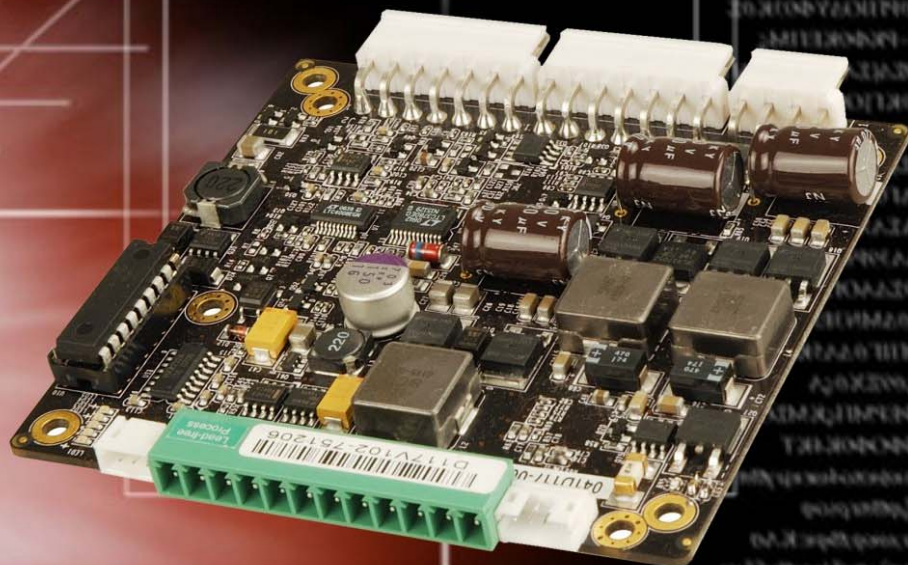




IEI Technology Corp.



MODEL: PM-P006UPS

65W DC/DC Converter Module
with UPS, Utility Software

User Manual

Rev. 1.00 NOVEMBER 2007





Revision

Date	Version	Changes
2007-11	1.00	Initial Release

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Packing List

**NOTE:**

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PM-P006UPS from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the PM-P006UPS package.

- 1 x PM-P006UPS DC/DC converter module
- 1 x RS-232 cable
- 1 x Utility software CD
- 1 x QIG (Quick Installation Guide)

Optional items:

- Li-Polymer Smart Battery
- Cable for AC-DC adapters
- Cable for 63000-FSP120AAB-RS 120W AC-DC adapter
- Cable for Terminal Block
- Power on/off cable to SBC (Power ok and 5VSB)

Images of the above items are shown in **Chapter 3**.

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Chapter

1

Introduction

1.1 PM-P006UPS Overview

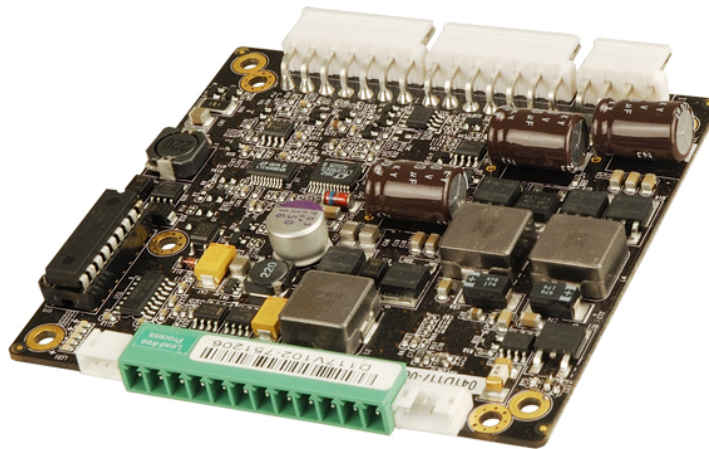


Figure 1-1: PM-P006UPS DC/DC Converter Module

The highly efficient, high-performance PM-P006UPS DC-to-DC converter module provides 5V, 3.3V, 12V, -12V and 5VSB outputs. The PM-P006UPS supports up to two Li-Polymer smart batteries to provide stable and uninterruptible power. The power module also receives a wide range of inputs between 6V and 36V DC. The PM-P006UPS is built on an intelligent design and provides outstanding line and load regulations. The PM-P006UPS is capable of sustaining 90% power efficiency.

The PM-P006UPS power module also comes with the utility software that provides information on current power source, battery status, charging status and remaining percentage.

1.2 PM-P006UPS Power Module Features

- Highly compact design
- High efficiency up to 90%
- Load down protection
- Over voltage protection
- Over current protection
- Short circuit protection
- Supports up to two battery packs
- Supports AT or ATX mode

PM-P006UPS DC/DC Converter Module

- RoHS compliant
- I/O interface:
 - SMBus/I²C
 - RS-232
- Utility software: pull data out through RS-232 to system
- Total output capacity: 65W
- Input Voltage: 6V to 36V DC
- Output Voltage:

Voltage	+5V	+12V	-12V	+3.3V	5VSB
Max. Load	10A	4A	0.1A	8A	1A

Table 1-1: Output Voltage

- Dimensions: 90mm x 96mm
- Environment:
 - Operating temperature: -20°C ~ +85°C
 - Storage temperature: -40°C ~ +125°C
- Weight (NW): 178g

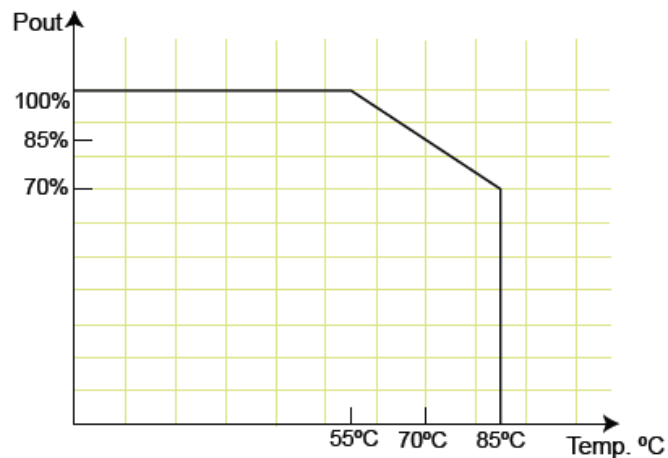


Figure 1-2: Output Power and Temperature

1.3 PM-P006UPS Dimensions

Figure 1-3 shows the PM-P006UPS dimensions. The dimensions are given in millimeters.

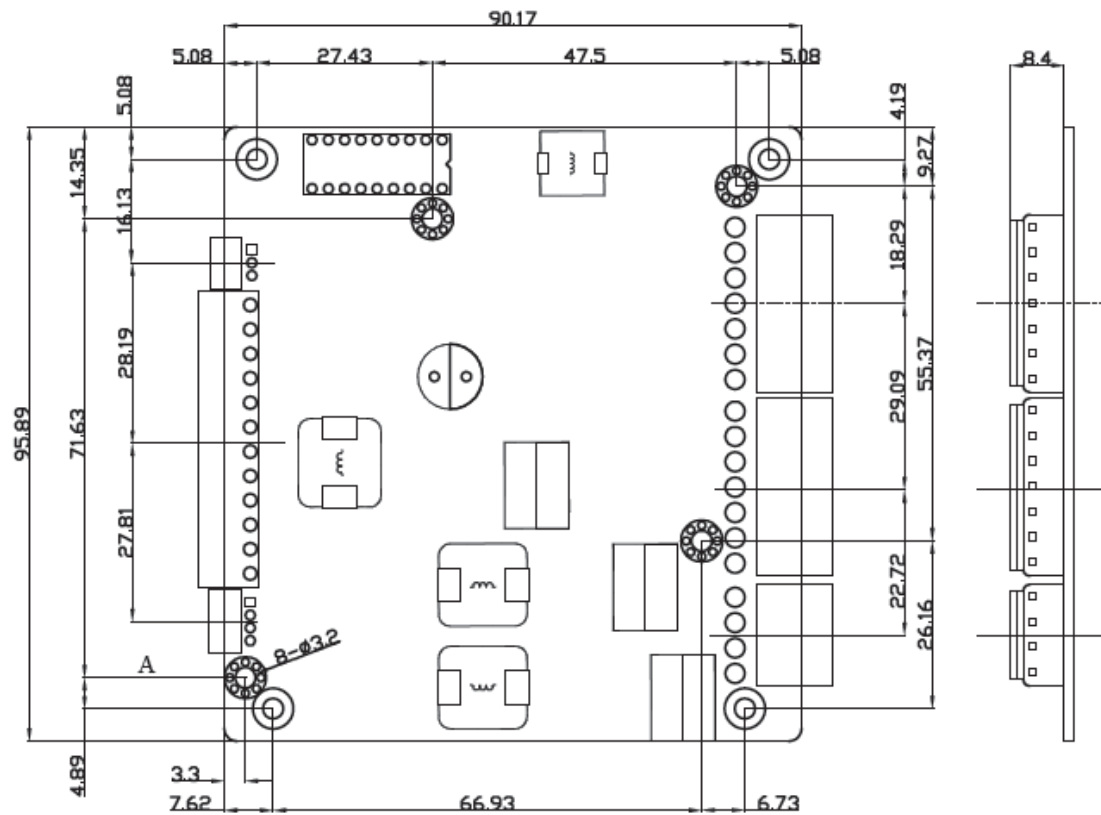


Figure 1-3: PM-P006UPS Dimensions (mm)

Chapter

2

Detailed Specifications

2.1 PM-P006UPS System Block Diagram

Figure 2-1 shows the system block diagram of the PM-P006UPS. The detailed descriptions of the system operation are described in the following sections.

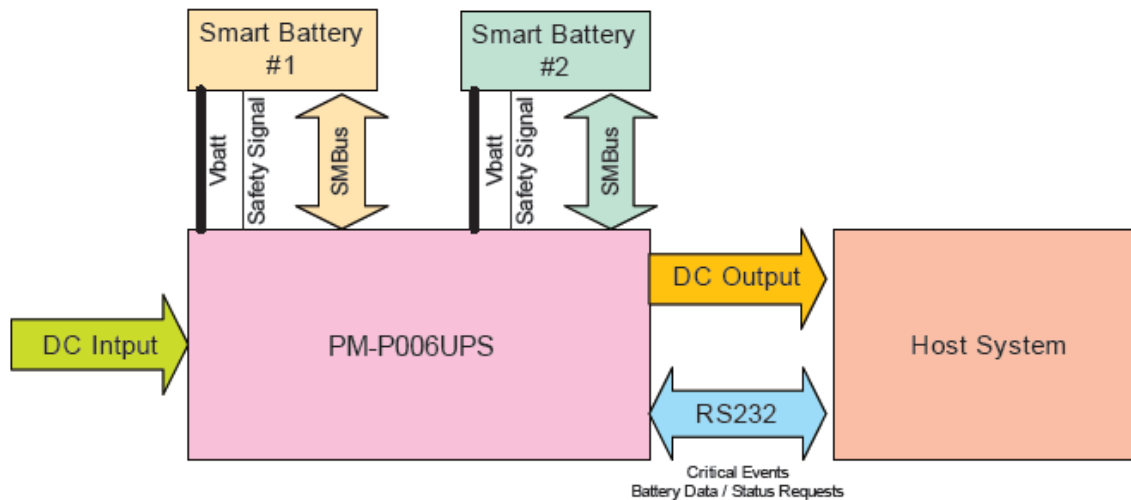


Figure 2-1: PM-P006UPS System Block Diagram

The PM-P006UPS is a charging circuit that provides the Smart Battery with charging current and charging voltage from DC input to match the requirements from Smart Battery. The PM-P006UPS also provides DC output power to the Host System with following features:

- Provide stable and uninterruptible power to equipment during a power outage, line sags and spikes
- Absorb power surges and transients
- Smooth out noisy power sources

The PM-P006UPS receives critical events from the Smart Battery when it detects a problem. The Smart Battery communicates with PM-P006UPS via two separate communication interfaces:

- The SMBus CLOCK and DATA lines (primary communication channel)
- The secondary signaling mechanism or Safety Signal (secondary

PM-P006UPS DC/DC Converter Module

communication channel)

The Host System (SMBus Host) requests information from the battery and then uses it to provide the user information about the battery present state and capabilities. The Host System (SMBus Host) also receives critical events from the Smart Battery when it detects a problem. Using the utility software, the battery state and capabilities can be shown in the Host System through RS-232.

2.2 Safety

Both the battery and the PM-P006UPS must agree it is safe enough to begin charging. If the battery detects some error conditions, the charging never begins. The error conditions might include:

- battery pack voltage too high or low,
- temperature out of acceptable ranges,
- individual cell voltage shorted.

Furthermore, to continue charging, both the battery and the PM-P006UPS must be satisfied it is still safe to do so. The battery sends a message or stop sending messages to the PM-P006UPS to terminate charge if any error condition occurs in the battery. Second, the PM-P006UPS monitors the battery pack Safety Signal terminal. If the Safety Signal moves out of a range that allows charging, the PM-P006UPS immediately terminates charge. This could happen if the temperature of the battery pack got too hot.

These mechanisms are independent of and in addition to any protection mechanisms in the battery pack itself, for example, fuses or protection FETs controlled by hard-wired safety circuitry.

2.3 Battery Specifications

The PM-P006UPS may also come with a Li-Polymer smart battery. Some of the Li-Polymer smart battery specifications are listed in **Table 2-1**.

Battery Type	Li-Polymer
Nominal Capacity	3000mAH
Nominal Voltage	7.4V (Two 3.7V Li-Polymer battery cell)
Main Board	Dual-cell Li-Ion battery PCB, Gauge IC and NTC 10KΩ
Max. Output Power	100W
Max. Output Current	16.7AH
Housing	DR202
Dimensions	148mm x 89mm x 20mm
Operating Temperature	-20°C ~ +60°C
Weight	230g

Table 2-1: BAT-LI-2S1P3000 Specifications

Chapter

3

Unpacking

3.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the PM-P006UPS may result in permanent damage to the PM-P006UPS and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PM-P006UPS. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PM-P006UPS, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the PM-P006UPS, place it on an anti-static pad. This reduces the possibility of ESD damaging the PM-P006UPS.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the PM-P006UPS is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the PM-P006UPS does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

PM-P006UPS DC/DC Converter Module

3.3 Unpacking Checklist



NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PM-P006UPS from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The PM-P006UPS is shipped with the following components:

Quantity	Item	Image
1	PM-P006UPS DC/DC converter module	
1	RS-232 cable (P/N: 32100-157200-RS)	
1	Utility software CD	
1	QIG (Quick Installation Guide)	

Table 3-1: Package List Contents

3.3.2 Optional Items


NOTE:

The items listed in this section are optional items that must be ordered separately. Please contact your PM-P006UPS vendor, distributor or reseller for more information or, contact iEi directly by sending an email to sales@iei.com.tw.

The following optional items are available for the PM-P006UPS.

Quantity	Item and Part Number	Image
1	Li-Polymer Smart Battery, 2S1P, 3000mAH (P/N: BAT-LI-2S1P3000)	
DC Input Cable		
1	Cable for following AC-DC adapters -FSP0601AD101C 60W -UP0451E12P 45W -UP0251E12PL 25W (P/N: CB-P1LP4-RS)	
1	Cable for 63000-FSP120AAB-RS 120W AC-DC adapter (P/N: CB-MD4P4-RS)	
1	Cable for Terminal Block (P/N: CB-NOLP4-RS)	

PM-P006UPS DC/DC Converter Module

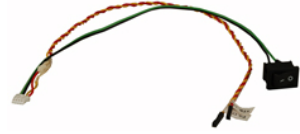
Power On/Off Cable		
1	Cable to SBC (Power ok and 5VSB) (P/N: CB-JST3PSW001-RS)	

Table 3-2: Optional Items



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Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.1 shows peripheral interface connector locations. Section 4.1.2 lists all the peripheral interface connectors seen in Section 4.1.1.

4.1.1 PM-P006UPS Layout

Figure 4-1 shows the on-board peripheral connectors of PM-P006UPS.

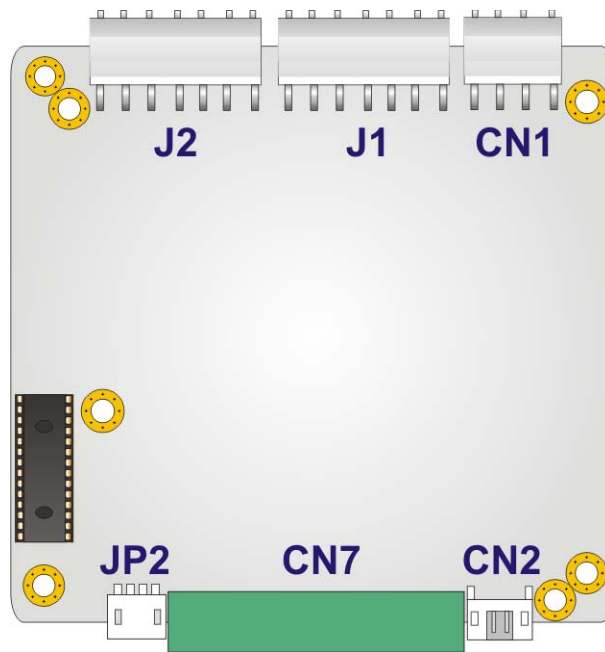


Figure 4-1: PM-P006UPS Connector Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the PM-P006UPS. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX mode connector	4-pin wafer connector	CN2
Battery connector (1)	7-pin wafer connector	J1

PM-P006UPS DC/DC Converter Module

Battery connector (2)	7-pin wafer connector	J2
Input power connector	4-pin wafer connector	CN1
Output power connector	12-pin connector	CN7
RS-232 cable connector	3-pin wafer connector	JP2

Table 4-1: Peripheral Interface Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the PM-P006UPS.

4.2.1 ATX Mode Connector

CN Label:	CN2
CN Type:	4-pin wafer connector (1x4)
CN Location:	See Figure 4-2
CN Pinout s:	See Table 4-2

Connect the ATX Mode Connector (CN2) to the motherboard to use ATX mode to control power on/off.

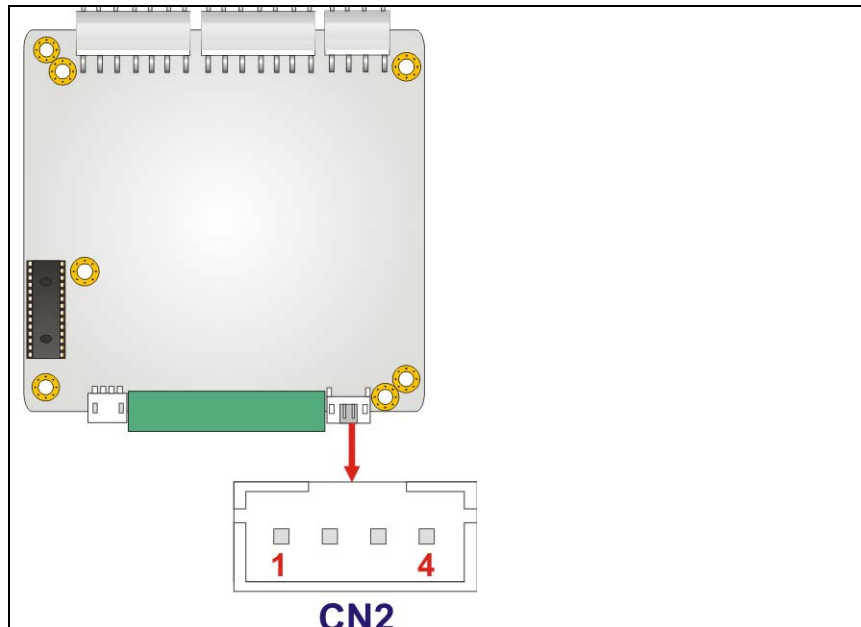


Figure 4-2: ATX Mode Connector Location

PIN NO.	DESCRIPTION
1	PWROK
2	5VSB
3	GROUND
4	PS_ON

Table 4-2: ATX Mode Connector Pinouts

Use either one of the following cable to connect CN2 with motherboard:

	Cable to SBC (Power ok and 5VSB) (P/N: CB-JST3PSW001-RS)
--	---

Table 4-3: CN2 Connector Cable

PM-P006UPS DC/DC Converter Module

4.2.2 Battery Connectors

- CN Label:** J1, J2
- CN Type:** 7-pin wafer connector (1x7)
- CN Location:** See Figure 4-3
- CN Pinouts:** See Table 4-4

This connector is connected to the smart battery.

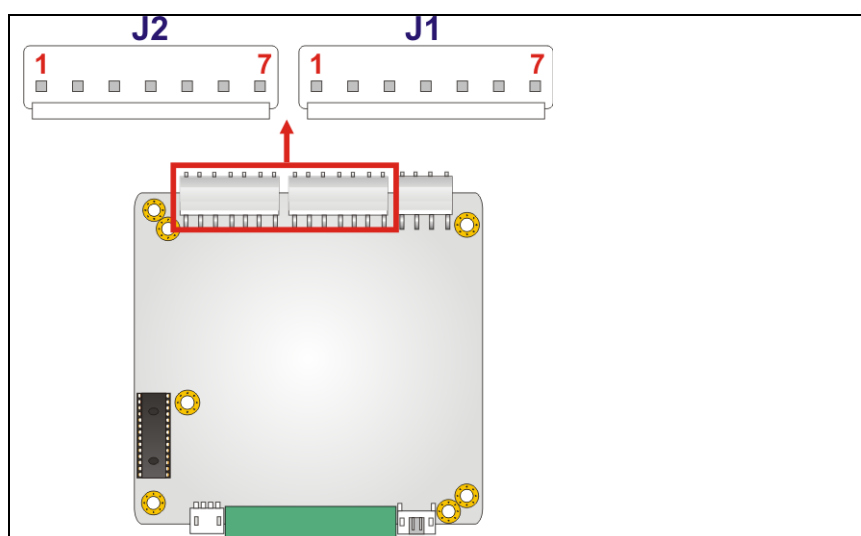


Figure 4-3: Battery Connector Locations

PIN NO.	DESCRIPTION
1	BAT+
2	BAT+
3	Clock
4	DATA
5	Temp
6	GROUND
7	GROUND

Table 4-4: Battery Connector Pinouts

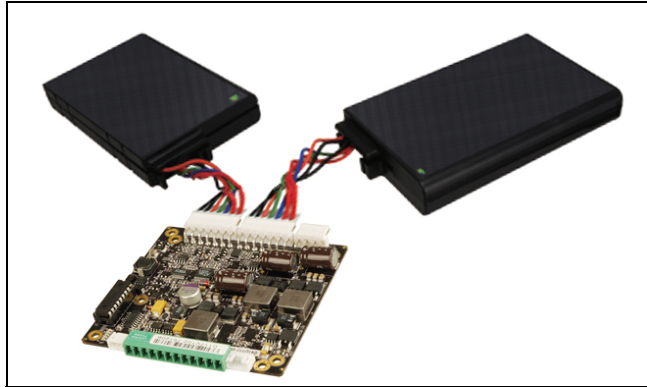


Figure 4-4: Battery Connected

4.2.3 Input Power Connector

CN Label: CN1

CN Type: 4-pin wafer connector (1x4)

CN Location: See Figure 4-5

CN Pinouts: See Table 4-5

The input power connector is connected to power source, such as a power adapter or a terminal block.

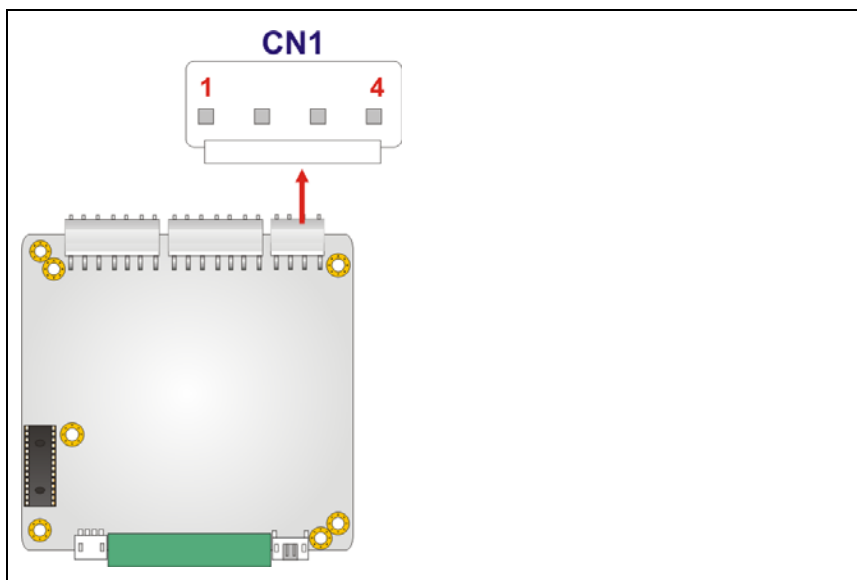


Figure 4-5: Input Power Connector Location

PM-P006UPS DC/DC Converter Module

PIN NO.	DESCRIPTION
1	VIN
2	VIN
3	GROUND
4	GROUND

Table 4-5: Input Power Connector Pinouts

Use either one of the following cables to connect CN1 with power source:

	Cable for following AC-DC adapters -FSP0601AD101C 60W -UP0451E12P 45W -UP0251E12PL 25W (P/N: CB-P1LP4-RS)
	Cable for 63000-FSP120AAB-RS 120W AC-DC adapter (P/N: CB-MD4P4-RS)
	Cable for Terminal Block (P/N: CB-NOLP4-RS)

Table 4-6: CN1 Connector Cables

4.2.4 Output Power Connectors

CN Label:	CN7
CN Type:	12-pin connector (1x12)
CN Location:	See Figure 4-6
CN Pinouts:	See Table 4-7

The power module provides power to devices through this output power connector.

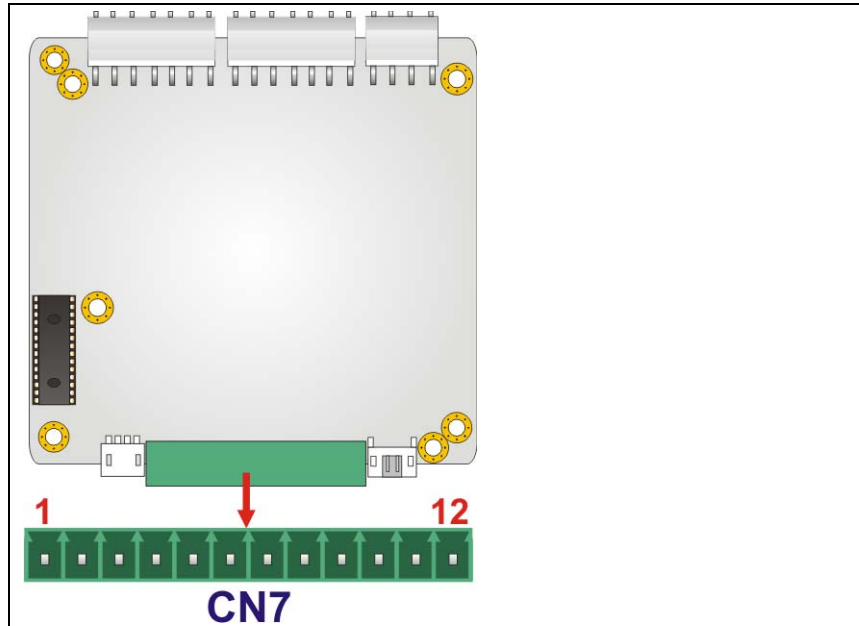


Figure 4-6: Output Power Connector Locations

PIN NO.	DESCRIPTION
1	N12V
2	GROUND
3	+12V
4	GROUND
5	3V
6	3V
7	GROUND
8	5V
9	5V
10	GROUND
11	5V_SB
12	GROUND

Table 4-7: Output Power Connector Pinouts

PM-P006UPS DC/DC Converter Module

4.2.5 RS-232 Cable Connector

- CN Label:** JP2
- CN Type:** 3-pin wafer connector (1x3)
- CN Location:** See Figure 4-7
- CN Pinouts:** See Table 4-8

This connector enables the PM-P006UPS to communicate with the SBC through RS-232 serial port.

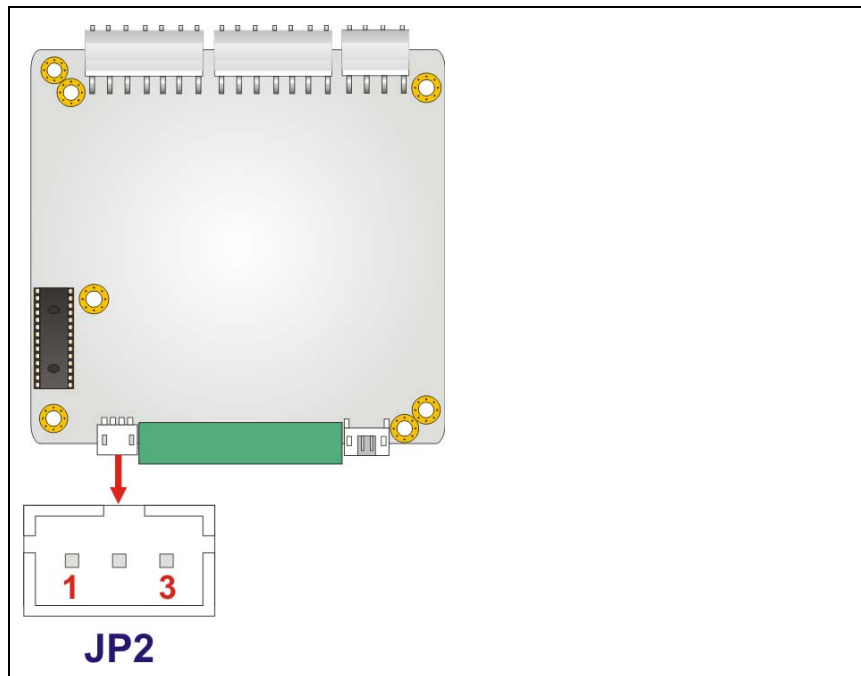


Figure 4-7: RS-232 Cable Connector Location

PIN NO.	DESCRIPTION
1	GROUND
2	TX
3	RX

Table 4-8: RS-232 Cable Connector Pinouts

Use the following cable to connect JP2 with the serial port of the SBC.

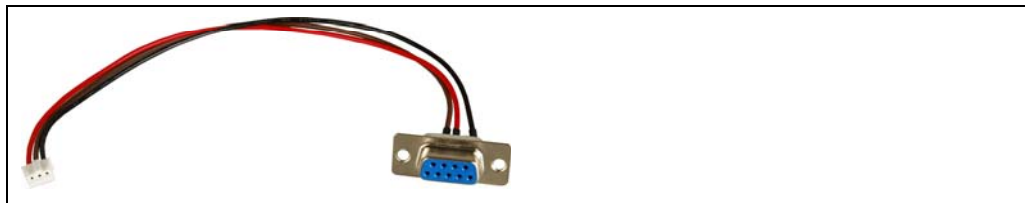


Figure 4-8: JP2 Connector Cable (RS-232 cable)

Chapter

5

Software Application

5.1 Introduction

The IEI IDDUPS Battery Status Monitor application detects the information of the smart battery and monitors the battery status. It is recommended to execute this IDDUPS application in Windows XP SP2 environment.

5.2 Monitoring DC Power and Smart Battery

5.2.1 Using the Application

Follow the steps below to start the IDDUPS Battery application.

Step 1: Use the RS-232 cable to connect the JP2 connector on the PM-P006UPS to the serial port of the SBC. Please refer to **Section 4.2.5** for the location of the JP2 connector.

Step 2: Insert the application CD that comes with PM-P006UPS.

Step 3: Double click the **IDDUPS.exe** icon (**Figure 5-1**).



IDDUPS.exe
IDDUPS Battery Status Monitor
IEI Technology Corp.

Figure 5-1: IDDUPS Battery Status Monitor Application

Step 4: Click the SETTING tab when the IDDUPS Battery application is loaded (**Figure 5-2**).

PM-P006UPS DC/DC Converter Module

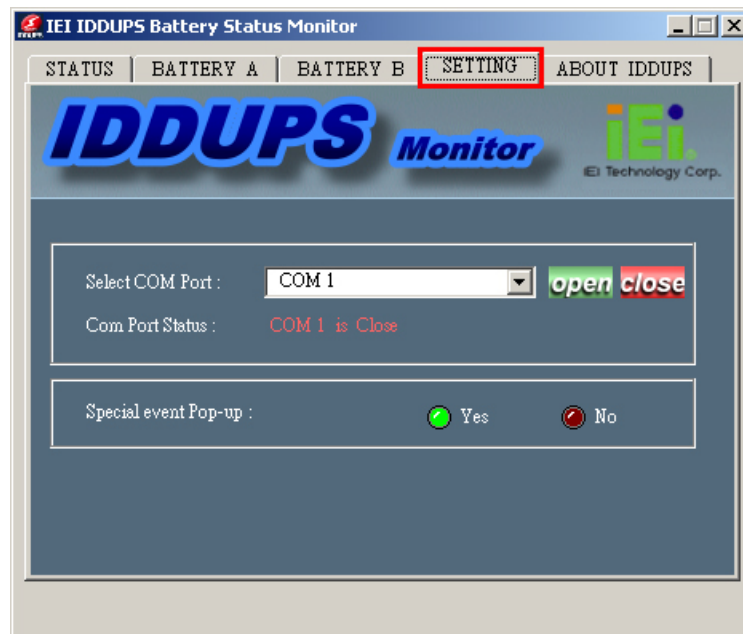


Figure 5-2: IDDUPS Battery Application - Setting

Step 5: Select the label of the connected serial port of the SBC (Figure 5-3).

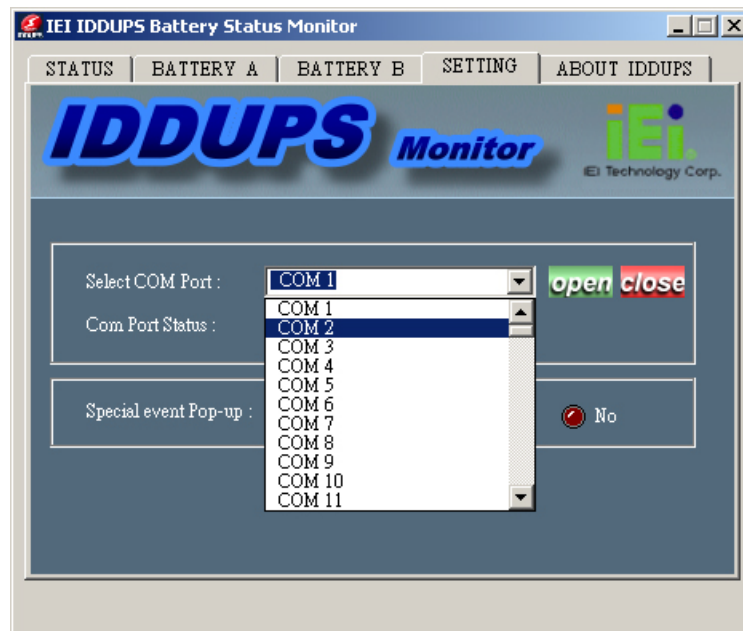


Figure 5-3: Serial Port Selection

Step 6: Press **open** to activate the selected serial port. The Com Port Status on the application shows the selected COM port is open (**Figure 5-4**).



Figure 5-4: Activate the Connected Serial Port

5.2.2 Status Information

The IEI IDDUPS Battery Status Monitor application shows the DC power status and battery status (**Figure 5-5**). The following sections describe the status information in details.

PM-P006UPS DC/DC Converter Module

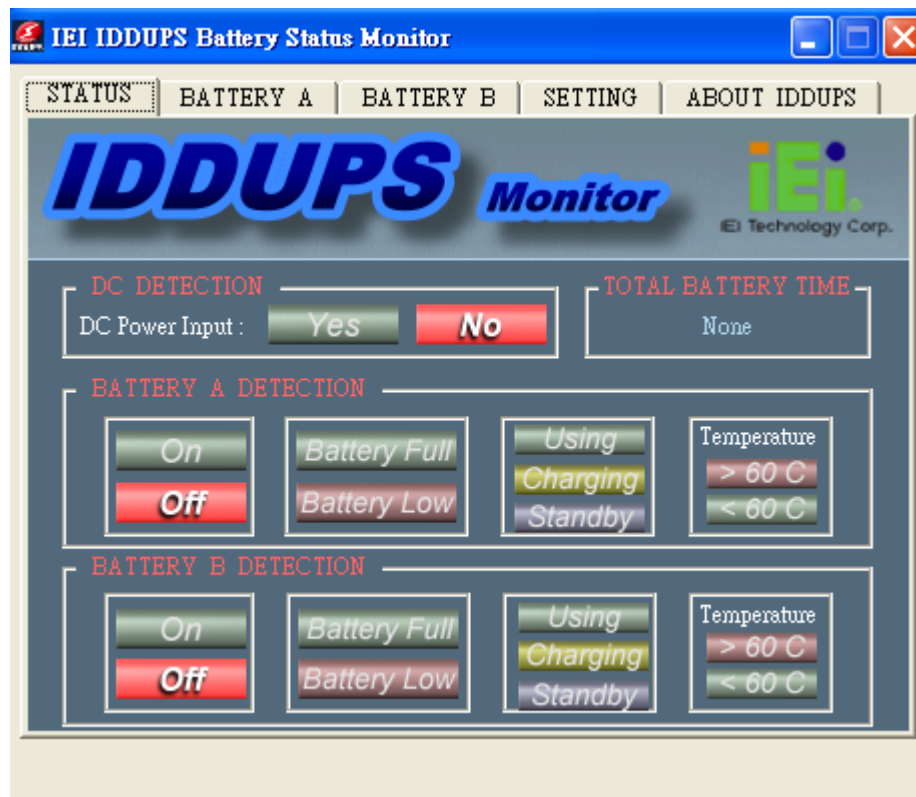


Figure 5-5: Status Information

5.2.2.1 DC Detection

When the DC power is connected to the PM-P006UPS power module, the IDDUPS Battery Status Monitor detects it and shows in the screen as **Figure 5-6**.

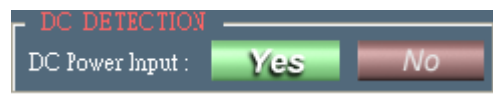


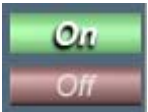
Figure 5-6: DC Detection

5.2.2.2 Battery Detection

When the smart battery is connected to the PM-P006UPS power module, the IDDUPS Battery Status Monitor detects it and shows in the screen as **Figure 5-7**. Two batteries can be connected to the PM-P006UPS power module at the same time. The second battery information is shown in the **Battery B Detection** section if connected.



Figure 5-7: Battery Detection

	On	The battery is connected to the PM-P006UPS.
	Off	The battery is not connected to the PM-P006UPS.
	Battery Full	The battery is fully charged.
	Battery Low	The battery is low.
	Using	The battery is being used.
	Charging	The battery is being charged.
	Standby	The battery is fully charged and ready to be used anytime.
	>60 C	The battery temperature is above 60°C.
	<60 C	The battery temperature is below 60°C.

5.2.2.3 Battery Remaining Time

The battery remaining time is shown in the top right corner (**Figure 5-8**) of the status screen to indicate the total battery remaining time. To view the individual battery time, click on the BATTERY A or BATTERY B tab (**Section 5.2.3**).



Figure 5-8: Battery Remaining Time

5.2.3 Battery Information

Click on the BATTERY A or BATTERY B tab to view the information of battery A or battery B. The listed information includes battery type, capacity, output voltage, temperature, charging rate, discharging rate and battery remaining time (**Figure 5-9**). The values listed are updated per second.

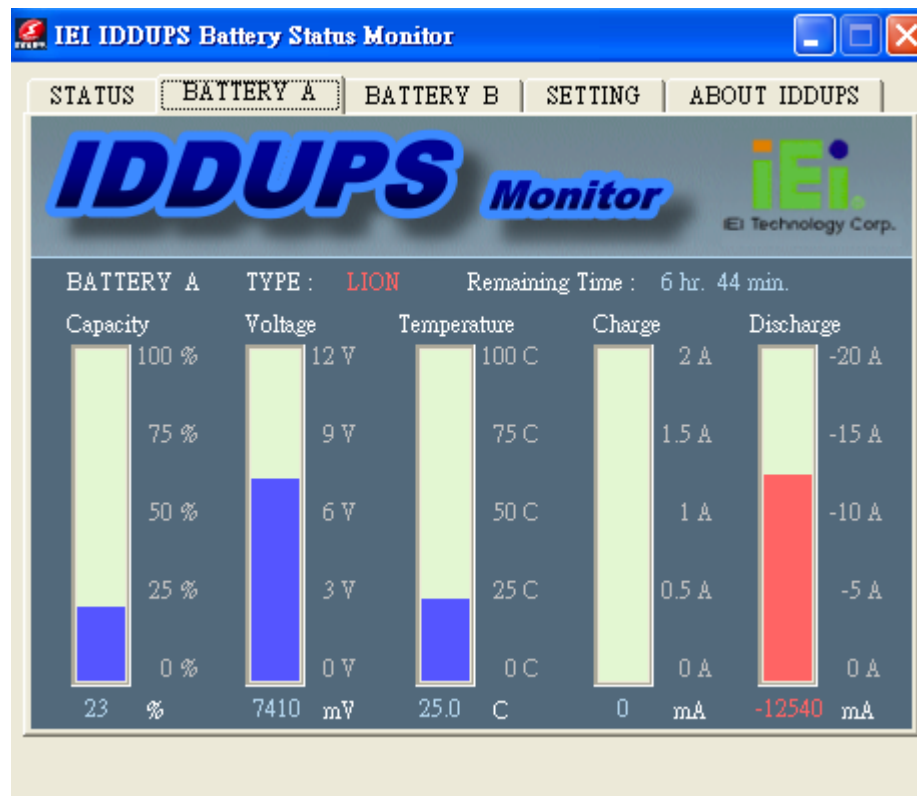


Figure 5-9: Battery Information

5.2.4 Setting

Click on the SETTING tab to select the COM port or enable/disable the special event pop-up window (**Figure 5-10**).

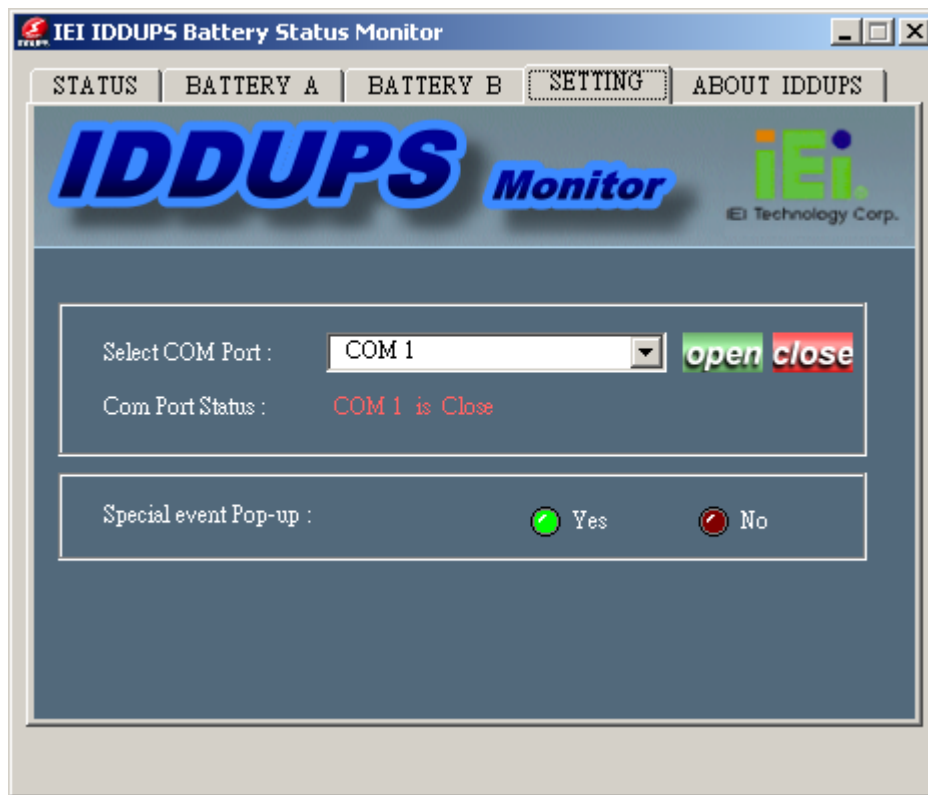


Figure 5-10: Application Setting

When the IDDUPS Battery Status Monitor application starts up, the user need to click the SETTING tab to select the connected COM port of the SBC and activate the COM port by clicking the **open** button. Please refer to **Section 5.2.1** for step-by-step description.

Figure 5-11 shows the COM 2 is open by the user for connecting the PM-P006UPS to the SBC.

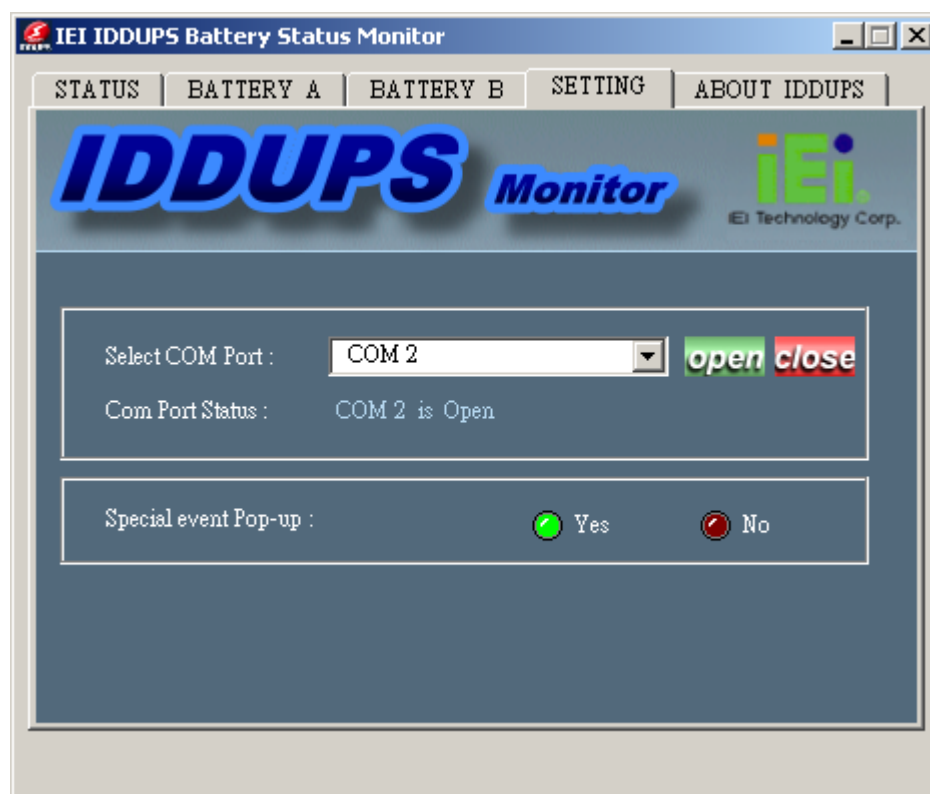


Figure 5-11: COM Port Status

The IDDUPS Battery Status Monitor application will notify users with pop-up window if some special events happen, such as battery low or temperature over 60°C. This function can be enabled or disabled. Click **Yes** to enable or click **No** to disable (Figure 5-12).



Figure 5-12: Special Event Pop-up Setting

5.3 System Log

The IDDUPS application provides easy access to the system log. To view the system log, right click the icon in the quick launch toolbar on the desktop as shown in Figure 5-13 and select **System Log**.

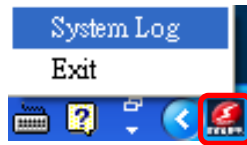


Figure 5-13: IDDUPS Application Quick Launch Icon

After clicking on the System Log, a screen pops-up (**Figure 5-14**) and displays all events that have happened.

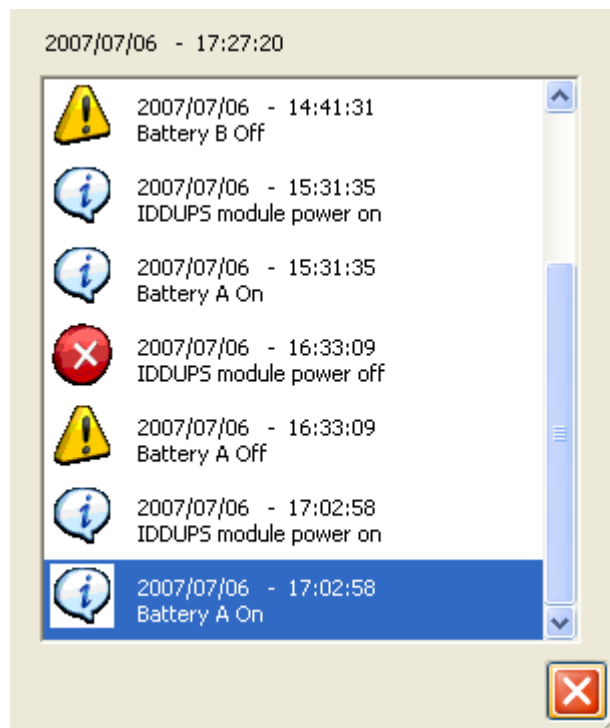


Figure 5-14: System Log Example

PM-P006UPS DC/DC Converter Module

5.4 Exit

To close the IDDUPS application, right click the icon in the quick launch toolbar on the desktop as shown in and select **Exit** (Figure 5-15).

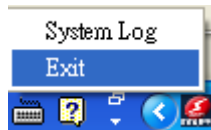


Figure 5-15: Exit IDDUPS Application



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Appendix

A

Hazardous Materials Disclosure

A.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

PM-P006UPS DC/DC Converter Module

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	x	O	O	O	O	x
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O
O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006						

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						

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