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EPS 2.0 Documentation

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SpaceLab, Universidade Federal de Santa Catarina, Florianópolis - Brazil

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Project Chief:
Eduardo Augusto Bezerra

Authors:
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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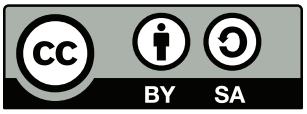

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Nomenclature

EPS *Electric Power System.*

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CHAPTER 1

Introduction

The Electrical Power System (EPS) has been designed to harvest, store and distribute energy for a CubeSat. The energy harvesting system is based on solar energy conversion through six solar panels attached to the CubeSat structure. The EPS is designed to operate the solar panels at their maximum power point. The harvested solar energy is stored in the battery module connected to the EPS. The energy distribution is done by several integrated DC-DC converters. The full EPS system is composed of the solar panels, the EPS PCB and the battery module. A general view of the EPS 2.0 board can be seen in Figure 1.1.

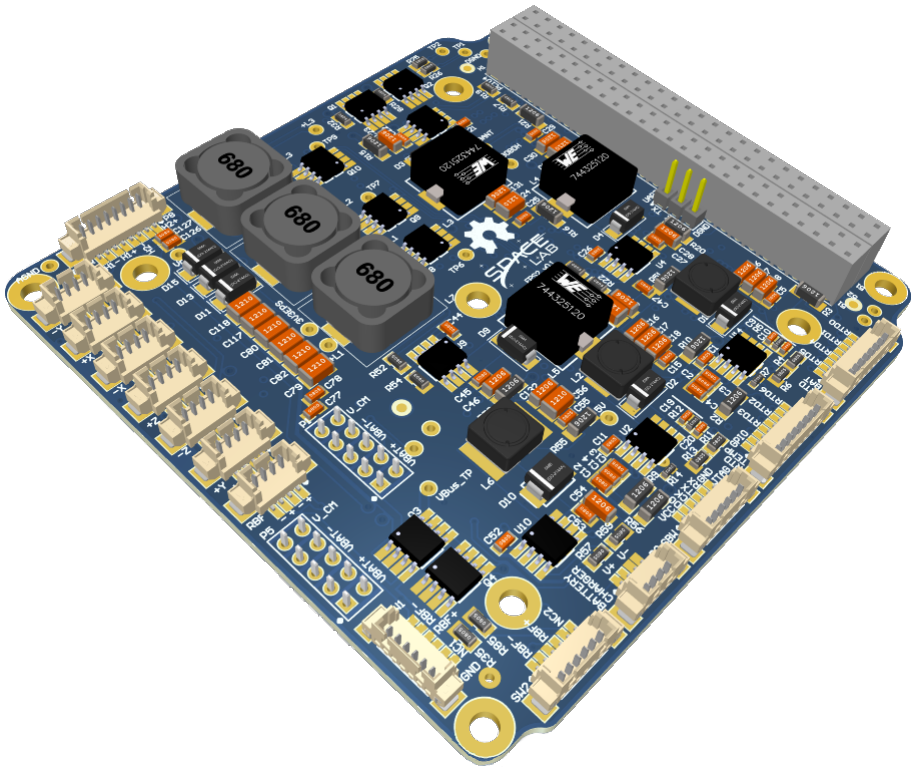

Figure 1.1: 3D view of the EPS 2.0 PCB.

The main characteristics of the EPS module are available below:

- Compatible with Gomspace Solar Panels or panel of similar characteristics.
- Compliant with CubeSat standard.

- Low power MSP430 MCU 20 MHz.
- Maximum power point tracking (MPPT).
- Overvoltage, undervoltage, overcurrent and short circuit protection for the battery module.
- Consumption measurement capability.
- Solar panels power measurement capability.
- Battery module measurements capability.
- 3.3V/1A (x1), 3.3V/2A (x2), 5V/3A (x1), 5V/5A (x2) and one battery voltage supply output pins.
- Seven temperature measurements with high accuracy.
- Low power operation capability.

[1], [2]

CHAPTER 2

System Overview

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CHAPTER 3

Hardware

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CHAPTER 4

Firmware

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CHAPTER 5

Board Assembly

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CHAPTER 6

Usage Instructions

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[1] SpaceLab. *Test*, July 2020. Note.

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