AN-712E8N/AN-716E8N/ AN-724E8N PCI-E Gen3 x 8 to 6Gb SAS/SATA Series RAID Subsystem Hardware Installation Guide

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Regulatory information

For Europe

This drive is in conformity with the EMC directive.

Federal Communications Commission (FCC) Statement

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.

Those limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antennas.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circlet different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Warning:

A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

About This Hardware Installation Guide

Welcome to Hardware Installation Guide. This guide is designed to be used as step-by-step instructions for installation of your subsystem, and covers everything you need to know in learning how to operation, troubleshooting and future upgrades. For the detail about how to configure your subsystem, please refer to the Software Operation manual.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

Caution

This icons indicates that failure to follow directions could result in personal injury, damage to your equipment or loss of information.

Note

This icon presents commentary, sidelights, or interesting points of information. .

Important terms, commands and programs are put in **Boldface** font.

Screen text is given in **`screen`** font.

Contents

Chapter 1.

INTRODUCTION

This chapter introduces the features and capabilities of Alnico series RAID subsystems.

You will find:

- ⇨ **A full introduction to your Alnico RAID subsystem.**
- ⇨ **Details of key features and supplied accessories.**

Model Variations

There are three available models in Alnico PCI-E Gen 3 to 6Gb SAS/SATA RAID storage subsystem series; which utilize a PCIe x 8 connector as Host interface, each with 12, 16, or 24 device bays. .

Model Name	*Host Interface*	*Device bays*	*Controller Numbers*
AN-724E8N	PCI-E 8X	24 bays	1
AN-716E8N	PCI-E 8X	16 bays	1
AN-712E8N	PCI-E 8X	12 bays	1

Features

The Alnico Series RAID Subsystem is designed to meet today's high volume, performance storage requirements from rapidly changing business environment. It provides a maximum data protection and exceptional performance in a storage subsystem. Target usage ranges are set from small business to departmental and corporate server needs. The RAID SYSTEM is designed for easy integration, smooth data expansion and server migration.

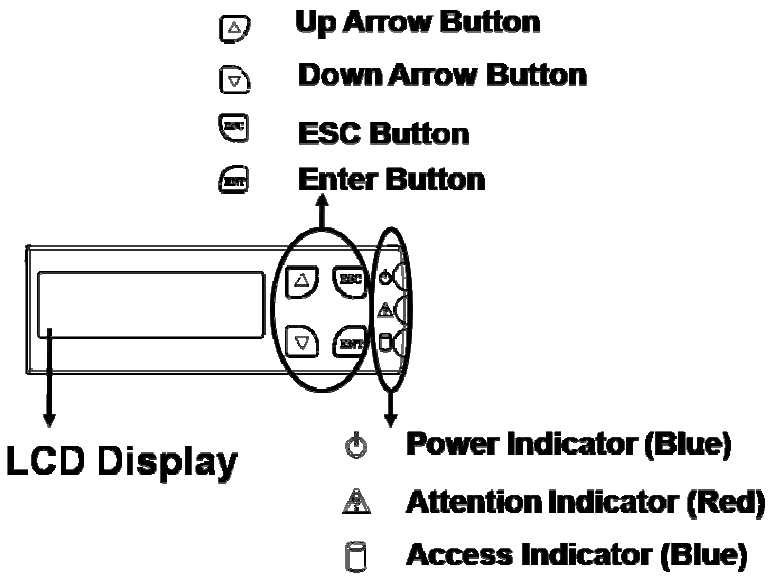
The Alnico Gen 2 series supports the following features:

- PCI-E Gen3 x 8 as Host
- 6Gbps SAS / 6Gbps SATA backplane supported.
- RAID Levels : 0, 1,1E, 3, 5, 6, 50, 60 & JBOD.
- Multiple RAID selection.
- Online RAID level/stripe size migration.
- Online Array roaming.
- Globe and dedicated Hot Spare Disk / Pass through Disk support.
- Disk Scurbbing/Array verify scheduling.
- When connecting with JBOSs, Max 256 SAS devices.
- Max 128 LUNs (volumeset) per controller.
- Online capacity expansion and RAID level migration simultaneously.
- Online Volume Set growth
- Support spin down drivers when not in use to extend service life(MAID).
- Instant availability and background initialization.
- Automatic drive insertion / removal detection and rebuilding.

Understanding the Alnico RAID subsystem

Front Panel Overview

LCD Module



Function keys. (ENT, ESC, Scroll up, Scroll Down)

Keys	Descriptions
Up Arrow	To scroll upward through the menu items
Down Arrow	To scroll downward through the menu items
(ENT) Enter	To confirm a selected item
(ESC) ESC	To exit a sub-menu and return to previous menu.

There are three LED indicators on the front panel. Following table provides a summary of the meanings of these LED indicators:

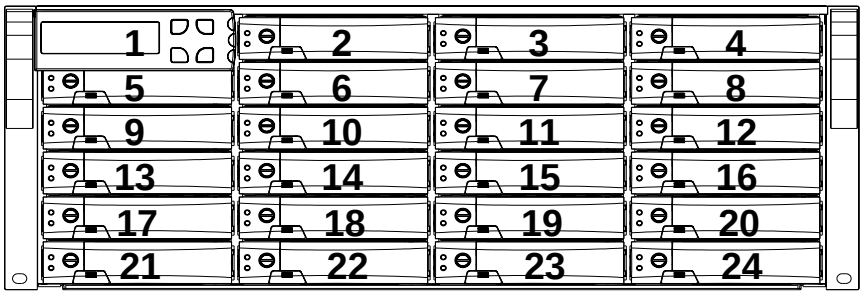
LED Indicator	Normal Status	Problem Indication
Power On indicator	Bright Blue	This LED does not light up after power switched on
Fail Indicator	LED never light up	LED light up as Red.
Data Access Indicator	Blink blue during host computer accessing the RAID subsystem.	LED never flickers

For additional information on using the LCD panel and keypad to configure the RAID see Software manual ”LCD Panel Configuration” on Chapter 3.

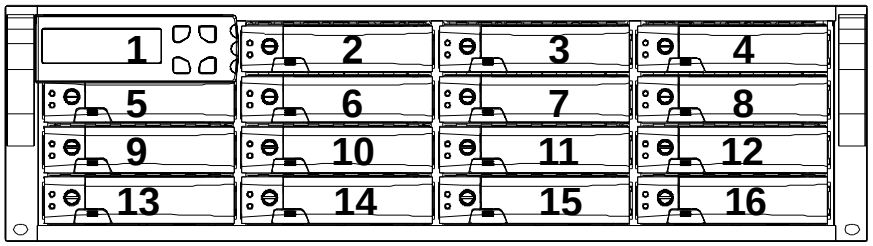
Driver Bay numbering convention

The enclosure bay numbering convention is shown in following figure. A bay is designed to house a single 3.5-inch hard disk drive or 2.5-inch hard disk drive in his carrier module.

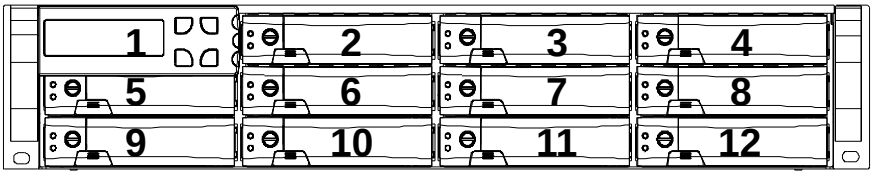
AN-724



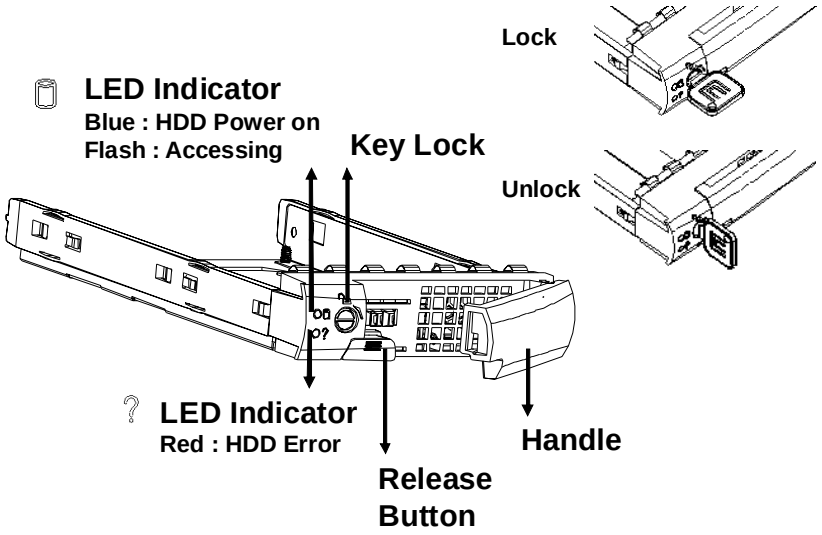
AN-716



AN-712

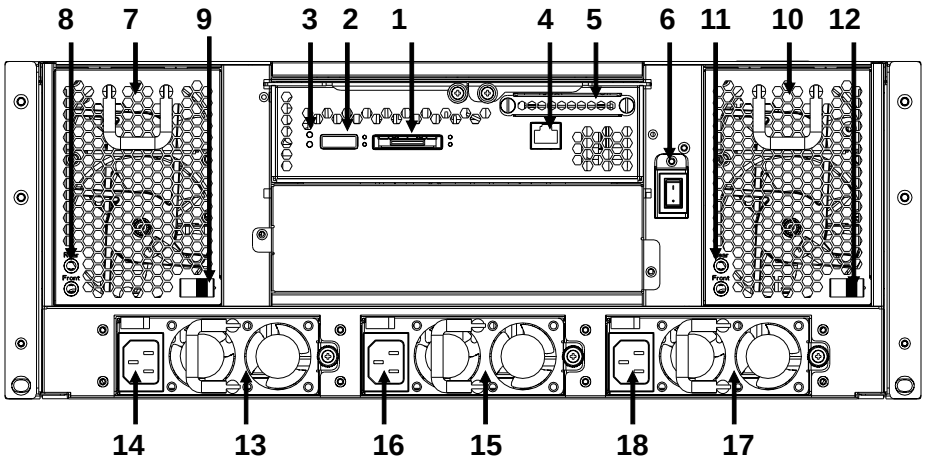

1
2
3
4
5
6
7
8
9
10
11
12

Drive Bay


Lock
LED Indicator
Blue : HDD Power on
Flash : Accessing
Key Lock
Unlock
LED Indicator
Red : HDD Error
Handle
Release
Button

Rear Panel Overview

AN-724E8N PCIe-SAS/SATA RAID SUBSYSTEM



1. PCIe 8X Connector

LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

2. SAS Expand Port

SAS Expand Port LED Indicator (Link / Access)

LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

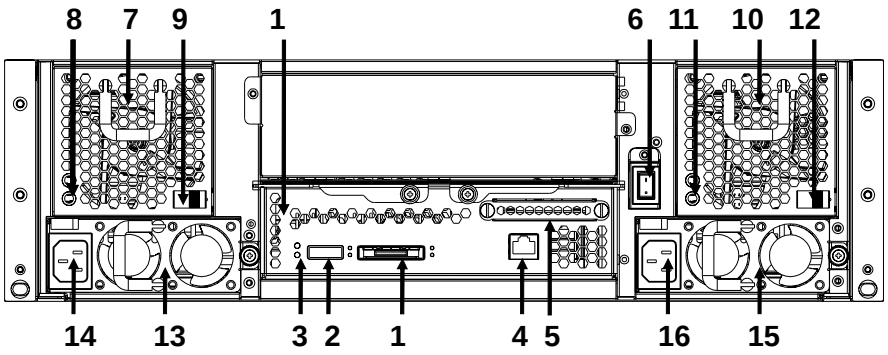
3. Raid Controller Status LED & Fault LED Indicator

LED	Colors	Indicate
Status	Green + Blink	Raid Controller OK
Fault	Red	Raid Controller Fault

4. LAN port

6. Battery back up module
7. Power Switch
8. FAN Module /FAN Module 1
9. FAN failure indicator (Rear / Front)
10. FAN Module /FAN Module 1 latch
11. FAN Module 2
12. FAN failure indicator (Rear / Front)
13. FAN Module 2 latch
14. Power Module 1
15. AC inlet 1 & Ltch
16. Power Module 2
17. AC inlet 2 & Latch
18. Power Module 3
19. AC inlet 3 & Latch

AN-716E8N PCIe-SAS/SATA RAID SUBSYSTEM



1. PCIe 8X Connector

LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

2. SAS Expand Port

SAS Expand Port LED Indicator (Link / Access)

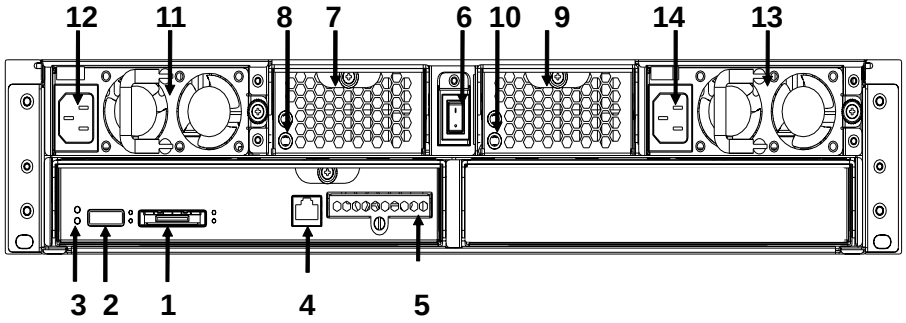
LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

3. Raid Controller Status LED & Fault LED Indicator

LED	Colors	Indicate
Status	Green + Blink	Raid Controller OK
Fault	Red	Raid Controller Fault

4. LAN port
5. Battery back up module
6. Power Switch
7. FAN Module /FAN Module 1
8. FAN failure indicator (Rear / Front)
9. FAN Module /FAN Module 1 latch
10. FAN Module 2
11. FAN failure indicator (Rear / Front)
12. FAN Module 2 latch
13. Power Module 1
14. AC inlet 1 & Ltch
15. Power Module 2
16. AC inlet 2 & Latch

AN-712E8N PCIe-SAS/SATA RAID SUBSYSTEM



2. PCIe 8X Connector

LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

2. SAS Expand Port

SAS Expand Port LED Indicator (Link / Access)

LED	Colors	Indicate
SAS	Green	Link
	Blue + Blink	Access

3. Raid Controller Status LED & Fault LED Indicator

LED	Colors	Indicate
Status	Green + Blink	Raid Controller OK
Fault	Red	Raid Controller Fault

4. LAN port
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8. FAN failure indicator (Rear / Front)

9. FAN Module 2
10. FAN failure indicator (Rear / Front)
11. Power Module 1
12. AC inlet 1 & Ltch
13. Power Module 2
14. AC inlet 2 & Latch

Chapter 2. INSTALLATION

This chapter presents:

- ⇨ **Instructions on unpacking & checking the equipment**
- ⇨ **Instructions on how to install Hard disk drive**
- ⇨ **Instructions on how to install Alnico RAID in a Rack.**
- ⇨ **Instructions on how to connect Alnico RAID.**

Unpacking & checking the Equipment

Before unpacking the Alnico RAID subsystem, prepare a clean, stable surface to put on the contents of RAID shipping container. Altogether, you should find following items in the package:

PCIe to SAS/SATA RAID Subsystem :

- RAID subsystem x1
- CD-ROM x 1 (Includes Hardware Installation Guide, Software operation Manual & HTTP Proxy Server utility for Web browser-based Configuration).
- Serial cable x1
- Power Cord x 2 (AN-712 and AN-716), Power Cord x 3 (AN-724)
- PCIe 8X repeater card x 1
- PCIe 8X External cable x 1
- Key for Drive Bay x 4
- Spare Drive Bay x 1
- Rails for Rack
- Mounting Screws (bag) : For 2.5” device x 1 bag / for 3.5” device x 1 bag.,

What else you need

- Hard disk drives (different RAID levels requires different numbers of HDDs. Refer to Software Operation manual for more detail information.
- Host computer support PCIe 8X interface.

- Dedicated terminal or PC with third party communication software that supports ANSI terminal emulation (required for viewing Monitor Utility)

ESD Precaution

Use a suitable anti-static wrist or ankle strap and observe all conventional ESD precaution when handle Alnico RAID's modules and components. Avoid contact with backplane components and module connectors.

Installing hard disks

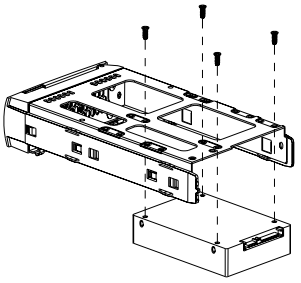
The Alnico RAID series includes 12/16/24 hot swappable drive bays. The following

sections describe how to install disks into Alnico RAID subsystems.

Loading 2.5" Hard Disk to the drive bay.

1. Put 2.5 HDD into the bay.

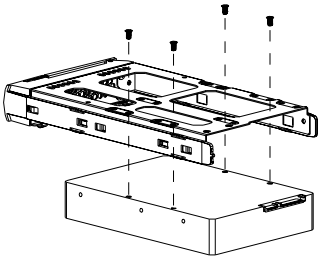
2. Fasten all 4 screws to mount HDD in the bay and make sure the HDD is properly tightened.



Loading 3.5" Hard Disk to the drive bay.

1. Put 3.5 HDD into the bay.

2. Fasten all 4 screws to mount HDD in the bay and make sure the HDD is properly tightened.



Place drive bays back into the system

1. Slide in drive bay, make sure the handle is open fully.

2. Close the handle to engage the drive bay into the slot.

NOTE

The hard drives in a RAID array should match in size and speed. All drives in any array should be identical models with the same firmware versions. RAID arrays can use any size drive, however the smallest drive will determine the size of the array.

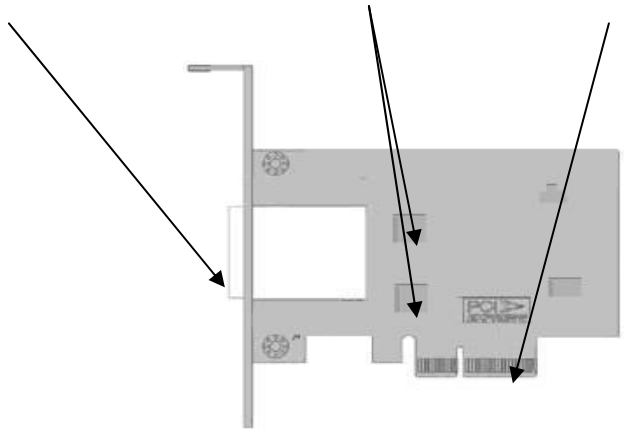
Caution

1. *Only use the screws offered with Alnico RAID subsystem. Longer screws might cause the drive damage.*

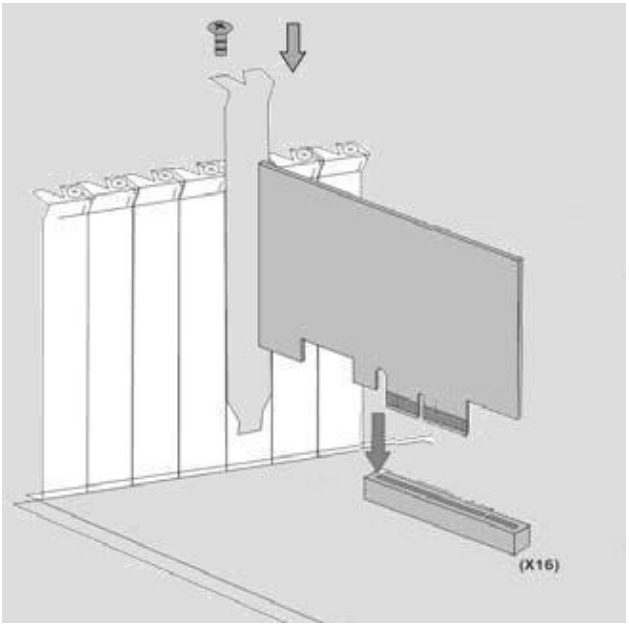
2. *All the drive bays (with or without hard drive) must be placed in the Alnico subsystem. Alnico's cooling system is designed with full of drive bays. Missing drive bays might cause the subsystem damage.*

Install PCIe repeater card

External PCIe 8X Connector PCIe repeater PCIe 8X



To install the PCIe repeater card, remove the mounting screw and existing bracket from the rear panel behind the selected PCIe slot. Align the gold-fingered edge on the card with the selected PCIe expansion slot. Press down gently but firmly to ensure that the card is properly seated in the slot. Then, screw the bracket onto the computer chassis. ARC-1607 repeater card requires a PCIe slot supports PCIe 8X.



Install The Alnico subsystem into a Rack

You are shipped one rackmounting kit for each Alnico subsystem that you intend to rackmount. Alnico subsystem is designed for installation into a industry-standard 19-inch rackmount cabinet. Following the use of this section for installing the Alnico subsystem into a Rack

Install the Slide Rails

1. Combine Left slide rail and rear slide rail.
2. Measure the depth of the rack enclosure, then fasten 4 of P4*8M screws into M4 Locking nuts to fix the length.
3. Use T5*8M screws and PW14 washer to install the left slide on Front and rear Posts of Rack as Figure 1.
4. repeat procedure 1 ~ 3 to install the right Slide into the Rack.

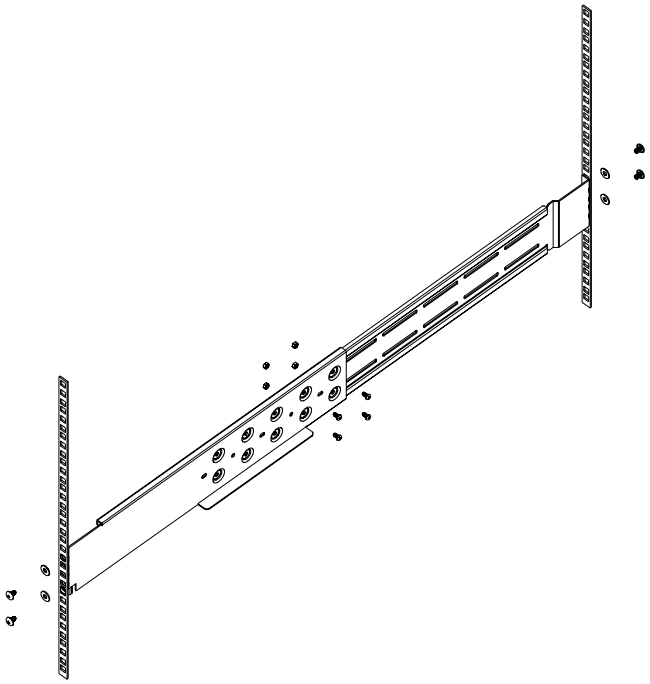


Figure 1.

Place the Alnico Subsystem into the rack

1. Lift the subsystem enclosure and slide it slowly and gently along the slide rail into the rack as Figure 2.

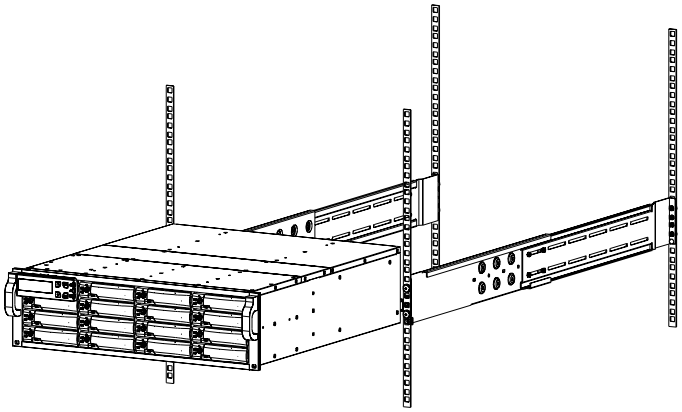


Figure 2.

2. Fasten two M5 screws through the chassis ears in the front side of the

chassis to secure the Alnico subsystem in the rack as Figure 3.

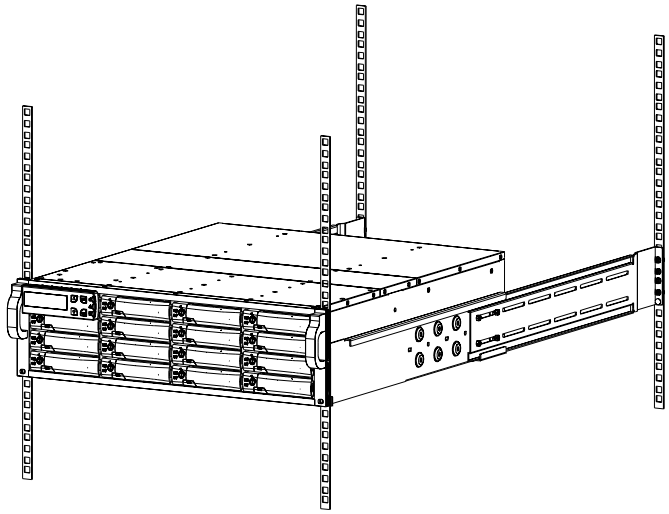


Figure 3.

The Alnico subsystem is heavy, two person are required to move the system in the procedure.

System Connection

Connect all cables and power cord as shown below :

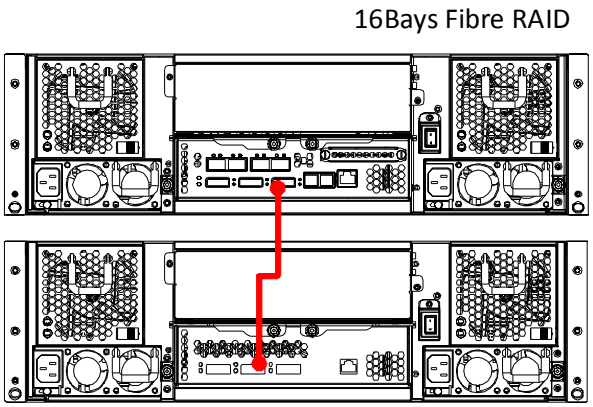
Cable	Alnico RAID	Device	Purpose
Serial Cable	Terminal Port	ANSI Terminal or a PC with Terminal emulator.	Configuration Utility
Serial Cable	Console Port	ANSI Terminal or a PC with Terminal emulator.	Debug port, to check and monitoring all of status of RAID subsystem.
PCIe 8X External Cable	PCIe 8X Connector	PCIe Repeater Card	Host interface between RAID and Host computer
Power Cord	Power inlet	A/C power outlet	A/C power input

RJ 45 Cable	Ethernet Port	Switch or HUB	Connect to Internet.
Mini SAS Cable	SAS Expander Port	Raid System	Connect to SAS Expander

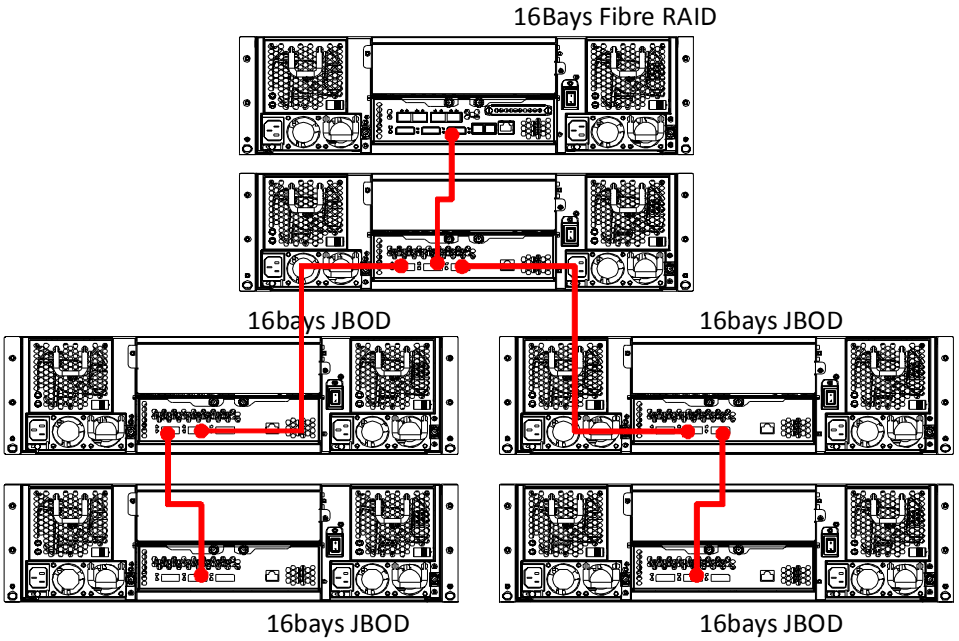
Connection to Alnico Gen 2 RAID subsystem with SAS JBODs

There are many topologies of SAS JBOD with Alnico Gen 2 RAID subsystems. Ways to implement are as below:

One SAS Raid subsystem with one SAS JBOD



One SAS Raid subsystem with more SAS JBODs



It supports up to four tiers and 256 drives.

- One RAID Set supports up to 32 HDDs
- One SAS Raid subsystem supports up to 128 Volumes
- One SAS Raid subsystem supports up to 256 HDDs

There are four tiers within JBOD topology as above:

- First tier is a RAID System.
- Second tier is a SAS JBOD with a SAS CH0 on it. Connecting SAS CH0 to SAS exp. Port on RAID System via a Mini SAS to Mini SAS Cable.
- Third tier could be two SAS JBODs with a SAS CH0 port individually. One is connected to the SAS EXP. Port on the second tier SAS JBOD via a Mini SAS to Mini SAS Cable. Another is connected to the SAS CH1/E Port on the second tier SAS JBOD
- Fourth tier is a SAS JBOD with a SAS CH0 on it. Connecting SAS CH0 to SAS exp. Port on third tier SAS JBOD via a Mini SAS to Mini SAS Cable.

1. It is often recommended to install the hard drive with same brand, model no., interface and capacity in this RAID subsystem.

2.Please do not install SAS and SATA hard drives at the same time, as these hard drives spin at different speed and may lead to compatible issues or performance decline.

3. RAID members need to be included at the same enclosure that means you need to create array in the same enclosure. RAID members across two or more enclosures would get some risks (for example: if mini-SAS cable get problem, more RAID members will be lost, volume sets belong to this Array may be failed. Shutdown RAID and JBOD to fix problem, after that, turn on JBOD and RAID system again and controller will get array back, but in some special case maybe it can't get array back)

Turning on for the first time

When cabling is completed, RAID SYSTEM can be turned on. This should be done in the following order:

1. First turn on the power switch of JBODs.
2. Then turn on the power switch of RAID SYSTEM.
3. Power on and boot the host computer(s)

When RAID SYSTEM is running, you are ready to configure one or more RAID arrays. You have the following options:

1. Turn to Chapter 3 of "Software Operation Manual" to perform a quick setup of a single RAID array using the control panel.
2. Turn to Chapter 6 of "Software Operation Manual" to access the Monitor Utility. Once the Monitor Utility is accessed, you can perform a Quick Setup or complete configuration with Monitor Utility.
3. Turn to Chapter 5 of "Software Operation Manual" to perform a full configuration using the web browser.

Turning off

When turning off RAID SYSTEM, users are advised to first shut down the server, then power off RAID SYSTEM.

Chapter 3. TROUBLE SHOOTING

This chapter contains trouble shooting procedures and suggestions to minimize their impact on the Alnico RAID operation :

- ⇨ **Instructions on how to replace the components of Alnico RAID subsystem.**

If the fault LED on the front panel and LCD of Alnico RAID lights red and LCD displays a error message , or if Alnico RAID's Internet manager indicates a fault, determine the reason for this alert immediately. Examine the component LEDs to see if any indicates a fault, then replace it as soon as possible.

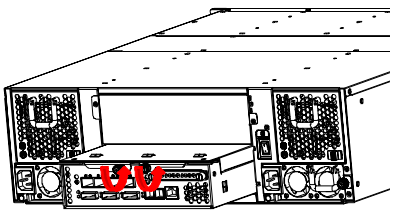
Replace the Controller

Read the replacing notices earlier in this chapter before proceeding with replacement.

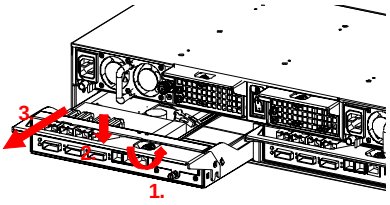
This section provides instructions for the removal and installation of the RAID controller components indicated in the figure below. This section is for the reference of engineers. End users should not need to replace or remove components.

Removing the controller from Alnico AN-716 and AN-724 RAID :

In order to access controller box, turn anti-clock wise to release two thumb screws, then use the eject bar to remove controller box.



Removing the controller from Alnico AN-712 RAID :



In order to access controller box,

1. Turn anti-clock wise to release the thumb Screws.

2. Push down the use eject bar to remove controller box.

Installing the controller into Alnico RAID:

Reverse the procedure of **"removing the controller"** to install the controller into Alnico RAID.

Then according to "Appendix C. Configuration table" on "Soft Operation Manual" to reconfigure your RAID

Replacing / Upgrading DIMM

Alnico RAID are normally supplied with 1GB cache memory installed.

NOTE

There's no set formula to determine how much cache memory to use, but as a general rule, a workstation, with mostly very large files, such as for audio or video editing and playback, graphics or CAD files, can benefit from a large cache. File servers, with multiple random access of varying file size, generally have little or no performance improvement with additional cache.

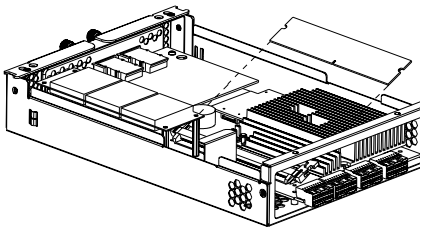
Specifications:

Type	◆ 240-pin DDR-III DIMM module (DDR III-1333Mhz) ◆ ECC,
Parity (ECC)	◆ With parity for data security.
Size	◆ From 2GB, 4GB & 8GB

Installing DIMM

To install a DIMM, ensure the system power is off and disconnected. Then:

1. Turn anti- lock wise to release two thumb screws, then use the eject bar to remove controller box, then open the cover.
2. Remove the BBM module.
3. Insert a memory card at a 45-degree angle into the memory card socket so that the gold teeth of the card are no longer visible.
4. Press the card down firmly until the latches lock it into place.



1. *Before starting any kind of hardware installation, please ensure that all power switches have been turned off and all power cords disconnected to prevent personal injury and damage to the hardware.*
2. *Use screws provided with Alnico system only. Longer or shorter screws may cause electric shorting or un-proper installed.*
3. *Static electricity can damage electronic components. To guard against such damage:*

   Work in a static-free environment

   Wear a grounded anti-static wrist strap

   Store uninstalled components in anti-static bags

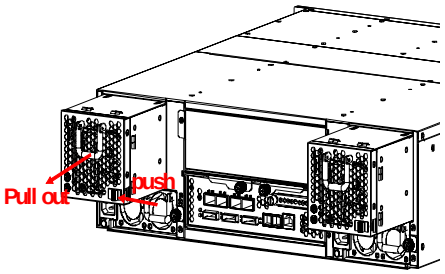
   Handle PCBs by their edges and avoid touching chips and connectors.

Hot Swapping to replace the Fan Module

This section provides instructions for the removal and installation of the Fan Module indicated in the figure below.

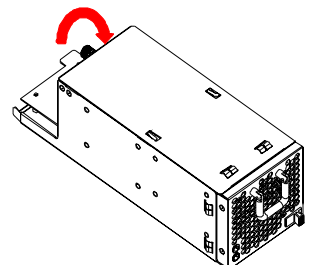
Removing the Fan Module from AN-716 and AN-724 :

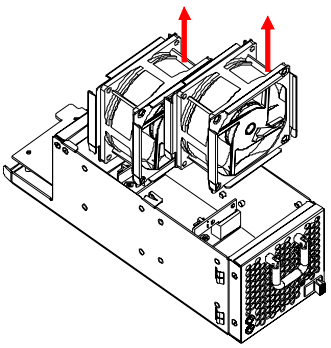
Remove the Fan modules by slide the release button left and pull the module out of system.



Replace the Fan in Fan module

1. There are two failure LEDs on the rear of Fan module. Check which LED lights to yellow.
2. Remove the Fan modules by anti-clock wise to release the thumb screw then slide it back and lifting off.
3. Release the screw to remove the defect fan.
4. Insert the spare Fan and fasten the screw.

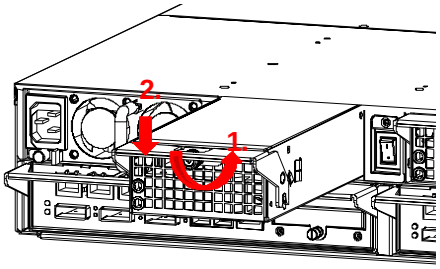




Removing the Fan Module from AN-712 :

In order to access controller box,

1. Turn anti-clock wise to release the thumb Screws.
2. Push down the use eject bar to remove controller box.
3. Remove the Fan modules by pull the module out of system.



Replace the Fan in Fan module

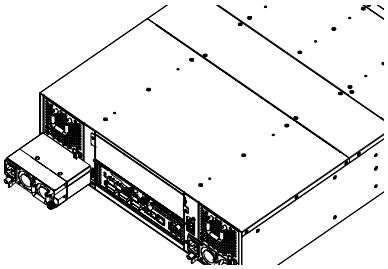
5. There are two failure LEDs on the rear of Fan module. Check which LED lights to yellow.
6. Remove the Fan modules by anti-clock wise to release the thumb screw then slide it back and lifting off.
7. Release the screw to remove the defect fan.
8. Insert the spare Fan and fasten the screw.

Hot Swapping to replace the Power Module

This section provides instructions for the removal and installation of the Power Module indicated in the figure below.

Removing the Power Module

Unscrew the thumb fastener, then push right the release button, slide it back and lifting off.



Installing the Power module into Alnico:

Insert a Power module then fasten the screw.

The Power indicator will turn bright “Green” to indicate it has powered on

Appendix A

Connectors

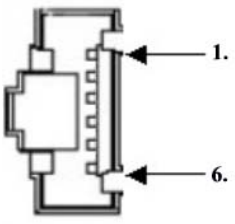
Ethernet RJ-45 Connector

1.

8.

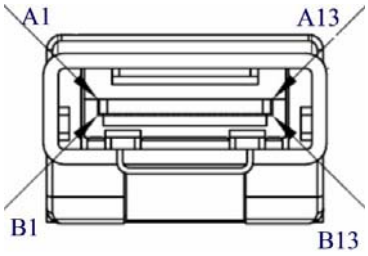
Pin#	Signal Name
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

RJ-11



Pin#	Signal	Pin#	Signal
1	NC	6	NC
2	GND		
3	RX		
4	TX		
5	CTS		

miniSAS (SFF-8088)



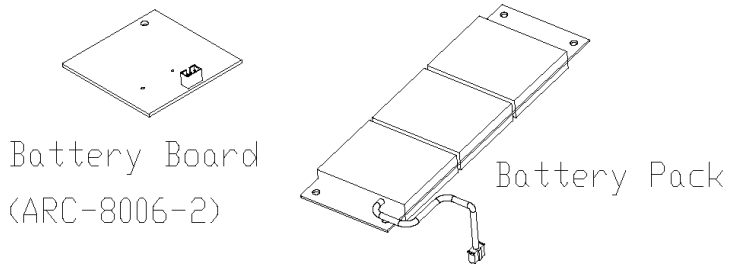
Pin#	Signal	Pin#	Signal
A1	GND	B1	GND
A2	RX0+	B2	TX0-
A3	RX0-	B3	TX0+
A4	GND	B4	GND
A5	RX1+	B5	TX1-
A6	RX1-	B6	TX1+
A7	GND	B7	GND
A8	RX2+	B8	TX2-
A9	RX2-	B9	TX2+
A10	GND	B10	GND
A11	RX3+	B11	TX3-
A12	RX3-	B12	TX3+
A13	GND	B13	GND

Appendix B

Battery Backup Module (BBM)

The external RAID controller operates using cache memory .The battery Backup Module is an add-on module that provides power to the external RAID controller cache memory in the event of a power failure. The Battery Backup Module monitors the write back cache on the external RAID controller, and provides power to the cache memory if it contains data not yet written to the hard drives when power failure occurs.

BBM Specifications



Mechanical

Module Dimension (W x H x D) : 50 x 10 x 147 mm

Battery Board (W x H x D) : 45 x 14 54 mm

BBM Connector

3 x Pins Connector

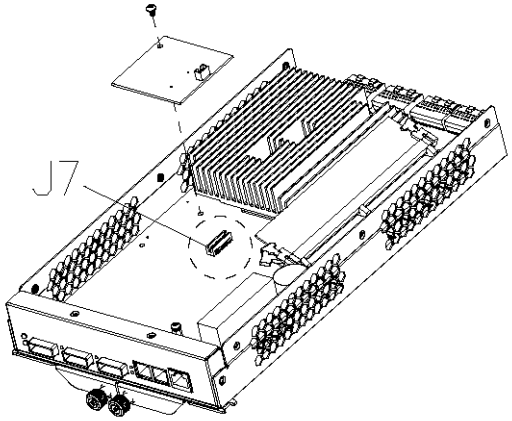
Input Voltage

+3.6 VDC

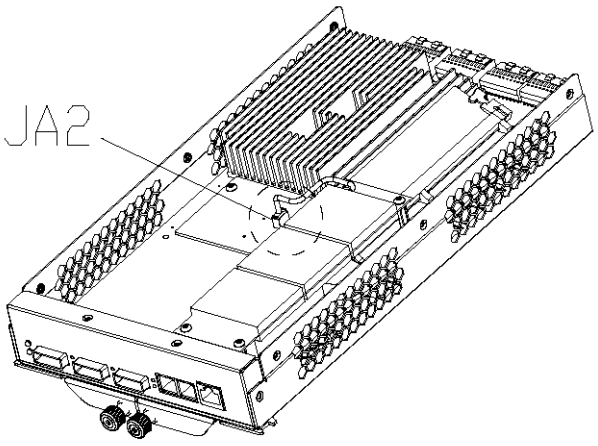
On Board Battery Capacity

3900MAH (3*1300MAH)

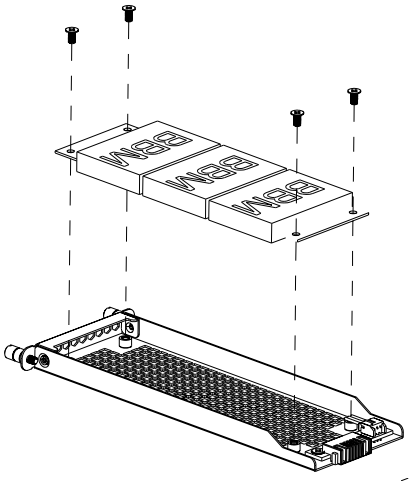
- Install Battery board (ARC-8006-2) into controller's J7 connector, location is shown as bellowing :



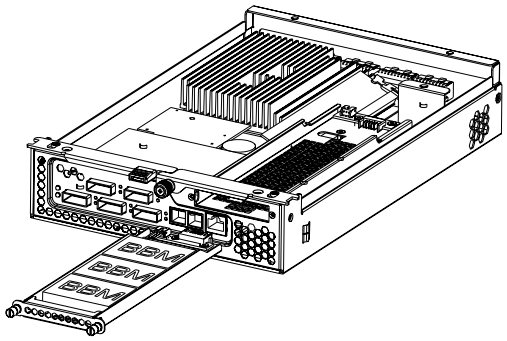
- Insert the 3pin Connector into Battery Board's (ARC8006-2) JA2 connector.



- Install the BBM and fasten 4 screws.on BBM carrier.
- Plug in the BBM's connector into socket on carrier



- Plug the BBM carrier into the controller and fasten the thumb screws.



Battery Backup Capacity

Battery backup capacity is defined as the maximum duration of a power failure for which data in the cache memory can be maintained by the battery. The BBM's backup capacity varied with the memory chips that installed on the external RAID controlle

Capacity	Memory Type	Battery Backup duration (Hours)
2GB Memory	DDR3-1333	98
4GB Memory	DDR3-1333	83

Operation

- Battery conditioning is automatic. There are no manual procedures for battery conditioning or preconditioning to be performed by the user.
- Battery bad a tendency to “remember” its capacity. In order to make sure of all the capacity of your battery cells, allow the battery cell to be fully charged when installed for the first time. The first time charge of battery cells takes about 24 hours to complete.

Removing the Battery Backup Module

The battery module will need to be removed for one of the following reason:

- Disconnect battery module if there is a long storage period before deployment
- The LI-ION battery will no longer accept a charge properly.

Appendix C. Specifications

Alnico AN-7 RAID Series			
			
Model	**AN-724E8N**	**AN-716E8N**	**AN-712E8N**
Controller Number	Single	Single	Single
RAID Architecture	800Mhz Dual Core RAID-On-Chip Storage Processor. Up to 8GB DDR3-1333 SDRAM on one DIMM socket with ECC protection. Write-Through or Write-back cache mode support. NVRAM for RAID configuration and transaction log. Advanced PCI-Express 3.0 x8 bus architecture Battery backup modules ready (Optional). Real time clock support.		
RAID Features	*RAID Levels: 0, 1,1E, 3, 5, 6, 50, 60 & JBOD. *Online array roaming. *Automatic drive insertion / removal detection and rebuilding. *Online capacity expansion and RAID level migration simultaneously. *Support spin down drivers for idle disk to extend service life (MAID). *Great than 2TB per volume set (64-bit LBA support) *Support Global Hot Spare and local Hot Spare disk *Disk Scrubbing / array verify scheduling for automatic repair of all configured RAID sets. *Multiple RAID selection. *Offline RAID set *Online volume set growth. *Online RAID level / stripe size migration. *Instant availability and background initialization. *Supports up to 256 SAS devices. *Max 128 LUNs (volume sets) per RAID set *Login record in the event log with IP address and service (http, telnet, and serial)		
System Type	4U Rackmount	3U Rackmount	2U Rackmount
Host Interface	PCI-E 8x	PCI-E 8x	PCI-E 8x
Disk Interface	24 x 6Gb SAS / 6Gb SATA drives	16 x 6Gb SAS / 6Gb SATA drives	12 x 6Gb SAS / 6Gb SATA drives
	Single downstream miniSAS (4x6Gb) expand ports per controller		

Model	AN-724E8N	AN-716E8N	AN-712E8N
RAID Management	Firmware-embedded Web browser-based RAID manager via built-in 10/100 Ethernet. Firmware-embedded manager through front LCD control panel. Firmware-embedded manager via RS-232 port. Field-upgradeable firmware in flash ROM.		
Monitoring / Indicators	All system status can be monitored by firmware-embedded Web browser-based RAID manager. Firmware-embedded SNMP agent allows the remote to monitor events with no SNMP agent required. System status indication through LCD, LED and alarm buzzer. All system events can be sent to multiple user alerts via e-mails. (SMTP)		
Operating System	**PCI-E 8x** driver required		
Power Supply	Redundant by three 500W / 80 Plus energy-efficient power modules with PFC and, load sharing and cable-less design.	Redundant by dual 500W / 80 Plus energy-efficient power modules with PFC, load sharing and cable-less design.	Redundant by dual 500W / 80 Plus energy-efficient power modules with PFC. load sharing and cable-less design.
Electrical	AC Voltage 100-240 VAC / AC Frequency 50-60Hz		
Temperature	Operating temperature: 5 to 35 degree C. Non tperating temperature: -40 to 60 degree C.		
Relative Humidity	20% to 80% non-condensing		
Dimension	446.5mm(W) x 517mm(D) x 4U	446.5mm(W) x 517mm(D) x 3U	446.5mm(W) x 517mm(D) x 2U
Weight	34KGS	20KGS	17KGS

Specifications subject to change without notice.