

# **CBP58-V1 Manual**

## ***Power Backup Module For HESC & HPSC Series Power Supplies***

Manufactured by  
**TRI-M ENGINEERING**  
Engineered Solutions for Embedded Applications

### **Technical Manual**

P/N: CBP58-V1-MAN  
Revision: 4 December 2008

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*This manual is for integrators of applications of embedded systems. It contains information on hardware requirements and interconnection to other embedded electronics.*

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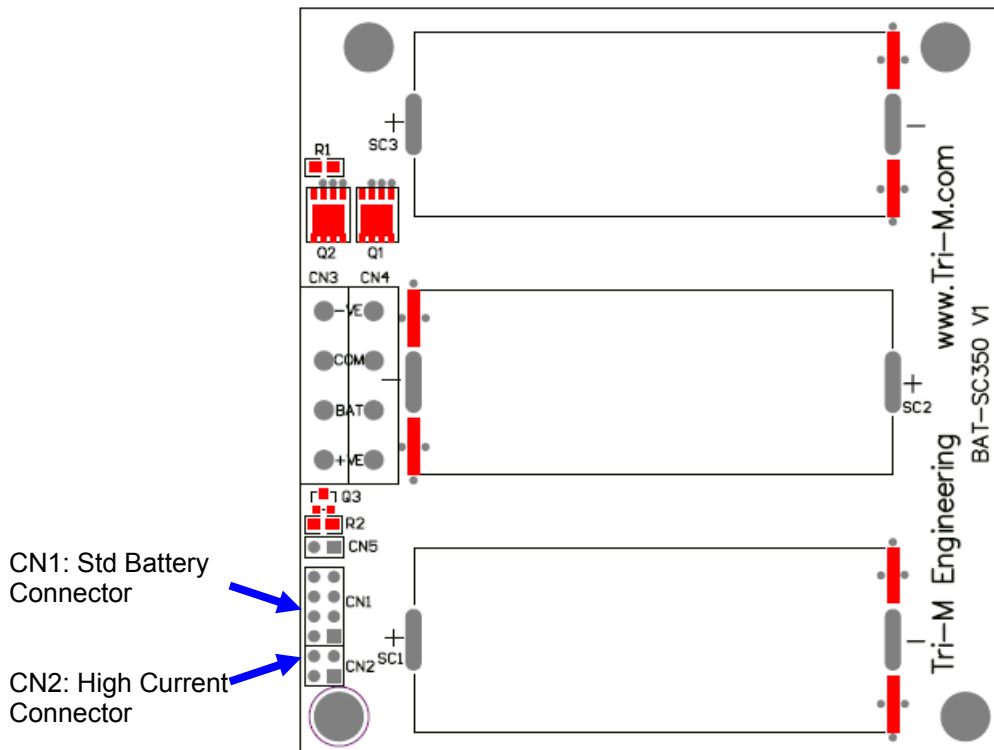
## CHAPTER 1: GENERAL DESCRIPTION

The CBP58-V1 creates a complete UPS system when plugged directly into the bottom of an HESC Vehicle Power Supply. The CBP58-V1 includes six “D” size Ultra Capacitor (each capacitor is 350 farads to maximum of 2.5V) wired in series for a total of 58.3 farads up to 15 volts. Therefore a CBP58-V1 can supply backup power for over four minutes to a 20 watt load.

The CBP58-V1 includes Mosfet transistors for preventing deep discharge occurrences during extended power outages. The Mosfet transistors electrically isolate the CBP58-V1 from the HESC whenever the BE output of the HESC is de-asserted (pulled to 5V)

The CBP58-V1 has does not have a thermal fuse as the Ultra Capacitors do not generate internal heat when reaching a full charge state. A current fuse for protection against overcharging is also not included as the Ultra Capacitors can withstand very large levels of current safely.

Of the six “D” size Ultra Capacitor, three of them are mounted on one PCB, and the other three mounted on a second PCB. The two PCBs are separated with metal spaces, and interconnected with wiring. The spacers used between the two PCBs are 2.75 inches. The size of each of the PCBs is 3.55 x 3.775 inches, and each PCB is 0.062 inches in thickness.



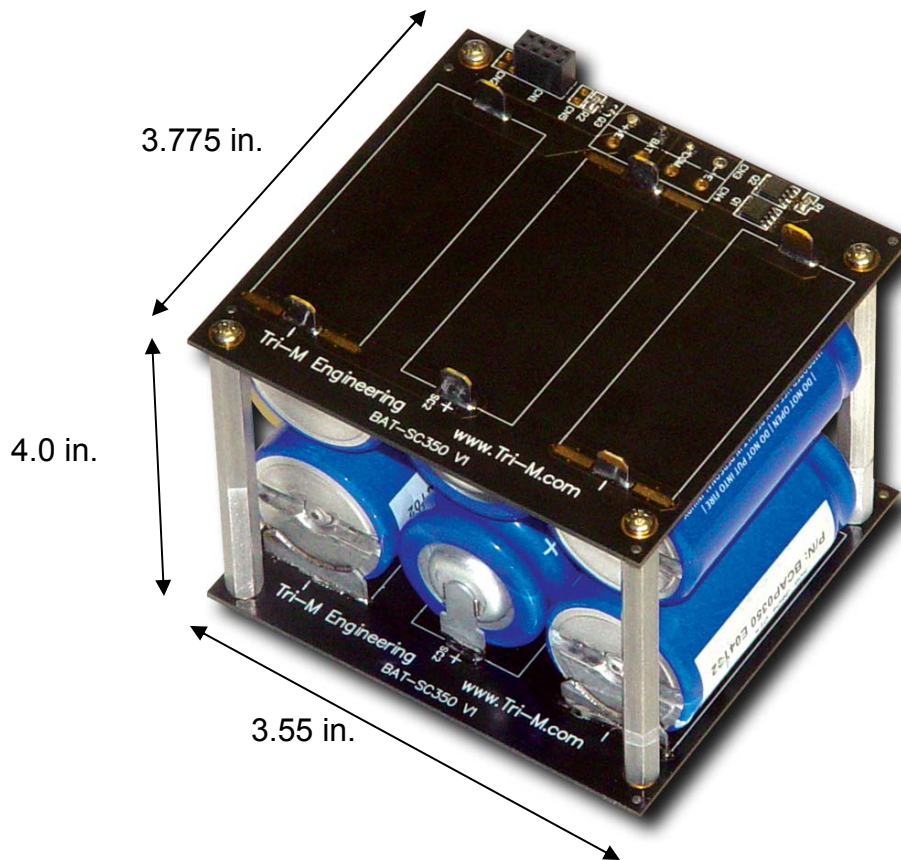


Figure 1 - CBP58 Dimensions

## CHAPTER 2: INSTALLATION

### 2.1 Installing the CBP58-V1

The CBP58-V1 mounts directly to the bottom of HESC products by plugging CN1 into the mating connector on the power supply. Spacers of 0.6 inch size are used between the CBP58-V1 and the HESC/HPSC power supply it is plugged into.

## CHAPTER 3: Determining Power Hold-Up Time

Energy decrease in capacitor:  $\Delta E = \frac{1}{2} C(V_{wv}^2 - V_{min}^2)$

Where:

- C is the capacitance in farads.
- $V_{wv}$  is the maximum voltage.
- $V_{min}$  is the cutoff voltage.
- E is energy in joules (watt-seconds)

Therefore for the CBP58-V1, total energy available is  $\Delta E = 0.5 * 58.3 (15^2 - 7^2) = 5130$  joules.  
 For a 20 watt load the hold-up time is  $5130/20 = 256$  seconds or just over four minutes.  
 For a 50 watt load the hold-up time is  $5130/20 = 102$  seconds or 1.7 minutes.

**BAT-SC350 Hold-up Time**
