

## Operation Manual of

Smart Battery Systems (SBS) for 7.4V-14.8V Li-Ion battery pack



AA Portable Power Corp (<http://www.batteryspace.com>)  
Address: 860 S, 19<sup>th</sup> St, Unit A, Richmond, CA, 94804  
Tel: 510-525-2328  
Fax: 510-439-2808  
Email: [Sales@batteryspace.com](mailto:Sales@batteryspace.com)  
Prepared & Approved by Louis (01/10/08)

Smart Battery System (SBS) is designed to manage Li-Ion battery pack from 7.4V-14.8V in series with 7000mAh Max capacity,

Perfect for The Intelligent Battery, or Smart Battery for EV / HEV, which provides outputs from sensors by provide the actual status of voltages, currents and temperatures within the battery as well as the state of charge

Smart Battery System (SBS) consist of the following:

- PCM board with temperature sensor wire for 7.4V-14.8V Li-Ion battery pack
  - Manufacture part# PCM-L04S07-403 (A-1)
  - Automatic Detect battery pack voltage by programming the parameter via RS 232 communication port
    - **Excluded 1pc CD programming software**
      - **Utilize for assign PCM board voltage for 7.4V-14.8V Li-Ion battery pack by your self**
      - **Need a CD programming software? Please contact [sales@batteryspace.com](mailto:sales@batteryspace.com)**
    - **You will be received the "Ready to use" PCM board from manufacture. Please select the PCM board voltage" via "PCM Board Voltage" menu**
  - Over-Charge protection
    - Cell'S level: 4.3V +/- 0.025V
    - Battery pack level: 4.375 +/- 0.05V /cell
  - Over-discharge protection
    - Cell'S level: 2.5V +/- 0.05V
    - Battery pack level: 2.75V +/- 0.5V / cell
  - Limit 7.4V-14.8V Li-Ion Battery pack's discharging current below **6.5A**.
  - Over-Temperature Protection
    - Charge: 55 +/- 5°C
    - Discharge: 60 +/- 5C
  - Max Dimension (LxWxH): 62mm(2.4") x 38mm(1.5") x 8mm (0.3")
- Touch Screen LCD Display
  - LCD display 1 (Push "On/Off" Switch 5 milli-sec)
    - Utilize for monitor parameter below
      - Voltage (mV)
      - RemCap (mAh)
      - DnCap (mAh)
      - FullCap (mAh)
      - Temp (°C)
      - Current (mAh)
      - Cycle (CYC)
  - LCD display 2 (Push "PU/PD" Switch)
    - Utilize for monitor parameter below
      - Cell -V1 (mV)
      - Cell-V2 (mV)
      - Cell-V3 (mV)
      - Cell-V4 (mV)
      - AveTTE (min)
      - AveTTF (min)
      - SN
    - Note: You may push ""On/Off" Switch" for switch back to LCD display 1
  - Touch Screen LCD Display Board dimension (LxWxH): 66mm(2.6") x 48mm(1.9") x 8mm (0.3")
  - LCD Display Area dimension (LxW): 40mm(1.6") x 35mm(1.4")
- Battery Communication Interface
  - SMBus
    - The SMBus (System Management Bus) is a two wire, 100 KHz, serial bus designed for use with low power Smart Battery Systems (SBS) with the limited objectives of interconnecting Smart Batteries which have built in intelligence, with their associated chargers.

- Smart battery management system will download all running data (log file) to a computer via Serial port

**Technical specification:**

Test item ( Test at normal temperature 25±2°C and relative humidity <90% )			Criterion		
			Parameter	Delay time	Release condition
Over charge Protection	Single cell	1st level safty	4.3±0.025V	2.0s±0.5s	4.1±0.05V
		2nd level safty	4.4±0.025V	1.5s±0.5s	Permanent fail
	Pack	1st level safty	4.375±0.05V/ Cell	2.0s±0.5s	4.0±0.1V/ Cell
		2nd level safty	4.45V / Cell	0	Permanent fail
Over discharge protection	Single cell		2.5±0.05V	2.0s±0.5s	3.0±0.1V
	Pack		2.75±0.05V/ Cell	2.0s±0.5s	3±0.05V/ Cell
Over current protection	1st level safty		6500mA	2S±0.5s	200mA
	2nd level safty		8000mA	2S±0.5s	200mA
	SOC protection		10000mA	0	Permanent fail
Over temperature protection	Charge	1st level safty	55±5°C	2.0s±0.5s	50±5°C
		2nd level safty	65±5°C	0	Permanent fail
	Discharge	1st level safty	60±5°C	2.0s±0.5s	55±5°C
		2nd level safty	75±5°C	0	Permanent fail
Short circuit protection			20A	488±100uS	20mA

**Electrical Characteristics:**

Item	Specification	Remark
Charging Voltage	4.2V *N	4.2V / 1Cell
Charging Method	CC/CV	Constant-current and - Voltage with Limited current
Supply voltage range (B+, B-)	-0.3 V to 34 V	
Impedance	≤100mΩ	B- to P- and B+ to P+
Current consumption	Firmware running	<600uA
	Sleep Mode	<200uA
Temperature	Operating Temperature	-40~+85°C
	Storage Temperature	-40~+125°C

**Other components required to operate the SBS**

- Charger**
  - You must choose a smart charger based on battery pack type and voltage. Ex: for a 4 cells Li-Ion battery pack, you will need a 14.8V smart charger with 16.8V CCCV cut-off
- DIY connector**
  - RS 232 serial communication connector for connect between LCD Display to PC computer
  - Charge / Discharge terminal connector

Picture



LCD display 1



LCD display 2

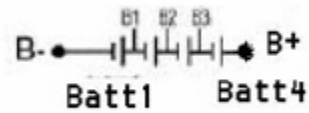
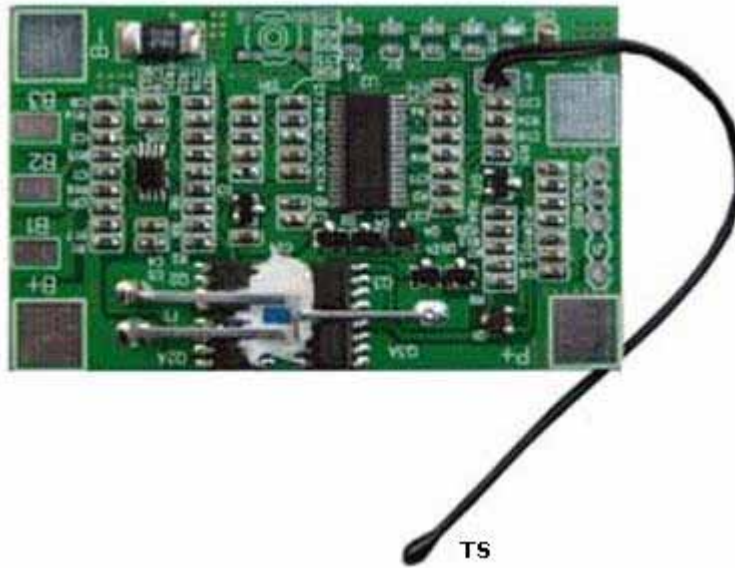


Perfect System for built up a [Intelligent Battery pack: 14.8V 6.6Ah](#)

## Wiring Diagram

- Connect to 7.4V / 11.1V/ 14.8V Li-Ion battery pack. Below picture shown how to connect to 14.8V Li-Ion battery pack

P+ = Charge + / Discharge +  
P- = Charge - / Discharge -  
TS = Temperature Sensor Wire



Connect to Touch Screen LCD Display via SMBus

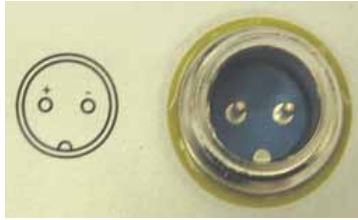




## How to connect PCM board & Display board for Intelligent Battery pack: 14.8V 6.6Ah



- Connect "1" to "9" & "2" to "8" for charge / Discharge terminal (2 pin male Cannon Plug)
- Connect "11", Temperature sensor wire to inside middle of the pack



- Connect "3" to "4" for connect between PCM board with LCD Display Board
- Connect "5" to "6" for RS 232 communication "PCM: pin 1-4"
- Connect "7" to "10" for RS 232 communication "LCD: pin 6-10"

