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Battery Module 4C Documentation

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SpaceLab, Universidade Federal de Santa Catarina, Florianópolis - Brazil

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Project Chief:
Eduardo Augusto Bezerra

Authors:
Amanda Batista Medeiros
André Martins Pio de Mattos
Gabriel Mariano Marcelino
Yan Castro de Azeredo

Contributing Authors:
Leonardo Kessler Slongo
Sara Vega Martinez
Bruno Vale Barbosa Eiterer
Túlio Gomes Pereira

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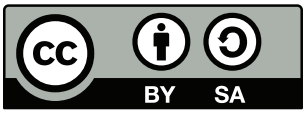

List of Figures

List of Tables

Contents

CHAPTER 1

Introduction

The Battery Module 4C is a separate board from the EPS2 [1] in order to accommodate 4 lithium-ion cells. Besides the cells, the board has connectors for interfacing signals and power lines with the EPS2 module, 2 power resistors to operate as heaters to maintain the cells temperature during eclipse periods, and 4 temperature sensors. The batteries used are the **ICR18650-30B** lithium-ion cells, which are connected in series and parallel to supply the required voltage and current. Each cell is fixed with **18650** metal holders and between the pairs there is the power resistor attached with a thermal element in the middle. A mechanical mount is placed over the batteries and screwed to the board, providing better stress resistance. Also, there are PC104 through hole pads present on the board for a connector that could be used for making mechanical integration with the EPS, or with future improvements a interface for power, data or control signals.

The board is a direct improvement from the first battery board used in the FloripaSat-1 mission [2]. All the project, source and documentation files are available freely on a GitHub repository [3] under its repectives licenses.

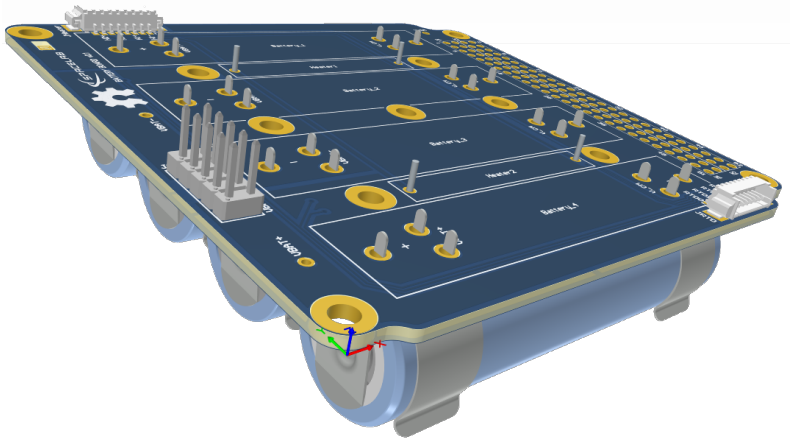

Figure 1.1: 3D view of the Battery Module 4C PCB.

CHAPTER 2

System Overview

The board is a 2 layer 1.6mm thick PCB with FR-4 dieletric. The board has PC104 through hole pads for a connector, however for the v0.1 of the project the interface is not used for any signals, power or mechanical fitting. The power from the batteries are conducted by a pin header making a board-to-board connection to the EPS2 module. The power for the heaters actuation and the temperature sensor (RTD) measurements are brought through PicoBlade connectors via external cables to the EPS2. The Figure 2.1 presents the simple block diagram of the module.

2.1 Block Diagram

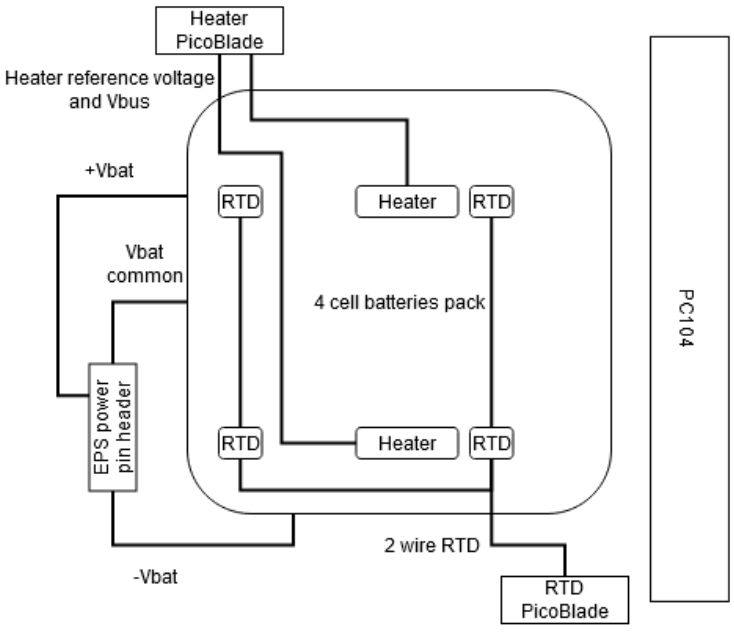

Figure 2.1: Battery Module 4C Block Diagram.

Bibliography

[1] Energy power system 2.0 documentation, 2021. Available at <https://github.com/spacelab-ufsc/eps2>.

[2] Battery board 1 documentation, 2018. Available at <https://github.com/floripasat/eps/wiki/External-Hardware#batteries-board>.

[3] Battery module 4c documentation, 2021. Available at <https://github.com/spacelab-ufsc/battery-module-4c>.