

Premium Series Digital Video Storage Array

Battery Backup Unit Failure Recovery on the Subsystems



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Preface

This document provides a strategy and detailed procedure when a battery backup unit (BBU) is failed or malfunctions. The Bosch RAID subsystem comes with one (1) standard or optional hot-swappable, Li-ION battery. If the BBUs are installed, they are located on the upper left side of the controller module in the rear subsystem chassis. These BBUs can sustain cache memory in the event of a power failure or in the extremely unlikely event of both PSUs failing. The BBU provides additional data security and helps minimize the loss of data during power shutdowns.

This document covers the following topics:

- IDENTIFYING A BBU FAILURE
- HOW DO I KNOW A BBU HAS FAILED?
 - LCD Panel
 - LEDs on the BBU and Controller Module Rear Panel
 - Audible Alarm
 - Terminal
 - Bosch RAIDWatch Server
- Bosch RAIDWatch
- WHAT DOES THE ERROR MESSAGE MEAN?
- IS IT POSSIBLE A BBU HAS NOT ACTUALLY FAILED?
- BBU REPLACEMENT PROCEDURES
- GENERAL NOTES ON COMPONENT REPLACEMENT
- HOW TO REPLACE A FAILED BBU?
 - Premium 3U subsystem
 - Premium 2U subsystem

Document Conventions

Convention	Meaning
Bold	Denotes a part, item, or assembly.
<i>Italic</i>	Denotes a reference to another paragraph, figure or table.
<u>Underline</u>	Used to emphasize a point.
<code>courier</code>	Denotes the actual name of an object, the exact code that should be typed or a message returned from a system.

Symbols

You may encounter these symbols within the document. Explanatory text accompanies each symbol, which provides additional information detailing the operation or highlighting safety information.



NOTICE! Notices inform you of essential but non-critical information. Read these messages carefully as any directions or instructions contained therein can help you avoid making mistakes.



CAUTION! Cautionary messages provide critical information that help you reduce the chance of losing data or damaging the system. Please heed these messages.



WARNING! Warnings highlight information, that if overlooked may cause damage to the system or result in personal injury. Take warnings seriously.



DANGER! Danger messages denote the presence of electrical equipment that may cause electric shock or electrocution. Take care when you see this symbol to avoid serious injury or death.

Related Publications

Refer to the latest Bosch Security Systems, Inc. Databook for the most up-to-date datasheets. To obtain a copy of the Databook, please contact your local Bosch representative.

You can also visit the Bosch Security Systems World Wide Web site at: <http://www.boschsecurity.com> to view a current listings of our publications.

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1 Identifying a BBU Failure

1.1 How Do I Know a BBU Has Failed?

- There are various ways to be notified of the events occurring on a RAID subsystem, including:
- Events displayed on the front of the subsystem's LCD panel
- LED indicators on the BBU or controller module
- Bosch RAIDWatch Server: Email, SNMP traps, fax, LAN broadcast, MSN, ICQ, and SMS messages
- The graphical representation of enclosure elements in the Bosch RAIDWatch graphical user interface
- Event prompts on the terminal screen
- Before replacing a BBU, perform the following steps to ensure that you can identify the exact failed module for removal.



NOTICE! The life expectancy of a BBU is more than one year and may eventually need to be replaced. Please order DVA-SBBK-00A from your subsystem vendors prior to the replacement procedures.

Before attempting to replace a BBU, make sure the malfunctioning situation is not caused by the following:

1. A faulty cable
2. Improper installation
3. Power loss period exceed BBU sustain time
4. Other causes of hardware failure affecting BBU operation



WARNING! If the BBU LED on the BBU module and the 5th or the 6th LED on the controller module rear panel continue flashes more than twelve (12) hours, that means the BBU has difficulty of recharging to its full capacity. The BBU may reach its lifespan and the BBU replacement maybe required. No warning message is shown on the LED panel, terminal screen or RAIDWatch interface.

1.1.1

LCD Panel

Every subsystem equips an LCD panel on the left handle in the front of the subsystem for convenient configuration and monitoring. If a BBU is failed or malfunctions, the LCD panel will:

1. The third LED (ATTEN) counting from the top of the left LCD panel will light red.
2. A BBU failure message will show on the LCD panel. (See Figure 1.1.)

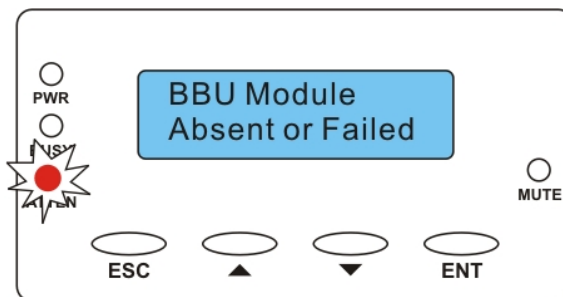


Fig. 1.1 LCD Panel

What to Do?

1. Find the exact faulty unit by checking the LEDs on the rear of the BBUs. The LED lit amber constantly indicates the BBU has failed. (See Figure 1.4.)

- or -

Check the 5th or the 6th LED on the controller module rear panel. If the LED lit amber constantly indicates the BBU installed on the upper left corner of the controller has failed. (Refer to Method 1.1.3.)

2. Press [ESC] button to clear the message and return to the LCD main screen.
3. To stop the alarm beeping, press the [MUTE] button on the LCD panel.



NOTICE! The event log will be saved in the subsystem's NVRAM even if you press the [ESC] key to clear the message. To access an existing event log, please refer to the Generic Operation Manual in the Product Utility CD that came with your subsystem.

4. Refer to Section 1.2 for the definition of the messages. Refer to Section 1.3 for the BBU failure rectification procedures

1.1.2**LEDs on the BBU and Controller Module Rear Panel**

Depends on the subsystem models you purchased; the BBU LED can be located on the BBU rear panel and/or controller module rear panel. The LEDs on the controller module rear panel that can be accessed from the rear of the enclosure are numbered from 1 to 5 or 1 to 6. Examples are showing in Figure 1.2 and Figure 1.3.

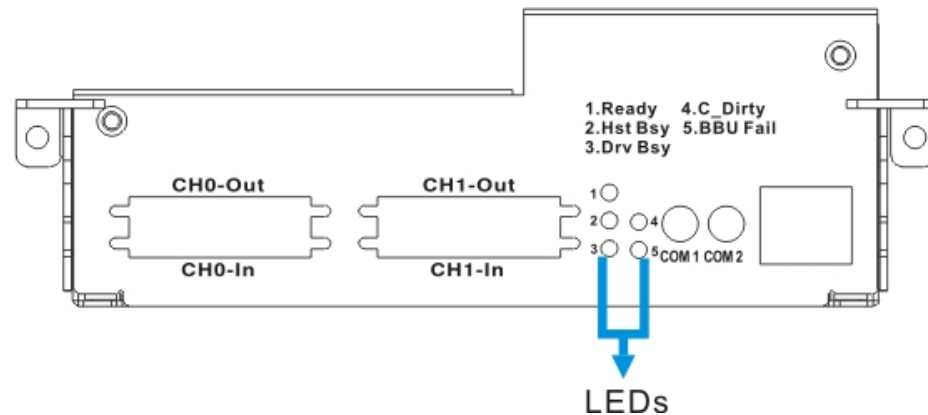


Fig. 1.2 Controller Module LEDs (I)

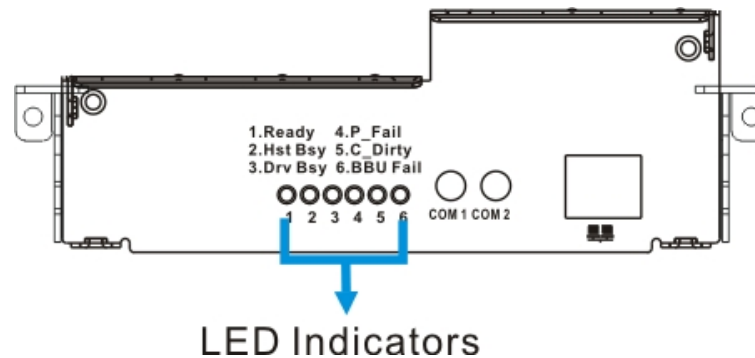


Fig. 1.3 Controller Module LEDs (II)

The 5th or the 6th LED that is marked as "BBU Fail" has the same function as the LED on the BBU rear panel. These LEDs are functional only when BBUs are installed in the subsystem. Please refer to Table 1 for the LED definitions.

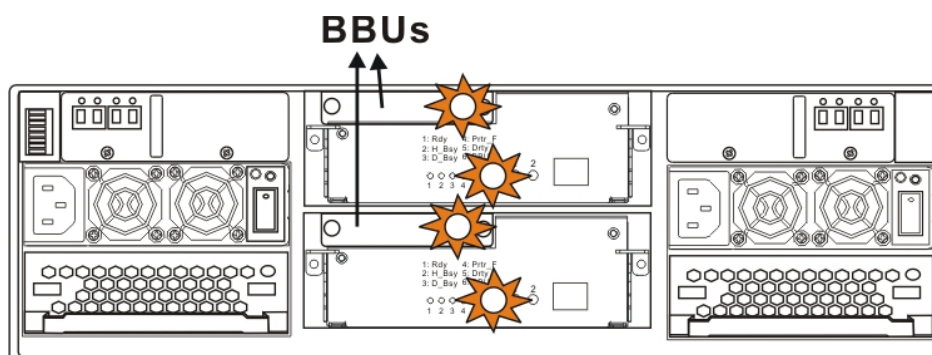
Status	Description
Flashes	The BBU is charging
On	The BBU cannot sustain the cache memory
Off	The BBU is functioning normally and is able to sustain the cache memory

Table 1.1 BBU LED Definition

If a BBU is failed or malfunctions, the LEDs will be turned on. Refer to the following figures for the BBU LEDs locations on different subsystem models.

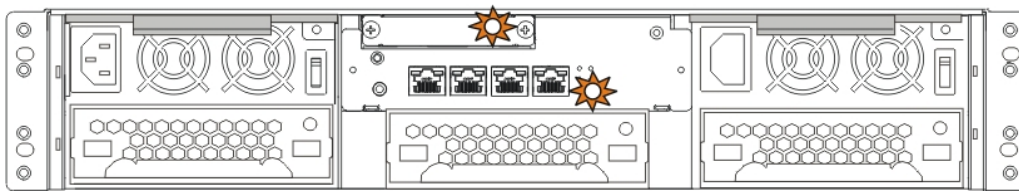
Premium 3U Subsystem

The BBUs are installed independently and are hot-swappable. The BBU LEDs are located on both BBU rear panel and the 5th or 6th LED on the controller module rear panel. (See Figure 1.4)

**Fig. 1.4** BBU LEDs on Enhanced 3U Subsystem

Premium 2U Subsystem

The BBUs are installed independently and are hot-swappable. The BBU LEDs are located on both BBU rear panel and the 5th or 6th LED on the controller module rear panel. (See Figure 1.6)

**Fig. 1.5** BBU LEDs on Enhanced 2U Subsystem

What to Do?

1. If any of the LEDs mentioned above lit amber constantly, indicates the BBU installed on the upper left corner of the controller has failed.
2. If the audible alarm is beeping, press the [MUTE] button on the LCD panel (see Figure 1.1) or use terminal to stop the alarm. (Refer to Method 1.1.4.)
3. Refer to Section 1.3 to rectify the BBU failure problem.

1.1.3

Audible Alarm

Every Bosch RAID subsystem equips an audible alarm. If a subsystem component has failed, the audible alarm will automatically be triggered. If the system manager is onsite and hears an alarm, the manager should immediately check for error messages that are simultaneously displayed on the LCD screen, a management terminal, or the Bosch RAIDWatch user interface to determine what has triggered the alarm. If a BBU failure is detected, please follow the below steps to take appropriate actions and rectify the problem.

What to Do?

1. Find the exact faulty unit by checking the LEDs on the rear of the BBUs. The LED lit amber constantly indicates the BBU has failed. (Refer to Method 1.1.2.)
- or -
Check the 5th or the 6th LED on the controller module rear panel. If the LED lit amber constantly indicates the BBU installed on the upper left corner of the controller has failed. (Refer to Method 1.1.2.)
2. Press the [MUTE] button on the LCD panel (see Figure 1.1) or use terminal to stop the audible alarm. (Refer to Method 1.1.5.)
3. Refer to Section 1.3 for the BBU failure rectification procedures.

1.1.4

Terminal

You will be prompted with an event message through terminal screen if a BBU failure occurred.

A BBU malfunction message should be similar to Figure 1.6 on the terminal screen.

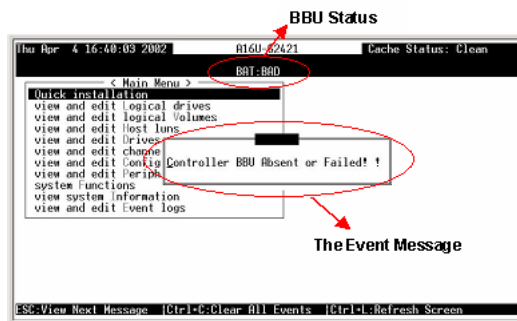


Fig. 1.6 Alert Message on RS-232C Terminal Screen

What to Do?

1. Find the exact faulty unit by checking the LEDs on the rear of the BBUs. The LED lit amber constantly indicates the BBU has failed. (Refer to Method 1.1.2.)
- or -
Check the 5th or the 6th LED on the controller module rear panel. If the LED lit amber constantly indicates the BBU installed on the upper left corner of the controller has failed. (Refer to Method 1.1.2.)
2. Refer to Section 1.2 for the description of the event messages.
3. Press [ESC] to return to the terminal mains menu/screen.
4. To stop the beeping alarm, first select from the main menu, "System Functions," and then press [ENTER] on "Mute beeper." Choose "Yes" and press [ENTER] in the next dialog box to turn the beeper off temporarily for the current event. The beeper will still be activated on the next event. The same function can also be accessed through the LCD panel and Bosch RAIDWatch.

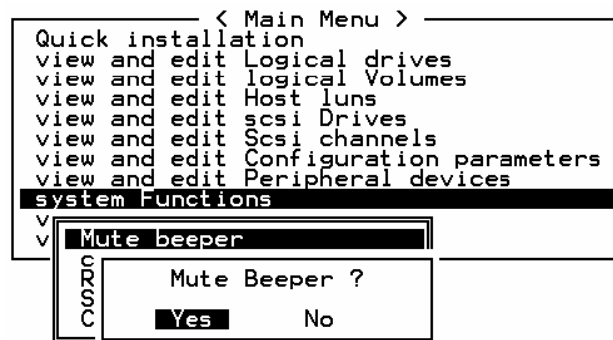


Fig. 1.7 BBU Status in the Terminal Screen

5. Refer to Section 1.3 for the BBU failure rectification procedures.

1.1.5

Bosch RAIDWatch Server

The RAIDWatch Server is a sub-module of the RAIDWatch program for centralized management. If you have setup and turn on the RAIDWatch Server function, no matter where you are, a BBU failure alert message can be sent to you wirelessly by Email, SNMP traps, fax, LAN broadcast, MSN, ICQ, and SMS messages. The message may look like below:

Name: ID xxxxxxxx, Peripheral Set 0 Device ALERT: FAN __ Failure Detected

If you have received a BBU failure alert message, refer to Section 1.3 for the rectification procedures. Refer to Section 1.2 for the description of event messages.

What to Do?

1. Find the exact faulty unit by checking the LEDs on the rear of the BBUs. The LED lit amber constantly indicates the BBU has failed. (Refer to Method 1.1.2.)
- or -
Check the 5th or the 6th LED on the controller module rear panel. If the LED lit amber constantly indicates the BBU installed on the upper left corner of the controller has failed. (Refer to Method 1.1.2)
2. If the audible alarm is beeping, press the [MUTE] button on the LCD panel (see Figure 1.1) or use terminal to stop the alarm. (Refer to Method 1.1.4.)
3. Refer to Section 1.3 for the BBU failure rectification procedures.

1.1.6

Bosch RAIDWatch

The Bosch RAIDWatch software has the visualized representation of enclosure components that corresponds to the real situation. RAIDWatch recognizes each subsystem by its board serial number, and displays an exact replica of it in its panel view. Although BBU problems can only be solved onsite, an administrator can use the RAIDWatch GUI manager to remotely identify a problem and then contact the engineer in the place at the array site.

To view the BBU information in the RAIDWatch Enclosure View window, select either the Enclosure icon from the configuration tree or select the Enclosure View from the Action menu, as shown in Figure 1.8. The command allows you to access the graphical display of the enclosure's front and rear view window.



Fig. 1.8 Opening RAIDWatch Enclosure View Window

If multiple enclosures have been cascaded, you can select a different enclosure by clicking its tabbed icons as displayed in Figure 1.11.

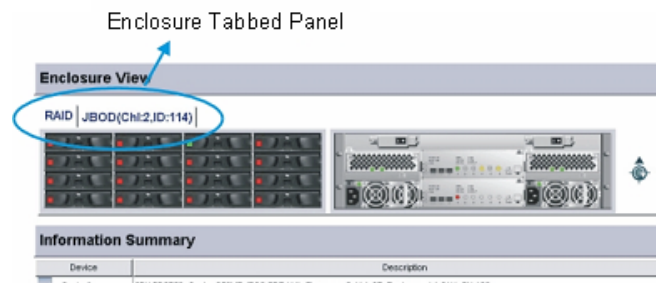


Fig. 1.9 Enclosure Tabbed Panel

Select an enclosure and start viewing devices in the Enclosure View window.

LEDs shown on the enclosure view correspond to the real LEDs on the subsystem's rear panel. An example is shown in Figure 1.10.

When a BBU is failed, the Bosch RAIDWatch will notify you by:

1. On the Enclosure View page, the LED corresponding to a failed BBU on the subsystem rear panel will light amber constantly.
2. Move your mouse cursor over the enclosure rear panel for a few seconds, and a summary of the enclosure status includes the BBU failure information will be displayed.
3. The BBU failure messages will appear on the event log list on the bottom of the interface.

The Correspondent LEDs

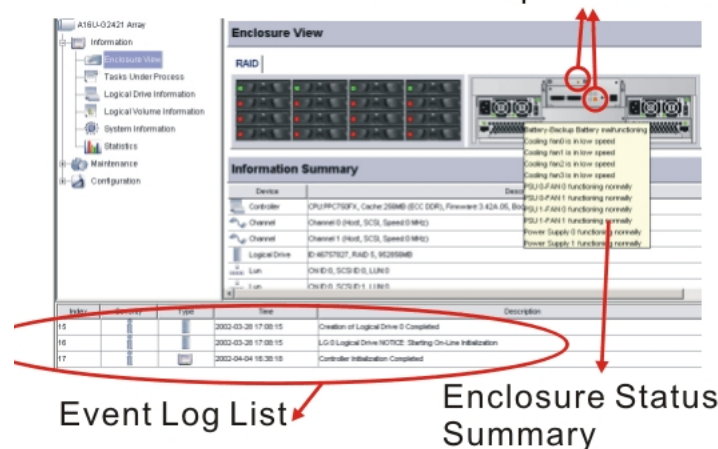


Fig. 1.10 RAIDWatch Graphical User Interface

If the corresponding BBU LED lit amber or an event log is showed on the Bosch RAIDWatch screen, refer to Section 1.3 to rectify the problem.

What to Do?

1. Verify the subsystem enclosure that the faulty BBU is installed by checking the enclosure tabbed panel located above the enclosure view window. (See Figure 1.11.)
2. If the audible alarm is beeping, press the [MUTE] button on the LCD panel (see Figure 1.1) or use terminal to stop the alarm. (Refer to Method 1.1.4.)
3. Refer to Section 1.3 for the BBU failure rectification procedures.

1.2**What Does the Error Message Mean?**

You may receive BBU failure messages through terminal screen, LCD screen, or RAIDWatch GUI; and the message may look like one of the following:

BBU Absent or Failed! Correct It and Reset Ctlr to Take Effect

Controller BBU Absent or Failed!

Controller BBU Failure Detected!

Controller BBU is Charging!

Controller BBU Thermal Shutdown/Enter Sleep-Mode!

Refer to the table below for the event message description.

Event Message Description

Event Message	Description	Action
BBU Absent or Failed! Correct It and Reset Ctlr to Take Effect	A BBU could not be detected; reset the subsystem maybe required.	Reset controller or replace a new BBU.
Controller BBU Absent or Failed!	An empty BBU slot is detected; a missing BBU could result from insecure installation.	Insert or replace a new BBU.
Controller BBU Failure Detected!	The BBU is failed.	Replace a new BBU.
Controller BBU is Charging!	The BBU is charging.	Check the status after twelve (12) hours. If a BBU is continue being charged more than six hours, a BBU replacement maybe required.
Controller BBU Thermal Shut-down/Enter Sleep-Mode!	The BBU is over-temperature.	Checking the temperature from the system display, and cool down the environment temperature.

Table 1.2 Event Messages Definitions

1.3

Is It Possible a BBU Has Not Actually Failed?

When you have received any of the above alert messages, or determined a BBU LED is lit amber on the Bosch RAIDWatch screen or on the rear panel of the BBUs and controller modules, follow the below steps to rectify the problem.

1. Be sure to identify the failed BBU and its location. Follow the steps in each method described above.
2. A malfunctioned BBU in a subsystem may simply be the result of improper handling, for example, when a BBU is not properly installed. Check carefully that all the BBUs are firmly seated in the subsystem chassis.
3. Check the power cables and power sources that are connected to the subsystem to eliminate the problems caused by faulty cables or long period of power shortage.
4. Hot-swap the failed BBU.
5. If the BBU is still not function properly, it should be replaced. Please refer to Chapter 2 for the procedures of replacing a BBU.

2 BBU Replacement Procedures

2.1 General Notes on Component Replacement

- Qualified engineers who are familiar with the Bosch DVSA subsystems should be the only ones who make component replacements. If you are not familiar with the Bosch DVSA series subsystems or with RAID subsystem maintenance in general, it is strongly advised that you refer the subsystem maintenance to a suitably qualified maintenance engineer.
- Keep a failed BBU in its enclosure bay until a replacement unit is in hand. Although the BBUs are hot swappable, it is not advisable to run the subsystem with an empty BBU slot for an extended period of time. An empty slot would cause the irregular airflow in the subsystem and the system is at risk of sustaining irreparable damage.
- In accordance with international transportation regulations, the BBU is only charged to between 35% and 45% of its total capacity when shipped. A new or replaced BBU takes at least 12 hours to charge to its full capacity. Reset the subsystem whenever a BBU is replaced or added in order for the new BBU to take effect.
- The lifespan of a BBU is more than one year. Follow the procedures below to replace an old BBU with a new one in order to maintain fault-tolerant subsystem functionalities.
- Always dispose of discharged or used batteries in an ecologically responsible manner. Dispose of used BBUs at authorized battery disposal sites only.
- Before replacing a BBU, please read and follow strictly with the BBU handling precautions listed on the Installation Manual in the Product Utility CD that came with your subsystem.

2.2 How to Replace a Failed BBU?

Depends on the subsystem models that you purchased, please follow different procedures to replace a failed BBU.

- Premium 3U subsystems - See Section 2.2.1 on page 9.
- Premium 2U subsystems - See Section 2.2.3 on page 11.

2.2.1 Premium 3U Subsystem

The BBU that is compatible with enhanced 3U subsystem, each consists of a bracket, battery pack, and a PCB board that connects to the backplane board. If replacing a failed BBU is necessary, the faulty BBU should only be removed from the subsystem when you have a replacement in hand.

The BBUs are secured to the subsystem with two (2) retention screws located on the rear surface of the module itself. To replace the BBU, please follow these steps:

1. Remove the faulty BBU from the chassis. The BBU is located on the upper left corner of each controller module. Loosen the two (2) retention screws located on both sides of the BBU rear panel, then pull out the BBU. (See Figure 2.1.)

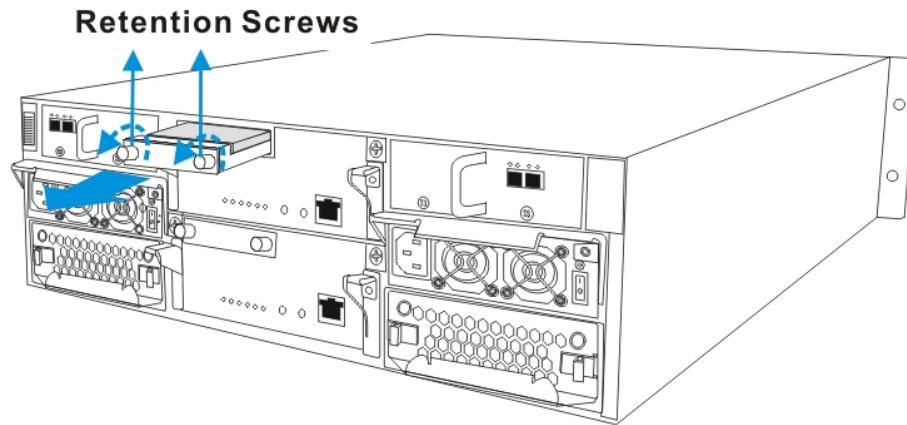


Fig. 2.1 Removing the BBU

2. Install the new BBU. Align the new BBU with the slot, and then gently push the BBU into the slot, until the end of the BBU module reaches the end of the slot. (See Figure 2.2.)

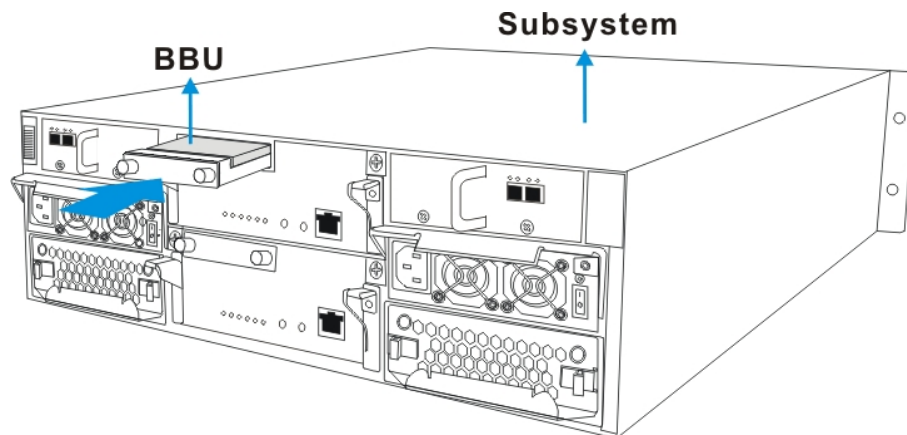


Fig. 2.2 Installing the BBU

3. Secure the BBU to the subsystem by fastening the two (2) retention screws on the BBU rear panel. (See Figure 2.3)

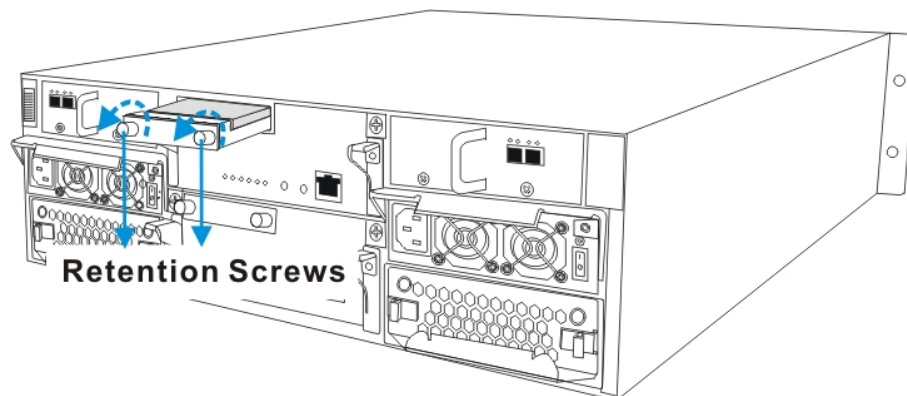


Fig. 2.3 Fastening the BBU Retention Screws

4. Reset the subsystem for the new BBU to take effect. After powering on the subsystem, the new BBU should start being charging. While the battery is being charged, the LED on the BBU rear panel and the fifth or the sixth LED on the controller module rear panel will flash slowly. (See Figure 1.4) You may check the status of the battery's charge via RAID-Watch or the firmware. When the BBU is fully charged, the LED will be turned off automatically.

2.2.2

Premium 2U subsystem

The BBU for the Premium 2U subsystem can be an optional item. It is an independent module that contains a bracket, battery pack, and a PCB board that connects to the backplane board. To replace a BBU into an enhanced 2U subsystem, please follow these steps:

1. Remove the faulty BBU from the chassis. Loosen the two (2) retention screws located on both sides of the BBU, then pull out the BBU. (See Figure 2.4.)

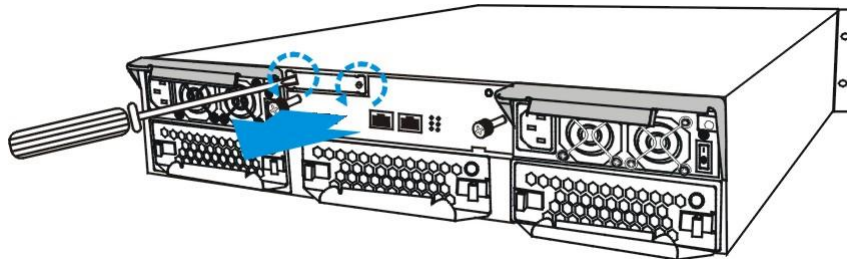


Fig. 2.4 Loosening the BBU Retention Screws

2. Install a new BBU module. Align the BBU module with the BBU module slot and gently insert the BBU module until the back of the BBU module reaches the end of the slot.
3. Secure the BBU module to the chassis. Fasten the two (2) retention screws on the BBU module rear panel to secure the BBU module to the chassis. (See Figure 2.5.)

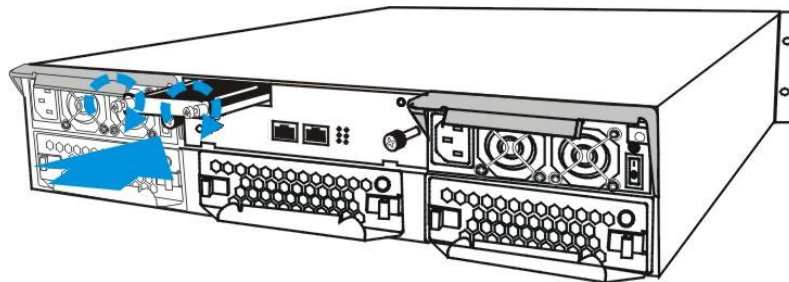


Fig. 2.5 Installing the BBU Module

4. Reset the subsystem for the new BBU to take effect. After powering on the subsystem, the new BBU should start being charging. While the battery is being charged, the LED on the BBU rear panel and the fifth or the sixth LED on the controller module rear panel will flash slowly. (See Figure 1.6) You may check the status of the battery's charge via RAID-Watch or the firmware. When the BBU is fully charged, the LED will be turned off automatically.

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