Fitted
ESQ-126-39-G-D	PC / 104 Connectors .100" PC/104 Elevated Socket Strip	2	PC104A, PC104B	Fitted
Header 8_PicoBlade	Connector Header Surface Mount, Right Angle 8 position 0.049" (1.25mm)	2	JHeater, JRTD	Fitted
Header 10_pos	Connector	1	J1	Fitted