USER MANUAL

Integration Kit

- **BKIT – MCINT**
- **BKIT – MCIHT**

Integration Kit for:

- **Maxwell Technologies® MC Series BOOSTCAP® Ultracapacitor Cells**

1. Introduction

This integration kit is intended to provide all the necessary hardware and instructions to interconnect 2, 4 or 6 series connected ultracapacitors. This kit includes printed circuit boards (PCBs) with voltage management circuitry, buss bars, washers and retaining nuts. For optimal implementation, we recommend to use an even number of cells with this kit.

Each individual cell voltage is monitored by the voltage management circuitry, which protects each cell from entering an over voltage condition. If any cell does experience an over voltage condition, an LED will illuminate and the active circuitry will begin to discharge that cell. Once the cell is back within nominal operation voltage limits, the LED will extinguish.

This manual is current at time of printing. Please visit **www.maxwell.com** for the latest product updates and information.

For illustrative purposes the integration kit with active PCBA is shown throughout this document.

2. Unpacking

The integration kit contains the following items.

BKIT-MCINT (P/N 106927) Integration Kit with active PCBA		
Part No.	**Description**	**Qty**
106610	Active PCBA	3
106517	Buss bar	5
105385	Washers	12
103996	M12-1.75 nuts	12
105003	Rivets	3

BKIT-MCIHT (P/N 108320) Integration Kit with passive PCBA		
Part No.	**Description**	**Qty**
106826	Passive PCBA	3
106517	Buss bar	5
105385	Washers	12
103996	M12-1.75 nuts	12
105003	Rivets	3

3. Installation

3.1 Preparing buss bar connection

3.1.1 Apply joint compound to capacitor surfaces that will come in contact with the buss bar. Use a highly conductive aluminum-aluminum antioxidant. For example, Noalox® Anti-Oxidant Compound available from IDEAL is a viable choice. There are many other vendors that supply equivalent compounds.

3.1.2 Apply joint compound to the buss bar **only** on the side that will come in contact with the capacitor.

3.1.3 Ensure any excess joint compound does not contact the top of the buss bar or come in contact with the voltage management circuitry as this may affect the circuitry performance.

3.2 Assembling connections

Notes: For optimal implementation, we only support and recommend the use of an even number of cells with this kit. These instructions show the assembly of six cells connected in series.

Figure 2

3.2.1 Place a buss bar over the threaded terminal at one end of the first pair of cells (Figure 2, A, B) with antioxidant facing towards capacitor. Note the polarity of the terminals of each cell, e.g. in Figure 2, A: positive terminal, B: negative terminal.

Figure 3

3.2.2 Place a wave washer over each threaded terminal on top of buss bar. (Figure 3, A, B)
Note: For optimal electrical connection, it is critical to use the provided washer on every single cell, per the explanation in step 3.2.6, below.

Figure 4

3.2.3 Thread a nut onto each threaded terminal and hand tighten. (Figure 4, A, B)

3.2.4 Repeat steps 3.2.1 to 3.2.3 on one side of each of the remaining pairs of cells. (Figure 5, A - F)

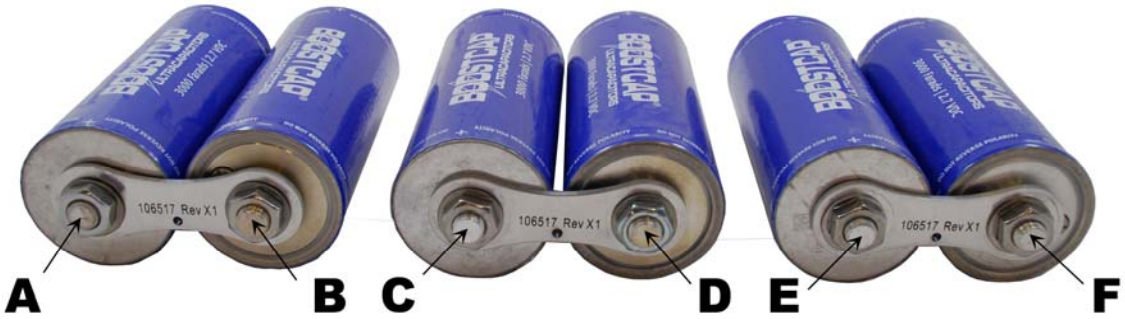

Figure 5

3.2.5 Turn the cells around so that the threaded terminals opposite to terminals A - F are facing you. Place buss bars over the middle pairs of threaded terminals (marked H, I, J and K in Figure 6), with antioxidant facing towards capacitor.

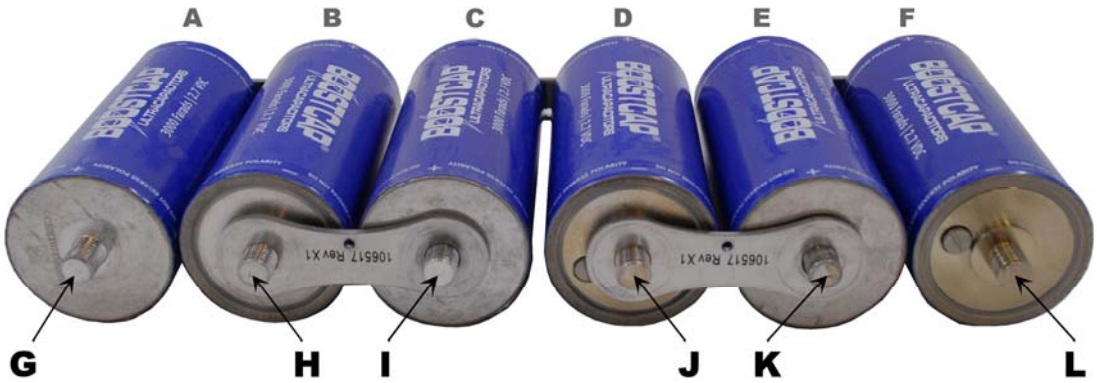

Figure 6

3.2.6 Place ⅛ inch thick lugs attached to power cables (1/0 AWG cables shown in Figure 7) over the remaining two threaded terminals of the cells at the ends of the series and a washer over each lug. (Figure 7, G and L). It is important to use a lug plus an aluminum washer that together have a minimum combined thickness of ⅛ inch. This prevents the voltage management boards (which are attached in the following step) from being stressed due to uneven stack up of the elements bolted to the cell.

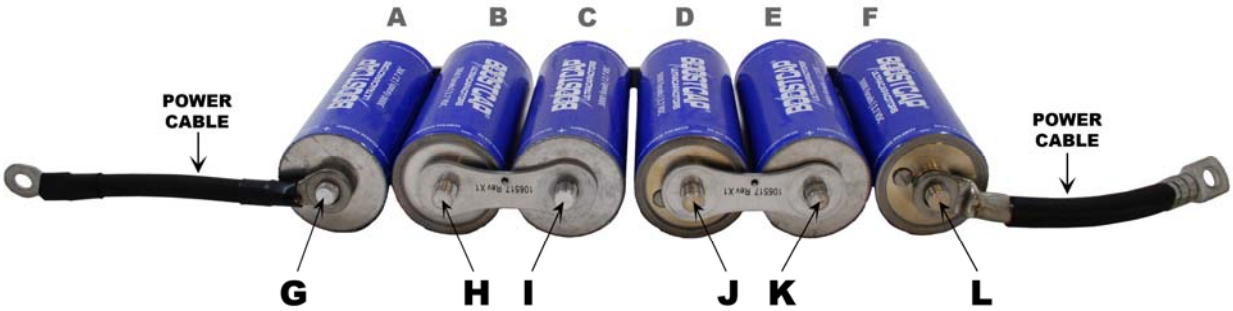

Figure 7

3.2.7 Place a voltage management board over each pair of threaded terminals as shown in Figure 8, with the printed circuit board components facing away from the capacitor. Make sure that the buss bar and power cable connections are **below** the voltage management board.

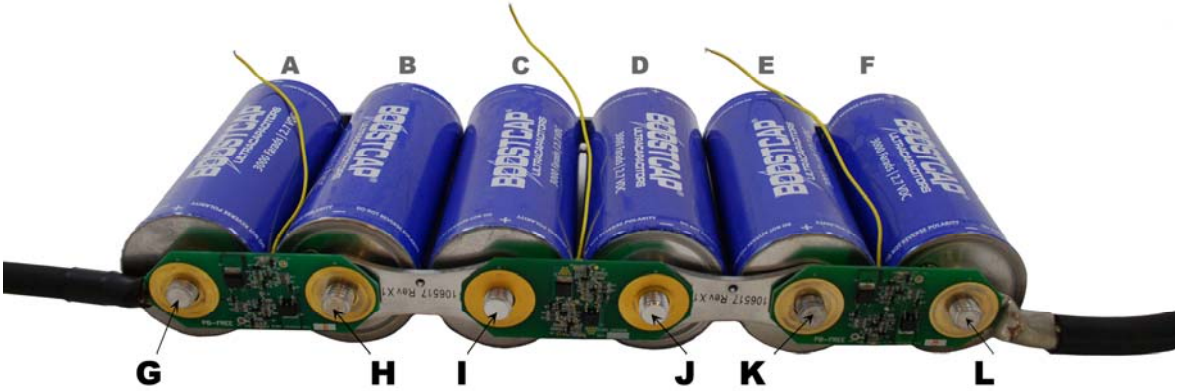

Figure 8

3.2.8 **Note:** The voltage management board is polarized. **J1 on the board is positive; J3 is negative**. Ensure correct polarities of capacitor terminal and voltage management board are connected. (Figure 9)

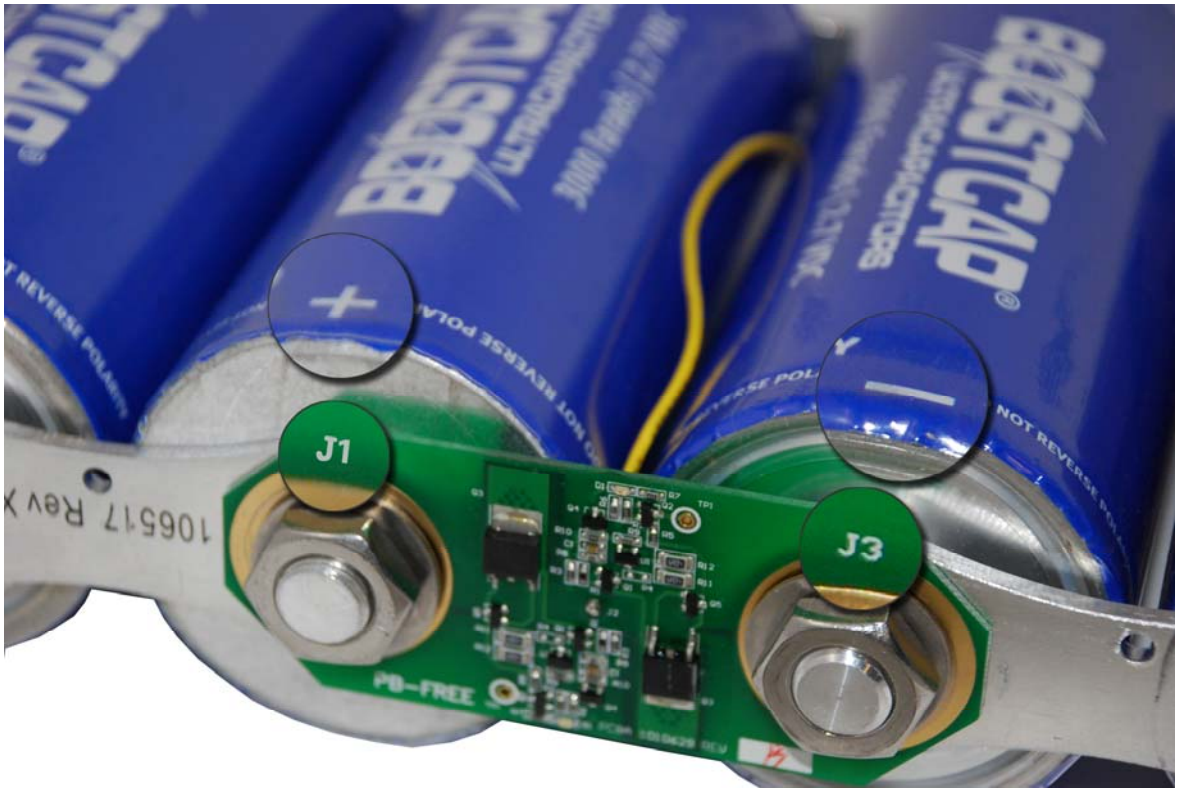

Figure 9

3.2.9 Place a wave washer over each threaded terminal on top of voltage management boards. (G – L, Figure 10)

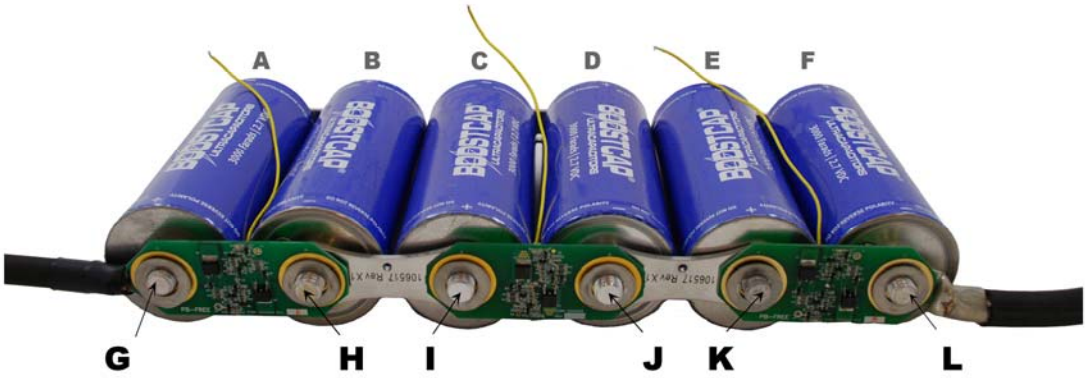

Figure 10

3.2.10 Thread a nut onto each threaded terminals and hand tighten. (G – L, Figure 11)

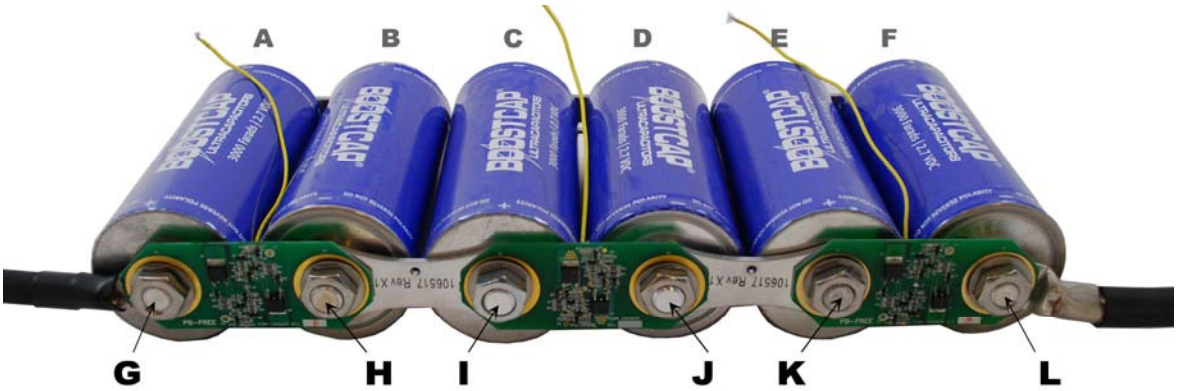

Figure 11

3.2.11 The 22 AWG wire attached to the voltage management board must be riveted in place with the provided rivet to the buss bar that spans **the same two cells as the printed circuit board** (M, N and O, Figure 12). Those two cells are protected by that one board. E.g.: the wire on the voltage management board spanning terminals G and H in Figure 11 is connected to the rivet on the buss bar spanning terminals A and B.

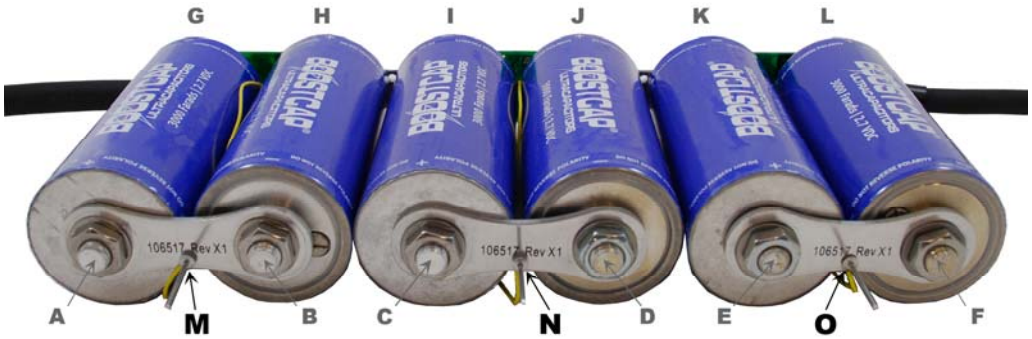

Figure 12

3.2.12 Trim the rivets as per standard riveting procedure.

3.2.13 Torque each connection to 14 Nm.

3.2.14 Wipe off any excess joint compound.

3.2.15 Repeat the steps above, until every cell is serially connected.

4. Accessories

Additional items not included in the integration kit but necessary for installation are:

1) Antioxidant high conductivity joint compound specified for aluminum-aluminum connections and lead free solder
2) Torque wrench capable applying 14 Nm torque to the nut.

5. Operation

No additional requirements for operation.

6. Safety

Voltage management circuitry does not prevent an individual capacitor or series of capacitors from over voltage conditions if prolonged charging to a higher than specified voltage persists (2.7V/cell). Provisions should be made with the system integration to prevent prolonged over voltage conditions.

7. Maintenance

No maintenance required.

8. Storage

Integration kits should be stored in a non-condensing environment.

9. Disposal

Buss bars and printed circuit boards should be recycled. The capacitors should be disposed of in accordance with local regulations.

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