
SiP-41/42B

Smart Industrial UPS Box

User's Manual

Version 1.0

Revision History

Version	Date	Description
1.0	2020.06	Initial release

Revision History ii

Contents i

Preface..... iii

Chapter 1 - Introduction..... 1

 1.1 Features..... 2

 1.3 Package Contents..... 2

 1.4 Ordering Information 2

 1.5 Dimensions 3

 1.6 Specifications..... 4

Chapter 2 - Installation & Configuration..... 7

 2.1 Getting to Know the UPS Box..... 8

 2.2 Connection..... 9

 2.3 Ensure Your PC is On Automatically When Power Resumes 11

 2.4 DIN-Rail Mounting 12

 2.5 Monitoring Power Status..... 12

 2.6 Configuring the UPS Box (Optional) 15

Chapter 3 - Operation Mode 19

 3.1 Normal Mode 20

 3.2 Backup Mode 21

 3.3 Operation When DC Power Resumes 23

Copyright Notice

All Rights Reserved.

The information in this document is subject to change without prior notice in order to improve the reliability, design and function. It does not represent a commitment on the part of the manufacturer.

Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this document may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped or damaged.
 - f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

Warning

The device and its components contain very delicately Integrated Circuits (IC). To protect the device and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your device from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the device, whenever components are separated from the system.

Supercapacitor Replacement

Incorrect replacement of the supercapacitor may lead to malfunction of the product. The supercapacitor must be replaced by the manufacturer.

Do not throw supercapacitors into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please contact us at:

<https://www.arbor-technology.com>

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

Introduction

1.1 Features

- Long-term availability and value-added services
- Backup time including safe shutdown
- Wide range power input : +12~28VDC
- Dual power output : +12 or +24VDC
- Wide operating temperature range (-20°C to 70°C)
- System monitoring for powered device(PD)
- Reboot function for PC-based systems

1.3 Package Contents

Upon opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, contact your local dealer or distributor. The package should contain the following items:



1 x SiP-41/42B



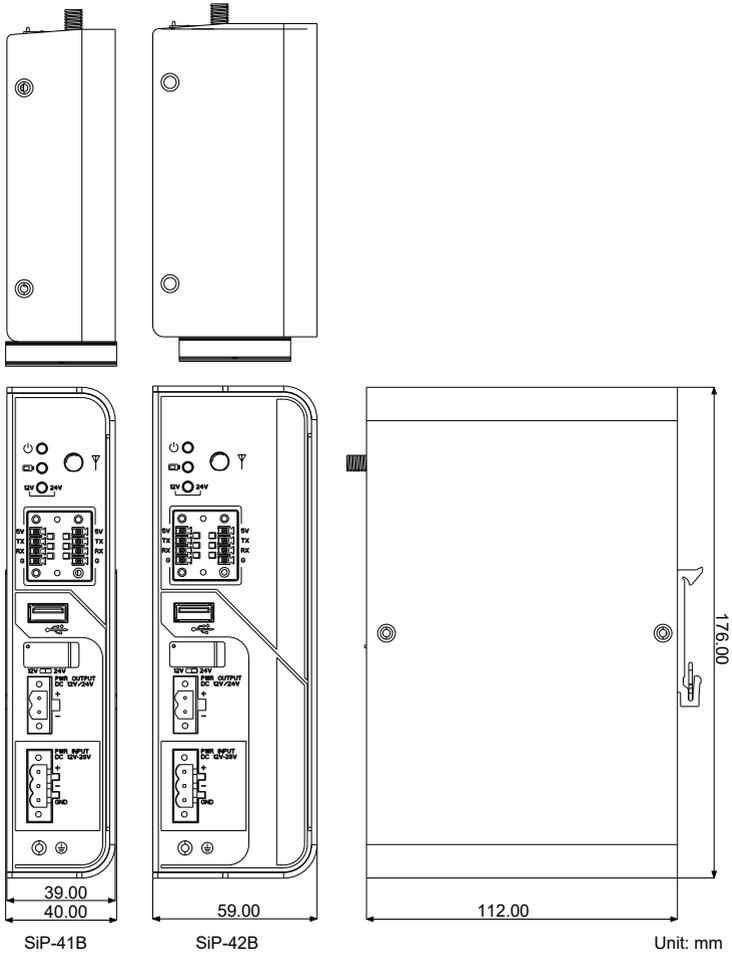
1 x **Accessory Box** that contains the following items:

- 1 x User's manual
- 1 x USB to USB cable
- 1 x 2-pin plug for terminal block
- 1 x 3-pin plug for terminal block

1.4 Ordering Information

SiP-41B	4S1P, 4x100F Smart Industrial UPS Box
SiP-42B	4S2P, 8x100F Smart Industrial UPS Box

1.5 Dimensions



1.6 Specifications

System	
Chip	High Current Super CAP Backup Controller
Supercapacitor	
Capacity	100 Farads / each
Power Requirement	
Power Input	DC +12/19/24V Input Support
Output voltage backup mode	DC +12V or 24V, selectable via switch
Output voltage normal mode	V _{in} -0.2 V at 100 % load
Output power	Max. 60W
Power Management	Powered device reboot via software
Monitoring	Real-time health monitoring of powered device
I/O	
Power Input	1 x 3-Pin Terminal Block
Power Output	1 x 2-Pin Terminal Block
Switch for Power Output	1 x Slide Switch
USB	1 x Type-A Connector
Terminal Block	1 x 8-pin terminal block for external sensor interface
Environmental	
Operating Temp.	-20°C ~ 70°C (-4°F ~ 140°F)
Storage Temp.	-30°C ~ 80°C (-22°F ~ 158°F)
Operating Humidity	10 ~ 95% RH @ 70°C (non-condensing)
Vibration	0.5 Grms/5~500Hz/random operation
Shock	Operating 10G (11ms), Non-operating 30G
Mechanical	
Mounting	Din Rail Mount with Bracket
Chassis	Din Rail-mounting chassis, and SECC steel chassis

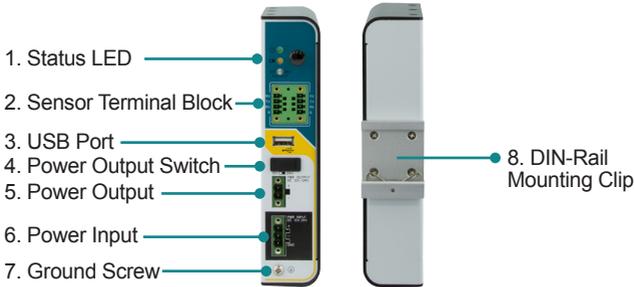
Weight	SiP-41B: 690g(1.52lb) SiP-42B: 860g(1.90lb)
Dimensions (W x H x D)	SiP-41B: 169(W) X 108(D) X 36(H) mm SiP-42B: 169(W) X 108(D) X 56(H) mm
Nominal backup time, measured at +25 °C	
SiP-41B	30W ~33sec ; 60W ~16sec
SiP-42B	30W ~66sec ; 60W ~32sec
OS Support	
Windows 7/10, Linux Kernel 4.x	

This page is intentionally left blank.

Chapter 2

Installation

2.1 Getting to Know the UPS Box



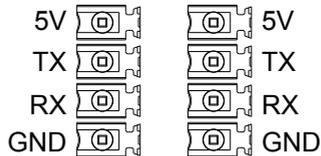
No.	Item	Descriptions
1	Status LED	Displays power & charging status. See below for details.
2	Sensor Terminal Block	8-pin terminal block for sensor connection.
3	USB Port	USB 2.0 port To connect to a PC for monitoring UPS box power status.
4	Power Output Switch	Open the hinge and use a pointed object to slide the switch to 12V or 24V output voltage according to the acceptable power input of the connected industrial PC system.
5	Power Input	DC 12/19/24V wide voltage power input terminal block To connect to the power source.
6	Power Output Terminal Block	DC 12V or 24V power output terminal block To connect to the power input of the industrial PC system.
7	Ground Screw	Ground screw for ground connection.
8	DIN-Rail Mounting Clip	For DIN-rail mounting.

Status LED

LED	Color	Status	Descriptions
PWR IN 	Green	Solid	Power input is on.
		Off	Power input is off.
Charging 	Orange	Flashing	UPS box is exporting power to connected device.
		Solid	UPS box is charging.
		Off	UPS box is fully charged.

24/12V	Green	Solid	UPS box power output is 24V.
PWR OUT	Orange	Solid	UPS box power output is 12V.

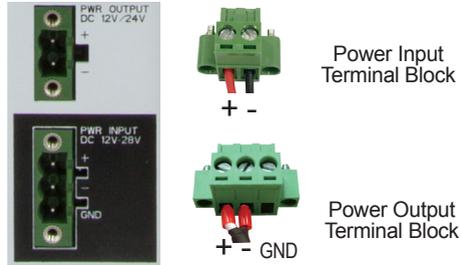
Sensor Pin Assignment



2.2 Connection

A. Wiring the Power Input and Power Output

1. Before wiring, make sure the power source is disconnected.
2. Find the terminal block in the accessory box.
3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the panel indicating the polarities and power range in voltage.
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.



B. Connecting the UPS box to Your Industrial PC System

1. Connect the power input of your IPC to the power output of the UPS box.
2. Slide the **PWR OUTPUT VOLTAGE** switch on the UPS box to 24V or 12V according to the acceptable power input of the connected system.



3. To monitor the UPS box power status, connect the UPS box to your industrial PC system via USB or COM port.

If you are using USB port, you need to install USB-to-COM port driver. See next section for details.

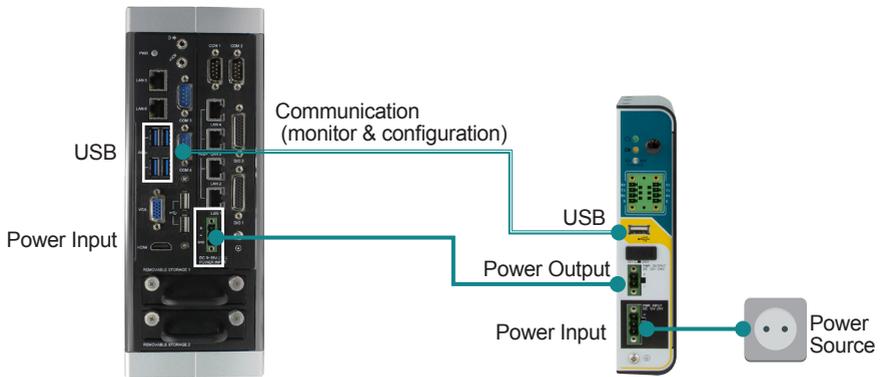
C. Connecting the UPS box to power source

Connect the power input of the UPS box to the power source (DC 12/19/24V).

D. Grounding the UPS box

Remove the ground screw from the front panel. Then attach a ground wire to the panel with the screw.

The following diagram illustrates a sample connection. Actual connection may vary according to your industrial PC system.

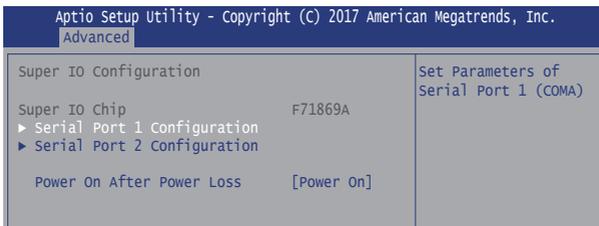


Connection Diagram Example

2.3 Ensure Your PC is On Automatically When Power Resumes

To ensure that your industrial PC restarts automatically after a power outage is over, you have to enable the computer to "see" the power returning by configuring the PC's BIOS settings as described below:

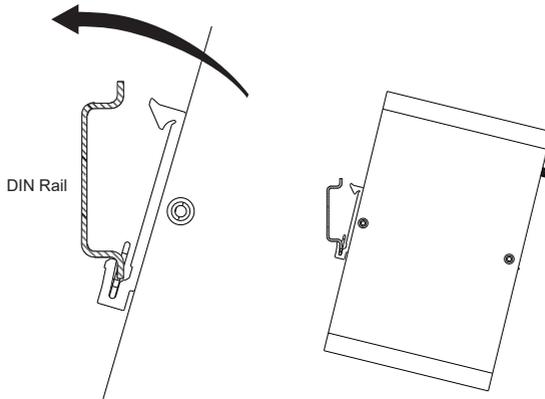
1. Open your computer's BIOS settings menu.
2. Look for the Power Settings menu. Ensure the "**Power on after Power Loss**" (or similar) setting is set to "**Power On**" as the example below:



2.4 DIN-Rail Mounting

The DIN-rail mounting clip is screwed on the UPS box in the factory. To DIN mount the UPS box:

1. Snap the DIN Rail clip to the upper edge (with a spring) of the DIN Rail.
2. Press the UPS box firmly downward towards the DIN Rail until the DIN Rail clip tab engages and snaps to the bottom edge of the DIN Rail.



2.5 Monitoring Power Status

Prerequisites

The UPS box comes with a Windows-based monitoring utility to monitor the UPS box power status. You can also use the utility to configure the shutdown mode and timeout settings.

To use the utility, make sure your industrial PC system meets the following requirement:

- Make sure the **USB connection** between the UPS box and the industrial PC is established for communication.
- Windows system with **.NET Framework 3.5** or above installed.
- **USB-to-COM driver installed:**

1. Visit ARBOR website and locate the driver page of the UPS box. Download the driver according to your operation system and save it to the industrial PC.
2. Extract the files. Double-click the driver installer file and follow the on-screen instructions to complete the installation.

- Install the **SiP Management Utility**.

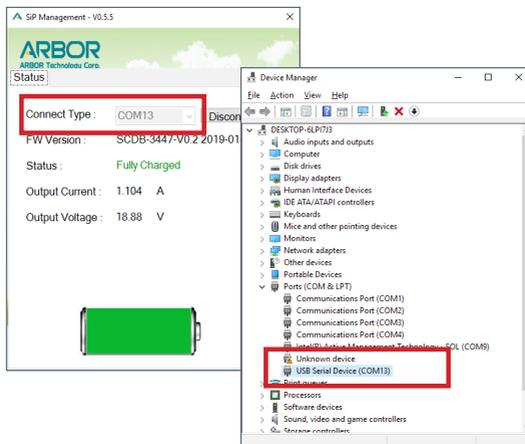
Visit ARBOR website and locate the driver page of UPS box. Download the installer file of the **SiP Management Utility** and install it to the industrial PC.

Running the SiP Management Utility

The **SiP Management Utility** will be automatically launched upon system start up. To access the utility, please use the utility icon in the systray.



The **SiP Management Utility** will automatically detect the interface to communicate with the SiP-41/42B.



Note: If the utility keeps detecting **Connection Type**, it could be the system didn't find the USB-to-Serial interface upon startup. Make sure the **USB connection** between the UPS box and the industrial PC is established and restart the industrial PC to retry.

Monitoring UPS Box Power Status

On the **Status** tab you can view the UPS box power information.



The following information are provided:

- **Connect Type:** The interface connected to the UPS box.
- **FW version:** The firmware version of the UPS box.
- **Status:** The charging status of the UPS box.
 - **Fully Charged:** The UPS box is fully charged from the connected power system.
 - **Charging:** The UPS box is charging from the connected power system.
 - **Discharging:** Power system is disconnected from the UPS box and the charging is stopped.
- **Output current:** The UPS box's output current.
- **Output voltage:** The UPS box's output voltage.

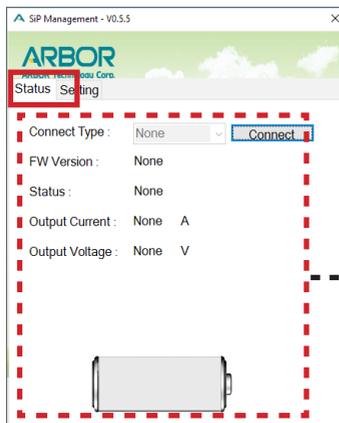
2.6 Configuring the UPS Box (Optional)

The UPS box utility allows you to configure the shutdown mode and timeout settings in case of power loss. If you need to make the configuration:

1. Launch the UPS box monitoring utility. On the **Status** tab, click the **Disconnect** button.



2. The connection between the UPS box and the industrial PC system will be disconnected and the originally displayed values will disappear. A **Settings** tab will appear. Click the **Settings** tab.



When using the utility for configuration purpose, the connection between the UPS box and the industrial PC system will be disconnected. As a result, no information will be displayed on the **Status** tab at this moment.

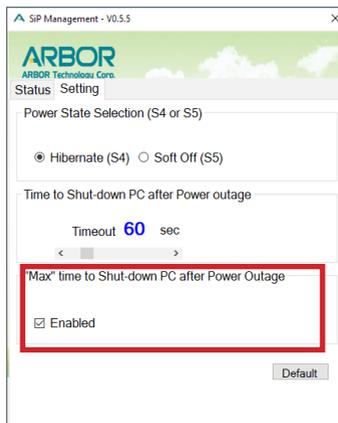
On the **Settings** tab, you can configure the following settings:

- **Power State Selection:** Select the power off mode upon power loss. Options include **Hibernate (S4)** (default) and **Soft Off (S5)**.
 - **Hibernate (S4):** The system saves the contents of volatile memory to a hard drive. After coming back from S4, then user can resume work where it was left off.
 - **Soft off (S5):** Known as a shutdown. The entire user session is torn down and restarted on the next boot. As a result a startup from this state takes longer than S4.
- **Time to shut down PC after power outage:**

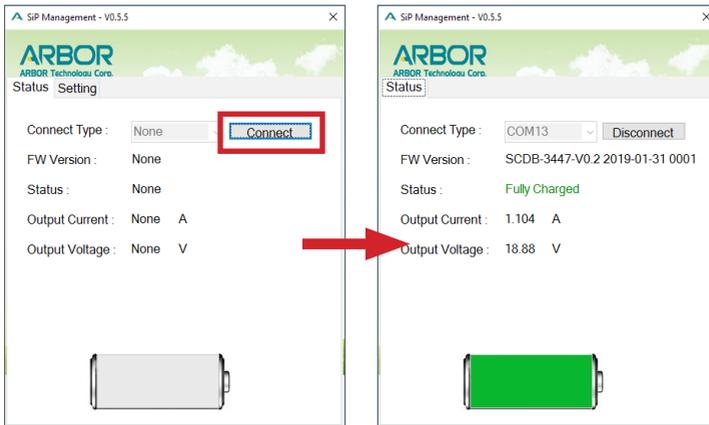
When power outage occurs, the UPS box will hibernate/shut down your PC after this time counts down to zero. The default is 60 seconds.
- **Max time to shut down PC after power outage:**

This option is enabled by default to force the PC to hibernate/shut down in case the remaining power is not enough. When power outage occurs, the UPS box keeps monitoring if the remaining capacity is enough for the IPC operation. If the capacity reaches a low limit, the UPS box will hibernate/shutdown the IPC after 10 seconds anyway, regardless of the shutdown timeout settings.

It is recommended that you enable this option to ensure the IPC can be safely shut down.



- After completing the settings, click the **Status** tab and click the **Connect** button to restore the connection.



After connection, the power information will be displayed again on the **Status** tab.

This page is intentionally left blank.

Chapter 3

Operation Mode

3.1 Normal Mode

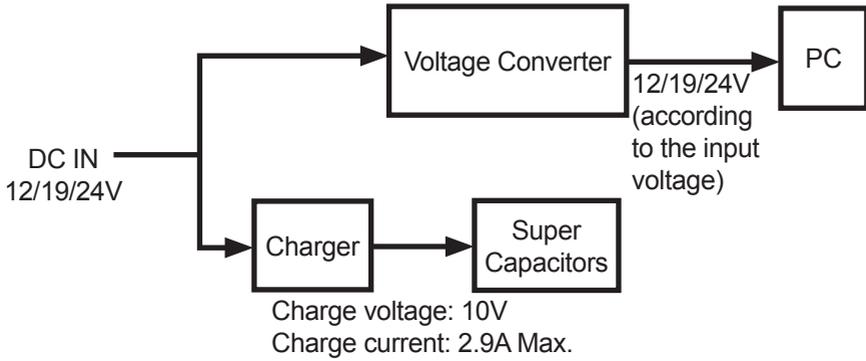


Figure 3-1 UPS Box Operation on DC Power

When DC power is available to the UPS box:

- The DC power supply provides both charging current for the supercapacitors and the load current for the connected IPC at the same time.
- The charging current for supercapacitors is 2.9A at maximum. It will decrease automatically if the adapter rated power is less than the sum of the charging power and load power.

3.2 Backup Mode

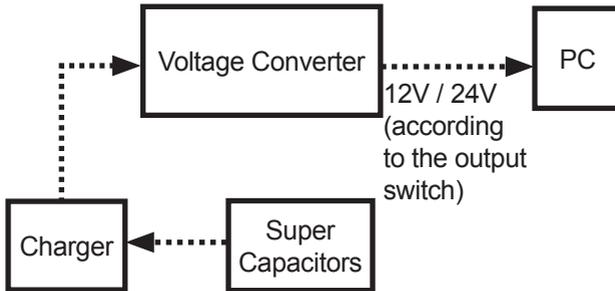


Figure 3-2 UPS Box Operation During Power Outages

When DC power is not available to the UPS box:

- The supercapacitors start providing power to the connected IPC to maintain its operation.
- After the shutdown timeout expires (60 seconds by default), the UPS box starts to hibernate (default) or shutdown your IPC.

If the power resumes during this phase, the countdown timer will automatically stop counting.

- During the timeout period, the UPS box keeps monitoring if the remaining capacity is enough for the IPC operation. If the capacity reaches a low limit, the UPS box will hibernate/shutdown the IPC after 10 seconds anyway, regardless of the shutdown timeout settings.

Operation Mode

The following graphic shows the timeline of events that occur during power outages:

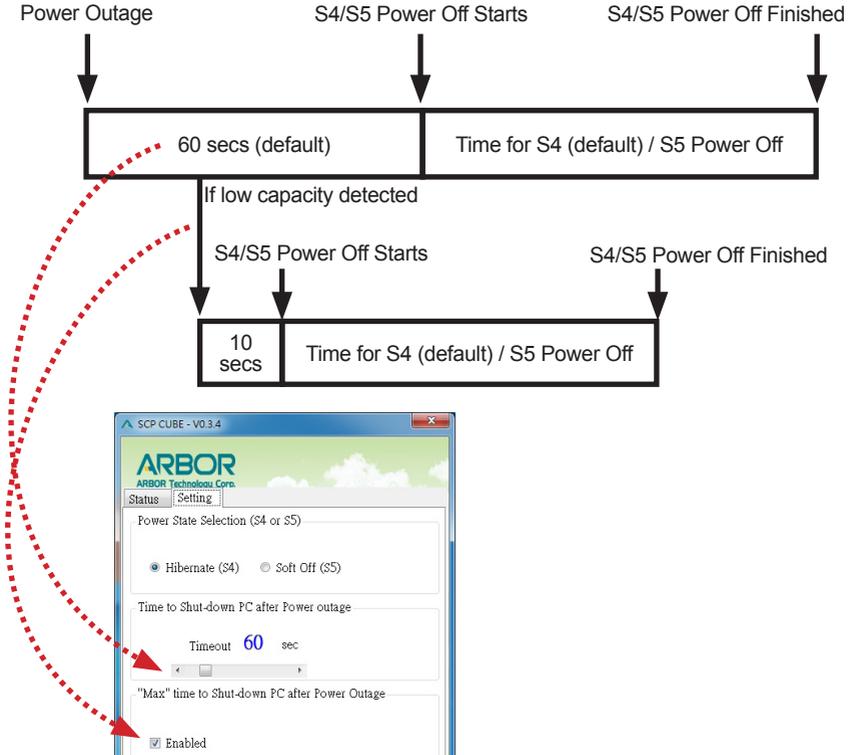


Figure 3-3 Event Timeline During Power Outages

3.3 Operation When DC Power Resumes

When the power resumes, the connected PC will restart automatically.

If not, please make sure to configure the PC's BIOS settings as described below:

1. Open your computer's BIOS settings menu.
2. Look for the Power Settings menu. Ensure the "**Power on after Power Loss**" (or similar) setting is set to "**Power On**" as the example below:

