

## UcBalancer KIT

### Professional Ultracapacitor protection board

By IanCanada June.23, 2023 Ver1.1b



## A. Safety tips

Please make sure all ultracapacitors are **fully discharged** before installation. If not, have to discharge them by a 5 ohms 10W power resistor, such as a SQP10AJB-5R. Never short a circuit after installation.

## B. Introduction

UcBalancer is a specially designed professional ultracapacitor protection board to make 3000F+ ultracapacitors work perfectly with UcPure or other high performance power supply.

With high level design and engineering quality, UcBalancer makes it possible for DIYer to build the world's best ultra-low noise and ultra-low ESR power supplies.

UcBalancer KIT comes with a full set of accessories, it really makes things much easier to set up top level power supply projects for clocks, streamers or DACs.

## C. Specifications and Highlighted Features

- Advanced 1A high constant current precision protection scheme
- Options for both 2.7V(default) and 3V protection/balance configuration
- Power MOSFET shunt circuit with PTC fuses for a double protection
- Has two direct ultracapacitor output connectors to get the best possible low ESR performance in continuous output mode rather than indirectly from a UcPure
- Comes with full set of accessories for a safe and easy installation
- Double thickness heavy copper PCB design makes it has the lowest possible internal ESR compared to all other power supplies
- Fully assembled KIT so there is no need for any soldering jobs during installation
- DIY friendly

## D. Steps of installation







## E. Layout and Dimensions

Please download the UcBalancer.dxf in the GitHub UcBalancer folder for the dimensions.

[github.com/iancanada/DocumentDownload/tree/master/UltraCapacitorPowerSupply/UcBalancer](https://github.com/iancanada/DocumentDownload/tree/master/UltraCapacitorPowerSupply/UcBalancer)

## F. Connectors

### J4 and J5:

Must be linked together by the supplied 2P PH2.0 cable.

### J1: Output barrier terminal block

Need to be connected to UcPure input J7 with the supplied red and black wires. To reach an even lower ESR, AWG16 or bigger single core wires are also recommended. Never reverse the wires.

### PAD+ and PAD-: output pads for solder

Alternative to J1 to connect to a UcPure if you prefer soldering the wires to. Equivalent to J1+ and J1-.

### J2 and J3: Direct ultracapacitor outputs

Alternative to the J10 and J13 on the UcPure to get continuous mode ultracapacitor power supply outputs at even lower ESR.

J2 and J3 are connected to the ultracapacitor terminals directly. They are equivalent to each other.

J2 and J3 don't have fust protection. So, in the real applications, I suggest using the UcPure J10 and J13 first and later on change to J2 and J3 after system gets stable.

## G. LED indicators

### D1 and D2:

Indicates over voltage of corresponding ultracapacitor is detected and the protection is triggered. Solid lit means a 1A constant shunt current is applied to that ultracapacitor cell.

Threshold voltages:

2.65V for 2.7V configuration

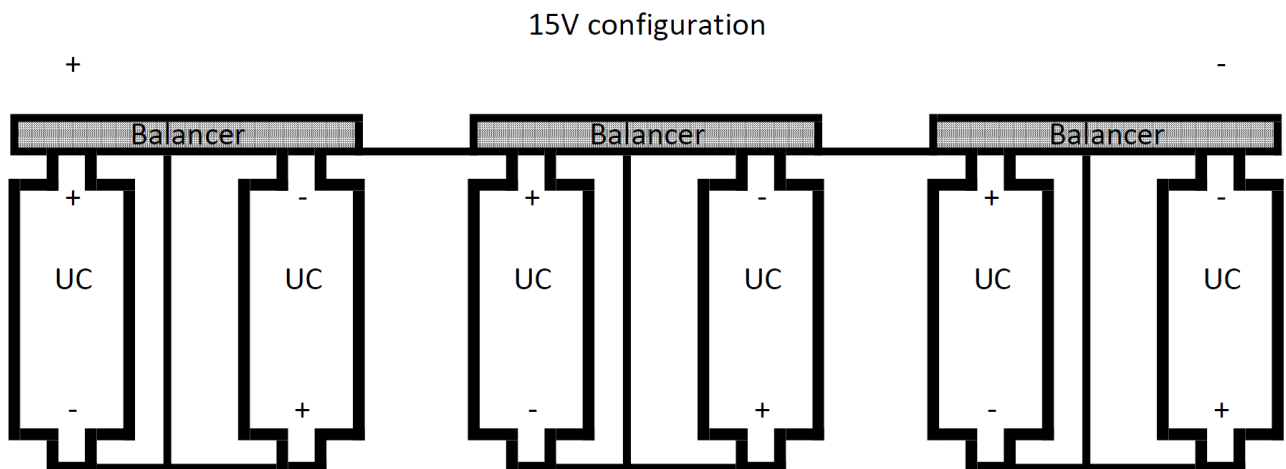
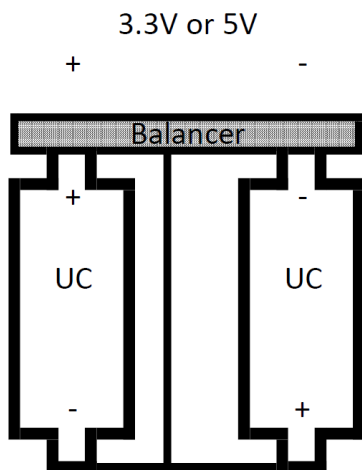
2.95V for 3V configuration

## H. Application notes

### 1. Prevent from short circuit

Please be very careful about the pins of connectors at the back side of the UcBalancer PCB. If they are too long, they can touch and break the protection film of the ultracapacitors to result in a short circuit. Please cut those pins shorter or insert more washers to prevent from any possible of short circuit.

### 2. Ultracapacitor pack configurations



The supplied bridge board needs to be used to configure a ultracapacitor pack with more than two ultracapacitor cells.

### **3. 2.7V and 3V configurations**

By default, UcBalancer is in 2.7V configuration.

To change to the 3V configuration, you just need to short S1 and S2 on the bottom side of the UcBalancer PCB with solder balls.

Please note, for 3.3V and 5V applications, I don't suggest using the 3V configuration even you have 3V ultracapacitors. For safety reason, never use the 3V configuration for 2.7V ultracapacitors.

### **4. Ultracapacitor selections**

Eaton 3000F or higher capacitive ultracapacitors are recommended.

XL60-3R0308T-R

XL60-2R7308T-R

Any other ultracapacitors with 12mm mount screws are all good to go. Such as

TPLH-2R7/3000SL60138

TPLH-3R0/3000SL60138

Lower ESR ones are always preferred.

## **I. History of revising**

June 23, 2023 V1.0b released

Nov 20,2023 V1.1b Add how to prevent from short circuit

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