



## *Intelligent Battery and Power System™*



## **2008 Selection Guide**

**Rev 4.0 May 2008**

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# Chapter 1

## 2008 Selection Guide

### 1.0 Purpose of this Guide

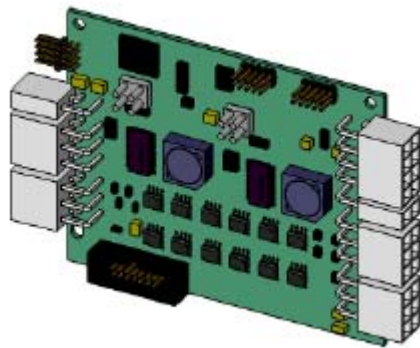
The purpose of this guide is to provide a simple step-by-step guide to choosing the ideal battery system for your application. OceanServer offers a variety of battery system products that can be used to power virtually any device. The products are scalable and can be configured with a single Li-Ion smart pack or up to 128 packs. All the parts are designed to work right out of the box and can be easily plugged together and monitored via two Windows Software applications or a LCD. We encourage customers to contact us directly with any questions.

### 1.1 Selecting an IBPS (Intelligent Battery Power System) Battery Manager/Charger Module

#### Step One:

The IBPS module allows designers to add Smart rechargeable Lithium-Ion (Li-Ion) battery power as an OEM component in computers, electronic equipment and other devices. The module manages all aspects of charging, safety and powering your system or portable device. The IBPS microprocessor continuously communicates with the attached Smart Battery packs in the system, managing charging and discharging, and responding to key events. The stand-alone controller will output raw battery voltage (12-16.8 Volts) and 18 volts

when an 18V power supply is connected to recharge the battery packs. Optional DC-DC converters can be added to the IBPS (Step 2) for regulated voltages (3.3V – 48V).



***IBPS Controller Image***

Keys to selecting the correct IBPS module ~ Note: the module needs to have a sufficient number of battery packs and total battery capacity to meet several requirements of your device (below is a list of considerations).

- Peak Power Consumption
  - Total Power
  - Regulated Voltage Peak Current
- Average Power Consumption
  - Total Average Power
  - Regulated Voltage Average Current (48V, 12V, 5V, 3.3V)

Note: Powering lightbulbs, AC inverters and motors are unique cases contact OceanServer support to discuss your application

Below is a list of our standard products and the power specifications:

<b>IBPS Module</b>	<b>Physical Module Size*</b>	<b>Battery Packs Supported</b>	<b>Max Unregulated Current Draw (Amps)</b>	<b>Maximum Power Output (with Max Packs Installed)</b>	<b>Total Capacity in Watt-hours, 95 Watt-hrs X Max Packs Installed</b>	<b>Peak Discharge per Pack (Watts)</b>
BBDC-02R w/ATX Power	3.55"x4.9"	1-2 Pks	8.25 A	100 Watts	190 Whrs	50 Watts
BB-04SR/FR	2.91"x3.58"*	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	2.91"x3.58"*	1-4 Pks	20 A	240 Watts	380 Whrs	60 Watts
XP-04SR/FR	2.91"x3.58"*	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	2.91"x3.58"*	1-8 Pks	53.25 A	640 Watts	760 Whrs	80 Watts

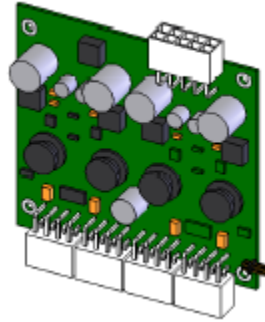
**Notes:** Standard Smart Battery Packs are 14.4V, 6.6 Ah, 95-Watt Hour (other sizes available) all chart numbers are given at the end of the pack discharge voltage. Modules can be clustered together by connecting to a CB-04 Communication Module(s) to create large battery systems greater than 760-Watt Hours.

\* The Modules ending in SR can also be ordered in PC104 form-factor (FR Variants)  
 "R" at the end of the part number indicates the part is RoHS compliant  
 The MP-04R and MP-08R are legacy board and should not be used for new designs.

## 1.2 Selecting an Optional DC-DC Converter Module

### Step Two:

OceanServer offers a full selection of DC-DC Converters for regulated output voltages. These converter modules take the output power from the IBPS battery management module and provide between 3.3V – 48V. Similar to selecting IBPS modules user should confirm the converter can handle the power requirements of the device or system. Multiple units can be used in parallel with a single IBPS module to handle larger power requirements



DC-DC Converter

The converter module selected needs to provide the regulated voltage which the system or device requires. If your device can handle raw battery voltage (12V-18V) you will not require a converter. The converter must be capable of handling the peak power requirements of the device and may require airflow if it is being used continually near the maximum specification (see below). Multiple converters can be used in parallel for power requirements above the maximum allowable power for a single unit. Below is a list of OceanServer standard converters and the IBPS management modules they operate with

Voltage Output	DC-023R	DC-123SR	BBDC-02R (Integrated)	DC1U-1VR	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.
<b>Total Power***</b>	<b>100W Max.</b>	<b>144W Max.</b>	<b>100W Max.</b>	<b>75W Max.</b>	<b>240W Max.</b>
Size: PCB (in.) (Excluding connector projections)	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"
Compatible with:	MP-04R MP-08R	BB-04SR/FR, MP-xxSR/FR, XP-xxSR/FR	BBDC-02R (Integrated)	All IBPS Units	All IBPS Units

**Notes:**

"R" at the end of the part number indicates the part is RoHS compliant

\*\*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.

### Example Picture:

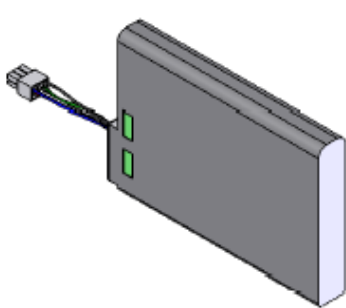
Below is a picture of a DC-023R DC-DC converter stacked on a MP-08R unit. The DC-023R puts out standard regulated ATX voltages ideal for powering an embedded PC. The MP-08R can have up to 8 Li-Ion smart packs when fully populated offering up to 760 Watt Hours of battery power. New designs should look at the MP-08SR/FR with DC123SR for improved performance.



## 1.3 Selecting Lithium Ion Rechargeable Battery Packs

### Step Three:

OceanServer offers Standard Li-Ion Smart Packs that are 95 Watt Hours (6.6 Ahr). Customer can select from two different shape packs. The packs are functionally identical and both come with flying leads so they can plug directly into the IBPS module. OceanServer also offers plug-in packs for customers who require a backplane design. The download page on the OceanServer website provides both mechanical drawings and 3D Models for designers to see which will best fit in the design.



***BA95HC-FL Rectangular Style Pack***



***BA95HCL-FL Long Style Pack***

## 1.4 Selecting a Power Supply (or other charge source)

### Step Four:

The final critical item is the power supply needed to recharge the battery system. IBPS management modules can both power the system and recharge the battery system at the same time. Customers can use wall-outlet AC/DC power supplies (used with notebook computers), solar panels or external DC sources available on vehicles and ships. The IBPS modules accept power sources between 18V -24V DC.



<b>Power Supply Options</b> available for OceanServer IBPS modules										
Product	Description	Number of 95 Whr 14.4V Li-Ion Battery Packs Supported (in blue)								
		1	2	3	4	5	6	7	8	8 to 32
PS-70	70 Watt AC/DC Power Supply	Blue	Blue	Grey	Grey	Grey	Grey	Grey	Grey	Grey
PS-100	100 Watt AC/DC Power Supply	Blue	Blue	Blue	Blue	Grey	Grey	Grey	Grey	Grey
PS-120	120 Watt DC/DC Vehicle Supply	Blue	Blue	Blue	Blue	Grey	Grey	Grey	Grey	Grey
PS-320	320 Watt AC/DC Power Supply	Grey	Grey	Grey	Grey	Blue	Blue	Blue	Blue	Grey
PS-600	600 Watt AC/DC Power Supply	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Blue

Solar Panel Note: IBPS modules can also be used with solar panels. The panels require the following characteristics to work correctly with our modules:

Open Circuit Voltage: Voc 19 - 24V  
 Peak power V: 15 -18V  
 Maximum voltage OC 24V (if larger a protection diode can be added)

For more information on Solar Applications please review the following paper:

[Creating Solar Charged Battery Power Systems using IBPS modular components](#)

Paper Location: Download page under Application Notes:

<http://www.ocean-server.com/download.html>

# Chapter 2

## 2008 Selection Guide

### 2.0 Additional Accessories

OceanServer offers additional products that users may require or need for their battery system. The options available include cables, On/Off switches, backplanes, standoffs, CB-04 communications module (for large battery clusters) and LCD displays. The LCD is useful to users not having access to a Windows based PC to monitor the battery system via OceanServer's MiniBats or FullBats software. The LCD is a very low-power 16x2 character display, which allows visual monitoring of the battery status.



LCD Display: Shows Discharge...etc

Where to find these items on the website?

<http://www.ocean-server.com/overview.html> (See Accessories Section)

Please note additional information and single unit pricing is on our online store:

<http://www.oceanserver-store.com/>

### 2.1 Summary of the Product Selection Process

Key Components For Your Battery System				
<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b>	<b>Step 4</b>	<b>Other Items</b>
				
<b>IBPS Modules</b>	<b>DC-DC Converters</b>	<b>Li-Ion Packs</b>	<b>Power Supplies</b>	<b>Accessories</b>

OceanServer combines some of our most popular items in 3 evaluation kits for first time users. These kits come with all the critical items required for an OceanServer battery system: Modules, Software, Cables and Power Supply (Li-Ion Packs Sold Separately). Kits can be found on the online store:

<http://www.oceanserver-store.com/evaluation-kits.html>

### Kit Offerings:

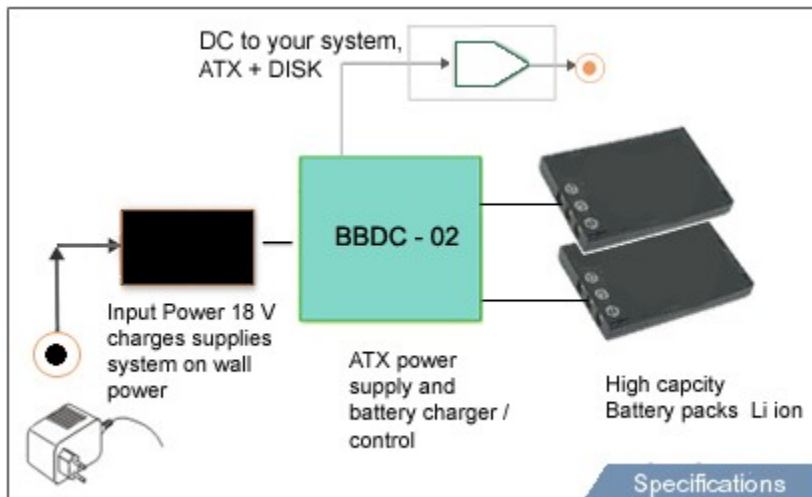
Kit	Description
<b>EK-03 Single Module Regulated Power Evaluation Kit</b>	Contains the IBPS components needed to provide regulated DC power to a PC Motherboard, including one BBDC-02R Base Module with integrated ATX Power Supply, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-2 batteries, sold separately.
<b>EK-05 Regulated Power Evaluation Kit</b>	Contains the IBPS components needed to provide regulated DC power (-12, 3.3, 5 and 12 V) to an electronic device, including one BB-04SR Base Module, one DC-123SR DC-DC Converter Module, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-4 batteries, sold separately.
<b>EK-04 Unregulated Power Evaluation kit</b>	Contains the IBPS components needed to provide unregulated DC power to your device, including one BB-04SR Base Module, assorted cables, a Desktop (AC) Power Supply, FullBats™ and MiniBats™ software. Supports 1-4 batteries, sold separately.

### 2.2 Example Configurations:

Below are some common applications for OceanServer Battery Management Modules. Please visit OceanServer’s main website and click on the Examples Configurations button for a variety of common applications.

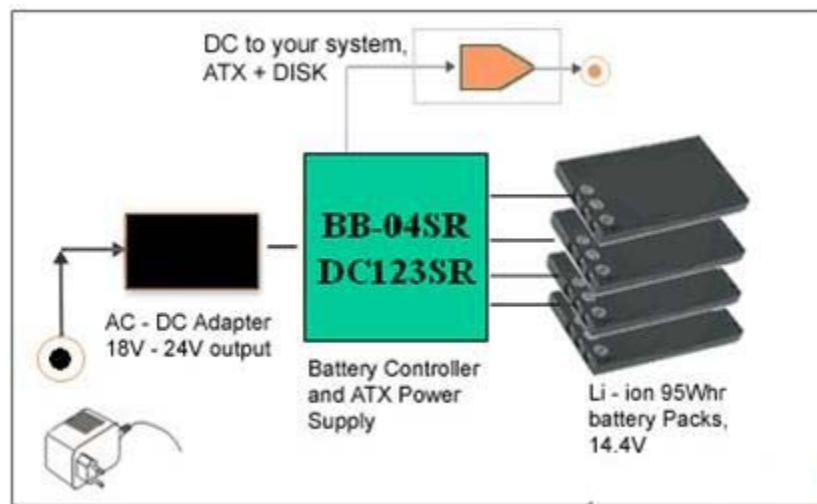
[http://www.ocean-server.com/example\\_configurations.html](http://www.ocean-server.com/example_configurations.html)

#### Example # 1:



Example one shows a BBDC-02R providing power to an embedded system. The BBDC-02R can be ordered in a kit (EK-03 Evaluation Kit).

### Example # 2:



The above example shows a BB-04SR and DC-123SR module providing power to an embedded system. The BB-04SR allows embedded system users to add up to four 95 Watt Hour battery packs (380 Whrs total battery capacity). This above setup can power a low powered system for up to 24 hours.

### Example # 3:



The above picture shows an underwater robot that utilizes OceanServer IBPS modules. The modules used are the MP-08SR, DC123R (ATX) and DC2U-1VR providing 24V DC to power the motor and ATX (3.3V, 5V, 12V & -12V) voltages for the embedded motherboard. The vehicle uses multiple Li-Ion smart packs, which sit in the bottom of the robot.

#### Example # 4:



A complete battery system can be easily integrated into a self-contained, environmentally secure portable package with expandable battery power for greater autonomy. This entire system can be charged and powered from a solar panel. This is an ideal setup for field instruments and wireless devices.

**Final Notes:** The IBPS MP-04/-08 and XP-04S/-08SR units can be clustered together to form very large battery clusters 6,000 Watt Hours plus. The CB-04 communications module enables users to view each Li-Ion Smart pack individually and set shutdown parameters. Please contact OceanServer with any questions and we can recommend a solution to meet your requirements.

## Customer Support

Send technical questions to: [support@ocean-server.com](mailto:support@ocean-server.com)  
Or call us at 508-678-0550 during normal business hours.

#### **Related Publications:**

Please visit our Download page and download our latest hardware and software guides. You will also find Mechanical Drawings and Models for our most popular items.

<http://www.ocean-server.com/download.html>

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