OceanServer™
TECHNOLOGY, INC

Intelligent Battery and Power System™

Pre-engineered Power System adds Clean, Safe, and Space-Saving Lithium-Ion Battery Back-up and Portability to your OEM Equipment.

The *Intelligent Battery and Power System* (IBPS) allows designers to add Smart rechargeable Lithium-Ion (Li-Ion) battery power as an OEM component in computers, electronic equipment and electromechanical devices. The IBPS serves as the complete AC/DC power supply. It provides clean regulated DC, sourced from Li-Ion battery packs, wall-outlet AC or external DC sources available on vehicles and ships. System designers can now easily create an isolated or portable battery backed-up device. If the AC wall power or external DC supply is lost or unplugged, the battery instantly switches in without interruption. The equipment is now portable or securely running in battery back-up mode. With external power restored, the attached battery packs recharge. The IBPS utilizes the same safety circuitry and high quality, low-cost battery cells found in laptop computers.

The IBPS microprocessor continuously communicates with the attached Smart Battery packs in the system, managing charging and discharging, and responding to key events. A variety of Battery Management Modules and DC Converters can manage up to 8 packs each, to provide up to 760 Watt-hours of high density Li-Ion battery power to your device. Larger systems can be developed using the CB-04 Communication Module to add enhanced management features. The regulated output is compatible with an ATX power supply for ease of use with off the shelf computer components.

- Fully-engineered for OEM and Embedded Applications
- Complete AC/DC Power Sub-system with Battery Power or Battery Back-up (Li-Ion or NiMH Smart Batteries)
- Modular and Scalable Battery Management
  - 1 to 2 (BBDC-02R); 1 to 4 (BB/MP/XP-04xx), or 1 to 8 (MP/XP-08xx) batteries per controller
  - 95 to 760 Watt-hours of power per controller (Li-Ion)
  - Controllers can scale to 12,000 WHrs of power
- Battery Charging from AC, vehicle/ship power, or solar panels - Simultaneous fast charging of all Smart Batteries
- Autonomous Operation - OR - full ASCII status reportable to host via RS232 communication
- Provides Raw Battery Output (16-12 V) or Regulated DC Outputs

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Battery Management Modules (Both Regulated and Unregulated DC Output Options)

IBPS Controller	Size*	Battery Packs Per Module	Maximum Unregulated Current Draw (Amps)	Maximum Output Power Max Packs Installed (Discharge)	Maximum Watt Hours Capacity (Max Packs Installed)	Maximum Continuous Watts Per 14.4V Pack (Discharge)
BBDC-02R w/ATX Power	3.55"x4.9"	1-2 Pks	8.25 A	100 Watts	190 Whrs	50 Watts
BB-04SR/FR	Two Sizes*	1-4 Pks	13.25 A	160 Watts	380 Whrs	40 Watts
MP-04R	PC104 3.55"x3.77"	1-4 Pks	20 A	240 Watts	380 Whrs	60 Watts
MP-04SR/FR	Two Sizes*	1-4 Pks	20 A	240 Watts	380 Whrs	60 Watts
XP-04SR/FR	Two Sizes*	1-4 Pks	26.5 A	320 Watts	380 Whrs	80 Watts
MP-08R	PC104 3.55"x3.77"	1-8 Pks	40 A	480 Watts	760 Whrs	60 Watts
XP-08SR/FR	Two Sizes*	1-8 Pks	53.25 A	640 Watts	760 Whrs	80 Watts

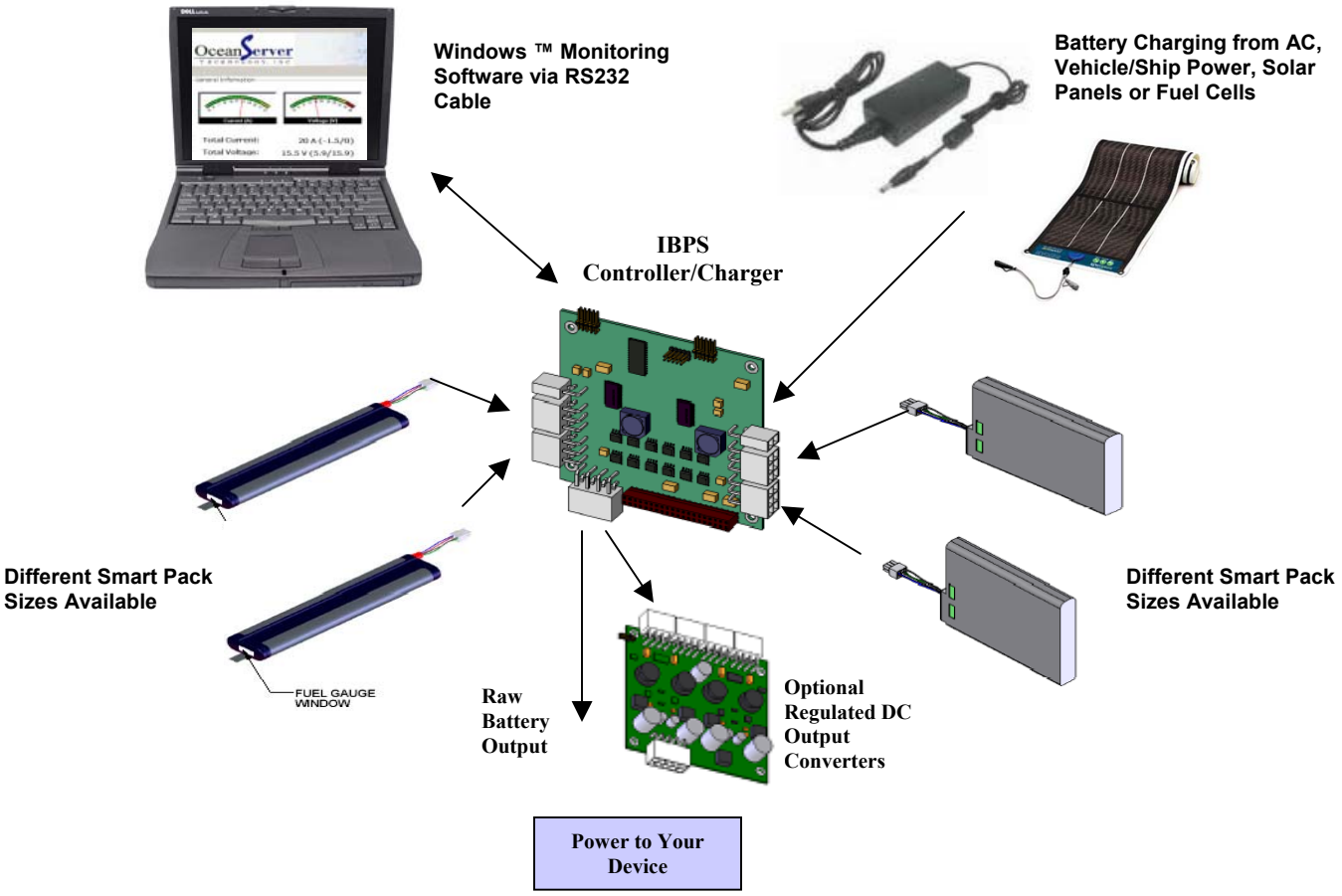
Notes: Standard Smart Battery Packs are 14.4V, 6.6 Ah, 95-Watt Hour (other sizes available) all chart numbers are given at the end of the pack discharge voltage. Modules can be clustered together by connecting to a CB-04 Communication Module(s) to create large battery systems greater than 760-Watt Hours. Above Modules are all RoHS compliant.
* The Modules ending in "SR" are 2.91"x3.58" and the "FR" parts are PC104 form-factor

DC-DC Converter Modules Options (Regulated DC Output)

Voltage Output	DC-023R	DC-123SR	BBDC-02R (Integrated)	DC1U-1V*	DC2U-1VR**
3.3 Volts DC	@ 10A Max.	@ 10A Max.	@ 10A Max.		
5.0 Volts DC	@ 10A Max.	@ 10A Max.	@ 10A Max.		
12 Volts DC	@ 7A Max.	@ 12A Max.	@ 7A Max.		
24 Volts DC				@ 3.1A Max.	@ 10A Max.
28 Volts DC				@ 2.7A Max.	@ 8.5A Max.
48 Volts DC					@ 5A Max.
Total Power**	**100W Max.**	**144W Max.**	**100W Max.**	**75W Max.**	**240W Max.**
Size: PCB (in.)	PC104 3.6" X 3.8"	2.91"X3.58"	3.55" X 4.9"	3.5" X 1.5"	PC104 3.6" X 3.8"
IBPS Compatible With:	MP-O4R MP-08R	BB-04SR/FR MP-0xSR/FR XP-0xSR/R	Not Applicable	All IBPS Modules	All IBPS Modules

Notes:
*Insert 'Voltage Output' to complete part number. Can be combined in parallel to increase current.
**Higher currents and larger power configurations are possible, contact OceanServer.
User Guides, 3D Models and Mechanical Drawing available for download on OceanServer Website

IBPS Battery System Model



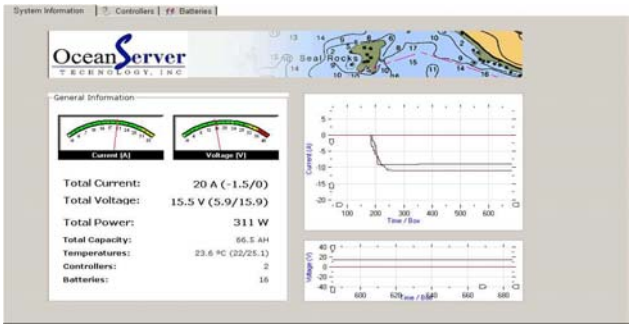
Intended Applications: Supplying clean, lightweight, safe and space-saving portable power to the Industrial Control, Instrumentation, Marine (ROVs, AUVs), Medical, Military, Robotics, Ruggedized PC, and Telecommunications Equipment Segments.

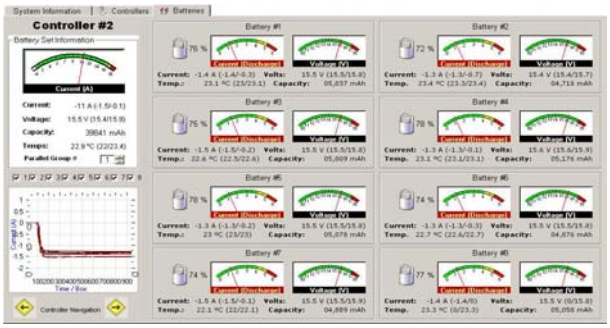
Left: Self-Contained, Environmentally Secure, Portable OceanServer Power8 Battery Box, Provides Portable Power for a Variety of Applications

Left: Clean, Portable, Safe, and Rechargeable Li-Ion Power System for PC104 Embedded Computers and Electronic Devices

Battery Monitoring Software – MS Windows™

In addition to the IBPS internal operating system firmware, the base controllers ship with two programs to assist the developer and end user in monitoring and managing the IBPS sub-system.





MiniBats™ provides the functionality of the battery ICON on a Notebook Computer, including power consumption, remaining capacity and user-defined parameters for cleanly shutting down the load device. **FullBats**™ provides additional functionality, including the state of the battery system, remaining capacity, current, voltage, percent of charge remaining, time to empty, a map of all connected components and other useful data. Both GUI-based aids are viewable from a host system, or can be displayed in configurable, abbreviated form on an optional LCD display.

LCD Display Kit

- A very low-power 16x2 character LCD display is available to allow for visual monitoring of IBPS and battery status in applications when a serial console is not available. User defined fields are selected from a configurable menu.

Power and Current Discharge Rate

RoHS Compliant Evaluation Kits

– Kits are available to demonstrate the performance of the Intelligent Battery and Power System.

Kits and Modules	Description
EK-03 Single Module Regulated Power Evaluation Kit	Contains the IBPS components needed to provide regulated DC power to a PC Motherboard, including one BBDC-02R Base Module with integrated ATX Power Supply, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-2 batteries, described below.
EK-05 Regulated Power Evaluation Kit	Contains the IBPS components needed to provide regulated DC power (3.3V, 5V, 12V and -12 V) to an electronic device, including one BB-04SR/FR Base Module, one DC-123SR DC-DC Converter Module, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-4 batteries, described below.
EK-04 Unregulated Power Evaluation kit	Contains the IBPS components needed to provide unregulated DC power to your device, including one BB-04SR or BB-04FR Base Module, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-4 batteries, described below.
Batteries	**Description**
BA-95HC	Rechargeable Lithium-Ion Smart Battery Pack, 95 Watt hours, integrated 5 position connector
BA95HC-FL	Rechargeable Lithium-Ion Smart Battery Pack, 95 Watt hours, Flying Lead connector
BA95HCL-FL	Rechargeable Lithium-Ion Smart Battery Pack, 95 Watt hours, Flying Lead connector, long body

The OceanServer IBPS contains patent-pending technology.