

The Low Voltage Power Supply (LVPS) for the Aztec Electric Racing (AER) vehicle is a Printed Circuit Board (PCB) enclosed in a modular, compact, fireproof, waterproof, and easy to assemble/disassemble enclosure. The purpose of the LVPS is to supply power to all onboard low voltage electronics on the AER vehicle via the use of an onboard low voltage battery pack. To achieve this, the PCB will be divided into five main circuits: battery management system (BMS), DC input for recharging the cells of the battery pack, dual voltage DC output, user interface (UI), and information logging. The BMS mainly consists of a microcontroller in the form of an ESP32 from the Wrover family of products and a BMS IC which will handle cell balancing and battery protection features. The DC input will be handled by an AC-DC wall power adapter which brings power to the PBC via a barrel jack. The dual voltage DC output will be handled by DC-DC converts that will create two voltage rails, 12V and 24V, the rails will be able to deliver up to 5A and 10A respectively. The UI will consist of a display and momentary switch on the front of the LVPS. The display will give the user information regarding battery performance and system power draw. The user will be able to request the logging of system information via the momentary switch located on the front of the LVPS. The logs will be written to an onboard SD card for the user to be able to review later. The following sections of this document cover functionality, inputs & outputs, use case, physical description & UI, development versus procurement, specifications, and validation in detail. In the next section we will be exploring the functionality of the LVPS device.