ETERNUS

P3AM-3042-03ENZ0

ETERNUS DX60/DX80

Disk storage system

User Guide

FUJITSU

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Preface

Fujitsu would like to thank you for purchasing our ETERNUS DX60/DX80 Disk storage system.
The ETERNUS DX60/DX80 Disk storage system is designed to be connected to a Fujitsu (PRIMEQUEST, PRIMERGY, or SPARC Enterprise) or other server.
This guide introduces the user to the ETERNUS DX60/DX80 Disk storage system (referred to as just "ETERNUS DX60/DX80" in the remainder of this manual), and explains the regular checks and maintenance required.
Please carefully review the information outlined in this manual.

Third Edition
October 2009

Applicable Environment

The ETERNUS DX60/DX80 was designed and manufactured with user safety in mind. When using the ETERNUS DX60/DX80, follow the handling instructions, placement and cautionary notes listed in this guide. If used beyond the limits described, the users may be at risk of personal injury and/or material damage.

Using this Manual

The manuals provided with the ETERNUS DX60/DX80 contain important information regarding safe usage.
Please read these manuals carefully before using the ETERNUS DX60/DX80. Pay special attention to "ETERNUS DX60/DX80 Disk storage system Safety Precautions", and understand the contents thoroughly before connecting. Keep these manuals in a safe place for future reference.
Fujitsu pays careful attention to the safe use of its products to prevent user injury and/or material damage. To use the ETERNUS DX60/DX80 properly, please follow the instructions in this manual.

The ETERNUS DX60/DX80 is designed, developed and manufactured as contemplated for general use, including without limitation, general office use, personal use, household use, and ordinary industrial use, but is not designed, developed and manufactured for use in situations with accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss (hereinafter "High Safety Required Use"), including without limitation, nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, and missile launch control in weapon systems. Do not use the ETERNUS DX60/DX80 for High Safety Required Use without securing the sufficient safety level required. If you wish to use the ETERNUS DX60/DX80 for High Safety Required Use, please consult with our sales representative before such use.

Electromagnetic compatibility
Emissions: FCC Class A, EN55022 Class A and CNS 13438 Class A
Immunity: EN55024

Safety
CAN/CSA C22.2 No. 60950, UL60950 and EN60950

Class 1 laser product

中华人民共和国　电子信息产品污染控制标志

Electronic intelligence product pollution control mark of the People's Republic of China.

环境保护 使用期限的详细说明

这标记是按照2006年2月28日公布的[电子信息产品污染控制管理办法]以及SJ/T11364-2006[电子信息产品污染控制标识要求]在中国销售的电子信息产品的环保使用期限。如遵守关于这产品的安全或使用上的注意，在这期限内(从生产日期起算)不会因产品中的有害物质漏到外部、或发生突然变异，而引起环境污染和对人体或财产的重大影响。

有害物质的名称和含有状况

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)
印刷线路板	×	○	×	○	○	○
HDD(硬盘)	×	○	○	○	○	○
机箱 底盘	×	○	×	○	○	○
电源	×	○	×	○	○	○
风扇机、电动机	×	○	×	○	○	○
电缆	×	○	×	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363－2006 规定的限量要求以下。

×：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/T 11363－2006 规定的限量要求。

About this Manual

This guide introduces the ETERNUS DX60/DX80 to the user and explains how to check and maintain the ETERNUS DX60/DX80 on a regular basis.
Refer to the manuals for each peripheral concerning details not included in this manual.

Organization

This manual is organized as follows:

- Chapter 1 Overview
  This chapter provides an external view of the ETERNUS DX60/DX80, and explains the special features, data configurations of RAID groups, and specifications of the ETERNUS DX60/DX80.
- Chapter 2 Hardware
  This chapter describes the hardware components of the ETERNUS DX60/DX80 and details of the basic operation methods of the ETERNUS DX60/DX80, such as how to turn the power on and off.
- Chapter 3 Installation
  This chapter describes the ETERNUS DX60/DX80 installation.
- Chapter 4 Setup
  This chapter describes how to connect and setup the ETERNUS DX60/DX80 for operation.
- Chapter 5 Installing Optional Products
  This chapter describes how to attach optional products.
- Chapter 6 Operation and Troubleshooting
  This chapter describes points to note when operating and performing maintenance for the ETERNUS DX60/DX80. Also, this chapter describes how to respond to any problems which may occur.
  Read this chapter when operating or performing maintenance on the ETERNUS DX60/DX80, or if an error

"Specifications", "Events detected by ServerView", and "About Using of Open Sources" are described as appendixes.

Refer to the manuals for each peripheral concerning details not included in this manual.

Warning Notations

Warning signs are shown throughout this manual in order to prevent injury to the user and/or material damage. These signs are composed of a symbol and a message describing the recommended level of caution. The following explains the symbols, their levels of caution, and their meanings as used in this manual.

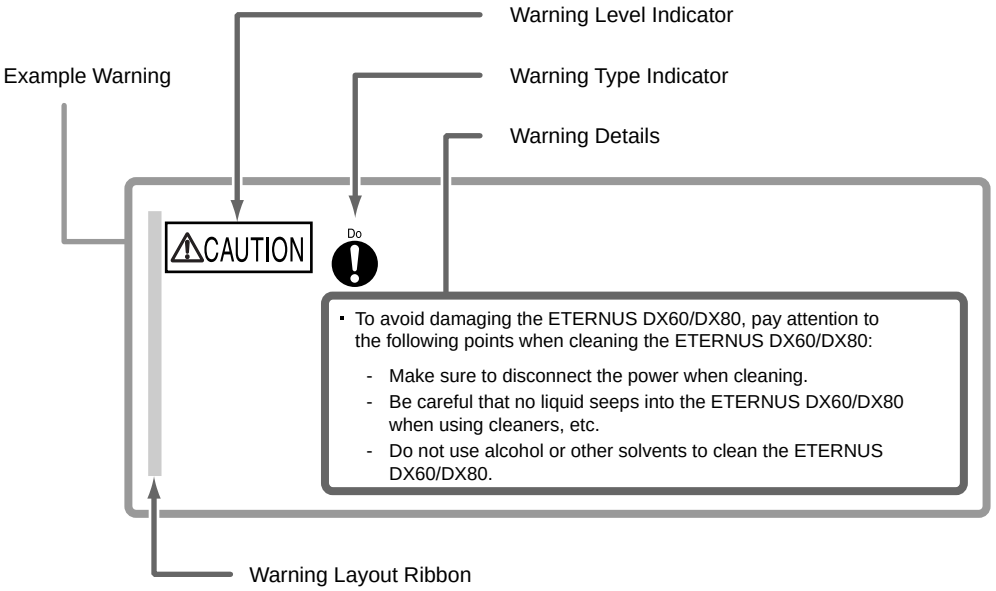
WARNING	This symbol indicates the possibility of serious or fatal injury if the ETERNUS DX60/DX80 is not used properly.
CAUTION	This symbol indicates the possibility of minor or moderate personal injury, as well as damage to the ETERNUS DX60/DX80 and/or to other users and their property, if the ETERNUS DX60/DX80 is not used properly.
IMPORTANT	This symbol indicates IMPORTANT information for the user to note when using the ETERNUS DX60/DX80.

The following symbols are used to indicate the type of warnings or cautions being described.

Electric Shock 	△The triangle emphasizes the urgency of the WARNING and CAUTION contents. Inside the triangle and above it are details concerning the symbol (e.g. Electrical Shock).
No Disassembly 	⃠The barred "Do Not..." circle warns against certain actions. The action which should be avoided is both illustrated inside the barred circle and written above it (e.g. No Disassembly).
Unplug 	●The black "Must Do..." disk indicates actions that must be taken. The required action is both illustrated inside the black disk and written above it (e.g. Unplug).

How Warnings are Presented in this Manual

A message is written beside the symbol indicating the caution level. This message is marked with a vertical ribbon in the left margin, to distinguish this warning from ordinary descriptions. An example is shown here.



Additional Information

Expressions and abbreviations

The following are expressions and abbreviations used throughout this manual:

Note	Functions and know how which can be useful when setting up or operating the ETERNUS DX60/DX80.
Refer	This notation indicates related reference manuals.

Product names and abbreviations

- "Windows®" represents the following products.
  - Microsoft® Windows® 2000 operating system
  - Microsoft® Windows Server® 2003 operating system
  - Microsoft® Windows Server® 2008 operating system

Latest Information

The information in this document is subject to change without notice for functionality expansion of ETERNUS DX60/DX80 and improvement. The latest version of this document and the latest information about the ETERNUS DX60/DX80 is released in the following web-site. Access the following address if needed.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx60-dx80/

Related Manuals

Refer to the following related manuals in addition to this manual.

Manuals	Code	Description
ETERNUS DX60/DX80 Disk storage system Setup Guide (Fibre Channel model)	P3AM-3082	This manual describes how to ready Fibre Channel model devices for operation.
ETERNUS DX60/DX80 Disk storage system Setup Guide (iSCSI model)	P3AM-3092	This manual describes how to ready iSCSI model devices for operation.
ETERNUS DX60/DX80 Disk storage system Setup Guide (SAS model)	P3AM-3102	This manual describes how to ready SAS model devices for operation.
ETERNUS DX60/DX80 Disk storage system Safety Precautions	P3AM-3142	This manual describes the points to note when installing and operating the device.
ETERNUS DX60/DX80 Disk storage system Package Contents	P3AM-3062	This is the list of package contents for the device and optional products.
ETERNUS DX60/DX80 Disk storage system Using Optional Products	P3AM-3152	This manual describes the points to note when using optional products.
ETERNUS DX60/DX80 Disk storage system Feature activation licenses	P3AM-3312	This manual describes the Advanced Copy license.
ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)[*1]		This manual describes how to connect the ETERNUS DX60/DX80 to a server.
ETERNUS Disk storage systems Server Connection Guide (iSCSI)[*1]		
ETERNUS Disk storage systems Server Connection Guide (SAS)[*1]		
ETERNUS DX60/DX80 Web GUI User Guide	P2X0-0620	This manual describes how to monitor and set the ETERNUS DX60/DX80 via Graphical User Interface (GUI).

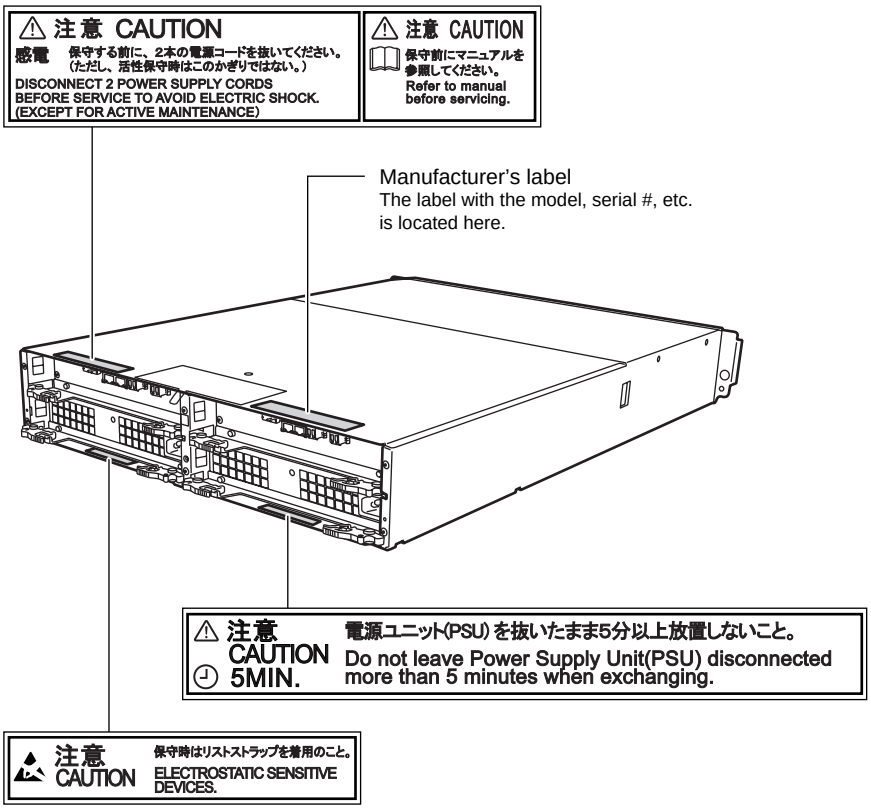
Manuals	Code	Description
ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide	P2X0-0710	This manual describes how to monitor and set the ETERNUS DX60/DX80 via Command Line Interface (CLI).
ETERNUS Multipath Driver V2.0 User's Guide		This manual describes how to use the optional ETERNUS Multipath Driver.
For Solaris™ Operating System	P2S0-0061	
(For Windows®)	P2WW-1451	
(For Linux)	P2U3-0031	
ETERNUS Multipath Driver V3.0 User's Guide		
For Solaris™ Operating System	P2S0-0062	
ETERNUS MPIO for IBM AIX V2.0.1 Installation & Configuration Guide for AIX	P2U3-0150	

*1: Download the necessary manuals for the customer operating environment (for server OS, Fibre Channel card type, etc.) from the specified web-site. For the URL of the download web-site, refer to the manual CD provided with the ETERNUS DX60/DX80.

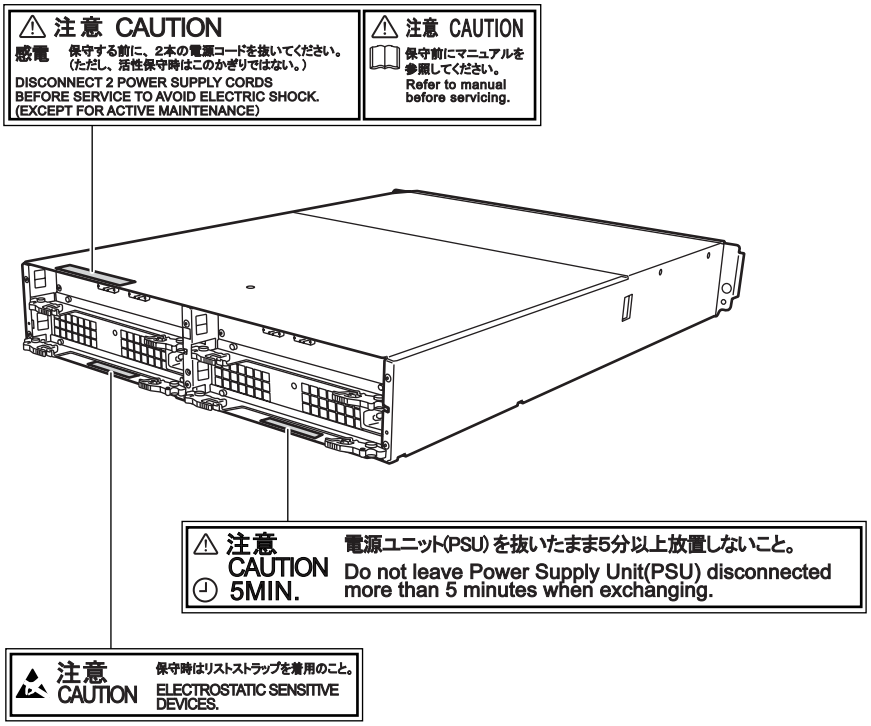
Labels

Warning labels and manufacturer's labels are found in various places of the ETERNUS DX60/ DX80, as shown in the example below.
Do not remove these labels.

Controller Enclosure

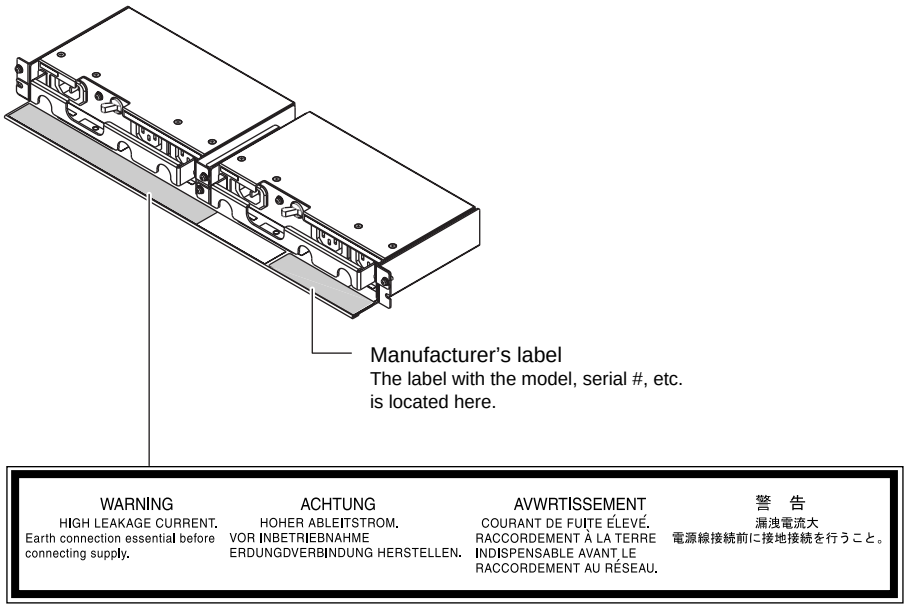


Drive Enclosure

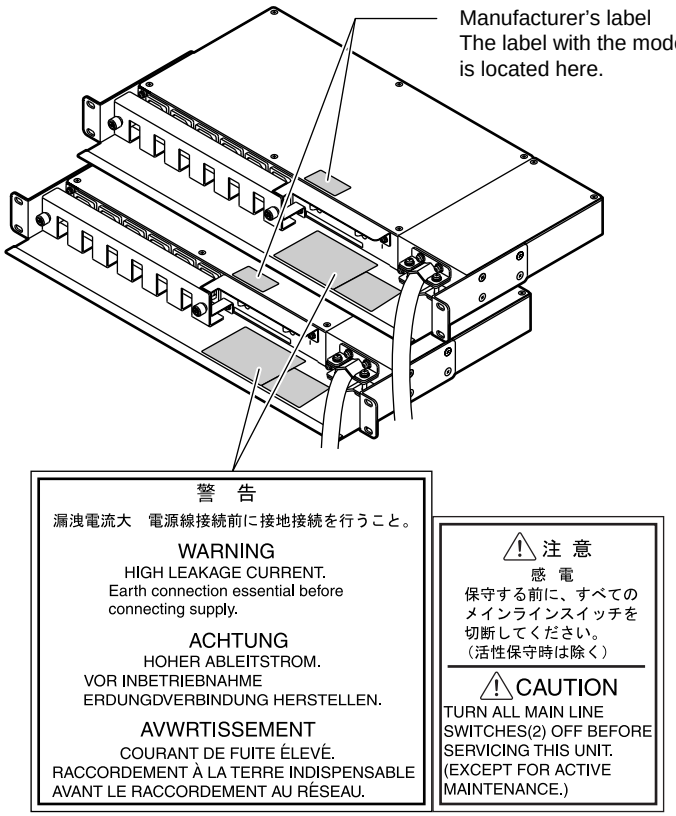


AC Outlet Box

- 1U type



- 2U type



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Chapter 1 Overview

This chapter provides an overview of the ETERNUS DX60/DX80 features, and specifications.

1.1 System Features

Special features of the ETERNUS DX60/DX80 are shown below:

Space and Energy Savings

- Compact design makes effective use of rack space
  - Two models are available; ETERNUS DX80 and ETERNUS DX60. Both models are compactly-designed to use rack space efficiently, coming in 2U size (*1) enclosures.
    *1: 2U = Two 19-inch rack units = 88mm device height
  - Optional drive enclosures can be added to allow installation of up to 24 disks in the ETERNUS DX60 and up to 120 disks in the ETERNUS DX80.
- Energy savings by the latest technology

  Power efficiency and energy savings are achieved with advanced technology.
- Eco-mode to reduce environmental load

  Using the Eco-mode function to start and stop the spindle rotation in the disk for each RAID group during the specified hour. Stop the spindle rotation when there is no access to the disk to reduce power consumption and decreases environmental load.
- Visualization of power consumption and ambient temperature

  Power consumption and ambient temperature for the entire ETERNUS DX60/DX80 can be checked using the (optional) "ETERNUS SF Storage Cruiser" integrated management software's Graphical User Interface (GUI). Both current status and historical records (for a day, a week, or an year) can be displayed.

Easy Installation and Operation Management

Settings of the ETERNUS DX60/DX80 and its operation management can be performed by GUI that uses a Web browser (hereafter referred to as "GUI"), or CLI that uses commands and command scripts.
Settings required for the ETERNUS DX60/DX80 initial installation can be easily performed by following the GUI wizard and inputting parameters for displayed setting items.
The ETERNUS DX60/DX80 can be configured, and its status can be displayed and monitored using GUI or CLI.

High scalability and versatile connectivity

- Utilizes the latest disk technology

  The ETERNUS DX60/DX80 is able to use 3.5" SAS disks (*1) (450GB/300GB (15,000rpm)). For data backup and archival purposes the ETERNUS DX60/DX80 is able to use large capacity, highly cost effective Nearline SAS disks (*1) (1TB/750GB (7,200rpm)).
  The ETERNUS DX80 is also able to use 3.5" SSDs (*2) (100GB/200GB) that store data in flash memory.

  *1: SAS: Serial Attached SCSI
  *2: SSD: Solid State Drive

- Supports capacity expansion during system operation
  - Disks and drive enclosures can be added during the system operation.
  - RAID group capacity can be expanded by adding disk from the unit of one.
  - Volume can be expanded during the system operation. Even when the work load increased rapidly, the ETERNUS DX60/DX80 flexibly expand the volume capacity with no interruption of the operation.

- High connectivity supports the multi-platform environment
  - The ETERNUS DX60/DX80 is able to support FC-SAN, IP-SAN, and DAS environments by utilizing Fibre Channel (maximum transfer speed: 8Gbps (for ETERNUS DX80)), iSCSI (maximum transfer speed: 1Gbps), and SAS (maximum transfer speed: 3Gbps) host interfaces.
  - The ETERNUS DX60/DX80 supports multiple Operating Systems such as UNIX, Linux, Windows®, and VMware®, and can be connected as a storage system for PRIMEQUEST, SPARC Enterprise, PRIMERGY servers as well as for UNIX/IA servers of other companies. Also the RAID aggregation using SAN (Storage Area Network) is available.

Data integrity with high-speed backup

- Nearline SAS disks for data backup and archiving
  - Using large capacity / cost effective Nearline SAS disks allows low cost D2D (Disk to Disk) backup and high-speed recovery in the case of unexpected failure.
  - Storing the less frequently accessed data such as archive data in the Nearline SAS disks allows easy reading. Nearline SAS disks and SAS disks can be installed in the same drive enclosure.

- Backup function

  Using the Advanced Copy function allows the high-speed copying of disk volumes at any given time.
  Up to eight SnapOPC+ and QuickOPC sessions can be used by default. Purchasing an (optional) Advanced Copy Feature allows you to use all the Advanced Copy functions.

High reliability supports 24/7/365 operation

- Duplication of important components

  Important components such as controllers (for dual-controller model), power supply units, and fans are duplicated to continue the operation in the case of unexpected failure. Also this allows the hot swapping of failed components with the device power on. In addition, the latest firmware can be applied during system operation.

- Various supported RAID levels

  The ETERNUS DX60/DX80 supports RAID5+0 that is superior to RAID5 in reliability and performance, and RAID6 that responds to the double failure of disks, as well as RAID1, RAID1+0, and RAID5. A flexible RAID configuration can be selected.

- Redundant copy ensures disk redundancy

  The ETERNUS DX60/DX80 diagnostic routines test the disks in order to predict failures before they happen. When a disk requires preventive maintenance, a hot spare is automatically switched in to replace it, providing continued data redundancy and stable operation.

- Block Guard ensures data integrity

  The ETERNUS DX60/DX80 adds check codes and check them at multiple checkpoints on data transfer path to ensure the data integrity.

- System Capacitor Unit (SCU)

  A SCU that does not need to be regularly replaced is installed as a backup power source in case of a power failure. If the power fails, the SCU enables the cache memory data to be saved to flash memory. Therefore, unlike a battery, the SCU does not have a time limit to save data. The SCU is charged so quickly that write performance is recovered right after power recovery.

E-mail notification

If an error occurs in the ETERNUS DX60/DX80, the details can be sent to a specified e-mail address.

Strengthening security against information leaks

- Data encryption to prevent information leaks

  Data can be encrypted and written. Data encryption can prevent information leaks caused by fraudulent decoding even if the disk is stolen.

Note

Data encryption may not be possible for some configurations.

- Protection against fraudulent access

  The ETERNUS DX60/DX80 supports SSL/SSH that encrypts and communicates information on the network. This protects against malicious use of data and fraudulent access to devices via a Web browser (GUI) or CLI.

RoHS compliance

The ETERNUS DX60/DX80 complies with RoHS, as mandated by the Council of Europe and our board of directors. RoHS limits the use in electric and electronic equipment of six specific chemicals: lead, hexavalent chromium, mercury, cadmium, PBB (polybrominated biphenyl), and PBDE (polybrominated diphenyl ether). In addition, lead-free soldering is used for all printed-wiring boards.

1.2 Configuration

This chapter describes items to be noted before configuring the ETERNUS DX60/DX80 systems.

1.2.1 RAID Level

This section describes the supported RAID level and usage (RAID level selection criteria), and RAID group configuration.

Supported RAID levels and mechanism

The ETERNUS DX60/DX80 supports the following RAID levels.

- RAID0 (striping)
- RAID1 (mirroring)
- RAID1+0 (striping of pairs of disks for mirroring)
- RAID5 (striping with distributed parity blocks)
- RAID5+0 (double striping with distributed parity blocks) (*1)
- RAID6 (striping with distributed double parity blocks) (*2)

*1: RAID5+0 is a RAID system in which the data on RAID5 volumes is then RAID0 striped.

*2: RAID6 ensures data safety and continues system operation in the case of a second malfunction within a single RAID group.

CAUTION

Do

- Remember that a RAID0 configuration is not redundant. This means that if a RAID0 disk fails, the data will not be recoverable. Therefore, using RAID1, RAID1+0, RAID5, RAID5+0, or RAID6 configuration is recommended.

Each RAID level description is shown below.

- RAID0 (striping)

  Data is split in unit of blocks and stored across multiple disks.

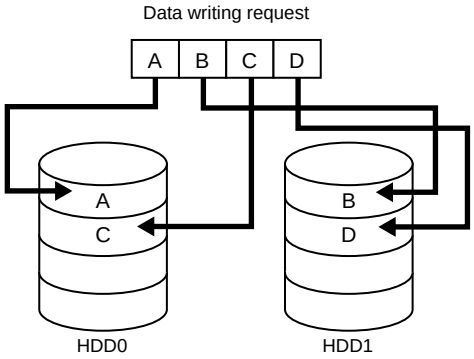


Figure 1.1 RAID0 Concept

- RAID1 (mirroring)

  RAID1 stores the same data on two duplicated disks at the same time.
  If one disk fails, other disk continues operation.

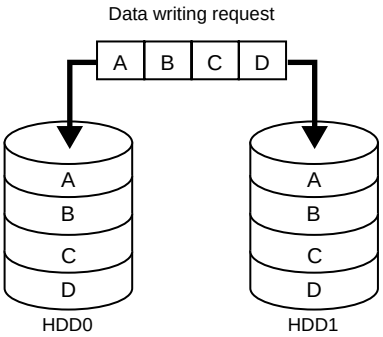


Figure 1.2 RAID1 Concept

- RAID1+0 (striping of pairs of disks for mirroring)

  RAID1+0 combines the performance of RAID0 (striping) with the reliability of RAID1 (mirroring).

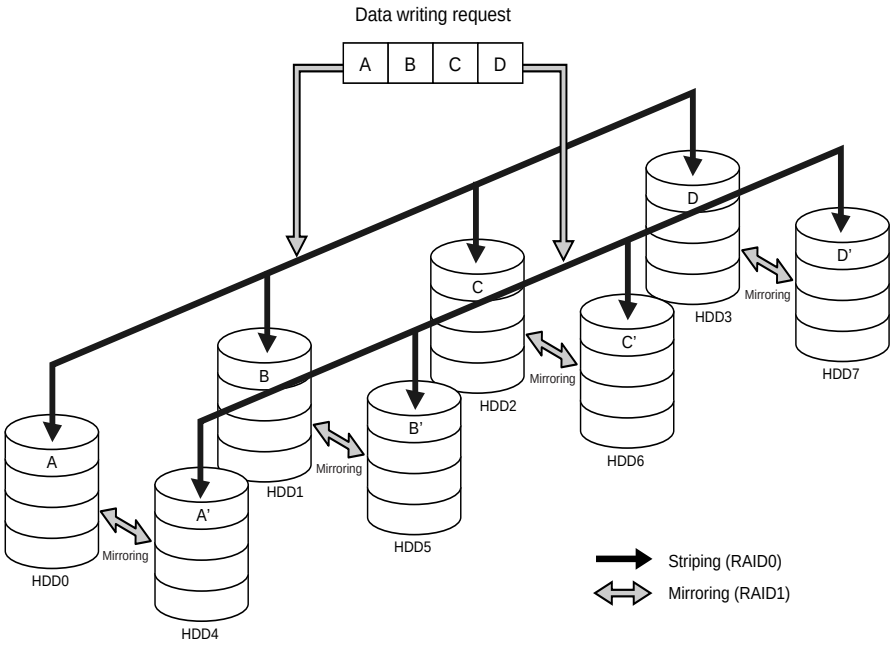


Figure 1.3 RAID1+0 Concept

- RAID5 (striping with distributed parity)

  Data divided into units of blocks and allocated across multiple disks together with parity information created from the data. If one disk fails, the remaining data and parity blocks are sufficient to allow the recovery of the lost data.

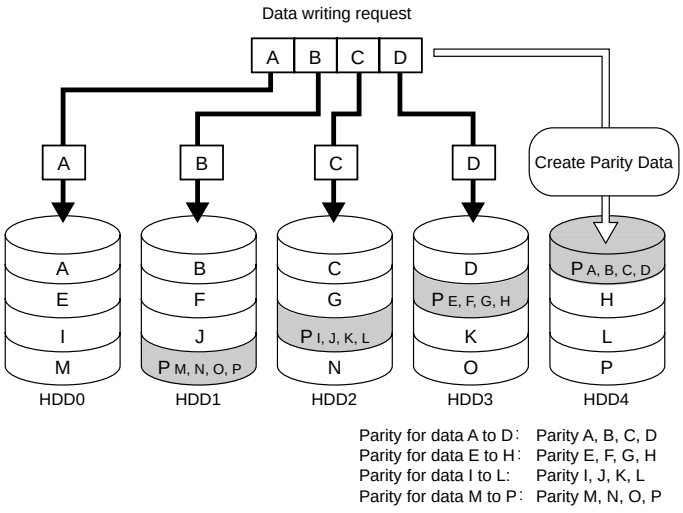


Figure 1.4 RAID5 Concept

- RAID5+0 (double striping with distributed parity)

  Multiple RAID5 volumes are RAID0 striped. For large capacity configurations, use of RAID5+0 instead of RAID5 results in enhanced performance, improved reliability, and shorter rebuilding times.

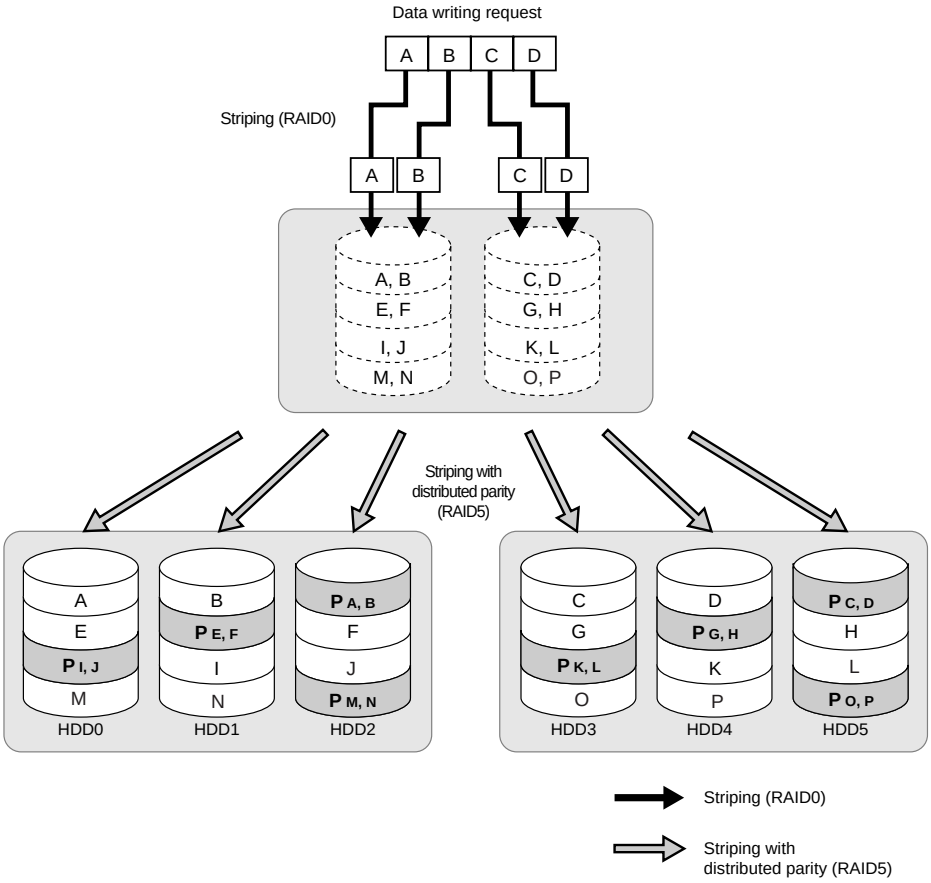


Figure 1.5 RAID5+0 Concept

- RAID6 (striping with distributed double parities)

  Store two different parities on different disks (double parities) to recover from up to two disk failures.

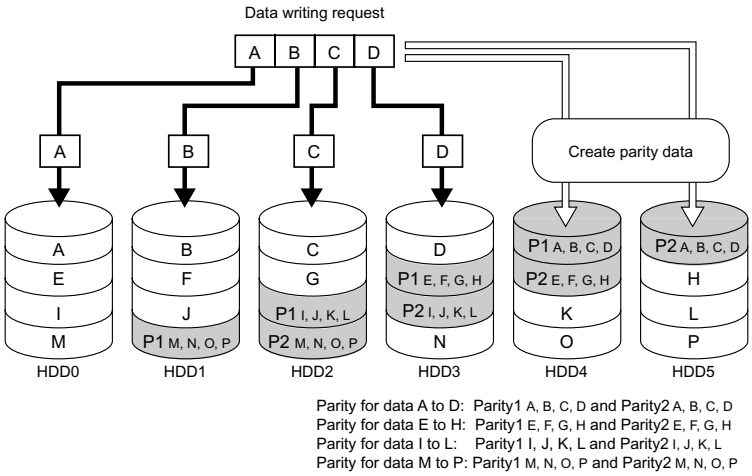


Figure 1.6 RAID6 Concept

User capacity for each RAID level

User capacity varies according to the RAID level.
Table 1.1 shows the formula for user capacity computation.

Table 1.1 User Capacity for each RAID Level

RAID level	Number of disks (*1)	Formula for user capacity computation
RAID0	2 to 16	Disk capacity × Number of disks
RAID1	2	Disk capacity × Number of disks/2
RAID1+0	4 to 32	Disk capacity × Number of disks/2
RAID5	3 to 16	Disk capacity × (Number of disks - 1)
RAID5+0	6 to 32	Disk capacity × (Number of disks - 2)
RAID6	5 to 16	Disk capacity × (Number of disks - 2)

*1: Actual number of disks can be installed depend on the models.

Reliability, performance, capacity for each RAID level

Table 1.2 shows the comparison result of reliability, performance, capacity for each RAID level.

Table 1.2 User Capacity for each RAID Level

RAID level	Reliability	Performance (Writing speed) (*1)	Capacity
RAID0	Bad	Very Good	Very Good
RAID1	Good	Good	Not Bad
RAID1+0	Good	Very Good	Not Bad
RAID5	Good	Good	Good
RAID5+0	Good	Good	Good
RAID6	Very Good	Good	Good

*1: Performance may differ according to the number of disks and the processing method from the host.

Recommended RAID level

Select the appropriate RAID level according to the usage.

- Recommended RAID level is RAID1, RAID1+0, RAID5, RAID5+0 and RAID6.
- For read and write performance, RAID1+0 configuration is recommended.
- For read only file servers and backup servers, RAID5, RAID5+0, or RAID6 can also be used. However, if the disk fails, note that it may affect the operation I/O for a rebuilding (writing) operation.
  For details of the rebuilding (writing) operation, refer to "1.3.1 Rebuild/Copyback" (page 33).

1.2.2 RAID Groups and Volumes

RAID group

In an ETERNUS DX60/DX80 Disk storage system, you can setup the RAID groups to all use the same RAID level or a mixture of different RAID levels.

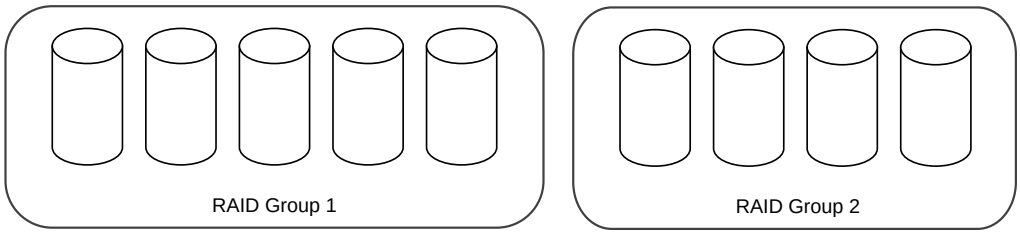


Figure 1.7 Example of a RAID group

Table 1.3 show the recommended number of disks that configures a RAID group.

Table 1.3 Recommended number of disks per RAID group

RAID level	Recommended number of disks
RAID1	2
RAID1+0	4, 6, 8, 10
RAID5	3, 4, 5, 6
RAID5+0	6, 8, 10, 12
RAID6	5, 6, 7

Note

- Adding more disks to a RAID group improves performance.
- Use of higher capacity disks in a RAID group will increase the time required for the disk rebuild process to complete.
- Similarly, the more disks per RAID5, RAID5+0, or RAID6 group, the longer the disk rebuild process will take following a disk failure.

Volume

Logical disk areas in RAID groups are called volumes.
A volume is the basic RAID unit, that can be recognized by the server.

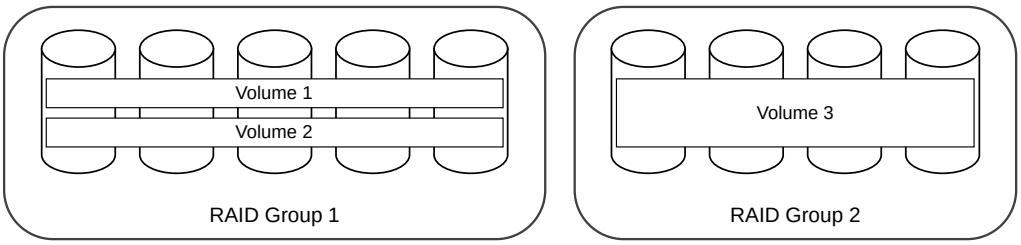


Figure 1.8 RAID group concept

- Table 1.4 shows the maximum number of volumes that can be set.

Table 1.4 The maximum number of volumes that can be set

Model	Per RAID group	Per storage system
ETERNUS DX60	Max. 128	Max. 512
ETERNUS DX80	Max. 128	Max. 1,024

- Table 1.5 shows the time for volume formatting (when the volume capacity is 100GB).

Table 1.5 Volume formatting time (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Time required for volume formatting (*1)	
		SAS disks	Nearline SAS disks
RAID1	2	Approx. 35 minutes/100GB	Approx. 85 minutes/100GB
RAID1+0	8	Approx. 25 minutes/100GB	Approx. 55 minutes/100GB
RAID5	5	Approx. 25 minutes/100GB	Approx. 55 minutes/100GB
RAID5+0	6	Approx. 25 minutes/100GB	Approx. 55 minutes/100GB
RAID6	6	Approx. 30 minutes/100GB	Approx. 75 minutes/100GB

*1: The value shows the time required for volume formatting when the volume capacity is 100GB and there is no server I/O. The time depends on the disk configuration or the disk type.

- No more than 8TB can be used for any one volume. However, the maximum allowed volume capacity is OS dependent.

1.2.3 System Disks

System disks are disks which have part of their area assigned for use by the system (the system area), and two system disks are installed in Slot0 and Slot1 in the controller enclosure.

IMPORTANT System disks cannot be registered as hot spares.

1.2.4 Hot Spare

Hot spares are used as spare disks for when disks in a RAID group fail, or are in error status. The following two types of hot spare are available:

- Global Hot spare
  This is available for any RAID group.
- Dedicated Hot spare
  This is only available to one specified RAID group.

Note Assign "Dedicated Hot spares" to RAID groups that contain important data, in order to preferentially improve their access to hot spares.

For details about Global Hot spare and Dedicated Hot spare, refer to the "ETERNUS DX60/DX80 Web GUI User Guide".

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

Make sure to register sufficient hot spares. If a free hot spare is available, when one of the RAID group disks has a problem, data from this disk is automatically replicated into the hot spare.

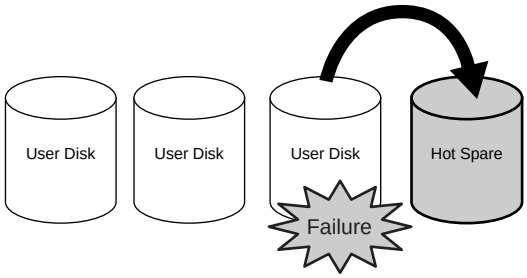


Figure 1.9 Hot Spares

CAUTION

Do

- If a disk configured in a RAID1, RAID1+0, RAID5, RAID5+0, or RAID6 group fails, contact your maintenance engineer immediately as the failed disk should be replaced at once. If another disk fails before the first disk that failed is replaced, the data of the second disk may be lost.

IMPORTANT System disks cannot be registered as hot spares.

1.2.5 Disks

Three kinds of drives can be installed in the device: SAS disks, Nearline SAS disks, and SSDs. Each is suitable for the following usage cases:

- SAS Disk
  SAS disks are highly-performance/high-reliability disks for enterprise use. SAS disks support 24/7/365 operations and are used to store high performance databases and other frequently accessed data.

- Nearline SAS Disk
  Nearline SAS disks are high capacity / cost effective disks for data backup and archive use. Nearline SAS disks can store information that requires a lower access rate at a still reasonable speed more cost effectively than the SAS disks.

- SSD (Solid-State Drive)
  SSDs are highly-performance/high-reliability drives for enterprise use. SSDs support 24/7/365 operations and are used to store high performance databases and other frequently accessed data. SSDs use flash memory as their storage media and provide better random access performance than SAS and Nearline SAS hard disks. Containing no motors or other moving parts, SSDs are highly resistant to impact and have low power consumption requirements.

1.2.6 Host Interface

The ETERNUS DX60/DX80 supports three models of host interfaces: the Fibre Channel model interface, the iSCSI model interface, and the SAS model interface.

- Fibre Channel interface
  Fibre Channel supports two connection topologies, Arbitrated Loop and Fabric.
  Maximum transfer speed is 4Gbps for the ETERNUS DX60, and 8Gbps or 4Gbps for the ETERNUS DX80.
  Fibre Channel is commonly used for database servers. A fabric connection via an FC switch will allow a large number of high-performance hosts to connect to a single port if required.
- iSCSI interface
  iSCSI is a communication protocol which transfers SCSI commands within IP packets over Ethernet, and has a maximum transfer speed of 1Gbps.
  Since iSCSI can be installed at lower cost than Fibre Channel, it is commonly used by divisions of large companies and by small-and-medium-sized companies.
  In order to secure iSCSI performance, it is recommended that the iSCSI network be physically separated from other typical purpose networks such as those used for Internet access and file transfer.
- SAS interface
  SAS (Serial Attached SCSI) is a serial transfer host interface that is as reliable as the normal (parallel) SCSI interface, but has a higher maximum transfer speed of 3Gbps.
  SAS is used to connect servers and DAS (Direct Attached Storage) devices and, while providing less expandability than a SAN connection, is still suitable for small-sized systems.

1.3 Functions

This section describes the main ETERNUS DX60/DX80 functions.

1.3.1 Rebuild/Copyback

When a disk fails and the RAID group redundancy has been broken, Rebuild/Copyback restores the disk status back to normal status as a background process.

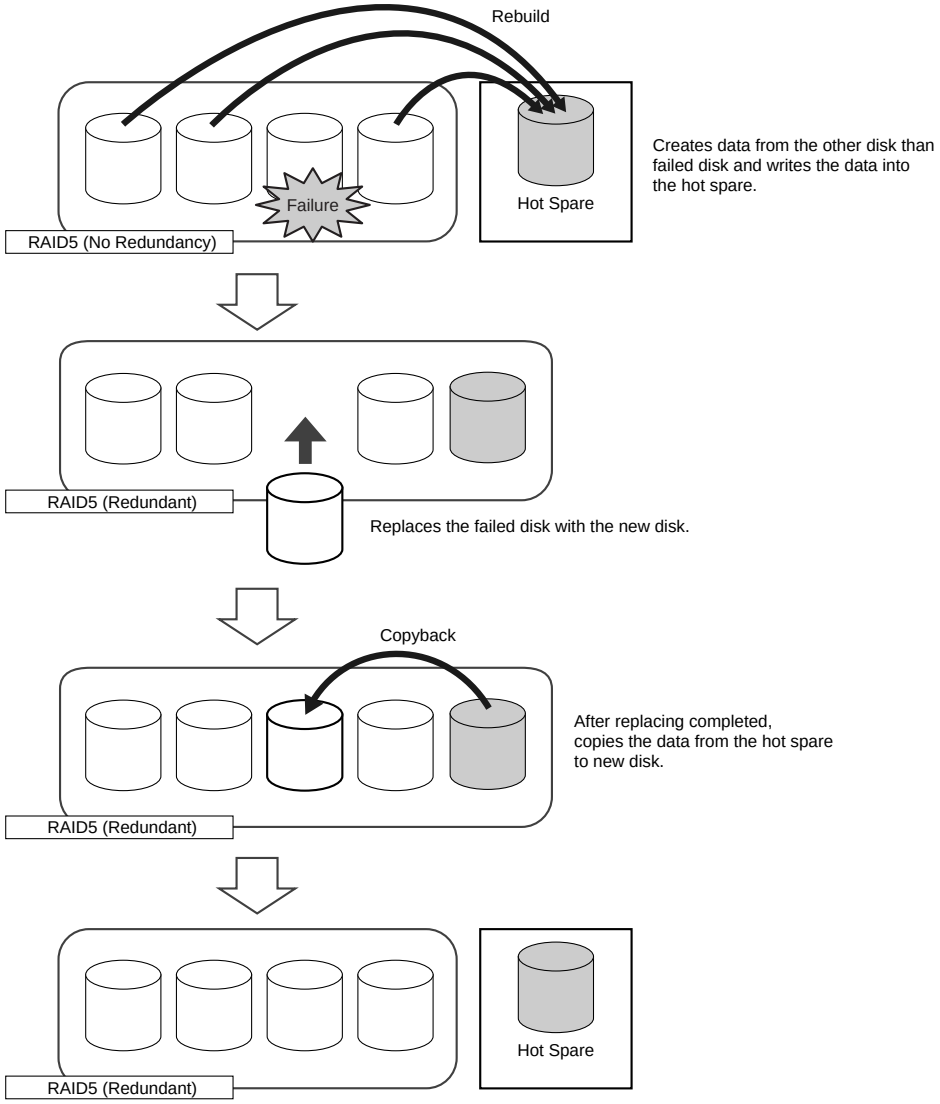


Figure 1.10 Rebuild/Copyback function

Table 1.6 shows the times (for 100GB volumes) required for the rebuild process to complete for various disk configurations.

Table 1.6 Rebuild process times (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Rebuild process time (*1)	
		SAS disks	Nearline SAS disks
RAID1	2	Approx. 20 minutes/100GB	Approx. 60 minutes/100GB
RAID1+0	8	Approx. 5 minutes/100GB	Approx. 15 minutes/100GB
RAID5	5	Approx. 10 minutes/100GB	Approx. 30 minutes/100GB
RAID5+0	6	Approx. 7 minutes/100GB	Approx. 20 minutes/100GB
RAID6	6	Approx. 13 minutes/100GB	Approx. 40 minutes/100GB

*1: The time required to rebuild a 100GB volume of the indicated RAID level, number and type of disks when there is no concurrent server I/O.

Table 1.7 shows the times (for 100GB volumes) required for the copyback process to complete for various disk configurations.

Table 1.7 Copyback process times (for SAS disks and Nearline SAS disks)

RAID level	No. of disks	Copyback process time (*1)	
		SAS disks	Nearline SAS disks
RAID1	2	Approx. 20 minutes/100GB	Approx. 60 minutes/100GB
RAID1+0	8	Approx. 5 minutes/100GB	Approx. 15 minutes/100GB
RAID5	5	Approx. 7 minutes/100GB	Approx. 20 minutes/100GB
RAID5+0	6	Approx. 5 minutes/100GB	Approx. 15 minutes/100GB
RAID6	6	Approx. 13 minutes/100GB	Approx. 40 minutes/100GB

*1: The time required to copyback a 100GB volume of the indicated RAID level, number and type of disks when there is no concurrent server I/O.

1.3.2 Redundant Copy

Redundant copy function copies data in the disk that found a error by Disk Patrol function requires the preventative maintenance to the hot spare. With this function, you can restore the data with keeping the redundancy.

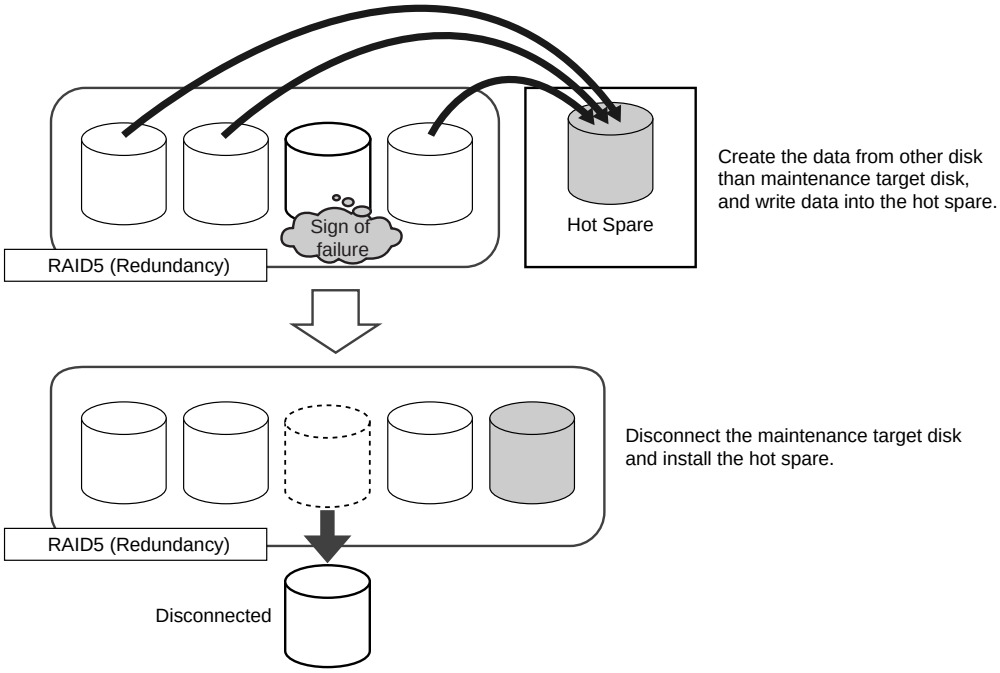


Figure 1.11 Redundant Copy Function

1.3.3 Advanced Copy

The Advanced Copy functions allows the ETERNUS DX60/DX80 to carry out high-speed data copying operations on its own, with no need to draw on server resources.

The Advanced Copy functions of the ETERNUS DX60/DX80 can be used in the following procedures.

- Data copy in volume unit using GUI or CLI commands
- Snap shot creation of volumes using the Microsoft® Windows Server® Volume Shadow Copy Service function (hereafter referred to as "VSS")
- Data backup, data restoration and test data replication for a system test in conjunction with work using ETERNUS SF AdvancedCopy Manager

The following shows an example of an Advanced Copy operation using ETERNUS SF AdvancedCopy Manager.

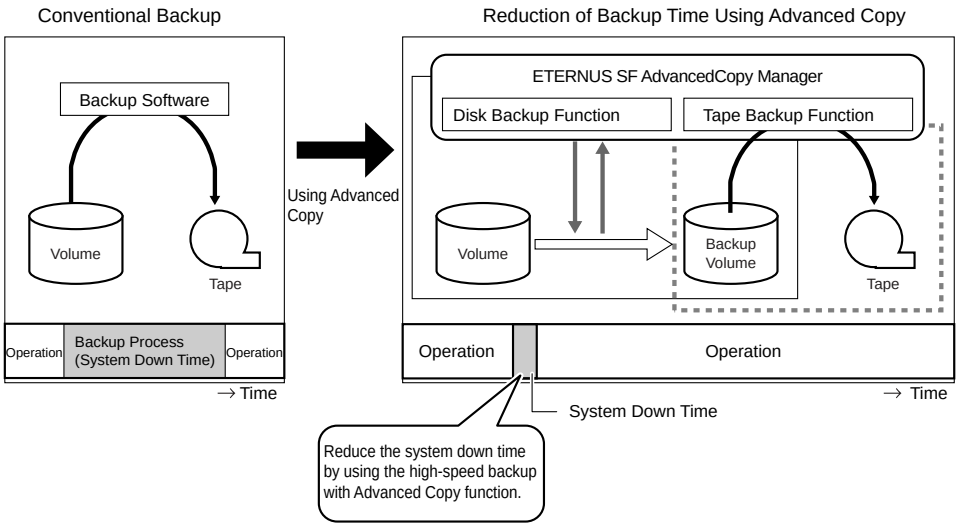


Figure 1.12 Example of an Advanced Copy operation

The following four methods are available as the Advanced Copy function.

- OPC (One Point Copy)

  One Point Copy (OPC) is a function that copies data in the volume (copy source) to another volume in the same device (copy destination) at a specific point in time.
  OPC is suitable for the following usages.

  - Making backup
  - Making replicas
  - Restoration from the backup data (restoration after replacing a disk when the copy source disk has failed)

- QuickOPC

  QuickOPC copies all data as initial copy as OPC. After the initial copy has completed, only updated data (differential data) need to be copied hereafter.
  QuickOPC is suitable for the following usages.

  - Making backup for less updated data
  - Making system test data replication
  - Restoration from the backup

- SnapOPC+

  As updates occur in the source data, SnapOPC+ saves the pre-change for each affected generation level. Registering standby storage areas in the SDP allows SnapOPC+ copy sessions to continue even when the amount of update data exceeds the copy destination capacity.
  SnapOPC+ is suitable for the following usages.

  - Making temporary backup for tape backup
  - Backup for less updated data (generation management is available)

- EC (Equivalent Copy)

  EC makes a mirror copy of the copy source to the copy destination beforehand, then suspends the copy and treats all data as independent data.
  When copying is Resumed, only updated data in the copy source is copied to the copy destination. If the copy destination data has been changed, copy the copy source data again.
  EC is suitable for the following usages.

  - Making backup
  - Making system test data replication

Purchasing the (optional) Advanced Copy Feature allows full use of all the Advanced Copy functions.
Table 1.8 shows the various functions that are available.

Table 1.8 Available copy functions

Item	Without Advanced Copy		With Advanced Copy		
Maximum number of copy sessions	8		512 (ETERNUS DX60) 1024 (ETERNUS DX80)		
Controlling software	GUI CLI	VSS	GUI CLI	VSS	ETERNUS SF AdvancedCopy Manager
Available copy type	SnapOPC+	SnapOPC+ QuickOPC	SnapOPC+	SnapOPC+ QuickOPC	All copy types

1.3.4 RAID Migration

RAID migration is a function that transfers a volume to a different RAID group with the data integrity being guaranteed. By using RAID migration, RAID levels and volumes can be hot switched. This allows easy redistribution of volumes among RAID groups in response to customer needs. RAID migration can be carried out while the system is running, and may also be used to switch data to a different RAID level changing from RAID5 to RAID1+0, for example.

The example of RAID migration is as follows:

- Example when transferring volumes from a RAID5(3+1) 300GB disk configuration to a RAID5(3+1) 450GB disk configuration:

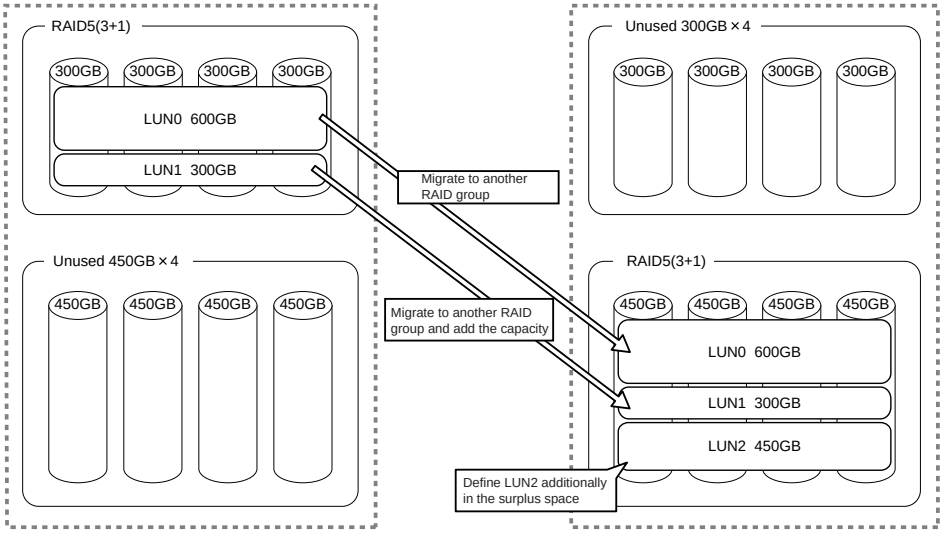


Figure 1.13 Example for use RAID Migration 1

- Example when volumes transferred from a RAID5(3+1) configuration to a different RAID level, RAID1+0(3+3), configuration:

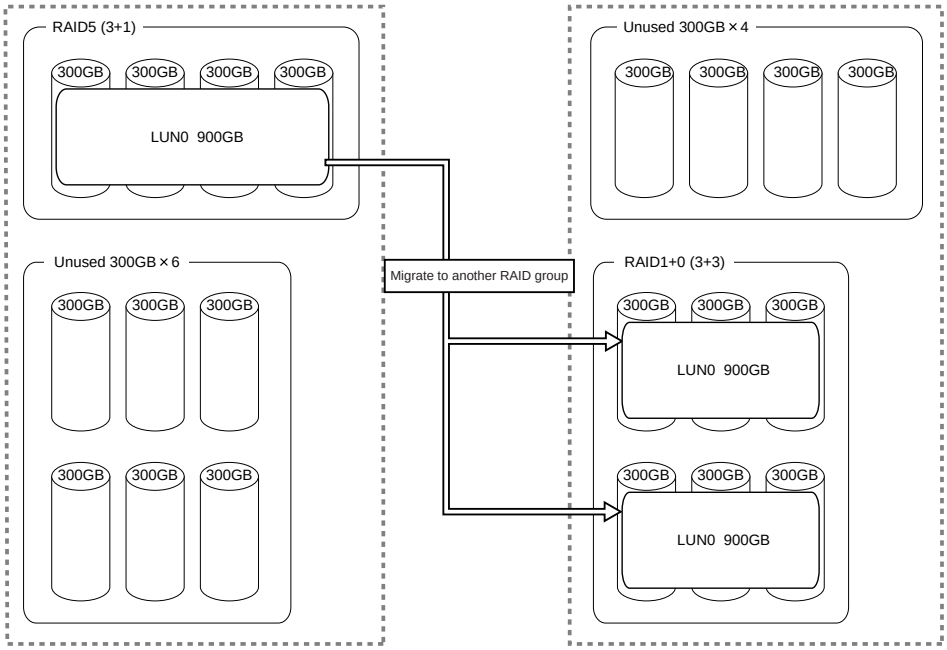


Figure 1.14 Example for use RAID Migration 2

1.3.5 Logical Device Expansion

Logical Device Expansion (RAID Group Expansion) allows the capacity of an existing RAID group to be dynamically extended by the addition of extra disks. By using Logical Device Expansion to extend the capacity of existing RAID group in this way, new volume can be added without having to add new RAID groups, as used to be the case.

The following shows the example when RAID5(3+1) 300GB configuration converted to a RAID5(4+1) configuration by the addition of an extra disk.

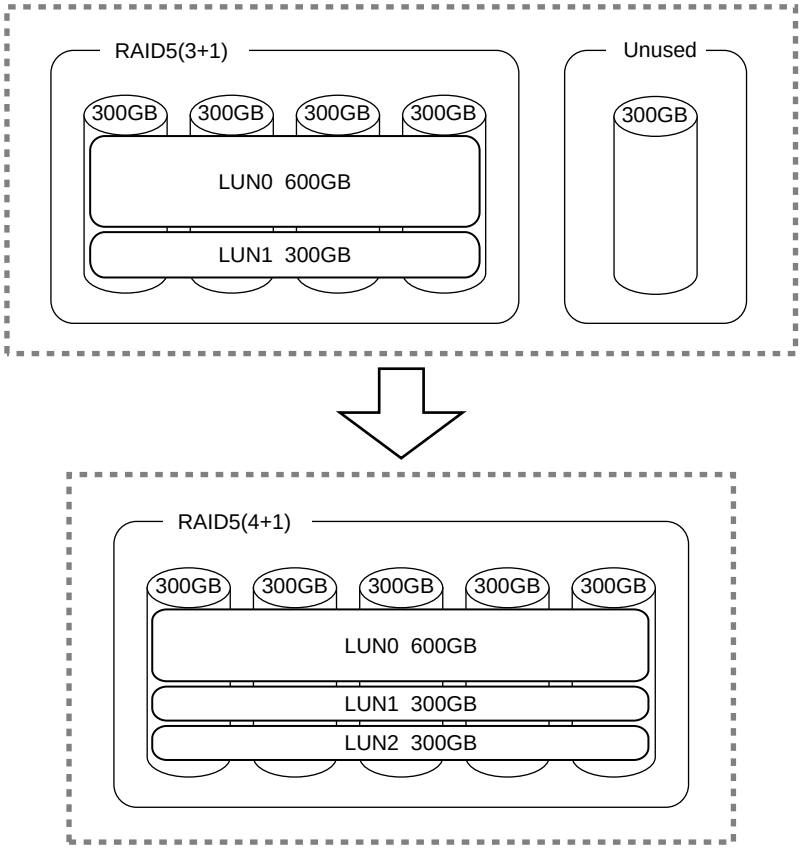


Figure 1.15 Example for use Logical Device Expansion

1.3.6 LUN Concatenation

LUN concatenation is a function that is used to add new area to a volume and so expand the volume capacity available to the server. This function enables the reuse of leftover free area in a RAID group and can be used to solve capacity shortages.

The following example shows the concatenation of an unused area of a different RAID group into LUN2, in order to expand LUN2's capacity to 900GB.

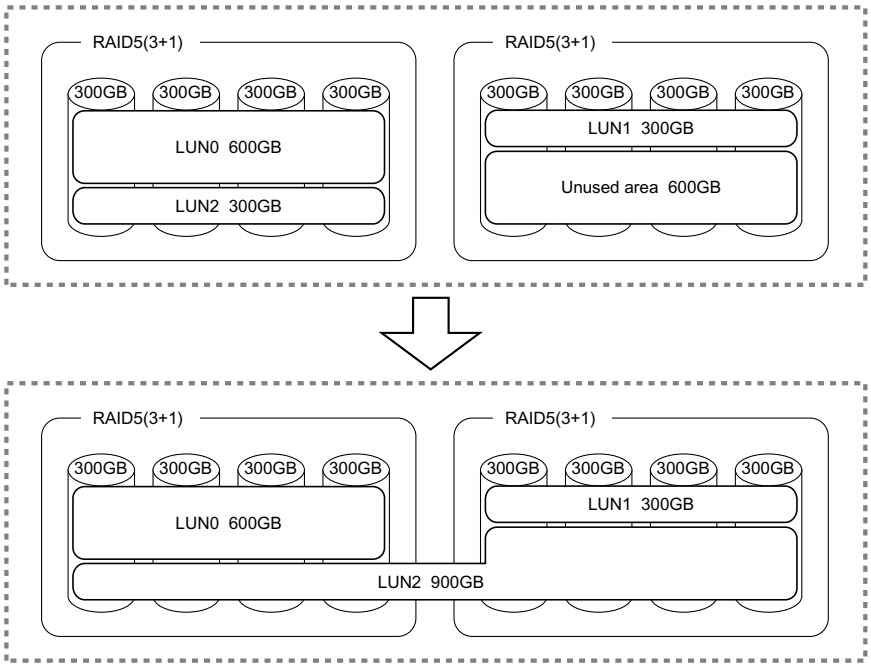


Figure 1.16 Example for use LUN Concatenation

1.3.7 Security Functions

The ETERNUS DX60/DX80 possesses functions that allow numbers of volumes, that can be recognized by a server, to be expanded or restricted by adjusting how the logical units (LUN) seen by the host correspond to the volumes within the storage system.
"LUN mapping function" and "Host Affinity function" are available as security functions.

- LUN Mapping function

  LUN mapping is used to set the relationship between the logical units (LUN) of the host and the volumes of the device, on a per device port basis.

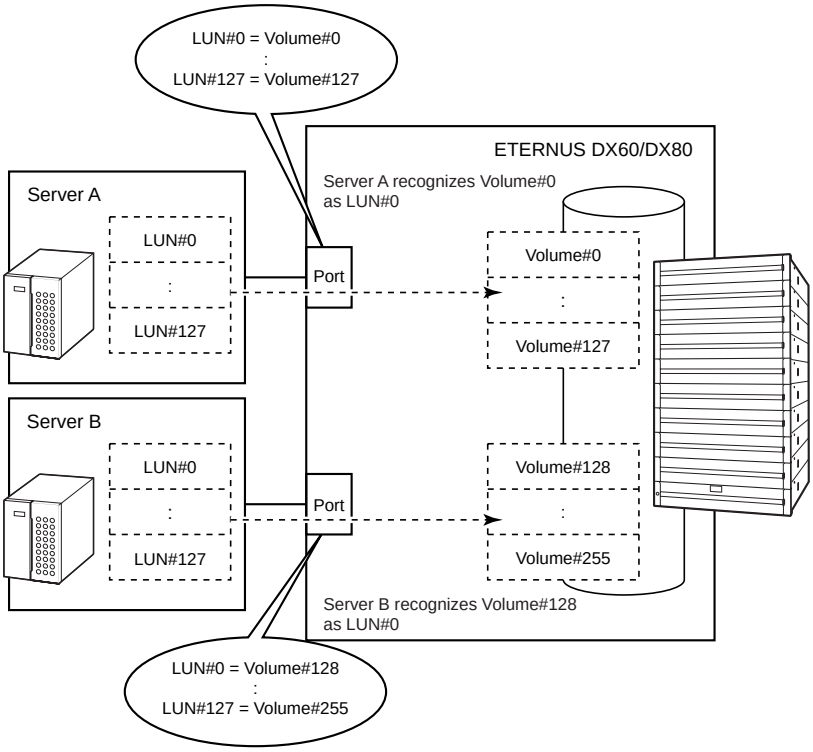


Figure 1.17 LUN Mapping function

By specifying different LUN mapping per port, it is possible to set the volumes that can be accessed for each server.

- Host Affinity function

  The Host Affinity function sets the "Affinity Group" to be applied for each server. "Affinity Group" defines the relationship between the host logical units (LUN) and the device logical volumes. Multiple settings are available.
  The Host Affinity function uses the server's World Wide Name (WWN), iSCSI name, or SAS address to distinguish it from other servers.

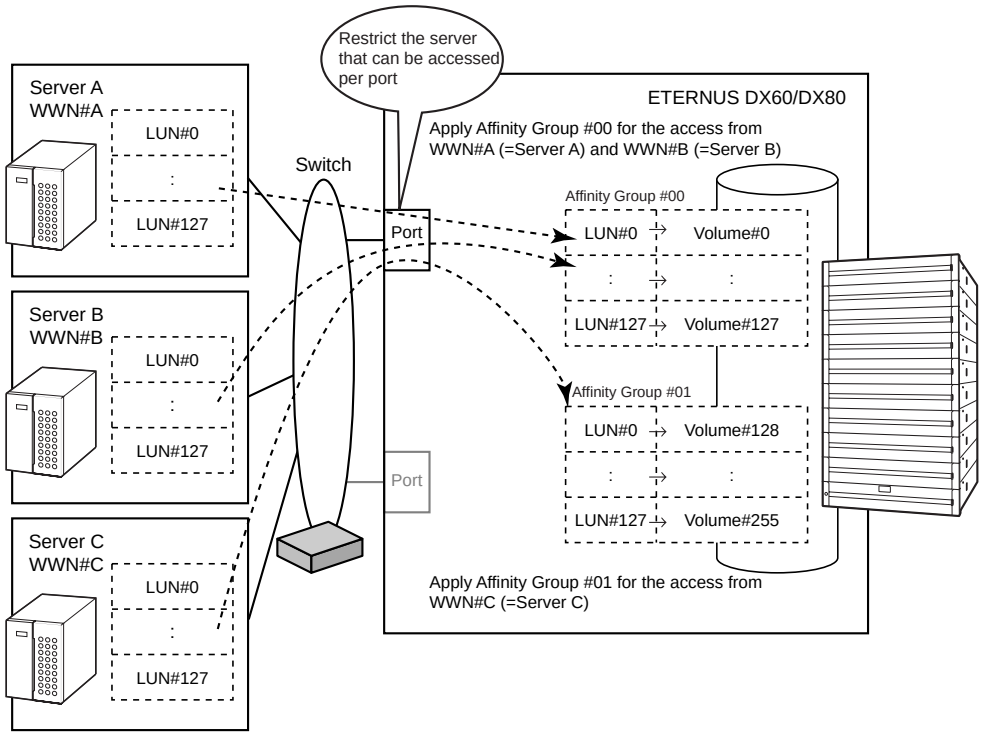


Figure 1.18 Host Affinity function

When multiple servers access the device using the same port, this assigns Affinity Group for each server.

1.3.8 Eco-mode

Using Eco-mode allows the spindle rotation of the disk to be stopped for specified periods to reduce power consumption. Disk spin-up and spin-down schedules can be set for each RAID group, and can also be set to allow backup operations.

The following shows the Eco-mode mechanism.

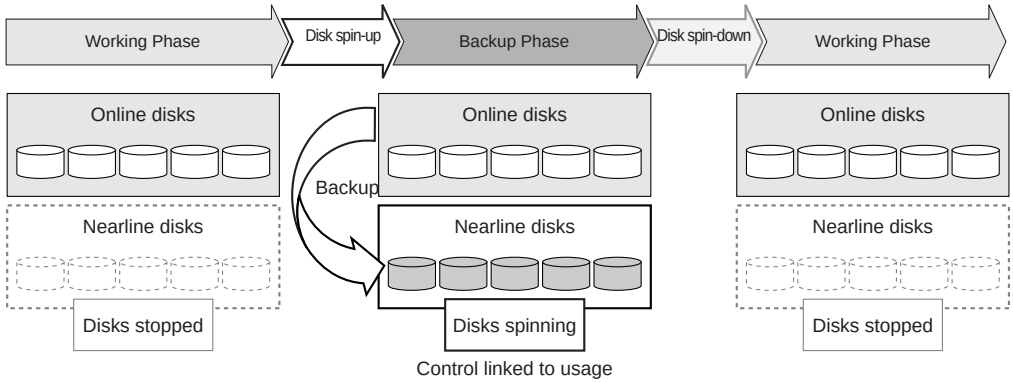


Figure 1.19 Eco-mode mechanism

The following shows an Eco-mode backup scheduling example.

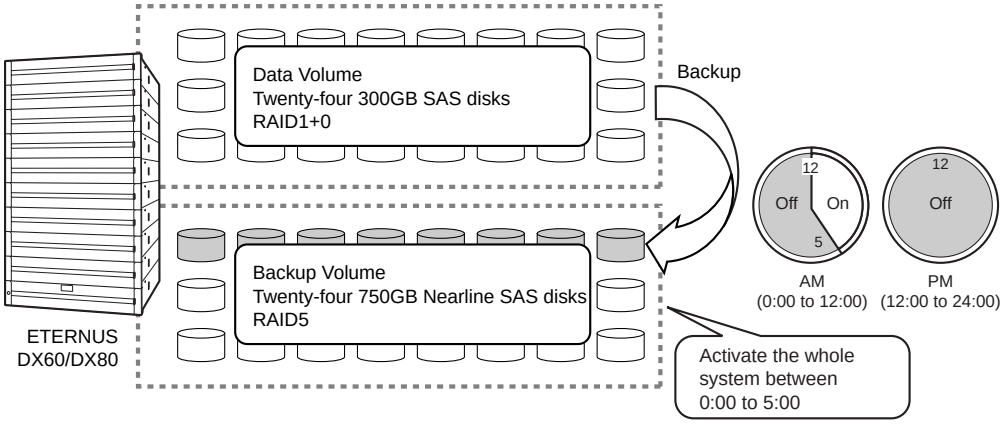


Figure 1.20 Setting example for Eco-mode schedule

Chapter 2 Hardware

This chapter describes the hardware components of the ETERNUS DX60/DX80 and standard operations.

2.1 Components

This section describes the components of the various form factors.

2.1.1 Controller Enclosure

The controller enclosure contains disks installed in the front, and controller modules and power supplies (with fans) in the rear.

2.1.1.1 Front view (with front cover)

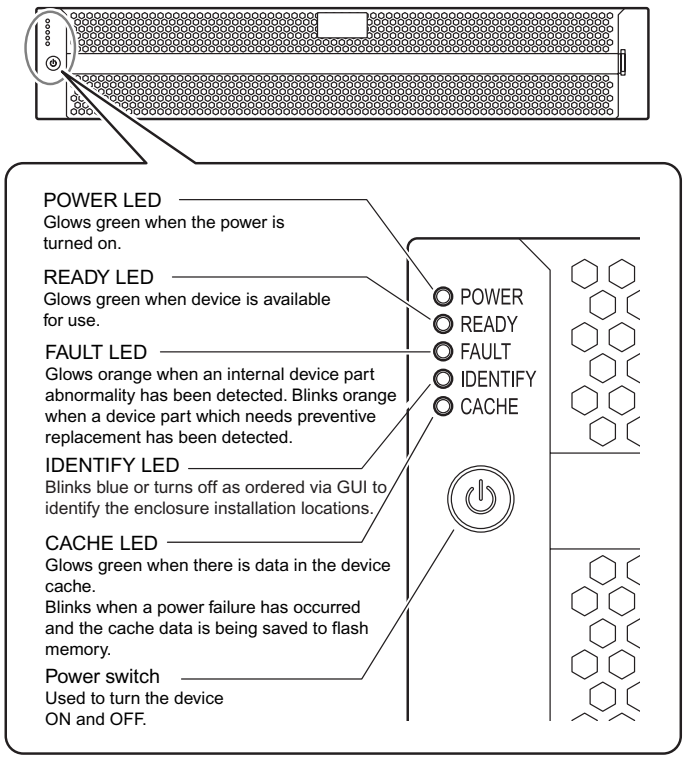


Figure 2.1 Front view of controller enclosure (with front cover)

2.1.1.2 Front view (without front cover)

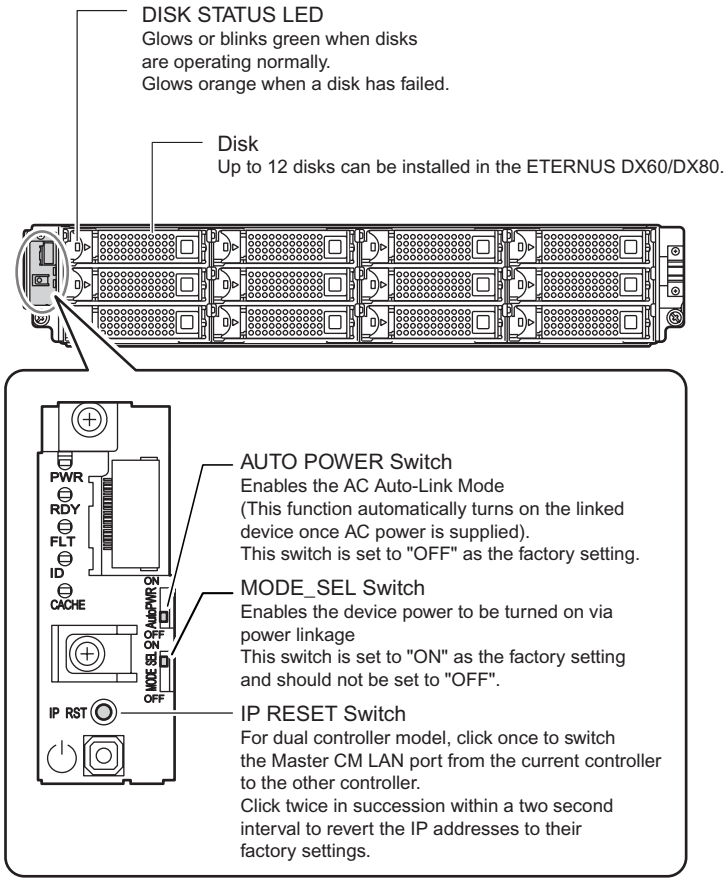


Figure 2.2 Front view of controller enclosure (without front cover)

- Disk slot numbers

Figure 2.3 shows the slot number of each disk.

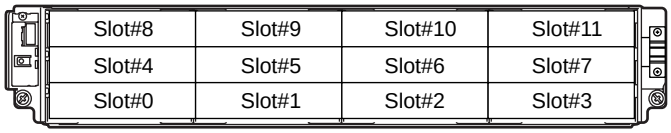
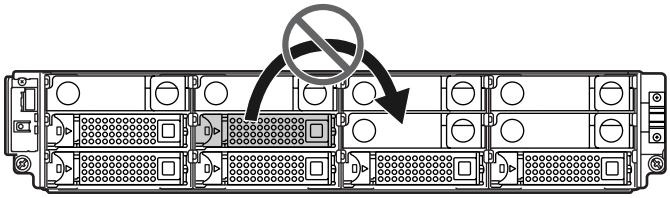


Figure 2.3 Disk slot numbers (controller enclosure)

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2.1.1.3 Rear view

Single controller model

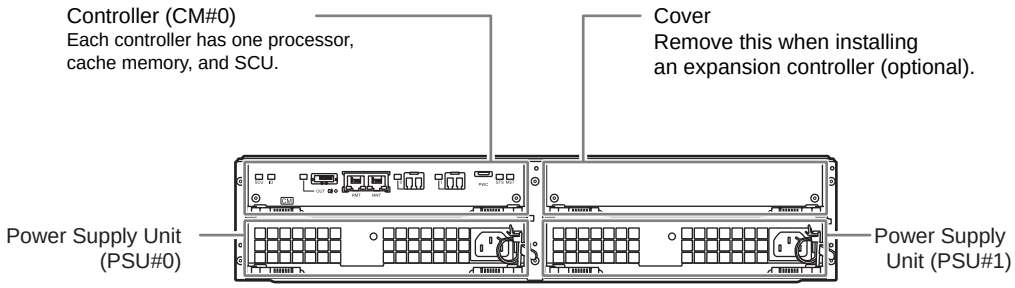


Figure 2.4 Rear view of controller enclosure (single controller model)

Dual controller model

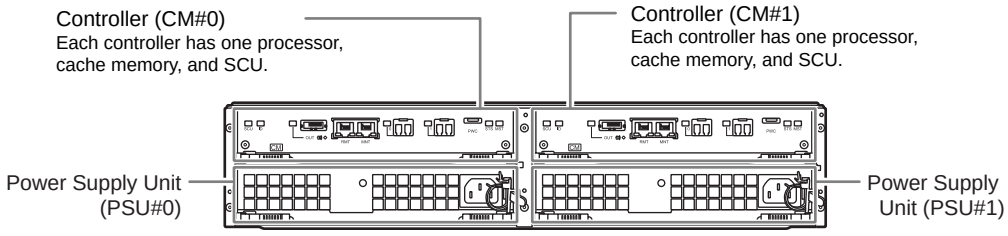


Figure 2.5 Rear view of controller enclosure (dual controller model)

Controller (CM) closeup

- Fibre Channel model

  Figure 2.6 shows a closeup of the Fibre Channel model controller.

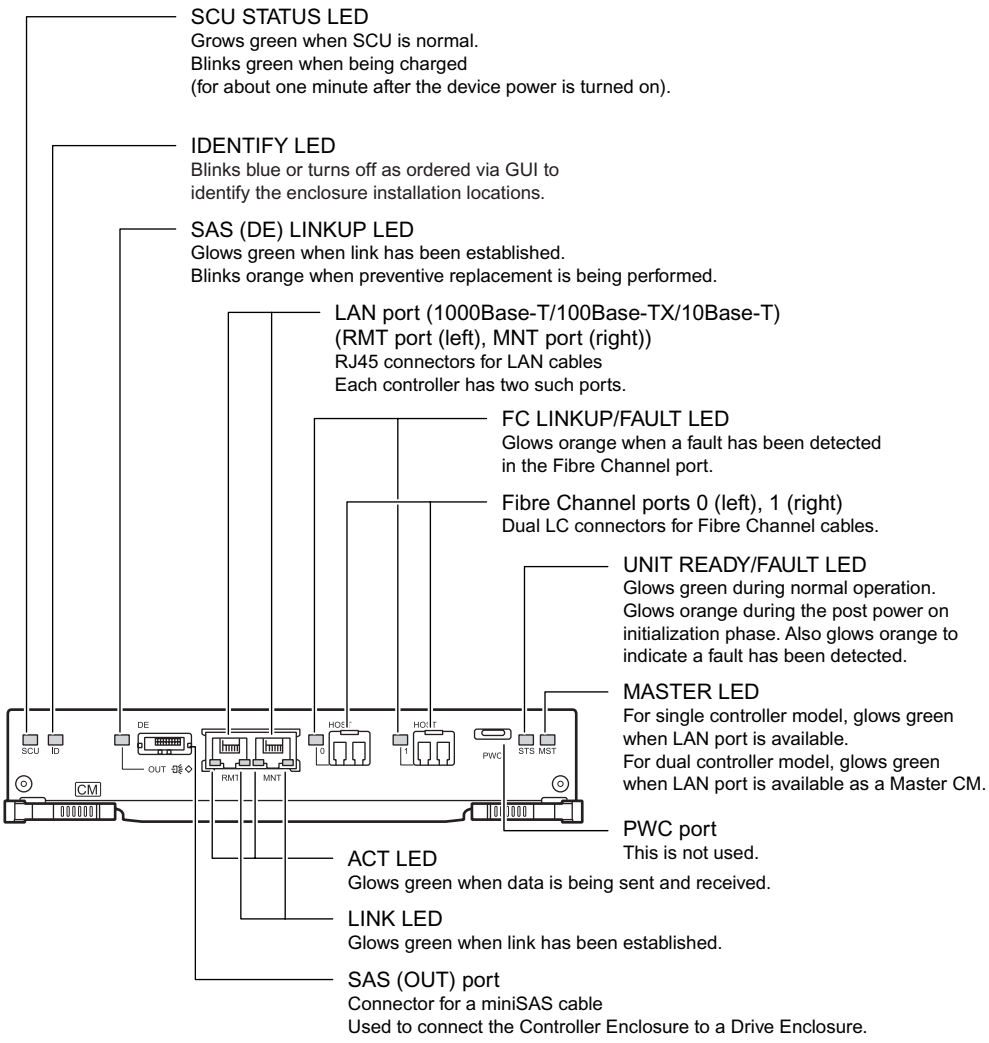


Figure 2.6 Fibre Channel model controller closeup

- iSCSI model

  Figure 2.7 shows a closeup of the iSCSI model controller.

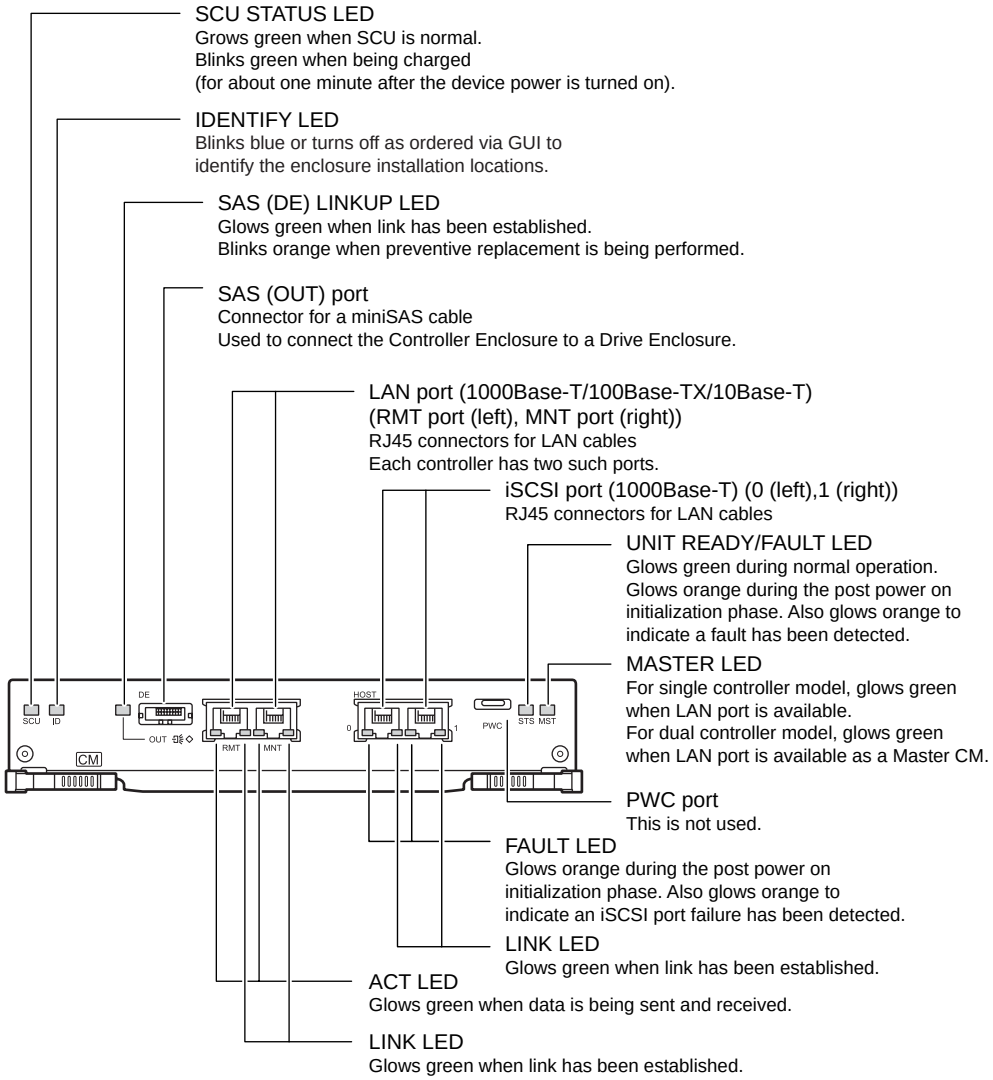


Figure 2.7 iSCSI model controller closeup

- SAS model

  Figure 2.8 shows a closeup of the SAS model controller.

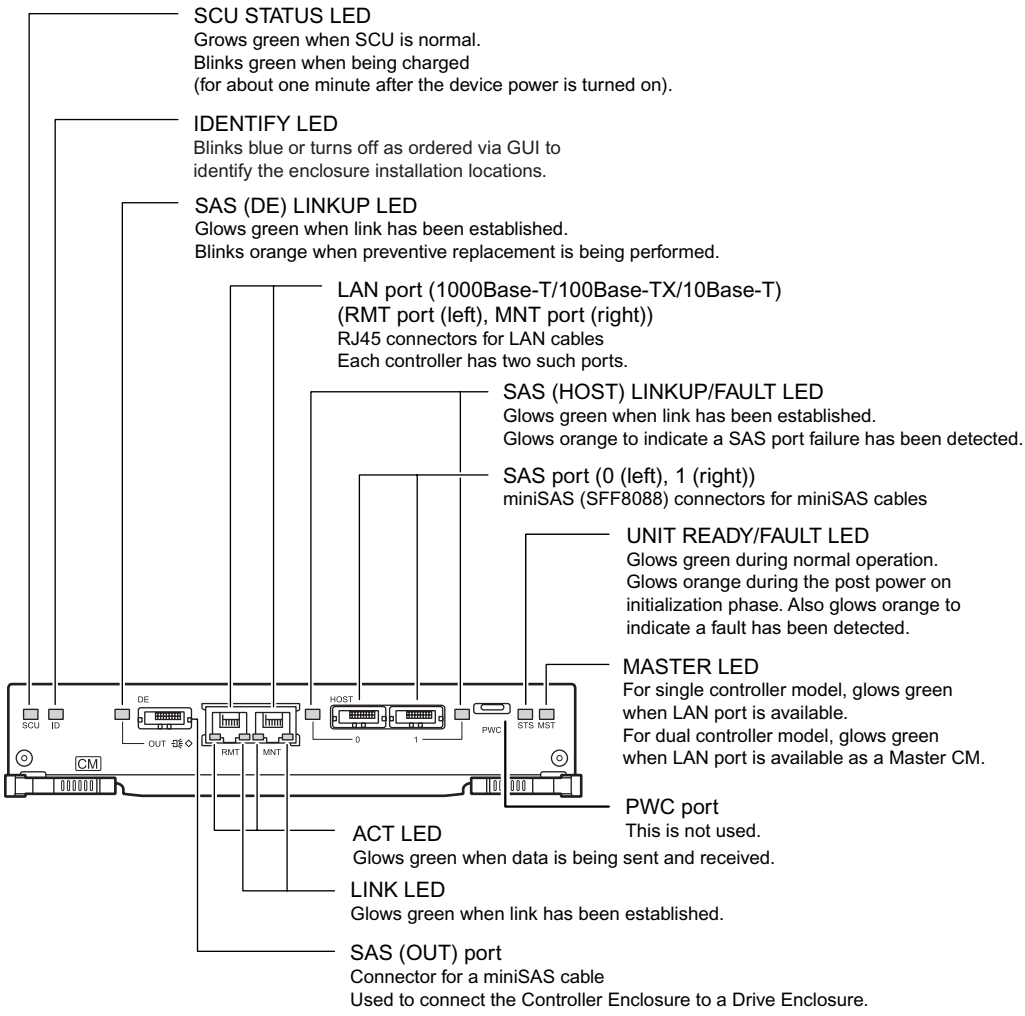


Figure 2.8 SAS model controller closeup

System Capacitor Unit (SCU)

An SCU is installed in the controller as a backup power source in case of power outage.

IMPORTANT

- If a power failure lasts for more than 20ms, the SCU starts supplying power, and the controller's cache data is copied to flash memory. There is no limit to the post-failure data retention time.
- SCU failure will disable the cache function, leading to degraded performance.

Power unit closeup

Figure 2.9 shows a closeup of the power unit.

Note

Each power unit has two internal cooling fans.

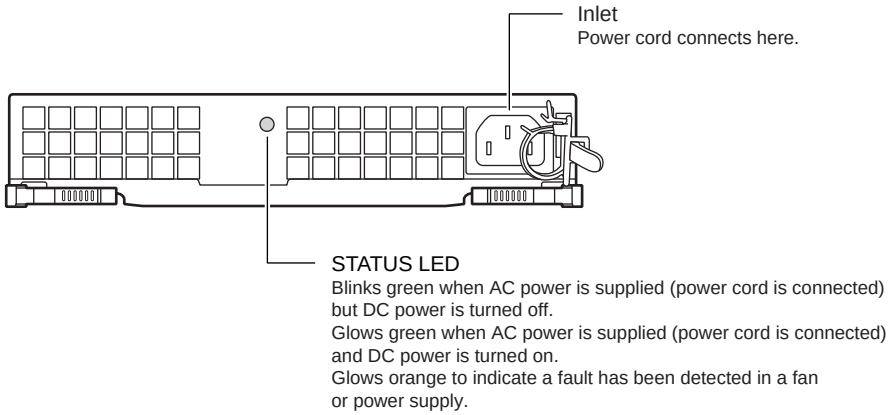


Figure 2.9 Power unit closeup (controller enclosure)

IMPORTANT

- The power unit is duplicated. The power cords must be connected to the inlets of both power units (PSU#0 and PSU#1).
- Power cords should not be reconnected immediately after being disconnected. Always wait for the power unit's STATUS LED to completely turn off (about 10 seconds) before reconnecting a disconnected power cord.

2.1.2 Drive Enclosure

Drive enclosures contain 3.5" disks installed in the front, and expanders and power supplies (with fans) in the rear.

IMPORTANT

- One drive enclosure can be mounted in the ETERNUS DX60.
- Up to nine drive enclosures can be mounted in the ETERNUS DX80.

2.1.2.1 Front view (with front cover)

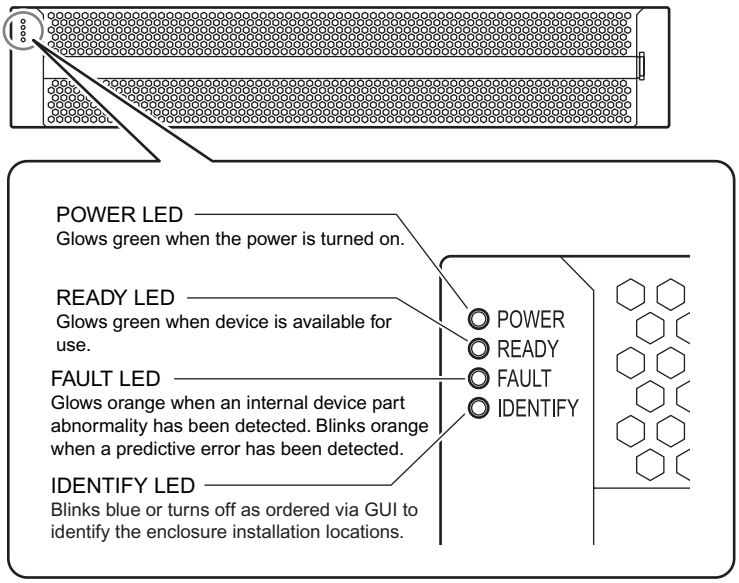


Figure 2.10 Front view of drive enclosure (with front cover)

2.1.2.2 Front view (without front cover)

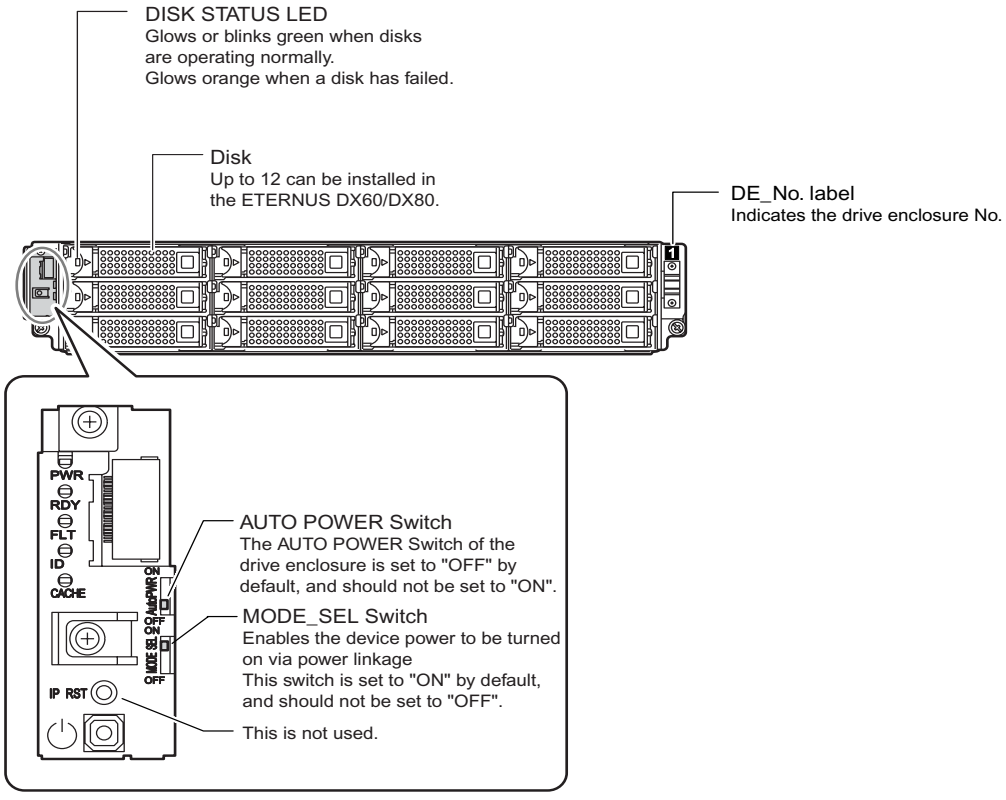


Figure 2.11 Front view of drive enclosure (without front cover)

Disk slot numbers

Figure 2.12 shows the slot numbers of the disks in the drive enclosure.

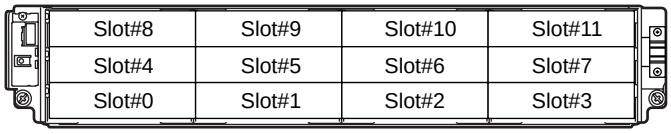
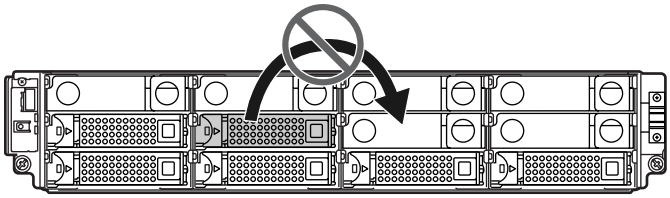


Figure 2.12 Disk slot numbers of drive enclosure

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2.1.2.3 Rear view

Single expander model

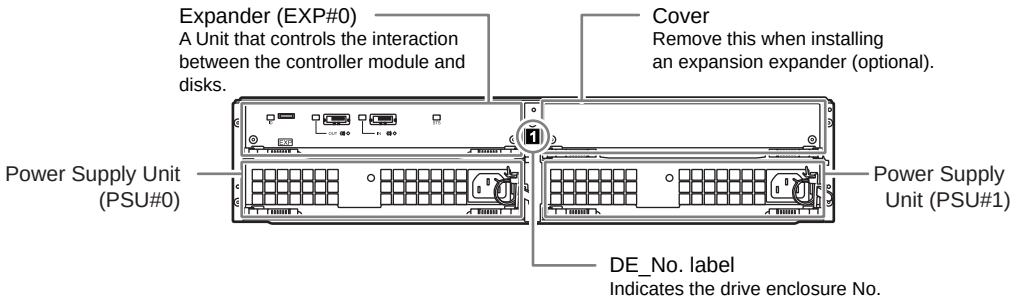


Figure 2.13 Rear view of drive enclosure (single expander model)

Dual expander model

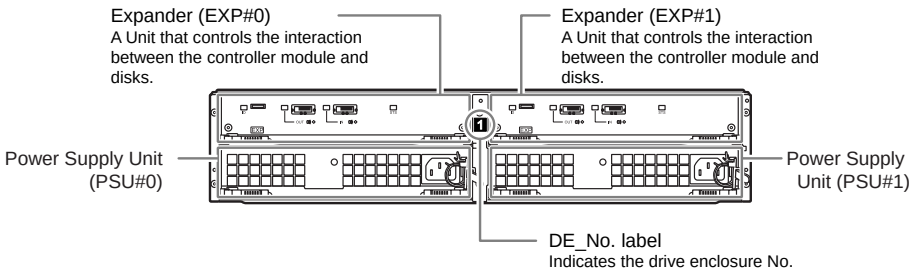


Figure 2.14 Rear view of drive enclosure (dual expander model)

Expander closeup

Figure 2.15 shows closeup of the expander.

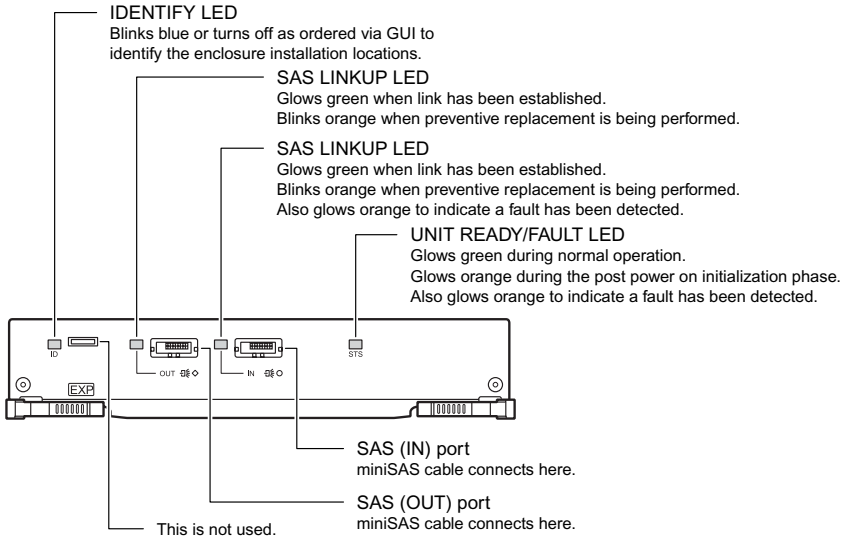


Figure 2.15 Expander closeup (drive enclosure)

Power unit closeup

Figure 2.16 shows a closeup of the power unit.

Note

The power unit has two internal cooling fans.

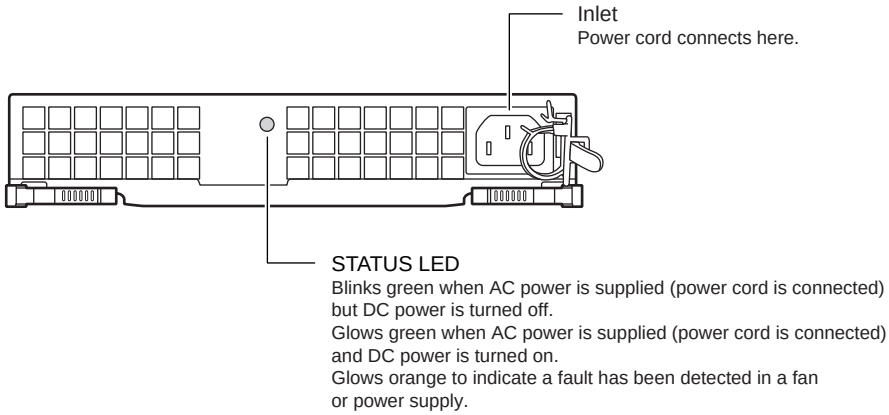


Figure 2.16 Power unit closeup (drive enclosure)

IMPORTANT

- The power unit is duplicated. The power cords must be connected to the inlets of both power units (PSU#0 and PSU#1).
- When connecting the power cord right after it is disconnected, wait for the STATUS LED of the power unit is turned off completely (about 10 seconds) before connecting it again.

2.1.3 AC outlet box

There are two sizes of AC outlet box: 1U and 2U.
1U AC outlet box has four outlets and two inlets.
2U AC outlet box has twelve outlets and two inlets.

2.1.3.1 AC outlet box (1U)

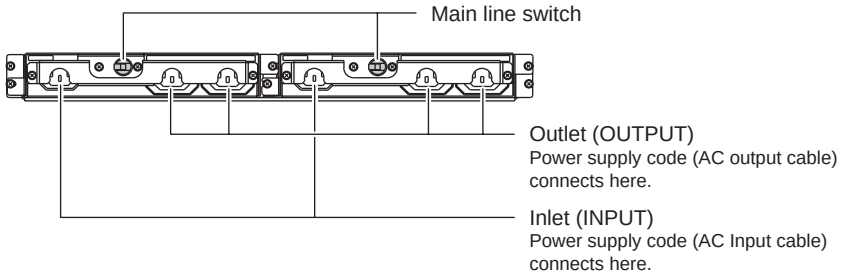


Figure 2.17 AC outlet box (1U)

2.1.3.2 AC outlet box (2U)

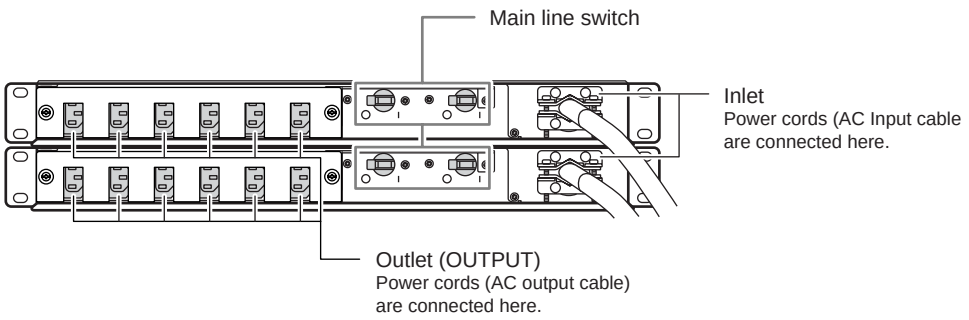


Figure 2.18 AC outlet box (2U)

2.2 Standard Operations

This section explains how to turn the device on and off, and how to attach and remove the front cover.

2.2.1 Power ON Control

This section describes the procedure to turn the power on.

IMPORTANT

- After turning the power on, it takes about 3 minutes for the device to become READY (i.e. the READY LED turns on). If an error is detected during the initial power-on diagnostic phase, a longer time (up to ten minutes) may be required before the READY LED turns on.
- Before turning the server on, check that the device, Fibre Channel switch, and Fibre Channel hub are all READY. If the server is turned on while any of these devices are not READY, the server may not be able to recognize the device.
- When the device power is turned on at the first time, a factory preset volume formatting process may occur.

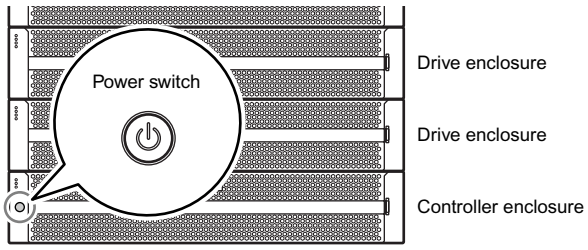
Procedure

1 Press the power switch (⏻) of the controller enclosure.

Controller enclosure POWER LED turns on.

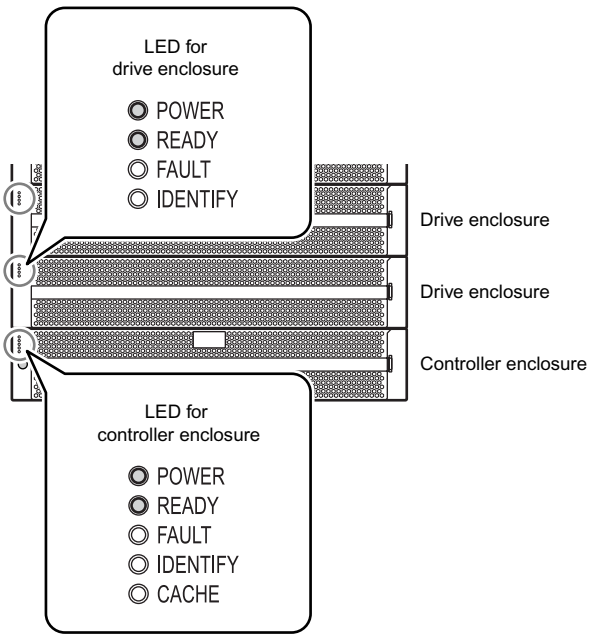
Note

When drive enclosures are installed, the power turns on automatically.



2 After a few minutes, check that controller enclosure's READY LED is lit up.

3 Check that all enclosure's POWER LED and READY LED are lit up.



End of procedure

2.2.2 Power OFF Control

This section describes the procedure to turn the power off.

IMPORTANT

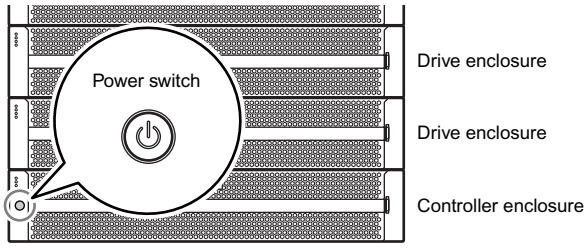
- When turning off the device, the power shuts off only after the data in the cache memory has been written to the hard disk. Therefore, it can take one minute (maximum six minutes) for the power supply to be completely turned off.
- Do not turn off the power of the device or network devices that connect the ETERNUS DX60/DX80 and server while the server is operating. Turning the power off may result in the loss of data or prevent data from being saved.

Procedure

1 Press and hold the console panel's power switch (⏻) for 4 seconds or longer.

The READY LED should turn off.

IMPORTANT Press the power switch only once. If the power switch is pressed again between the time of the READY LED turning off and the POWER LED turning off, the device power may turn on.



2 The device power is turned off.

When the power is turned off, the POWER LED will go out.

Note When drive enclosures are installed, the power turns off automatically.

End of procedure

2.2.3 Attaching and Removing the Front Cover

This section explains how to attach and remove the front cover of the controller enclosure or drive enclosure.

CAUTION

Do

- After completing the operation, be sure to reattach the front cover.

Note

This section explains how to attach and remove the front cover of the controller enclosure, but the same procedure is used to attach and remove the front cover of the drive enclosure.

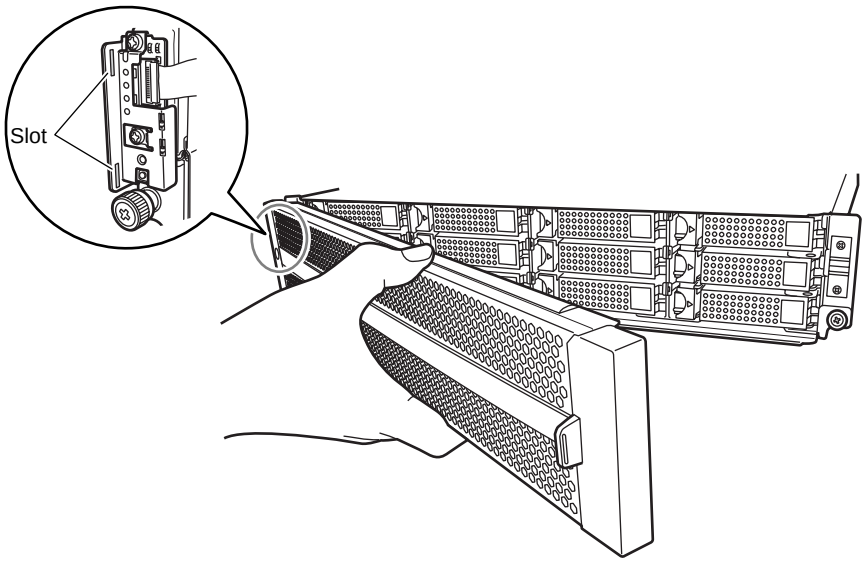
Attaching the front cover

Attach the front cover in the following order.

Procedure

1 Fit the front cover in the left end slot of the controller enclosure to attach.

IMPORTANT Be careful so that the part of the front cover to be fit in the slot does not touch the power switch (⏻).

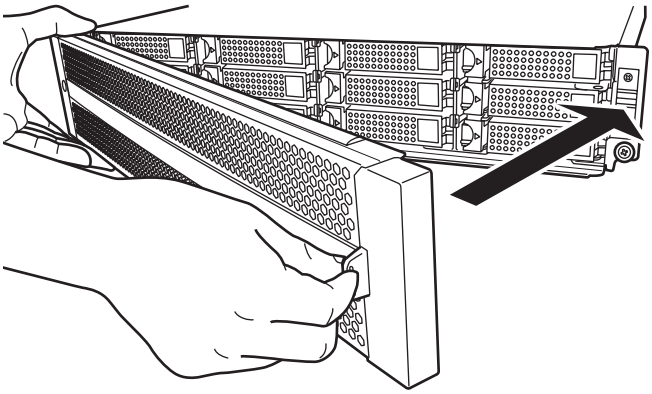


2 Holding the tab on the front cover, attach the right side of the cover to the enclosure.

CAUTION

Do

- When removing the front cover, support its left side with your left hand, to prevent it from coming loose and falling.



End of procedure

Removing the front cover

Remove the front cover in the following order.

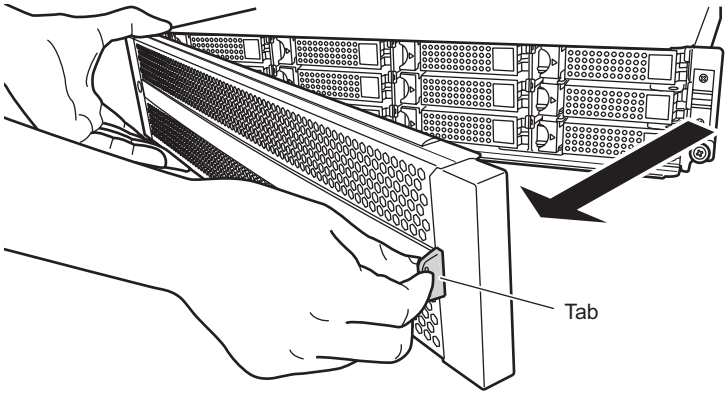
Procedure

1 By holding the tab of the front cover, pull the cover toward you to remove it.

CAUTION

Do

- When attaching the right side of the front cover, support its left side with your left hand, to prevent it from coming loose and falling.



End of procedure

2.2.4 Wearing the Wrist Strap

The wrist strap must be worn to discharge the human body's natural static electricity.
This section explains how to wear the wrist strap.

CAUTION

Do

When performing the following operations, make sure to wear the supplied wrist strap, and do not remove it until the operation is complete.

- Installing a controller enclosure, drive enclosures, and AC outlet boxes
- Connecting cables
- Installing disks

One end of the wrist strap (part A in the figures) connects to the metal frame of the ETERNUS DX60/DX80, while the other end (part B in the figures) should be wrapped around your wrist. Remove the protective film from part A, and attach it to the metal frame of the rack.

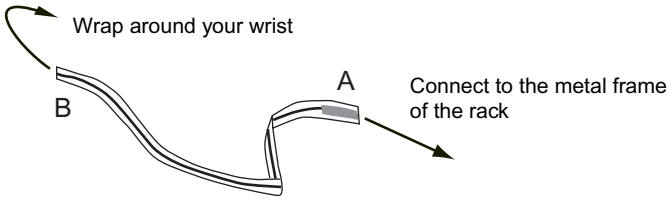
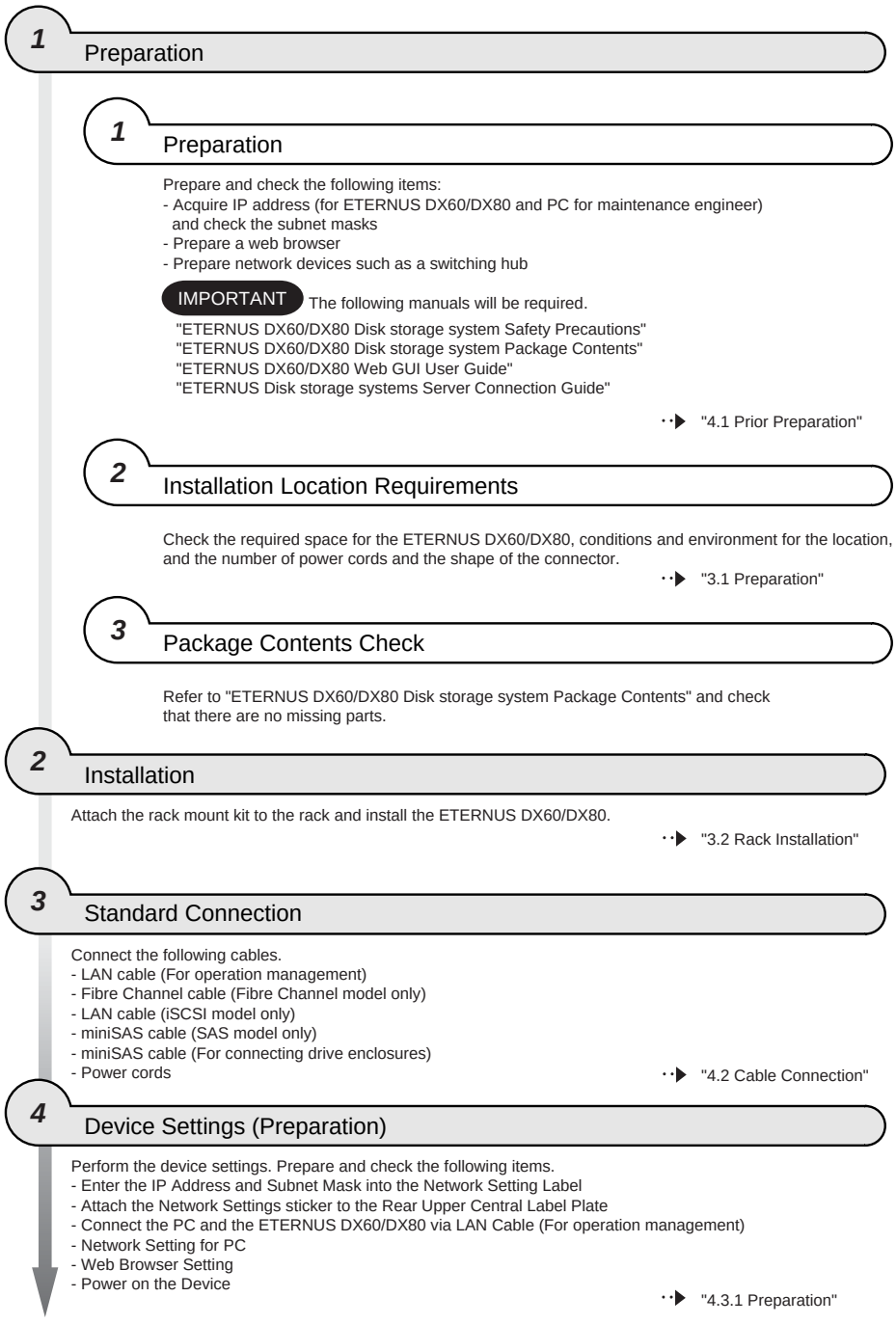


Figure 2.19 Wrist strap

2.3 Flow from Installation to Operation

This section explains the flow of work from installation to the start of ETERNUS DX60/DX80 operation.
Contact your sales representative or maintenance engineer to perform the device installation and setup, or follow the work flow shown below to perform the device installation and setup by yourself:



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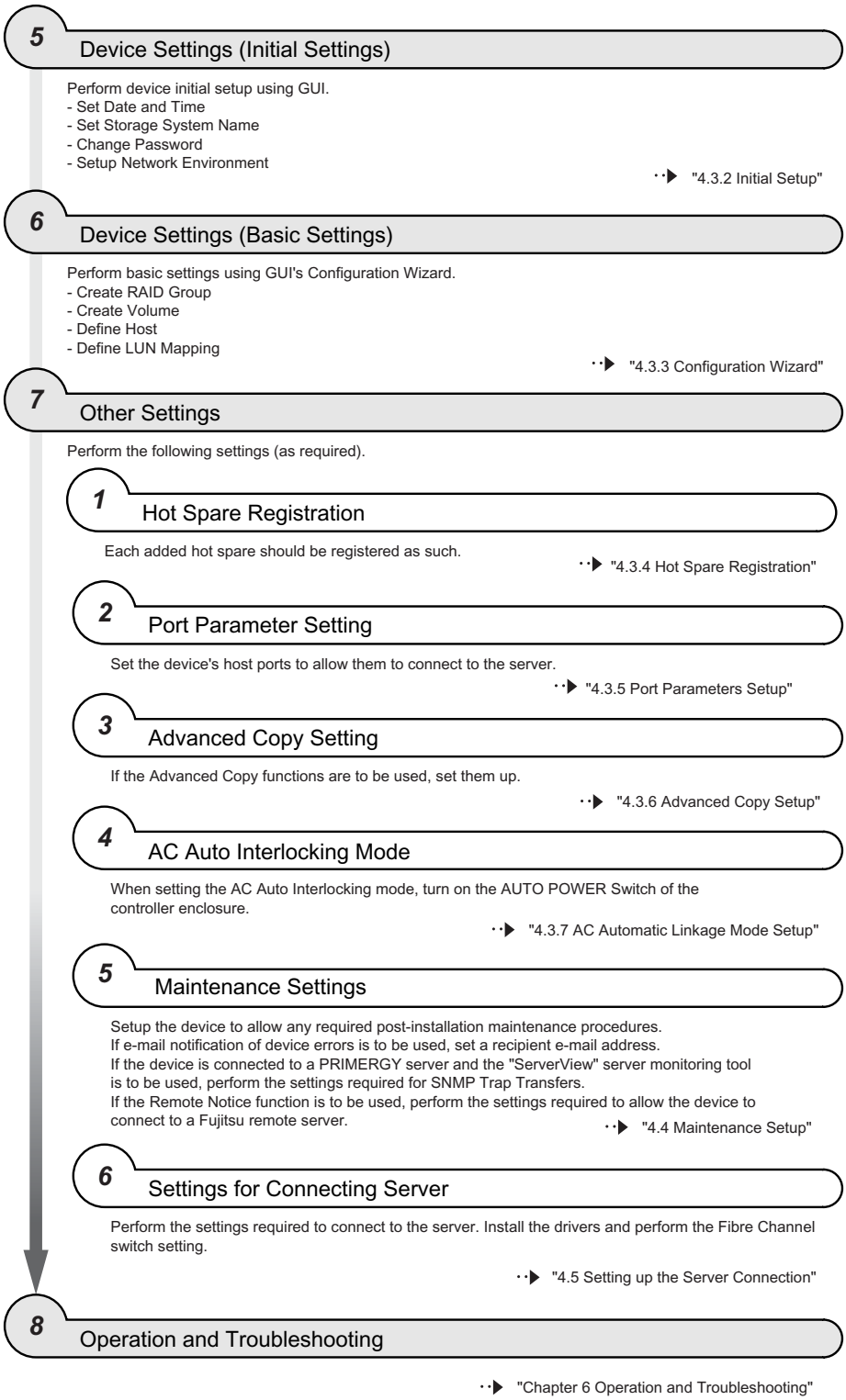


Chapter 3 Installation

This chapter describes the ETERNUS DX60/DX80 installation procedure.
Before installing the device, make sure to check the "ETERNUS DX60/DX80 Disk storage system Safety Precautions".

"ETERNUS DX60/DX80 Disk storage system Safety Precautions"

3.1 Preparation

3.1.1 Placement Area

- Installation area

Refer to the placement area of the rack to install the device.

- Installation condition

Refer to "Instructions for installation" in "ETERNUS DX60/DX80 Disk storage system Safety Precautions" and set the device in a location where all the requirements are satisfied.

IMPORTANT	The speed of the ETERNUS DX60/DX80 fans is stepped up and down in response to the ambient temperature. Up to 25°C the noise level should not exceed about 42dB, but higher temperatures or abnormal fan situations can result in noise levels over 42dB, and seclusion in a dedicated server room is generally recommended.

3.1.2 Check the number of wall outlets

Check the required type and number of the wall outlets.

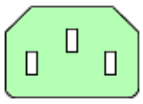
- Type of wall outlet connectors

All ETERNUS DX60/DX80 device models include US spec. AC200-240V cables (with plug) as standard.
In addition, power cords must comply with the particular safety standards of the country of use. In some cases, a power cord will need to be purchased locally to satisfy the relevant power safety requirements.

IMPORTANT

When determining the rack-mounting layout, consider the interaction between the position of each drive enclosure and AC outlet box in the rack and the length of each cable.
For example, for something installed at the top of a 1,800mm rack, about 2m of cable will be required to reach the bottom of the rack.

Table 3.1 Wall outlets and cable lengths

Cable type	ETERNUS DX60/DX80 connector	Power outlet connector	Cable length	Note
Controller Enclosure Drive Enclosure AC200V outlet box (1U)	IEC320 C13 	NEMA L6-15P 	4m	Max. rating: 250V 15A (Normal usage <12A)
AC200V outlet box (2U)	Direct connection	NEMA L6-20P 	4m	Max. rating: 250V 20A (Normal usage <16A)

Required Number of Power Outlets

The number of power outlets required will depend on the number of drive enclosures and AC outlet boxes.

- AC Outlet Boxes Not Connected

Table 3.2 Required number of power outlets (when AC outlet boxes are not connected)

Component	Combination pattern									
Controller Enclosure	1	1	1	1	1	1	1	1	1	1
Drive Enclosure	0	1	2	3	4	5	6	7	8	9
No. of power outlets	2	4	6	8	10	12	14	16	18	20

- AC Outlet Boxes Connected

Table 3.3 Required number of power outlets (when AC outlet boxes are connected)

Component	Combination pattern						
Controller Enclosure	1	1	1	1	1	1	1
Drive Enclosure	0 – 1	2 – 3	4 – 5	6 – 7	8 – 9	0 – 5	6 – 9
AC Outlet Box (1U)	1	2	3	4	5	–	–
AC Outlet Box (2U)	–	–	–	–	–	1	2
No. of power outlets	2	4	6	8	10	2	4

3.2 Rack Installation

This section describes the procedure for installing the ETERNUS DX60/DX80 in a rack.

Make sure to check "ETERNUS DX60/DX80 Disk storage system Safety Precautions" before installation. Also refer to the manual provided with racks.

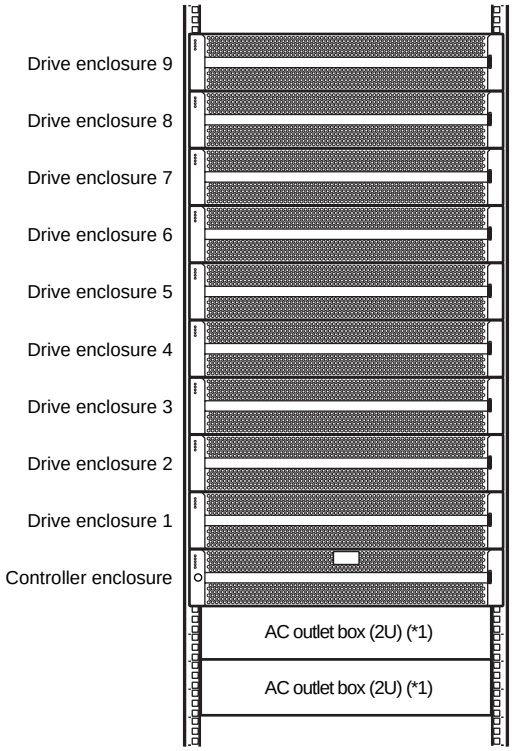
"ETERNUS DX60/DX80 Disk storage system Safety Precautions"
Manual provided with racks

CAUTION

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- If components are attached or removed in a way other as described herein, damage and/or device failure or electrical shock may occur.
- This device contains delicate components, and should be handled gently. Do not drop or knock the device against the rack when installing it.
- If no other components are installed, attach the blind panels provided with the rack.

Rack installation example

Install the controller enclosure, drive enclosures and the AC outlet box in the following layout.



*1: Two 2U size AC outlet boxes are installed in this example. Alternatively, for this mounting configuration, a maximum of five 1U size AC outlet boxes could be installed instead.

IMPORTANT

ETERNUS DX60/DX80 components should be installed in a rack in the following order (from the bottom upwards):
(1) AC outlet box(es)
(2) Controller enclosure
(3) Drive enclosure(s)

3.2.1 Installing Controller Enclosure

This section describes how to mount the controller enclosure in a rack.

WARNING

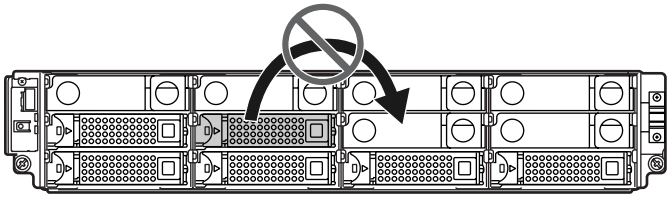
Warning

- For these operations, be sure to turn off the device connected to the ETERNUS DX60/DX80 (such as servers) when it is turned on, and remove the power cord from the outlet or it may lead to electronic shock.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



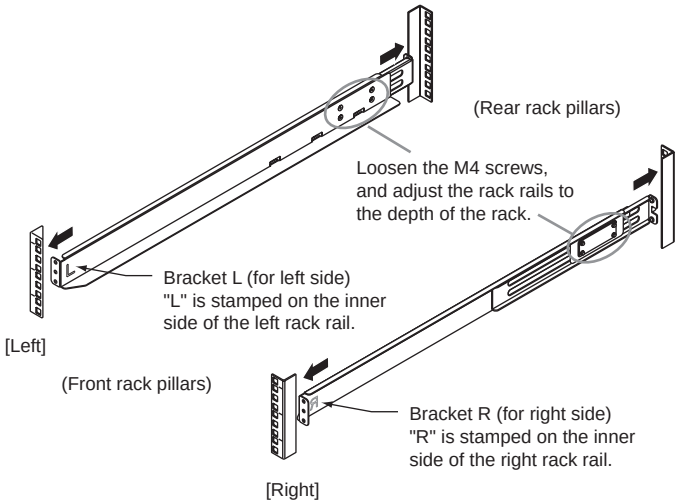
Procedure

1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Adjust the rack rails (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

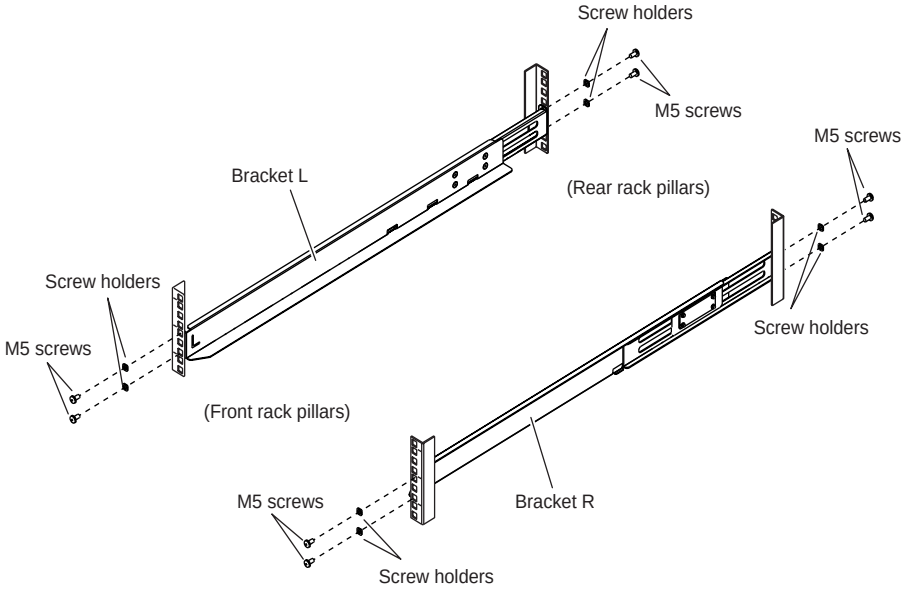
Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.



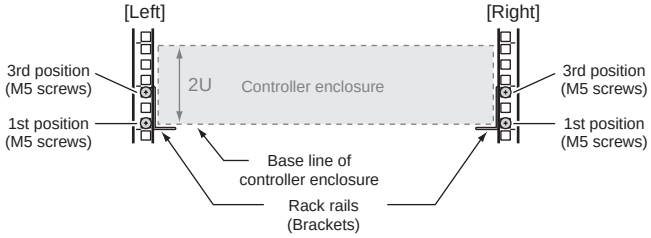
3 Attach the rack rails (brackets) to the rack.

Note

- When the holes in the rack pillars are square, use the screw holders to attach.
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.



The four M5 screw positions for the rack rails (brackets) are determined relatively to the base line of controller enclosure.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 Remove the front cover of the controller enclosure.

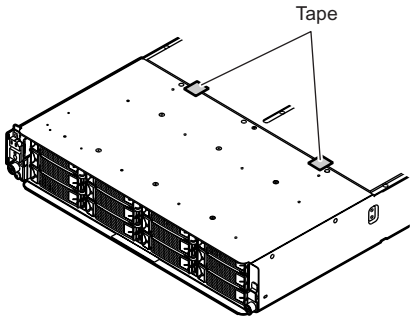
Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for procedure to remove the front cover.

6 Install the controller enclosure in the rack.

CAUTION

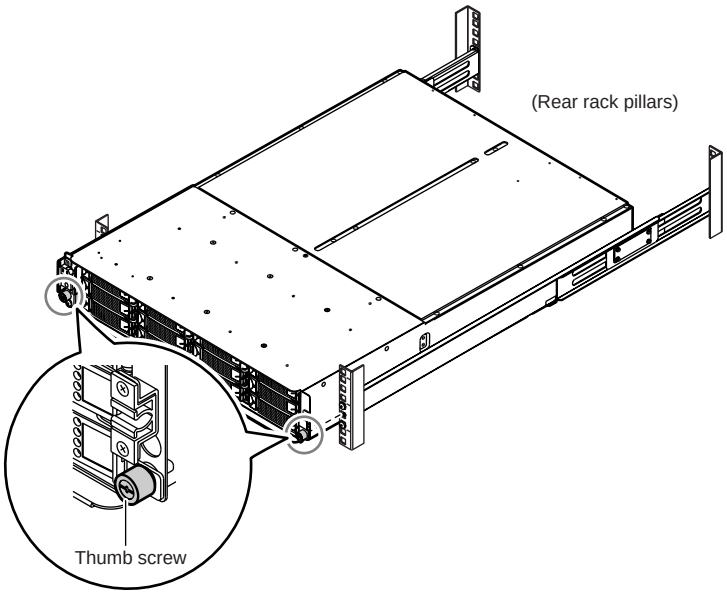
Do

- When installing or removing the controller enclosure to or from the rack, make sure to have the right and left sides and the bottom of the controller enclosure by two or more people. Failure to do so may cause injury.
- Two pieces of tape are attached to the top of the controller enclosure. Make sure that this tape does not come off.



7 Fix the controller enclosure in the rack.

Use the two thumb screws at the front of the controller enclosure to fasten it in the rack.



8 Replace the front cover.

Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the front cover replacement procedure.

End of procedure

3.2.2 Installing Drive Enclosure

This section describes how to install the drive enclosure in a rack.

WARNING

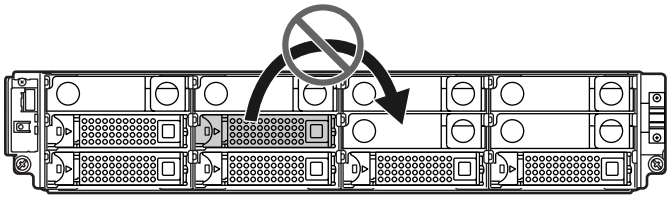
Electric Shock

- For these operations, be sure to turn off the device connected to the ETERNUS DX60/DX80 (such as servers) when it is turned on, and remove the power cord from the outlet or it may lead to electronic shock.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.

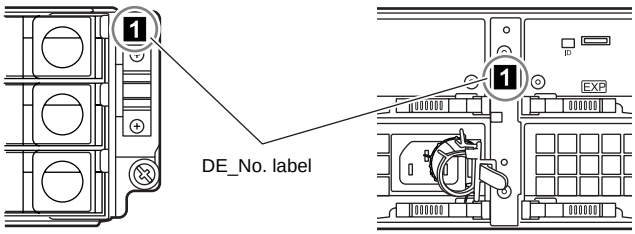


IMPORTANT

When installing multiple drive enclosures, install them on the controller enclosure in order of the "DE_No. label" attached on the drive enclosure. The "DE_No. label" is attached in the following location.

At the right side of the front of the drive enclosure

Between the EXP#0 and EXP#1 expanders at the rear of the drive enclosure



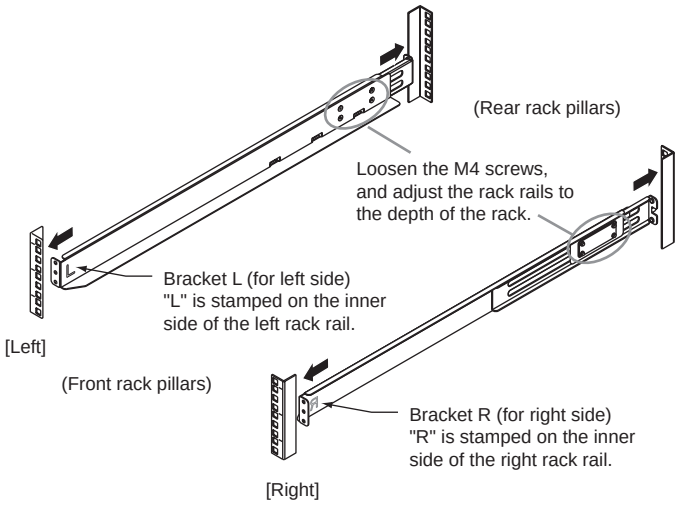
Procedure

1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Adjust the rack rail (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

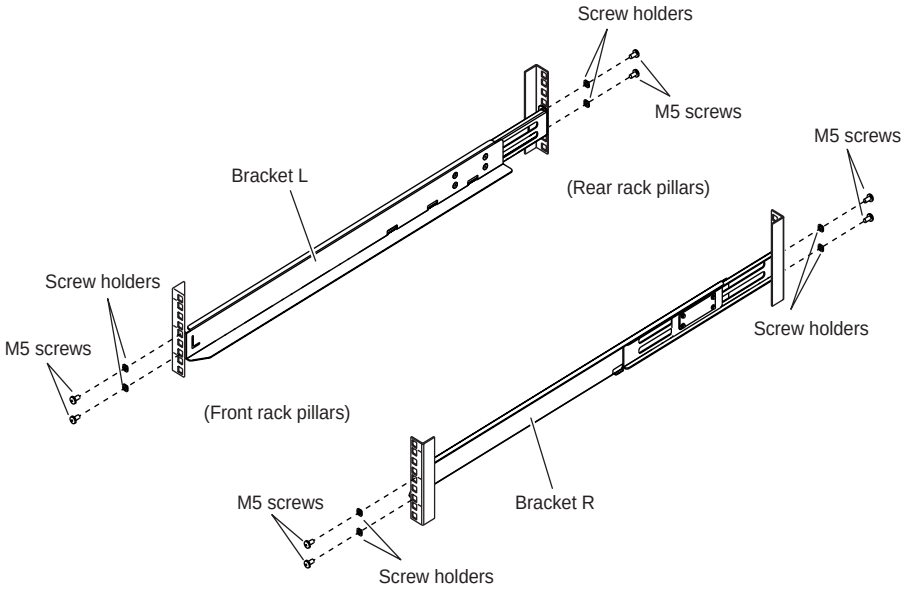
Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.



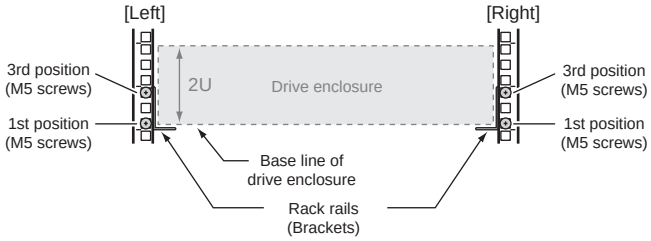
3 Attach the rack rails (brackets) to the rack.

Note

- If the rack pillars have square (approx. 9mm) holes, screw holders will need to be used when attaching the rack rails (brackets).
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.



The four M5 screw positions for the rack rails (brackets) are determined relative to the drive enclosure base line.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 First remove the front cover.

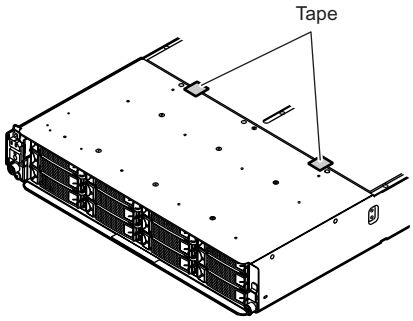
Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for procedure to remove the front cover.

6 Install the drive enclosure in the rack.

CAUTION

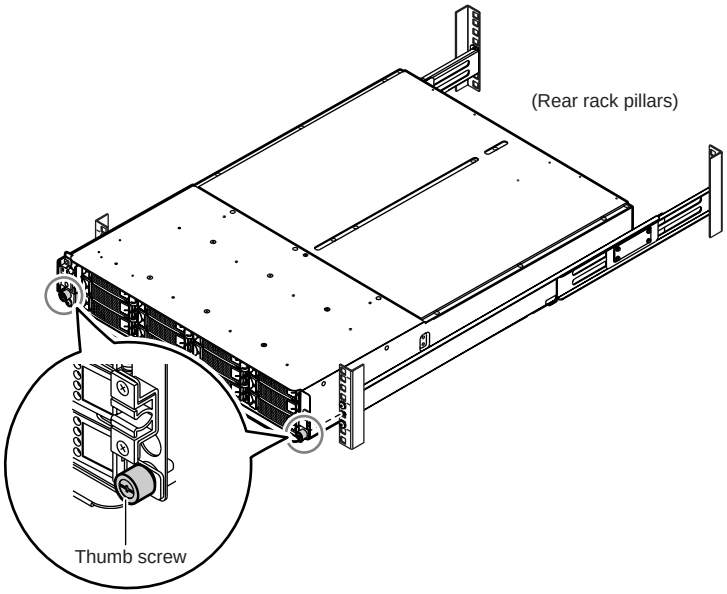
Do

- When installing or removing the drive enclosure to or from the rack, make sure to have the right and left sides and the bottom of the drive enclosure by two or more people. Failure to do so may cause injury.
- Two pieces of conductive tape are attached to the top of the drive enclosure. Make sure that this tape does not come off.



7 Fasten the drive enclosure in the rack.

Use the two thumb screws at the front of the drive enclosure to fasten it in the rack.



8 Finish by replacing the front cover.

Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the front cover replacement procedure.

End of procedure

3.2.3 Installing AC Outlet Box

This section describe how to mount the AC outlet box in the rack.

WARNING

Electric Shock

- For these operations, be sure to turn off the device connected to the ETERNUS DX60/DX80 (such as servers) when it is turned on, and remove the power cord from the outlet or it may lead to electronic shock.

CAUTION

Do

- AC outlet box cannot be connected to the device other than ETERNUS DX60/DX80.

3.2.3.1 For 1U

This section describes how to mount the 1U AC outlet box in a rack.

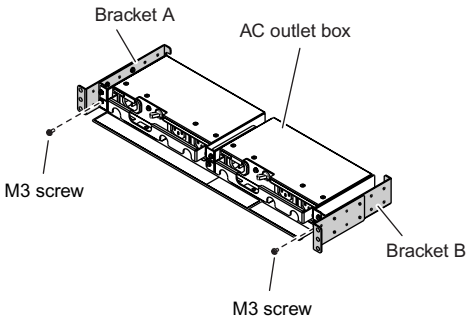
Procedure

1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Remove the two brackets temporarily attached to the AC outlet box.

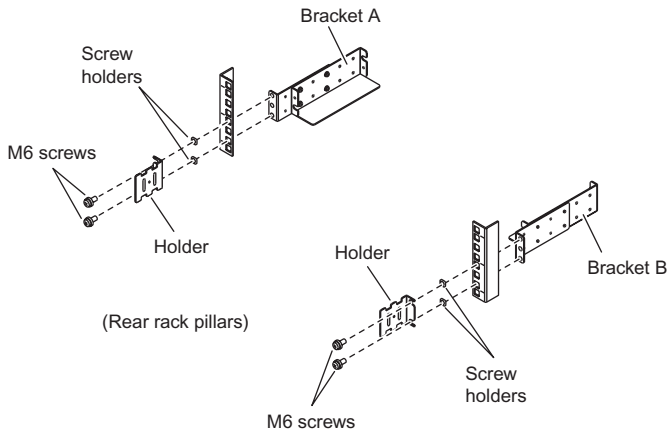
Remove the two M3 screws from the front of the AC outlet box to free the brackets.



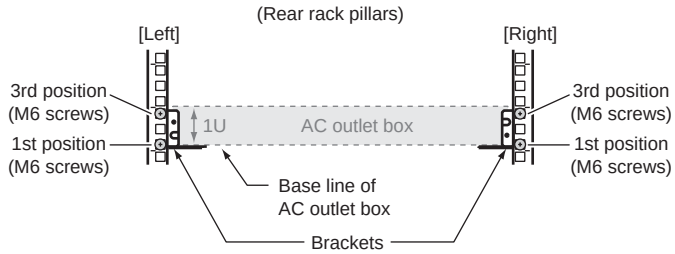
3 Attach the brackets and holders to the rack.

Note

When the holes in the rack pillars are square, use the screw holders to attach.

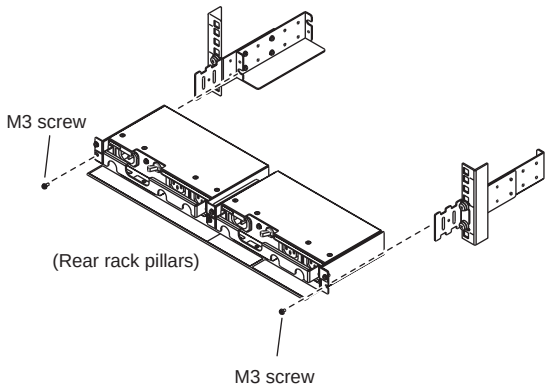


The four M6 screw positions for the brackets are determined relative to the AC outlet box base line.
The M6 screws should be inserted in the 1st and 3rd holes above the base line.



4 Mount the AC outlet box in the rack.

Fasten the AC outlet box to the bracket with the two M3 screws removed in Step 2.



5 Attach the blank panel to the front side of the rack.

The blank panel should be attached at the same height as the AC outlet box.

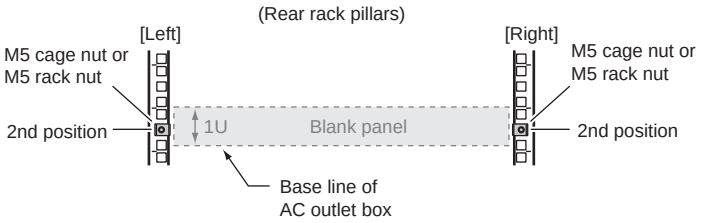
5-1 Attach the M5 cage nuts or M5 rack nuts to the front rack pillar.

Note

- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

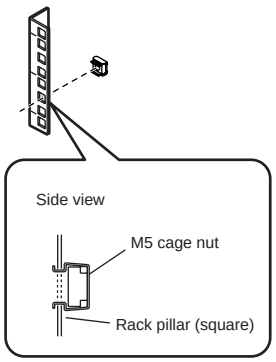
- Attachment positions

  On either side, insert two M5 cage nuts or M5 rack nuts in the 2nd holes above the blank panel base line.

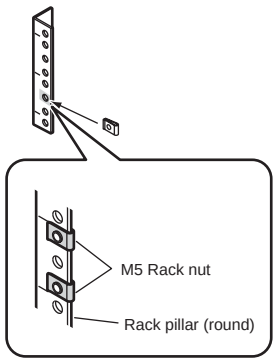


- Attachment procedure

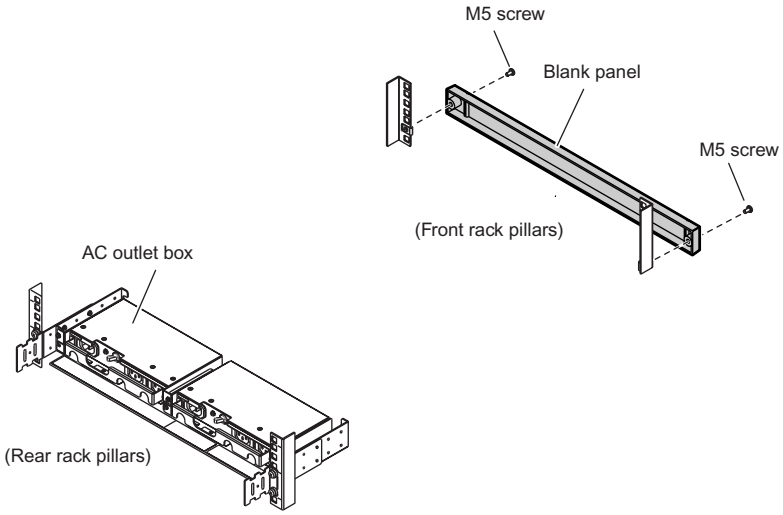
M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.



M5 rack nut
Clip the rack nut over the desired hole from the side.



5-2 Attach the blank panel to the rack pillars using two black M5 screws.



End of procedure

3.2.3.2 For 2U

This section describes how to mount the 2U AC outlet box in a rack.

Procedure

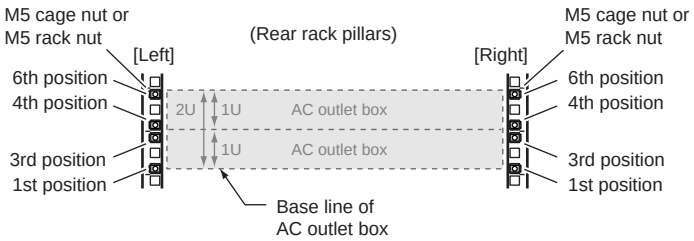
1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" to confirm there are no missing parts for the rack mount kit.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Attach the M5 cage nuts or M5 rack nuts to the rear rack pillar.

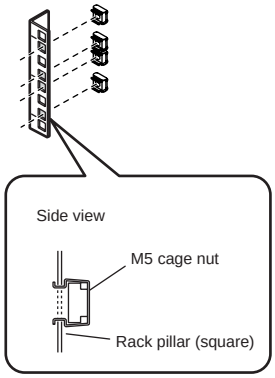
Note
- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

- Attachment positions
  On either side, insert eight M5 cage nuts or M5 rack nuts in the 1st, 3rd, 4th, and 6th holes above the AC outlet box base line.

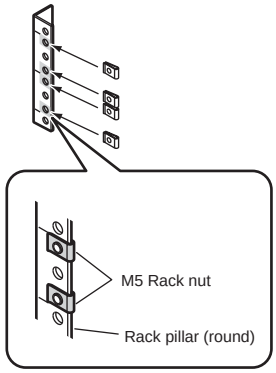


- Attachment procedure

M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.

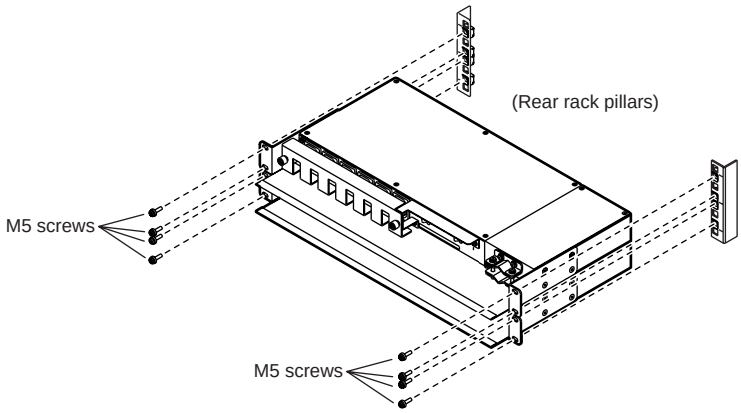


M5 rack nut
Clip the rack nut over the desired hole from the side.



3 Mount the AC outlet box in the rack.

Fasten it to the prepared holes in the pillars with eight M5 screws.



4 Attach the blank panel to the rack front.

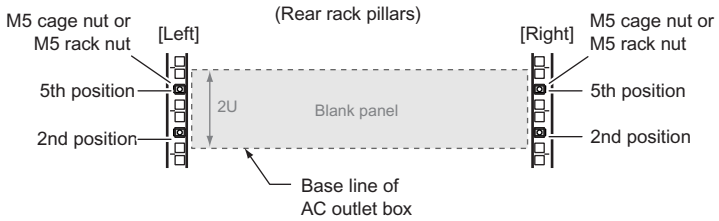
Mount it in the same position as the AC outlet box.

4-1 Attach the M5 cage nuts or M5 rack nuts to the front rack pillar.

Note

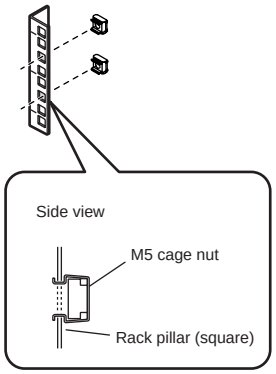
- Use the M5 cage nuts if the rack pillar holes are square.
- Use the M5 rack nuts if the rack pillar holes are round.

- Attachment positions
  On either side, insert four M5 cage nuts or M5 rack nuts in the 2nd and 5th holes above the blank panel base line.

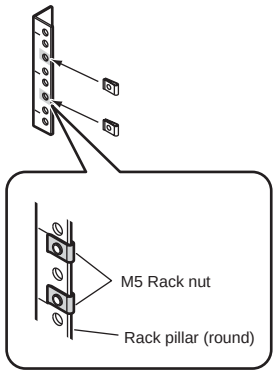


- Attachment procedure

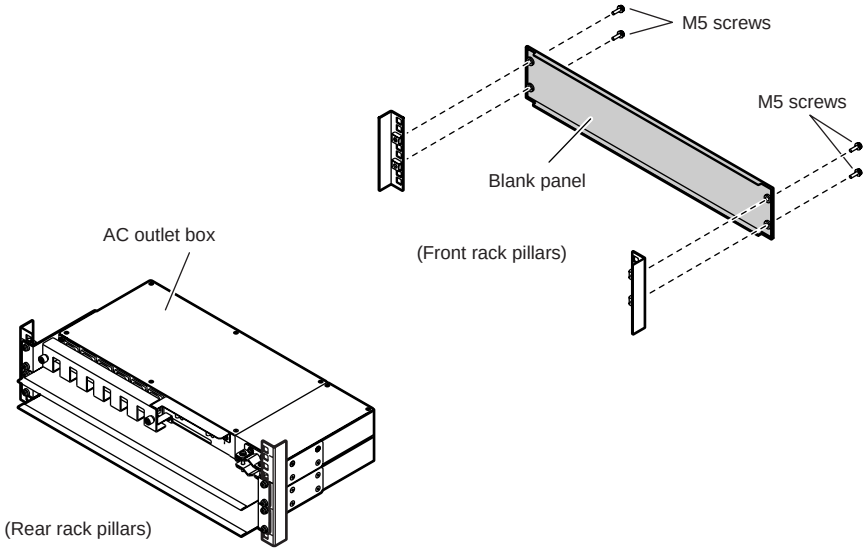
M5 cage nut
Clip the cage nut tabs into the desired hole from the inside.



M5 rack nut
Clip the rack nut over the desired hole from the side.



4-2 Fasten the blank panel to the prepared holes in the pillars with four M5 screws.



End of procedure

Chapter 4 Setup

This chapter explains how to setup the ETERNUS DX60/DX80.
You may contact your sales representative or your maintenance engineer to perform this steps, or alternatively perform them by yourself.

CAUTION

Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- When the disk is brought from a cold to a warm place, there is a chance that the change in temperature can result in condensation forming on the magnetic platters. Wait for the disks to warm up to the local ambient temperature before turning the ETERNUS DX60/DX80 on.

4.1 Prior Preparation

The following preparations are required before starting the ETERNUS DX60/DX80 setup:

Network settings

Determine the following network settings:

❏ IP address and subnet mask for the ETERNUS DX60/DX80's MNT port of Master CM (required)

Default IP address: 192.168.1.1
Default subnet mask 255.255.255.0

Note

For dual controller model, a controller for which a LAN port for the operation management of the ETERNUS DX60/DX80 is effective, is called a "Master CM". The other controller is called a "Slave CM".
Single controller model only has a "Master CM" controller.

❏ IP address and subnet mask for the ETERNUS DX60/DX80's MNT port of Slave CM

No default value is set.
This setting is required when enabling the MNT port of a Slave CM for dual controller model.

Note

For dual controller model, from the MNT port of Slave CM, the device status can be displayed, and a Master CM is switched to a Slave CM.

❏ IP address and subnet mask for the ETERNUS DX60/DX80's RMT port

No default value is set.
This setting is required if the remote support connection is to be independent of the customer network.
When enabling the RMT port of a Slave CM for dual controller model, two IP addresses are required.

❏ Gateway IP address

No default value is set.

❏ IP address for the PC

Prepare an IP address for the PC (FST: Field Support Terminal) used by your maintenance engineer.

IMPORTANT

The ETERNUS DX60/DX80 can be reset to the factory default network settings by pressing the Controller Enclosure's IP RESET Switch twice in succession within a two second interval.

Devices

Prepare the following device:

❏ PC

The initial settings are performed by using a Web browser running on a LAN connected PC. Prepare a PC installed with one of following Web browsers:

- Web browser
  Usable Web browsers are as follows. Using Web browsers other than the following is possible, but proper operation cannot be guaranteed.
  - Microsoft® Internet Explorer 6.0 or 7.0
  - Mozilla Firefox™ 3.0.x
- Resolution
  1024 × 768 or greater

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

❏ Networking equipment such as a switching hub

Related manuals

Prepare the following manuals:

- ❏ "ETERNUS DX60/DX80 Web GUI User Guide"
- ❏ "ETERNUS Disk storage systems Server Connection Guide"
- ❏ Other related manuals, for example, for a server or switch to be connected to the device.

Power related checks

Refer to "3.1.2 Check the number of wall outlets" (page 64) and check that the available power supply facilities meet the specified requirements.

- ❏ Number and specifications of the power outlets

Remote support operation checks

If the remote support connection is to be independent of the customer network, the following components will also be required:

- ❏ LAN cables × 2 (enhanced Cat-5 twisted-pair type)
- ❏ Routers and other networking equipment

"ETERNUS DX60/DX80 Web GUI User Guide"

4.2 Cable Connection

Various cables now need to be connected.

IMPORTANT To help with cable management and prevent incorrect connections, attach labels to the cables and make a note of connection origins and destinations.

4.2.1 LAN Cable Connection (for Operation Management)

This ETERNUS DX60/DX80 must be connected to a LAN to perform settings or maintenance operations via GUI or CLI, to monitor the device status, or when operating with remote support. User must prepare their own LAN cables (enhanced Cat-5 twisted-pair type).

IMPORTANT

- The ETERNUS DX60/DX80 has two LAN ports (1000Base-T/100Base-TX/10Base-T, MNT port and RMT port) for each controller.
  - For device management via GUI or CLI, use MNT port.
    For dual controller model, only device monitoring and switching the Master CM (when an error occurs in the LAN environment) can be performed from the MNT port of Slave CM.
  - For remote support operation, use MNT port or RMT port. For remote support on a different network to the customer network, use the RMT port as the remote support port. For remote support over the customer network, only the MNT port need be used.
  - Operation using only the RMT port without the MNT port is not allowed.
- The ETERNUS DX60/DX80 LAN ports operate by default in Auto-Negotiation mode, which recognizes 1000Base-T/100Base-TX/10Base-T, and Full duplex / Half duplex automatically.
  - When connecting networking equipment such as hubs and routers, check the specifications and settings of the equipment to be connected.
  - When the LAN ports of the device to be connected operate in Auto-Negotiation mode, the communication mode is set by the specified algorithm.
  - When the device cannot be recognized correctly, set both devices to be connected in Fix mode.
- When hub has Spanning Tree Protocol (STP) function and it is enabled, connection to the ETERNUS DX60/DX80 may fail. If failed, disable the STP function.
  - When STP function is not necessary for network configuration, disable the function for hub.
  - When STP function is necessary for network configuration, disable the STP function of the hub port or perform the Port-Fast setting only for the ETERNUS DX60/DX80 connection.

CAUTION

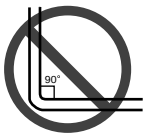
Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.

- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause device damage or failure.



Do not bend square


Do not bind up

LAN cable connection procedure

The following explains how to connect the LAN cable.

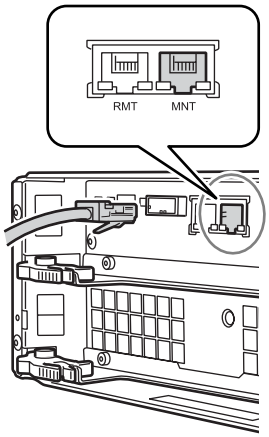
IMPORTANT	When connecting LAN cables, check the connector orientation and then firmly push it all the way in. When disconnecting LAN cables, depress the tab, then pull out the connector.

Note	This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

Procedure

1 Connect the LAN cable to the ETERNUS DX60/DX80.

Connect the LAN cable connectors to the MNT ports of the controller 0 (CM#0) and controller 1 (CM#1) for the ETERNUS DX60/DX80.



CAUTION

Do

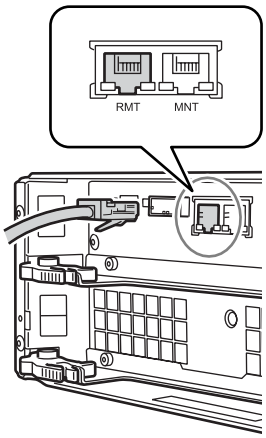
- When connecting the LAN cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the LAN cables to the networking equipment.

Connect the other end of the LAN cable to the networking equipment, such as hub or router. For networking equipment connection details, refer to the documentation for the networking equipment being connected to.

3 If the RMT ports are to be used, connect the LAN cables to RMT ports.

3-1 Connect the connector of the LAN cable to the RMT port of the controller 0 (CM#0) and controller 1 (CM#1).



3-2 Connect the other end of the LAN cable to the networking equipment, such as hub or router.
For networking equipment connection details, refer to the documentation for the networking equipment being connected to.

End of procedure

4.2.2 Fibre Channel Cable Connection (For Fibre Channel)

Connect the ETERNUS DX60/DX80 and the server or Fibre Channel switch with Fibre Channel cable.
User must prepare their own Fibre Channel cables.

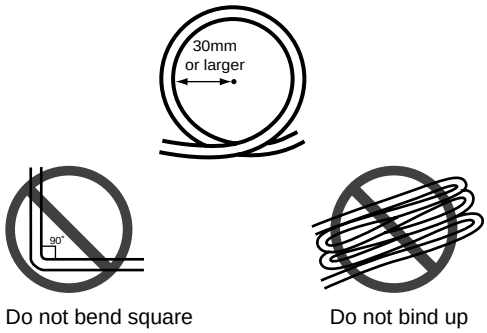
CAUTION

Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause damage.
- Before connecting Fibre Channel cables, confirm that the connectors are clean and free of dust, oil, and grease, etc.

CAUTION

- Fibre Channel cable is thin and breaks easily, so be careful not to pinch the cable between devices or bend it too much. Keep a 30mm or larger radius when bending Fibre Channel cable. Failure to do so may cause device damage or failure.



Do not bend square　　Do not bind up

Fibre Channel cable connection procedure

The following explains how to connect the Fibre Channel cable.

IMPORTANT

When connecting the Fibre Channel cable, check the direction of the connector tab and insert it all the way in firmly.
When disconnecting the Fibre Channel cable, pull out the connector while holding its tab.

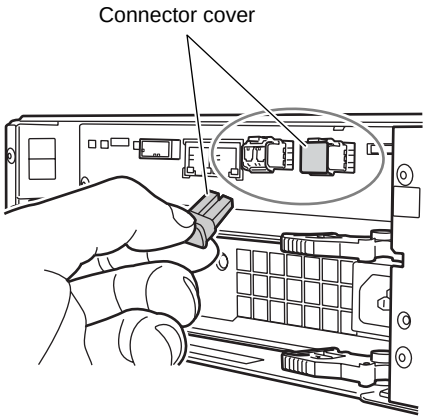
Note

This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

Procedure

1 Remove the connector cover of Fibre Channel port.

Remove the connector cover attached to the Fibre Channel port of the controller 0 (CM#0) or controller 1 (CM#1).

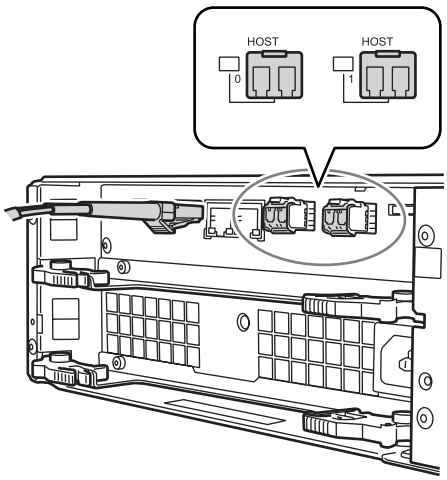


IMPORTANT Keep the removed connector cover in a safe place where they will not be lost.

2 Connect the Fibre Channel cable to the ETERNUS DX60/DX80.

2-1 Remove the covers from the Fibre Channel cable connectors.

2-2 Insert the Fibre Channel cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) Fibre Channel ports.



If only one Fibre Channel port is to be used, it should be port 0 on each CM.

CAUTION

Do

- When connecting the Fibre Channel cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

3 Connect the other end of the Fibre Channel cable to the server or Fibre Channel switch.

3-1 Remove the covers from the Fibre Channel cable connectors.

3-2 Connect the Fibre Channel cable to the Fibre Channel adapter in the server or Fibre Channel switch.

End of procedure

4.2.3 LAN Cable Connection (For iSCSI)

Connect the ETERNUS DX60/DX80 and the server or switching hub with LAN cables (enhanced Cat-5 type).

User must prepare their own LAN cables.

IMPORTANT

- Use a separate LAN for the iSCSI connection.
- The iSCSI interface operates in 1000Base-T full-duplex mode.
- When connecting the ETERNUS DX60/DX80 and the server via a switching hub, the switching hub must be able to support 1Gbps connection.

CAUTION

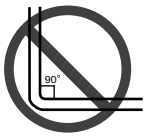
Do

- Be sure to wear a wrist strap or discharge static electricity by touching the metal frame of the ETERNUS DX60/DX80 before starting each operation, as failure to discharge static electricity may cause device failure.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

CAUTION

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



Do not bend square

Do not bind up

LAN cable connection procedure

The following explains how to connect the LAN cable.

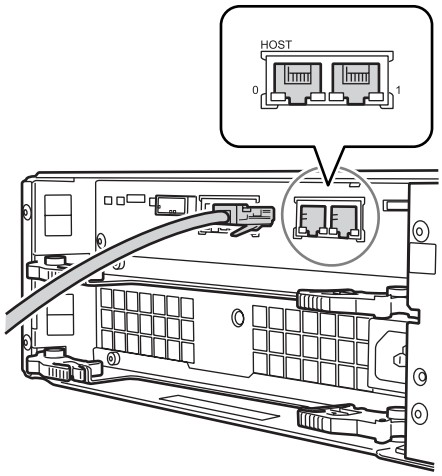
IMPORTANT When connecting LAN cables, check the connector orientation and then firmly push it all the way in.
When disconnecting LAN cables, depress the tab, then pull out the connector.

Note This section describes dual controller model as an example. Note that there is only controller 0 (CM#0) for single controller model.

Procedure

1 Connect the LAN cable to the ETERNUS DX60/DX80.

Insert the LAN cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) iSCSI ports.



If only one iSCSI port is to be used, it should be port 0 on each CM.

CAUTION

Do

- When connecting the LAN cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the LAN cables to the server or switching hub.

Connect the other end of the LAN cable to the server's LAN card or iSCSI HBA, or to the switching hub. For switching hub connection details, refer to the documentation for the switching hub being connected to.

End of procedure

4.2.4 MiniSAS Cable Connection (For SAS)

Connect the ETERNUS DX60/DX80 and the server with miniSAS cables.

User must prepare their own miniSAS cables (ETERNUS DX60/DX80 connector: SFF8088).

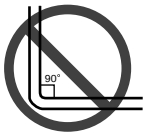
CAUTION

Do

- Be sure to wear a wrist strap or discharge static electricity by touching the metal frame of the ETERNUS DX60/DX80 before starting each operation, as failure to discharge static electricity may cause device failure.
- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



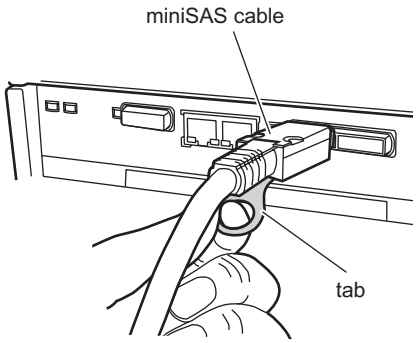
Do not bend square


Do not bind up

MiniSAS cable connection procedure

The following explains how to connect the miniSAS cable.

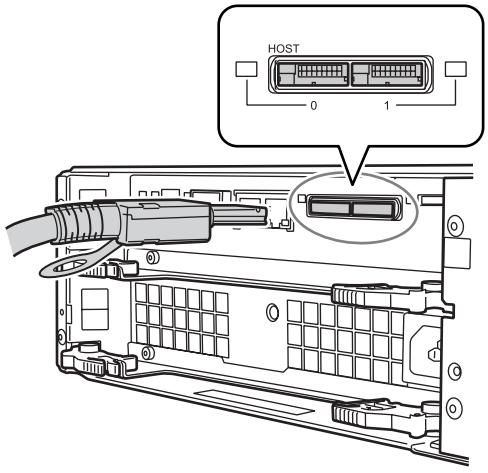
IMPORTANT When connecting miniSAS cables, check the connector orientation and then firmly push it all the way in.
When disconnecting miniSAS cables, use the pull-tab to extract the connector.



Procedure

1 Connect the miniSAS cables to the ETERNUS DX60/DX80.

Insert the miniSAS cable connectors in the controller 0 (CM#0) and controller 1 (CM#1) SAS ports.



If only one SAS port is to be used, it should be port 0 on each CM.

IMPORTANT Do not connect this cable to the SAS (OUT) port.

CAUTION

Do

- When connecting the SAS cables, position them so that they will not obstruct replacement of the power supply unit or controllers by the maintenance engineer.

2 Connect the miniSAS cables to the server.
Connect the other end of the miniSAS cables to the server's SAS adapters.

End of procedure

4.2.5 MiniSAS Cable Connection (For Drive Enclosures)

When a Drive Enclosure is installed, connect the Drive Enclosure to the Controller Enclosure with a miniSAS cable. When multiple Drive Enclosures are installed (only for ETERNUS DX80), connect the Drive Enclosures with miniSAS cable.
Two miniSAS cables (75cm) are supplied with each Drive Enclosure dual expander model, and one miniSAS cable (75cm) with each Drive Enclosure single expander model.

CAUTION

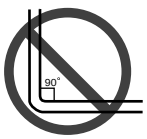
Do

- Make sure to wear a wrist strap before starting each operation, as failure to discharge static electricity may cause a device failure.
  Do not remove it until the operation is complete.

- When connecting external (signal, power, etc.) cables, avoid pulling them as it may cause device damage.

Do Not

- Do not bend the cable too much or bind it up. Doing so may cause a device damage or failure.



Do not bend square


Do not bind up

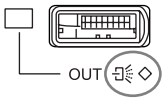
MiniSAS cable connection procedure

The following explains how to connect the miniSAS cable.

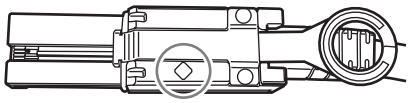
IMPORTANT

- When connecting miniSAS cables, always check the symbols on the connector and port are matching.
  - SAS (OUT) of CE or DE: Attach the connector with the ◇ symbol to the port with the ◇ symbol.

SAS (OUT) port

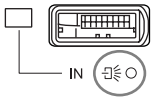


Plug connecting to SAS (OUT) port

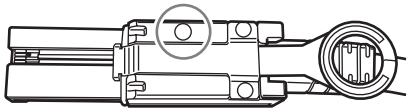


  - SAS (IN) of DE: Attach the connector with the ○ symbol to the port with the ○ symbol.

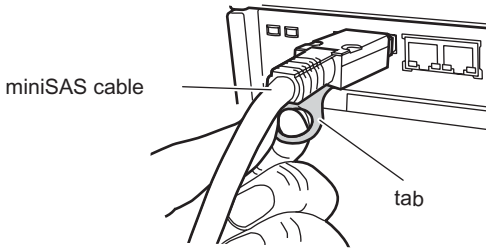
SAS (IN) port



Plug connecting to SAS (IN) port



- When connecting miniSAS cables, check the connector orientation and then firmly push it all the way in.
  When disconnecting miniSAS cables, use the pull-tab to extract the connector.

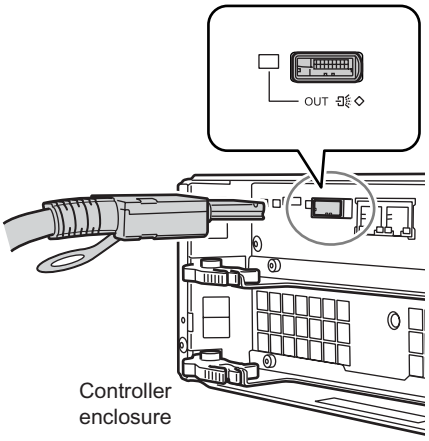


Procedure

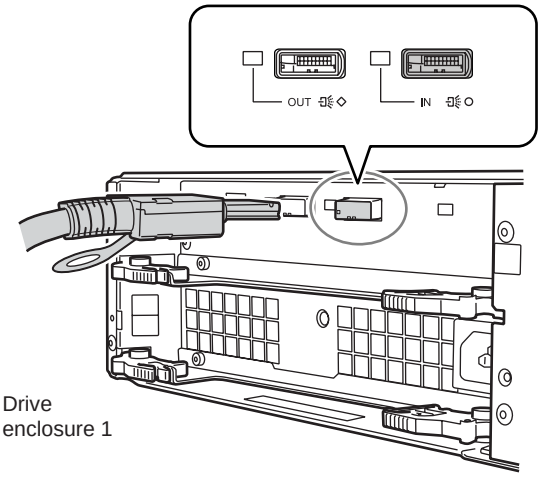
1 Connect the controller enclosure to the drive enclosure with the miniSAS cable.

1-1 Connect the SAS (OUT) port at controller 0 (CM#0) of controller enclosure, to the SAS (IN) port at expander 0 (EXP#0) of the drive enclosure 1 with the miniSAS cable.

(1) Connect the plug to be connected to SAS (OUT) port, to the SAS (OUT) port of the controller 0 (CM#0).
Remove the port cover from the SAS (OUT) port before inserting the plug.



(2) Connect the plug to be connected to SAS (IN) port, to the SAS (IN) port of the expander 0 (EXP#0).



1-2 For dual controller model, connect the SAS (OUT) port at controller 1 (CM#1) of controller enclosure, to the SAS (IN) port at expander 1 (EXP#1) of the drive enclosure 1 with the miniSAS cable.
Connect the miniSAS cable in the same way as Step 1-1.

The following shows the miniSAS connection figure between controller enclosure and drive enclosure.

IMPORTANT Do not connect anything to the SAS (OUT) port on the end edge.

- For single controller model

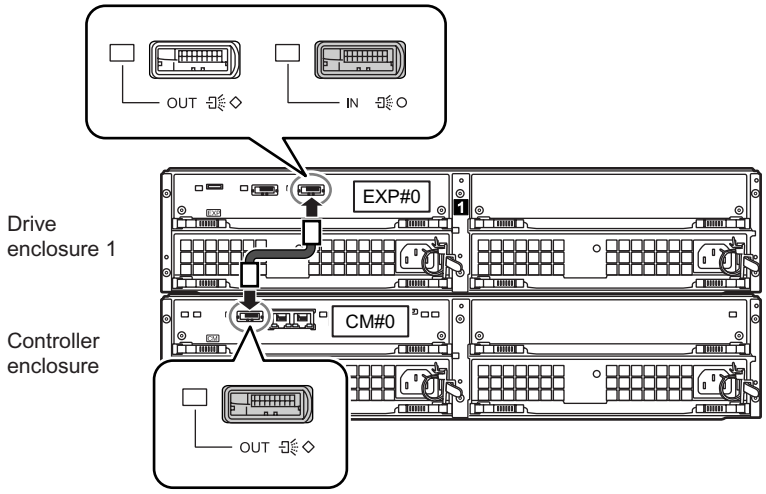


Figure 4.1 MiniSAS cable connection (between the controller enclosure and drive enclosure) (single controller model)

- For dual controller model

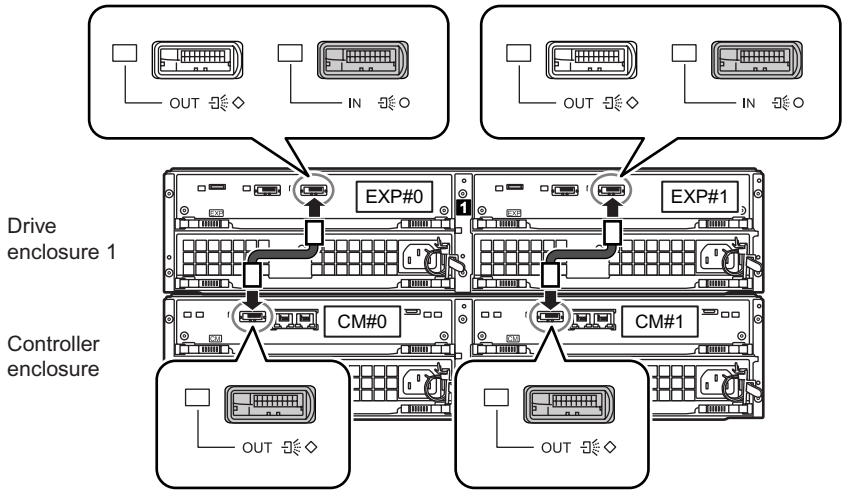
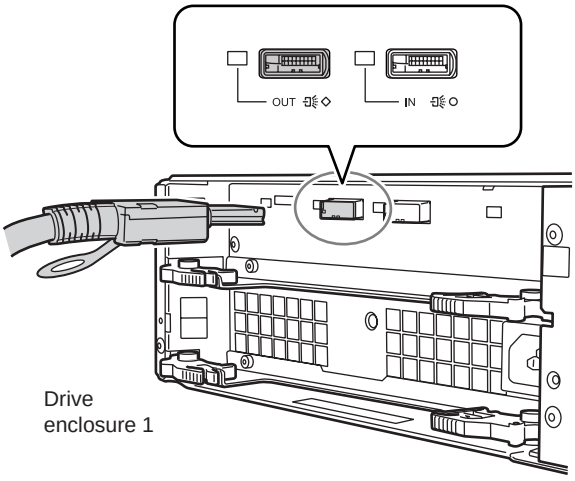


Figure 4.2 MiniSAS cable connection (between the controller enclosure and drive enclosure) (dual controller model)

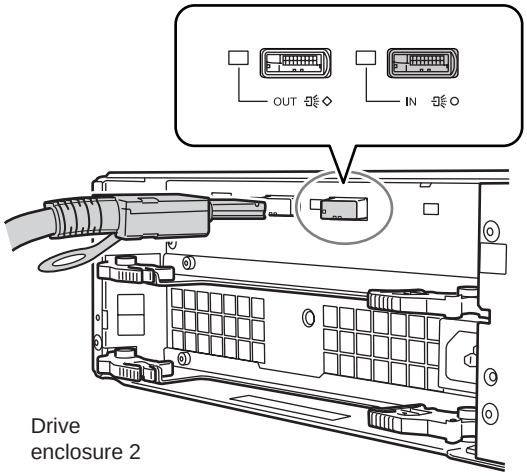
2 When two or more drive enclosures are installed, connect the drive enclosures with the miniSAS cable.

2-1 Connect the SAS (OUT) port at expander 0 (EXP#0) of the drive enclosure 1, to the SAS (IN) port at expander 0 (EXP#0) of the drive enclosure 2 with the miniSAS cable.

(1) Connect the plug to be connected to the SAS (OUT) port, to the SAS (OUT) port of the expander 0 (EXP#0) for the drive enclosure 1.



(2) Connect the connector to be connected to the SAS (IN) port, to the SAS (IN) port of the expander 0 (EXP#0) for the drive enclosure 2.



2-2 For dual controller model, connect the SAS (OUT) port at expander 1 (EXP#1) of the drive enclosure 1, to the SAS (IN) port at expander 1 (EXP#1) of the drive enclosure 2 with the miniSAS cable.
Connect the miniSAS cable in the same way as Step 2-1.

The following figure shows the miniSAS connection figure between drive enclosures.

IMPORTANT Do not connect anything to the SAS (OUT) port on the end edge.

- For single controller model

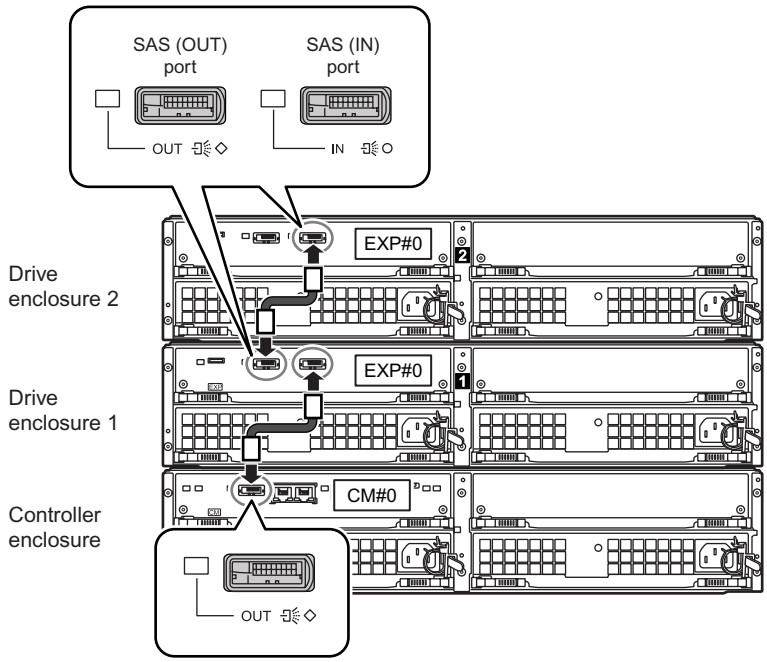


Figure 4.3 MiniSAS cable connection
(When two or more drive enclosures are added) (single controller model)

- For dual controller model

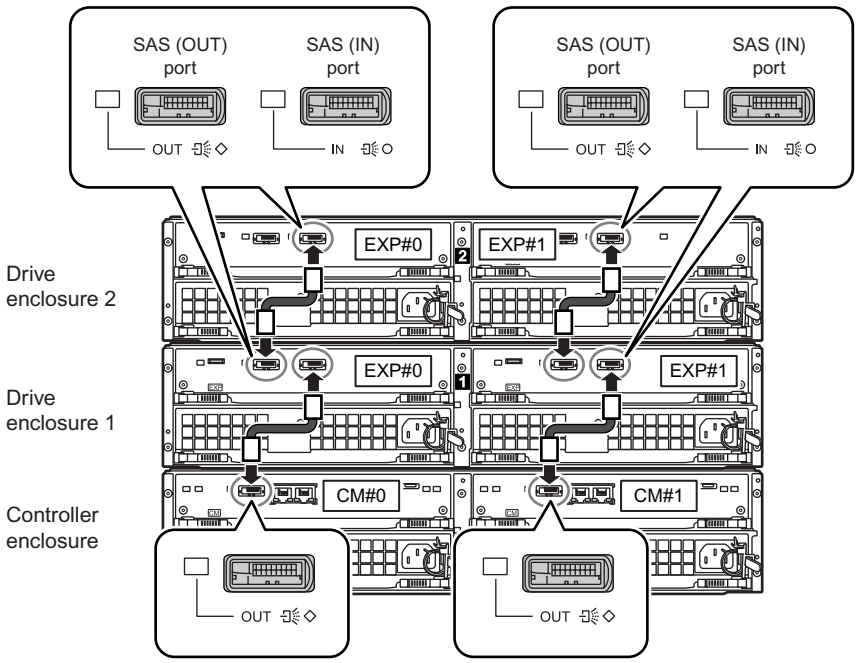


Figure 4.4 MiniSAS cable connection
(When two or more drive enclosures are added) (dual controller model)

End of procedure

4.2.6 Power Cord Connection

Connect the power cords to the ETERNUS DX60/DX80.

WARNING

Do Not

- Do not disconnect the power cord plug with wet hands as it may lead to fire or electrical shock.
- Do not attempt to repair a damaged power cord. Do not pull on, excessively bend/twist, apply heat or place heavy objects on the cord. Doing so will damage the cord, which may lead to fire or electrical shock.
- Do not put the stress on the root of the power cord, for example, by twisting it. Doing so may expose or cut the cable core of the power cord, causing fire or electric shock
- Do not use the power cord if it is damaged or the plug does not snugly fit into the socket as it may cause fire or electrical shock.
- Do not use a power cord other than one attached, or the one specified. Do not use the attached power cord or specified power cord for other devices. Doing so may cause failure, fire, or electric shock.

Do

- Wipe clean any excess dust from the plug prongs or socket with a dry cloth. Failure to do so, may lead to fire or electrical shock.

CAUTION

Ground

- Use a power cord with ground lead. Using a power cord without ground lead may cause fire, electric shock, or malfunction.

4.2.6.1 With No AC Outlet Box

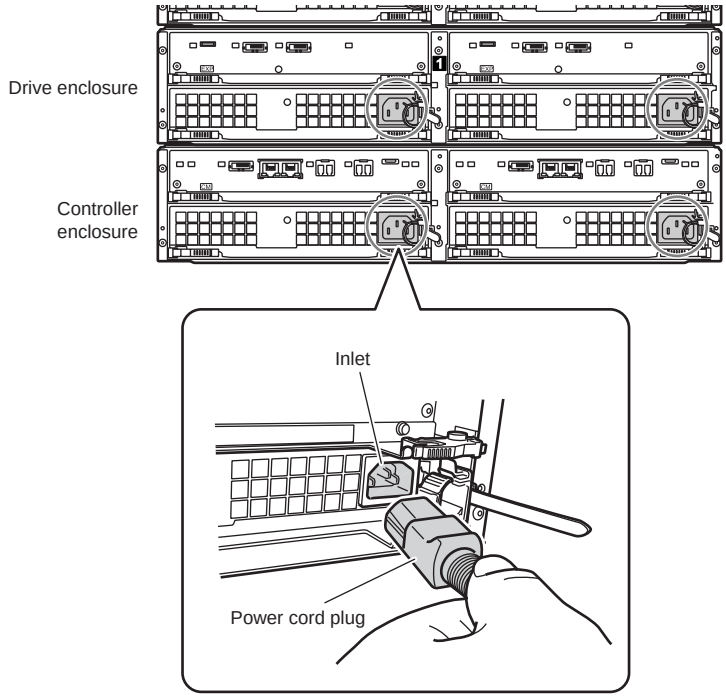
The following explains how to connect the power cords when no AC outlet boxes are installed. Two power cords (4m) are provided for each enclosure.

Procedure

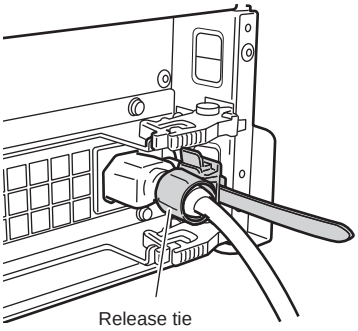
1 Connect the power cords to the ETERNUS DX60/DX80.

IMPORTANT The power unit for each enclosure is duplicated. The power cords must be connected to the inlets of both power units (PSU#0 and PSU#1).

1-1 Connect the power cord plugs to the power inlets of the Power Supply Units.



1-2 Attach the release tie to the plug of the power outlet for the power plug not to be unplugged.



2 Connect the power cords to the power outlet.

Connect the plug at the other end of each power cord to the power outlet.

WARNING

Do Not

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

Do

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

Do Not

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.
- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

Unplug

- If the ETERNUS DX60/DX80 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80 and its peripherals.

IMPORTANT

After unplugging the power cord, wait until the POWER STATUS LED of the power unit has turned off completely before reconnecting it.
(It takes about ten seconds for the STATUS LED to be turned off completely.)

End of procedure

4.2.6.2 With an AC Outlet Box

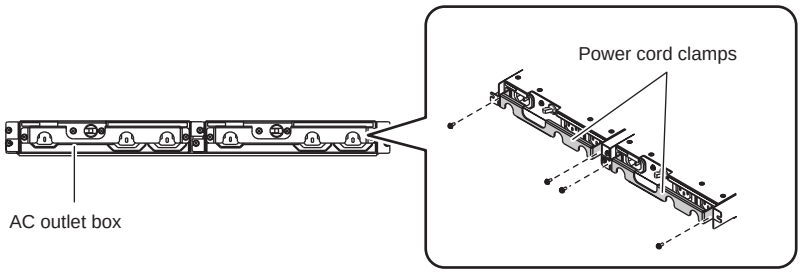
The following explains how to connect the power cord when an AC outlet box is installed.
The following explains how to connect the power cord to 1U or 2U AC outlet box.

When 1U AC outlet box is installed

The procedure to connect the power cord to 1U AC outlet box is as follows:

Procedure

1 Remove the power cord clamps from the AC outlet box.



2 Connect the AC outlet box outlets and power unit inlets with power cord (AC output cables) (4m).
The procedures to connect the power unit is the same as the Step 1 in "4.2.6.1 With No AC Outlet Box" (page 101).

IMPORTANT	The power unit for each enclosure is duplicated. The power cords must be connected to the inlets of both power units (PSU#0 and PSU#1).

The following table and figure show the connection path of an AC outlet cable and connection figure respectively

Table 4.1 Connection path of a power cord (AC output cable) (AC outlet box (1U))

Connection source (AC outlet box outlet)		Connection distribution (power unit inlet)
The first ACS	OUTPUT #0 - 1	Controller enclosure PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 1 PSU#0 inlet
	OUTPUT #1 - 1	Controller enclosure PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 1 PSU#1 inlet
The second ACS	OUTPUT #0 - 1	Drive enclosure 2 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 3 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 2 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 3 PSU#1 inlet
The third ACS	OUTPUT #0 - 1	Drive enclosure 4 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 5 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 4 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 5 PSU#1 inlet
The fourth ACS	OUTPUT #0 - 1	Drive enclosure 6 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 7 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 6 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 7 PSU#1 inlet
The fifth ACS	OUTPUT #0 - 1	Drive enclosure 8 PSU#0 inlet
	OUTPUT #0 - 2	Drive enclosure 9 PSU#0 inlet
	OUTPUT #1 - 1	Drive enclosure 8 PSU#1 inlet
	OUTPUT #1 - 2	Drive enclosure 9 PSU#1 inlet

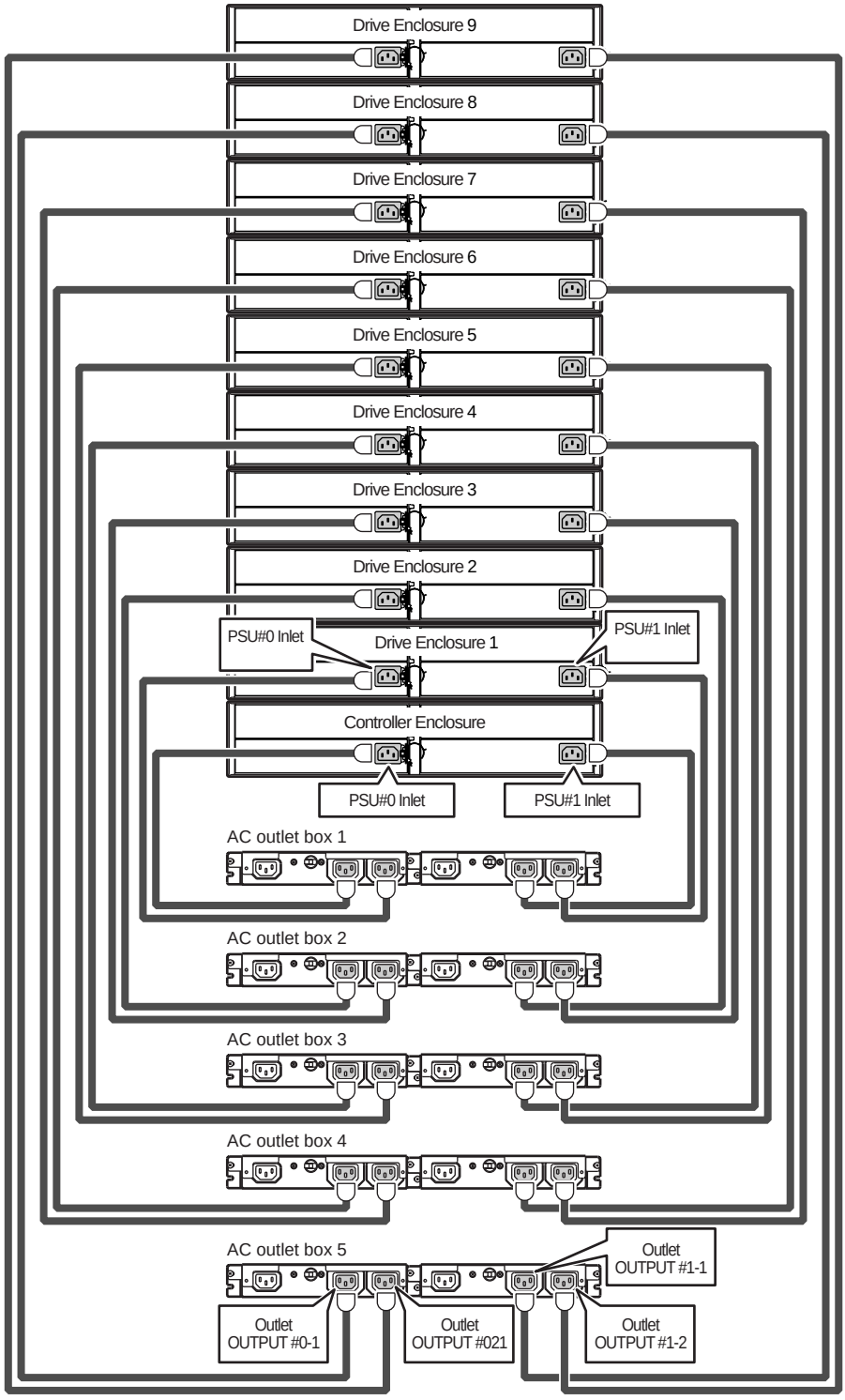
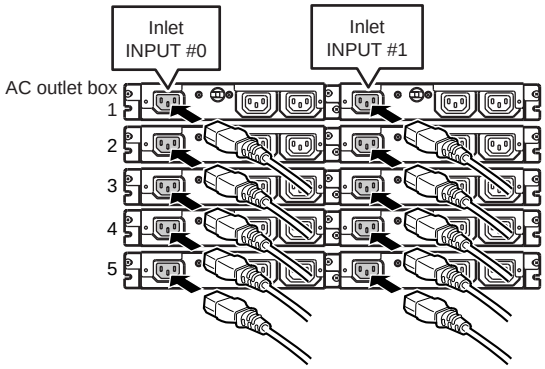


Figure 4.5 Connection of AC output cables (1U)

3 Connect the power cords (AC input cables) (4m) supplied with the AC outlet box to the inlet of the AC outlet box.



4 Use the power cord clamps to prevent the power plugs from coming unplugged.
Attach the power clamps removed in Step 1.

5 Connect the plug at the other end of each of the power cords (AC input cables) (4m) connected in Step 3 to the outlet.

WARNING

Do Not

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

Do

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

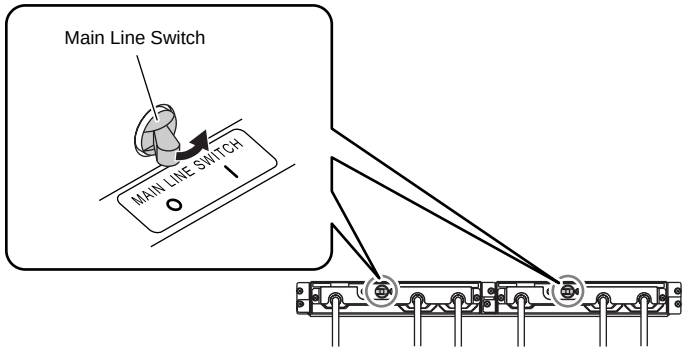
Do Not

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.
- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

CAUTION

- If the ETERNUS DX60/DX80 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80 and its peripherals.

6 Turn the main line switch of the AC outlet box to the "On" position (marked "I").



IMPORTANT

When turning the main line switch to "On" (marked "I") right after turning the main line switch to "Off" (marked "O"), turn it back to "On" (marked "I") after the STATUS LED of the power unit has turned off completely.
(It takes about ten seconds for the POWER STATUS LED to be turned off completely.)

End of procedure

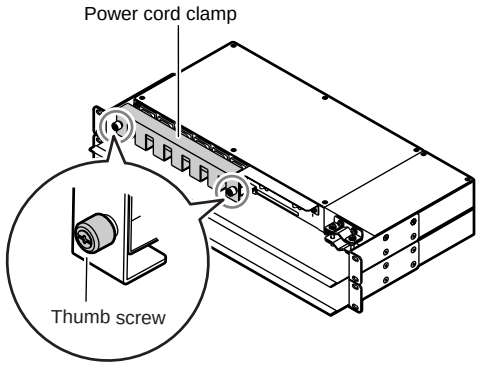
When 2U AC outlet box is installed

The procedure to connect the power cord to 2U AC outlet box is as follows:

Procedure

1 Remove the power cord clamp from the AC outlet box.

Loosen the two thumb screws on both sides of the power cord clamp to remove it.



2 Connect the AC outlet box outlets and power unit inlets with power cord (AC output cables) (4m).

The procedures to connect the power unit is the same as the Step 1 in "4.2.6.1 With No AC Outlet Box" (page 101).

IMPORTANT	The power unit for each enclosure is duplicated. The power cords must be connected to the inlets of both power units (PSU#0 and PSU#1).

The following table and figure show the connection path of an AC outlet cable and connection figure respectively

Table 4.2 Connection path of a power cord (AC output cable) (AC outlet box (2U))

Connection source (AC outlet box outlet)		Connection distribution (power unit inlet)
AC outlet box A	OUT1	Controller enclosure PSU#0 inlet
	OUT2	Drive enclosure 1 PSU#0 inlet
	OUT3	Drive enclosure 2 PSU#0 inlet
	OUT4	Drive enclosure 3 PSU#0 inlet
	OUT5	Drive enclosure 4 PSU#0 inlet
	OUT6	Drive enclosure 5 PSU#0 inlet
AC outlet box B	OUT1	Controller enclosure PSU#1 inlet
	OUT2	Drive enclosure 1 PSU#1 inlet
	OUT3	Drive enclosure 2 PSU#1 inlet
	OUT4	Drive enclosure 3 PSU#1 inlet
	OUT5	Drive enclosure 4 PSU#1 inlet
	OUT6	Drive enclosure 5 PSU#1 inlet
AC outlet box C	OUT1	Drive enclosure 6 PSU#0 inlet
	OUT2	Drive enclosure 7 PSU#0 inlet
	OUT3	Drive enclosure 8 PSU#0 inlet
	OUT4	Drive enclosure 9 PSU#0 inlet
AC outlet box D	OUT1	Drive enclosure 6 PSU#1 inlet
	OUT2	Drive enclosure 7 PSU#1 inlet
	OUT3	Drive enclosure 8 PSU#1 inlet
	OUT4	Drive enclosure 9 PSU#1 inlet

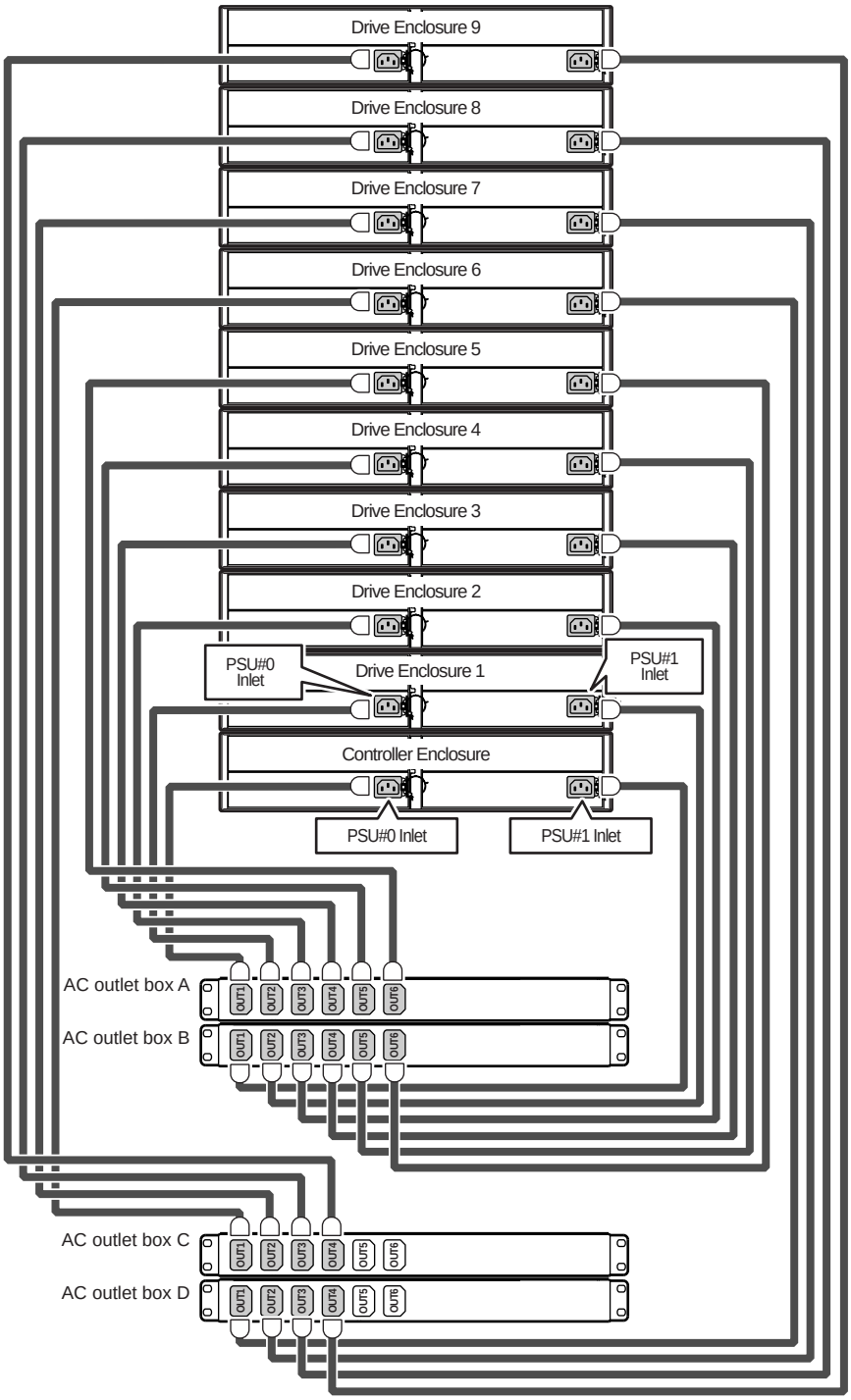


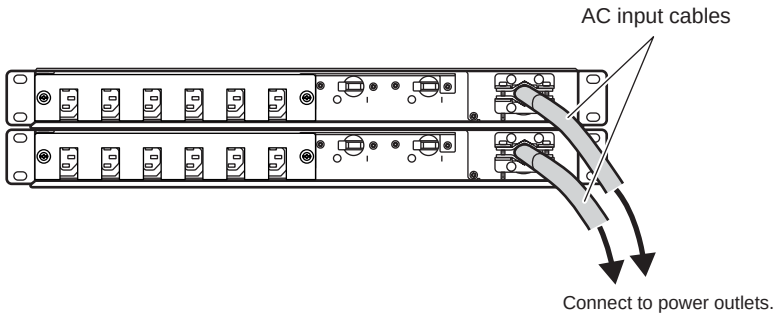
Figure 4.6 Connection of AC output cables (2U)

3 Use the power cord clamps to prevent the power plugs from coming unplugged.
Attach the power cord clamps removed in Step 1.

4 Connect the power cords (AC input cables) (4m) supplied with the AC outlet box to the inlet of the AC outlet box.

Note

The AC outlet box is shipped with the power cord connected to the inlets.



WARNING

Do Not

- Do not connect power cords or other cables during thunderstorms, as lightning can result in fire or electric shock.

CAUTION

Do

- Be sure to fully insert each plug into its socket. Failure to do so may lead to fire or electrical shock.

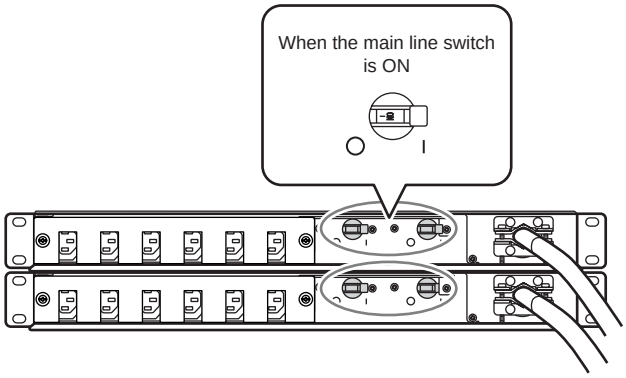
Do Not

- When disconnecting the power plug, be sure to pull from the plug and not the cord. Pulling the cord may expose or snap the inner wires, which can lead to fire or electrical shock.
- Do not use the server service outlet to connect the device power cord.
- Do not overload an electrical outlet. Doing so may lead to electric shock or fire.

CAUTION

- If the ETERNUS DX60/DX80 is not going to be used for a long period of time, it is advisable to unplug all power cords to avoid any chance of fire to the ETERNUS DX60/DX80 and its peripherals.

5 Turn the main line switch of the AC outlet box to the "ON" position (marked "I").



IMPORTANT

When turning the main line switch to "On" (marked "I") right after turning the main line switch to "Off" (marked "O"), turn it back to "On" (marked "I") after the STATUS LED of the power unit has turned off completely.
(It takes about ten seconds for the STATUS LED to be turned off completely.)

End of procedure

4.3 ETERNUS DX60/DX80 Setup

This section explains how to setup the ETERNUS DX60/DX80 using a PC.

4.3.1 Preparation

Prepare the following before setting up the ETERNUS DX60/DX80.

Filling in the Network Settings Label

Fill in the IP address and subnet mask fields on the Network Settings label and attach it on rear upper central label plate.

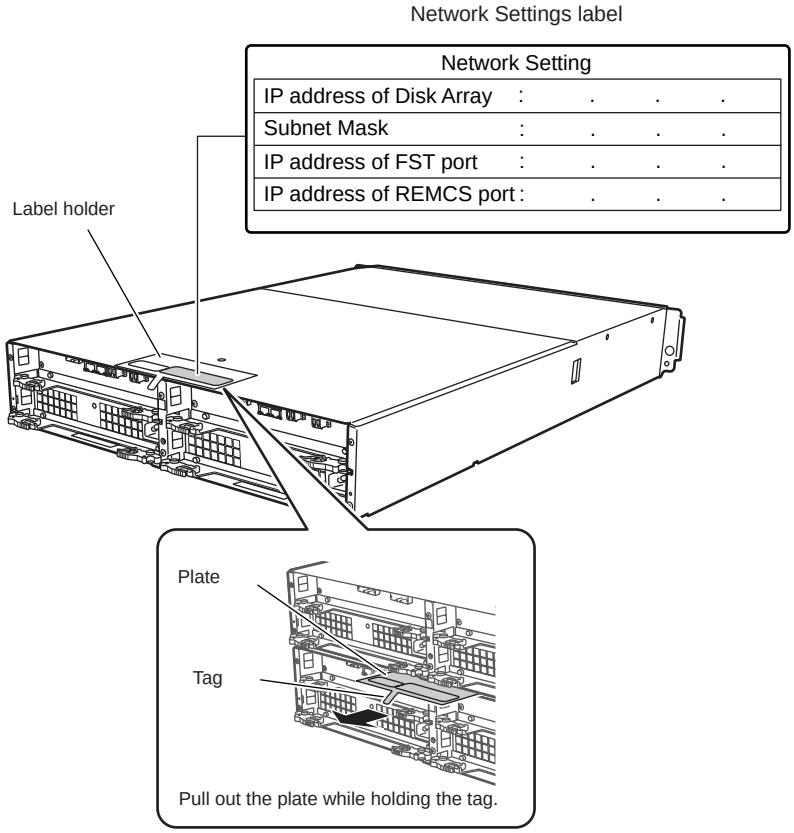


Figure 4.7 Network Settings label

The IP address for the PC used by the maintenance engineer during maintenance is also required. Acquire the IP address and note it on the Network Settings label.

Table 4.3 Network Settings label fields

Items	Value
IP address of Disk Array	IP address of the device MNT port
Subnet Mask	Subnet mask of network connected
IP address of FST port	IP address of PC (FST) used by maintenance engineer
IP address of REMCS port	IP address of the device RMT port

Network settings for the PC to be used

Perform the following procedure to setup the PC to be used for setting up the ETERNUS DX60/DX80.

Procedure

1. Connect the PC to the MNT port of the ETERNUS DX60/DX80 Controller 0 (CM#0) directly with a LAN cable (for operation management).
   When a LAN cable (for operation management) is connected to Controller 1 (CM#1), disconnect it.
2. Set the IP address and subnet mask of the PC.
   Set the following values.

   IP address: 192.168.1.2
   Subnet mask: 255.255.255.0
3. Set the Web browser to not use a proxy server and a cache (Temporary Internet Files).
4. Check that Java Script, style sheets, and cookies are enabled for the Web browser.
5. Turn on the ETERNUS DX60/DX80.

IMPORTANT

- When turning on the ETERNUS DX60/DX80 for the first time, volume formatting operation, which is set as factory default, may be performed. However, the ETERNUS DX60/DX80 setting operation can be continued.
- When stopping a volume formatting operation, delete the volume. For details on deleting a volume, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

Note

- When checking the connection between PC used for setup and the ETERNUS DX60/DX80, execute the "ping" command at the PC command prompt.
  The following is an example of ping execution: ("192.168.1.1" is the default IP address)

  ```
  ping 192.168.1.1
  ```

  If the execution results in error, check the PC's network settings.
- If communication fails even though the MNT port of controller 0 (CM#0) and the LAN port of the PC are connected, check that Master LED of controller 0 (CM#0) is lit. If the Master LED of controller 1 (CM#1) is lit for dual controller model, use the MNT port of controller 1 (CM#1).

End of procedure

4.3.2 Initial Setup

Start Graphical User Interface (GUI) from the Web browser of the connected PC that is to be used to set up the ETERNUS DX60/DX80, and perform the initial setup of the ETERNUS DX60/DX80 in the following order.

- Set Date and Time
- Set Storage System Name
- Change Password
- Setup Network Environment

The initial setup procedure is as follows: For the setup details, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

Procedure

1 Start the Initial Setup.

1-1 Start the Web browser on the PC that is to be used to set up the ETERNUS DX60/DX80.

1-2 Enter either of the following URLs in the address bar of the Web browser.

```
http://192.168.1.1/
```

or

```
https://192.168.1.1/
```

The logon screen of GUI appears.

Note

The confirmation screens for site certification may be displayed when starting up GUI using SSL (https).
However, this should not cause any problems. Accept the site certification and continue the process.
The following shows an example when using Internet Explorer 7.
The display contents vary according to your web browser.

> There is a problem with this website's security certificate.
> The security certificate presented by this website was not issued by a trusted certificate authority.
> Security certificate problems may indicate an attempt to fool you or intercept data you send to the server.
> We recommend that you close this webpage and do not continue to this Web site.

The warning for the site certification is not displayed after installing the certification.
For the procedure about site certification installation, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

1-3 On the logon screen, select the language (English or Japanese).

1-4 Type the following User name and Password, and click the [Logon] button.
User name: root
Password: root (default)

After logging on, the Storage System Status screen of GUI appears.

1-5 Click the [Initial Setup] menu on the [Easy Setup] tab.
The Start screen of the [Initial Setup] function appears.

1-6 Click the [Next >] button.

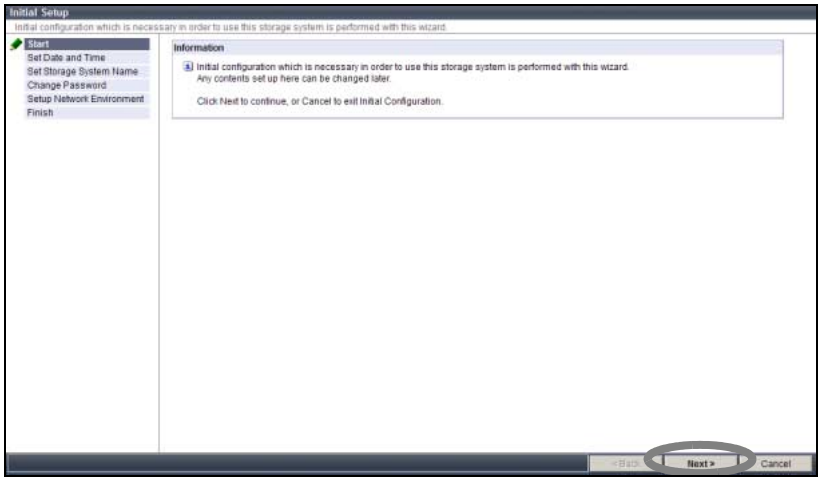


Figure 4.8 Start screen of the [Initial Setup] function

The [Set Date and Time] screen appears.

2 Set date and time.

Set the date and time of the internal clock of the ETERNUS DX60/DX80.

2-1 Set the necessary parameters, and click the [Next >] button.

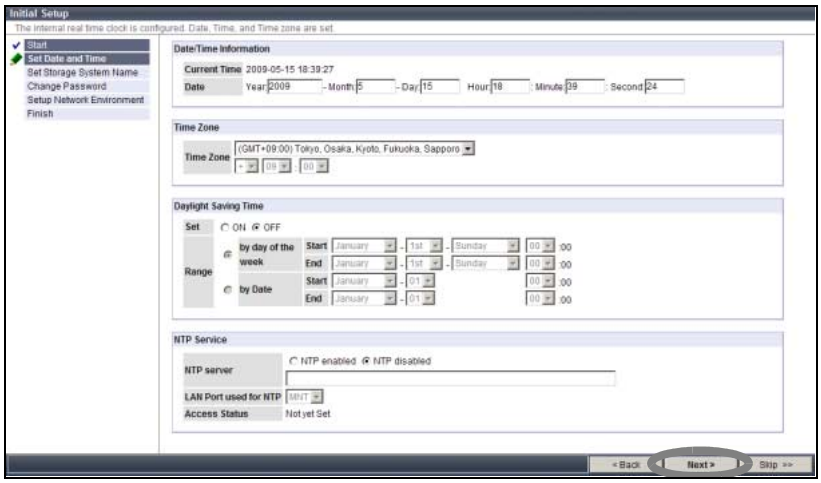


Figure 4.9 [Set Date and Time] screen

A confirmation screen appears.

2-2 Click the [OK] button.
The date and time setting is set, and the [Set Storage System Name] screen appears.

3 Set the machine name.

Set the name of ETERNUS DX60/DX80.

Note

The information that is set here is used for network management by SNMP. The device name is displayed in the logon screen and operation screen of GUI.

3-1 Set the necessary parameters, and click the [Next >] button.

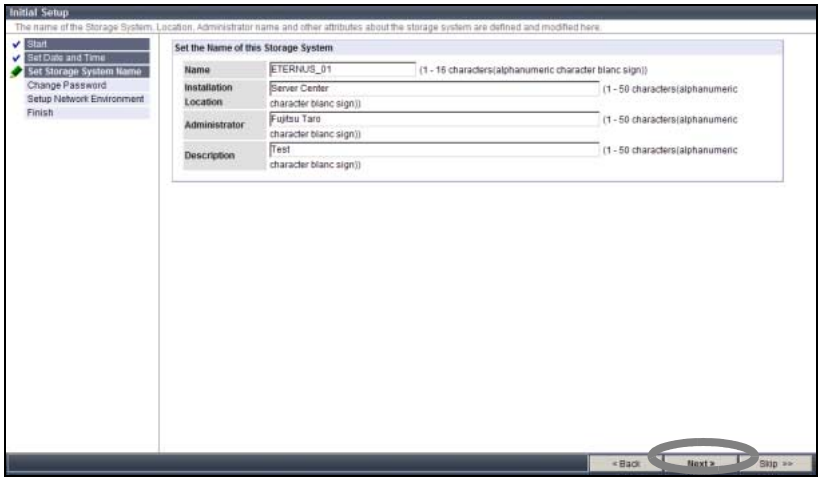


Figure 4.10 [Set Storage System Name] screen

A confirmation screen appears.

3-2 Click the [OK] button.
The machine name is set, and the [Change Password] screen appears.

4 Change the password.

Change the initial account password.

4-1 Set the necessary parameters in [Set Password], and click the [Next >] button.

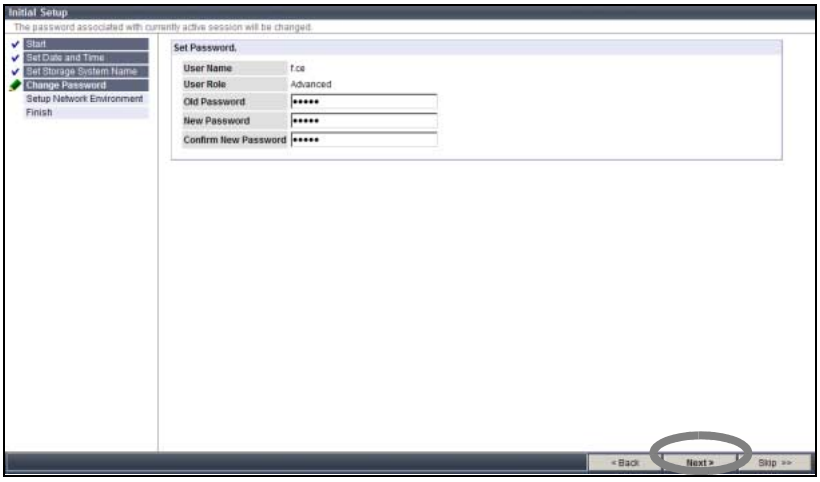


Figure 4.11 [Change Password] screen

A confirmation screen appears.

4-2 Click the [OK] button.
The password is changed, and the [Setup Network Environment] screen appears.

5 Set the network environment.

Set the ETERNUS DX60/DX80 environment for network communication.

5-1 Set the necessary parameters such as a MNT port IP address, subnet mask and default gateway, and click the [Next >] button.

Note	The appropriate IP address or network address must be set in the "Allowed IP List" to allow access from a device in a network other that in which the ETERNUS DX60/DX80 resides. Devices in the same network as the ETERNUS DX60/DX80 are allowed access even if not set in the "Allowed IP List".

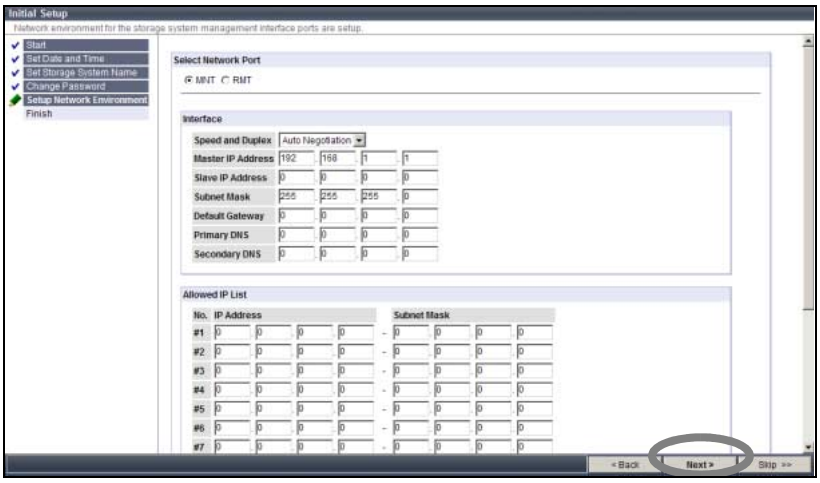


Figure 4.12 [Setup Network Environment] screen

A confirmation screen appears.

5-2 Click the [OK] button.
The Network Environment is set, and the [Finish] screen appears.

6 Finish the initial setup.

6-1 Click the [Finish] button.

Figure 4.13 [Finish] screen of the initial setup

The [Initial Setup] completes.

IMPORTANT	Device setting operation cannot be continued if the IP address is changed. Logon again with the new IP address is required.

6-2 Remove the LAN cable (for operation management) from the PC that is to be used to set up the ETERNUS DX60/DX80, and connect the LAN cable (for operation management) of the MNT port of Controller 1 (CM#1) and Controller 0 (CM#0) to the customer's network.

6-3 Start the Web browser, and logon again with the new IP address to perform the configuration settings of the ETERNUS DX60/DX80 using Configuration Wizard.

End of procedure

4.3.3 Configuration Wizard

Perform the necessary settings for the device operation using the Configuration Wizard of the setting\maintenance program.
Perform the settings in the following order.

- Create RAID Group
- Create Volume
- Define Host
- Configure Affinity Group
- Define LUN Mapping

IMPORTANT

Perform "Set Port Parameters" before starting the Configuration Wizard.
When using the Host Affinity functions, make sure to "Enable" the Host Affinity setting of the port.
Refer to "4.3.5 Port Parameters Setup" (page 133) for details about the port parameter settings.
Refer to "1.3.7 Security Functions" (page 41) for details about the Host Affinity functions.

For setting-related details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide". Also refer to the "ETERNUS Disk storage systems Server Connection Guide" as required.

"ETERNUS DX60/DX80 Web GUI User Guide
"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS Disk storage systems Server Connection Guide (SAS)"

Procedure

1 Start Configuration Wizard.

1-1 Click the [Configuration Wizard] button on the [Easy Setup] tab in GUI.
The [Configuration Wizard] screen appears.

1-2 Click the [Start] button.

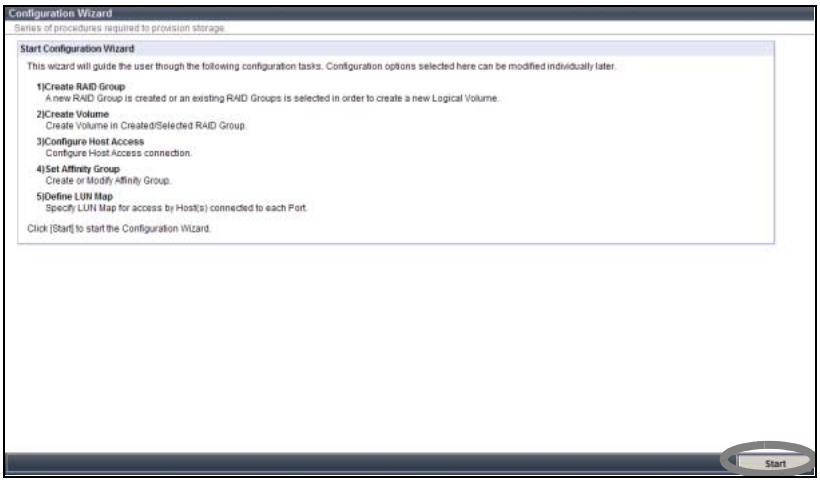


Figure 4.14 Configuration Wizard initial screen

The Configuration Wizard starts. The [Create RAID Group] menu screen appears.

2 Create a RAID Group.

Create or select a RAID group in which a volume is created (a group of disks configuring RAID in the storage system device).

IMPORTANT

- If the factory default settings are to be used, this setting is not required. When settings are desired, delete the factory settings (logical volumes, RAID groups, and LUN mappings) and then create your own RAID groups. For setting deletion details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide".
- For RAID5 and RAID6, ensure that a single RAID group is not being configured by too many disks. Doing so may increase the time to perform Rebuild/Copyback when a disk fails.
- Disks with different capacities can be installed in a single Drive Enclosure. However, all disks configuring a RAID group should be of the same capacity. Do not include disks with a different capacity in a RAID group.

CAUTION

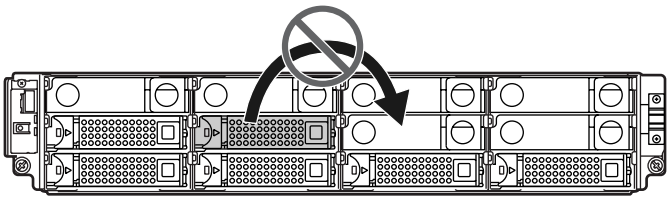
Do

- Data may not be recovered if a disk fails because RAID0 configuration is not redundant. RAID1, RAID1+0, RAID5, RAID5+0 , and RAID6 are recommended as the RAID level.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



2-1 Select the RAID group creating method on the [Create RAID Group] screen, and click the [Next >] button.
When "Select existing RAID Group" is selected, move on to Step 3.

2-2 Set the necessary items, and click the [Create] button.
The following is a setting example when "Create RAID Group (Disks are assigned automatically)" is selected.

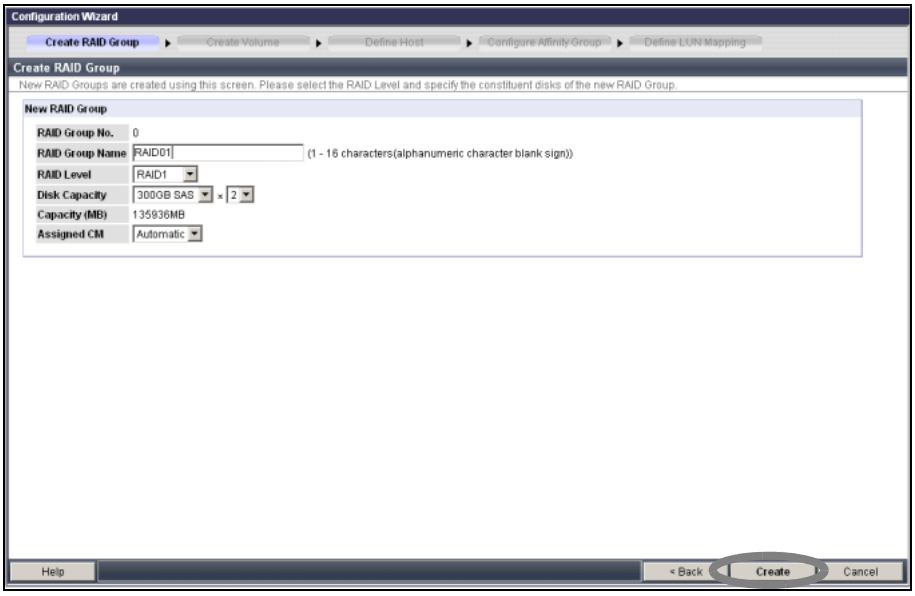


Figure 4.15 [Create RAID Group] screen

A confirmation screen appears.

2-3 Click the [OK] button.
The RAID group is created, and the [Create Volume] screen appears.

3 Create a volume.

Create a volume (area in the disks in the RAID group) in a RAID group.

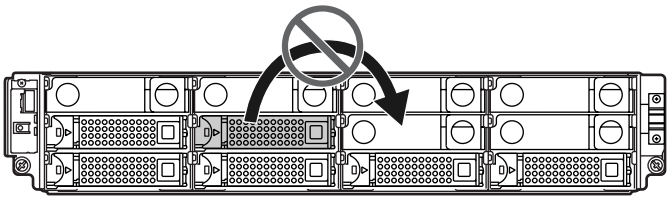
IMPORTANT

If the factory default settings are to be used, this setting is not required. When settings are desired, delete the factory settings (logical volumes and LUN mappings) and then create your own logical volumes. For setting deletion details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide".

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



3-1 Specify the necessary items in "New Volume", and click the [Create] button.

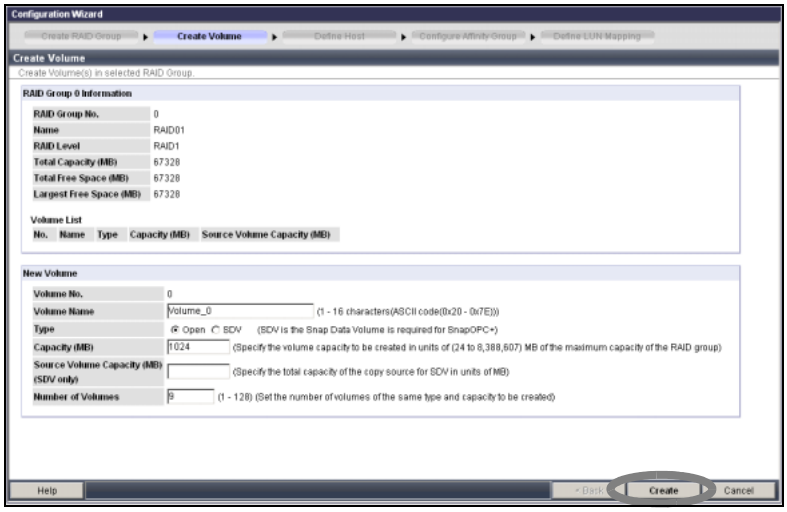


Figure 4.16 [Create Volume] screen

A confirmation screen appears.

3-2 Click the [OK] button.
The volume is created, and the [Define Host] screen appears.

4 Setup the host.

Specify information for the server being connected to the ETERNUS DX60/DX80.
Setting screens will vary depending on the ETERNUS DX60/DX80 model.

IMPORTANT	When the Host Affinity function is not used, the host setting is not required.

■ For Fibre Channel

On the [Setup FC Host] screen, register the Fibre Channel card WWN for the server being connected to the ETERNUS DX60/DX80.

IMPORTANT	When a FC switch is connected to the ETERNUS DX60/DX80, settings for FC switch and the server (FC host) must be completed in advance.

(1) Click the [Add] button on the [Setup FC Host] screen.

(2) Specify a WWN, server name, and host response.

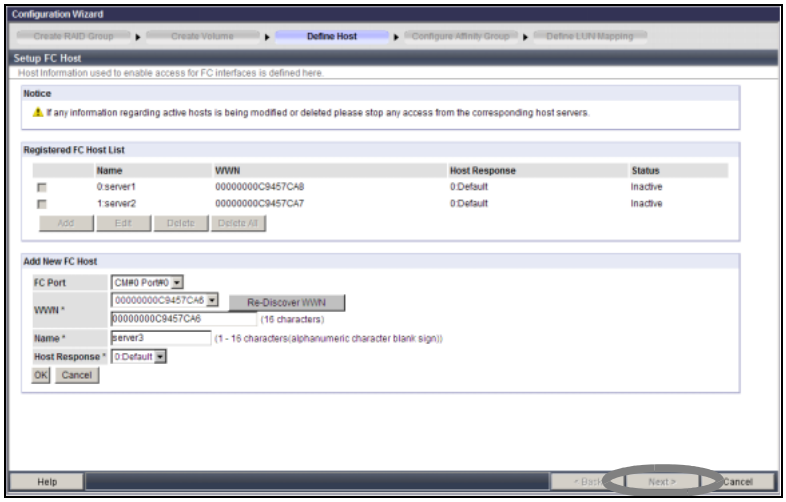


Figure 4.17 [Setup FC Host] screen

(3) Specify the other necessary items, and click the [OK] button.
The target FC host is displayed in the "Registered FC Host List" field.

(4) Click the [Next] button.
A confirmation screen appears.

(5) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

■ For iSCSI

On the [Setup iSCSI Host] screen, set the iSCSI name, IP address, and other items for the server being connected to the ETERNUS DX60/DX80.

(1) Click the [Add] button on the [Setup iSCSI Host] screen

(2) Specify an iSCSI name, IP address, server name, host response, and CHAP password.

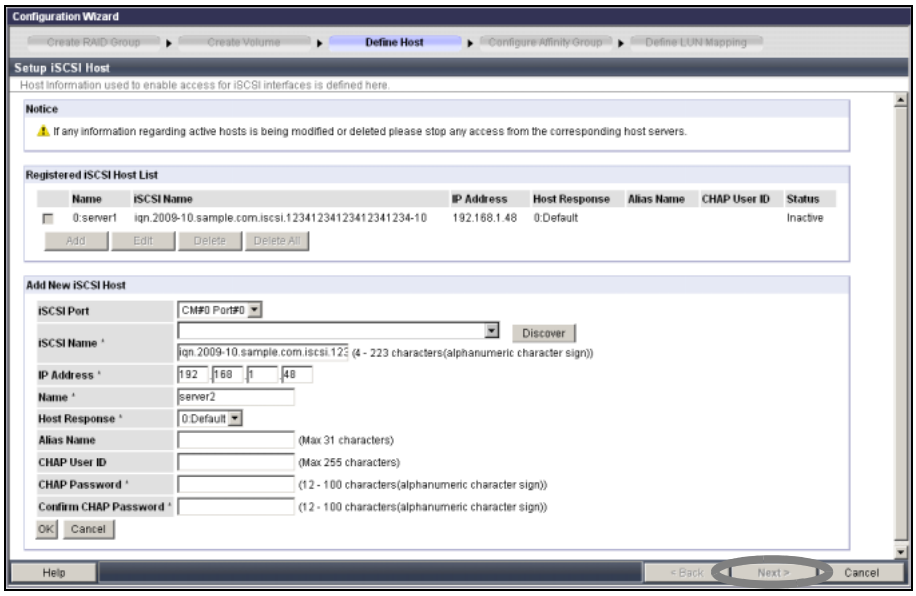


Figure 4.18 [Setup iSCSI Host] screen

(3) Specify the other necessary items, and click the [OK] button.
The target iSCSI host is displayed in the "Registered iSCSI Host List" field.

(4) Click the [Next] button.
A confirmation screen appears.

(5) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

■ For SAS

On the [Setup SAS Host] screen, set the SAS address, and other items for the server being connected to the ETERNUS DX60/DX80.

(1) Click the [Add] button on the [Setup SAS Host] screen

(2) Specify a SAS address, server name, and host response.

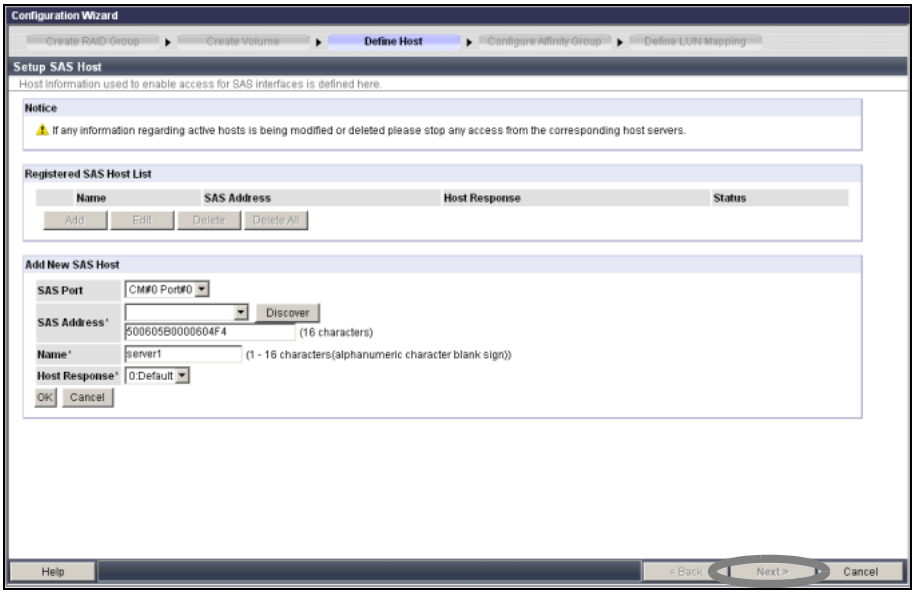


Figure 4.19 [Setup SAS Host] screen

(3) Specify the other necessary items, and click the [OK] button.
The target SAS host is displayed in the "Registered SAS Host List" field.

(4) Click the [Next] button.
A confirmation screen appears.

(5) Click the [OK] button.
The settings are reflected and the [Configure Affinity Group] screen in Step 5 appears.

5 Setup an affinity group.

Create the group of volumes that are to be recognized by the server (affinity group).

IMPORTANT	Set an affinity group when using the Host Affinity function. When not using the Host Affinity function, click the [Next] button and proceed to [Define LUN Mapping].

5-1 Click the [Create] button.

5-2 Enter the affinity group name in [Affinity Group Setting] and specify a volume number corresponding to the Logical Unit Number (LUN) in [Define LUN Mapping], and click the [Set] button.

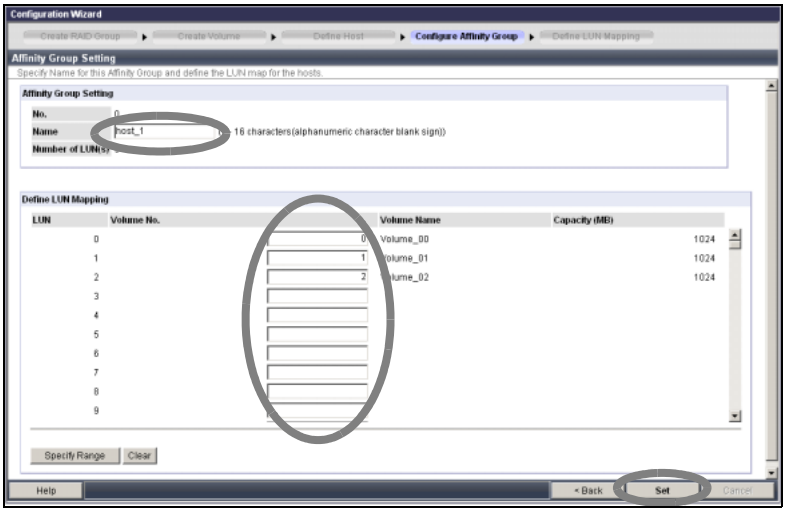


Figure 4.20 [Configure Affinity Group] screen

A confirmation screen appears.

5-3 Click the [OK] button.
The affinity group is created, and the affinity group list is displayed.

5-4 Click the [Next] button.
The [Define LUN Mapping] screen appears.

6 Configure a LUN mapping.

Set a volume to be recognized by the server.

■ When the Host Affinity function is used

Assign an affinity group to each server that is to be connected to the port.

(1) Select the port to be set from the "Port List" field, and click the [Edit] button.

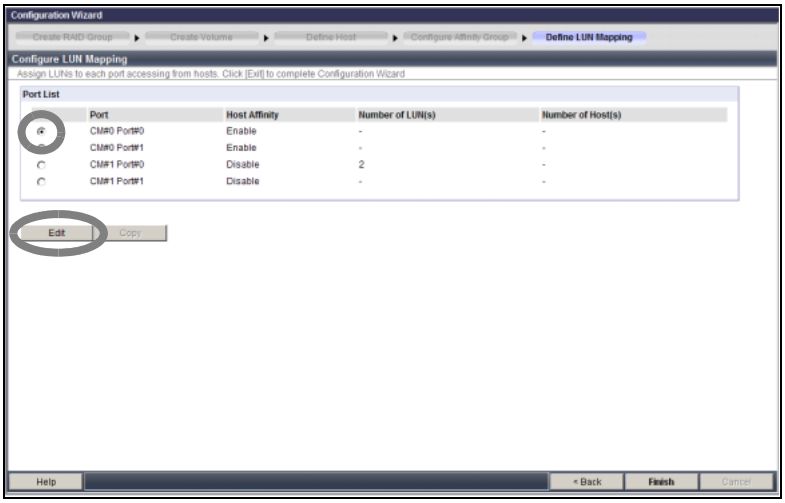


Figure 4.21 [Define LUN Mapping] screen 1 (when the Host Affinity function is used)

(2) Assign the affinity group to the server, and click the [Set] button.

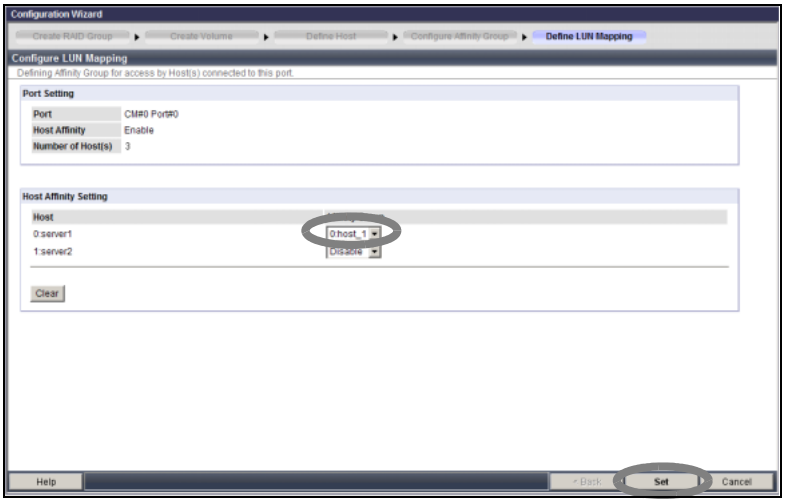


Figure 4.22 [Define LUN Mapping] screen 2 (when the Host Affinity function is used)

A confirmation screen appears.

(3) Click the [OK] button.
The affinity group is created, and the screen returns to the screen displayed in Step (1). Set other affinity groups as required.

(4) Click the [Exit] button.
The settings are reflected, and a message to confirm finishing the Configuration Wizard appears.

■ When the Host Affinity function is not used

Correspond the volume number to the LUN that can be recognized by the server for ports.

(1) Select the port and click the [Edit] button to change the setting.

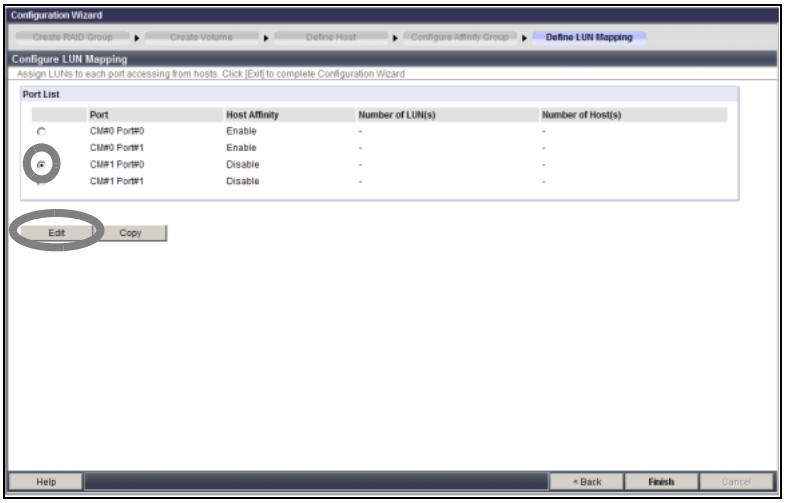


Figure 4.23 [Define LUN Mapping] screen 1 (when the Host Affinity function is not used)

(2) Change the setting as required, and click the [Set] button.

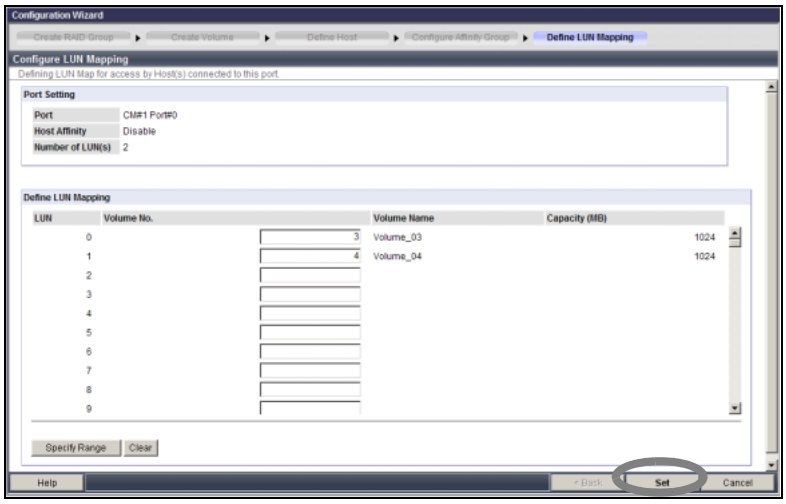


Figure 4.24 [Define LUN Mapping] screen 2 (when the Host Affinity function is not used)

A confirmation screen appears.

(3) Click the [OK] button.
Returns to the screen of "Port List" in Step (1).

(4) Click the [Exit] button.
A message to confirm finishing the Configuration Wizard appears.

7 Finish Configuration Wizard.

7-1 Click the [OK] button.
Configuration Wizard finishes.

End of procedure

4.3.4 Hot Spare Registration

Register the hot spare for the failure of a disk.

IMPORTANT

- Check the factory settings and register a hot spare as required. When changing the factory default setting, delete the factory setting (volume, RAID group, and LUN mapping) and then register the hot spare. For details on deleting the setting, refer to "ETERNUS DX60/DX80 Web GUI User Guide".
- System disks cannot be registered as hot spares.

Note

The following two types of Hot spare are available:

- Global Hot spare
  This is available for any RAID group.
- Dedicated Hot spare
  This is only available to one specified RAID group.

For a RAID group that contains important data, assign one or more "Dedicated Hot spares", in order to preferentially improve that RAID group's access to hot spares.
For details on hot spares, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

CAUTION

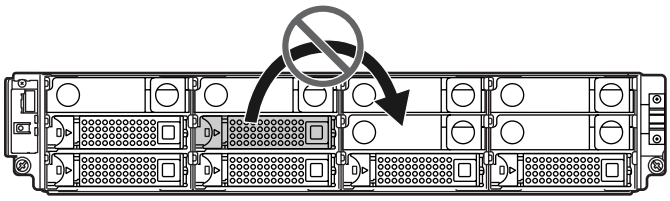
Do

- Be sure to register hot spares.
- The capacity of each hot spare should be the same as that of the largest capacity disk in the storage system or RAID group.
  If a mixture of SAS disks, Nearline SAS disks, and SSDs is installed in the storage system, separate hot spares will be required for each type of disk. Again, the capacity of each type of hot spares must equal or exceed that of the largest capacity same-type disks.
  A smaller capacity disk is not usable as a hot spare for a larger capacity data disk.

CAUTION

Do Not

- RAID groups, volumes, and hot spares are factory set. Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



Note

This section explains the procedure for the setup using GUI. For the setup using the CLI commands, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

For setting-related details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide".

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

Procedure

1 In the GUI screen, click [Assign Hot Spare] under the [RAID Group Management] menu on the [Configuration] tab.

The [Assign Hot Spare] screen appears.

2 Select the hot spare type and the disk to be used as hot spare, and click the [Assign] button.

The following is a setting example when "Global Hot Spare" is selected.
When selecting "Dedicated Hot Spare" as the hot spare type, "Select an existing RAID Group" appears.

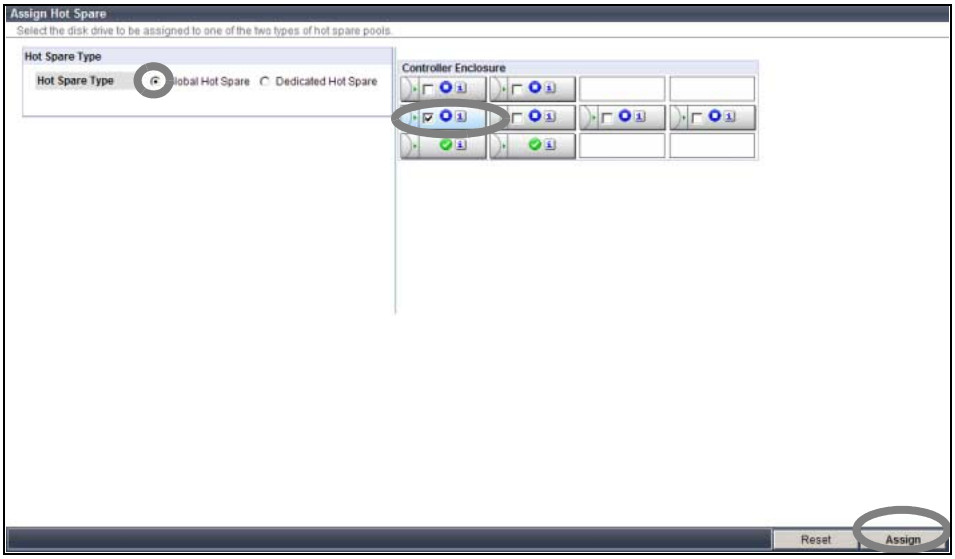


Figure 4.25 [Assign Hot Spare] screen

A confirmation screen appears.

3 Click the [OK] button.

The hot spare is registered.

End of procedure

4.3.5 Port Parameters Setup

Set the connecting information for the host port of the ETERNUS DX60/DX80 to connect to the server.
Setting screens will vary depending on the ETERNUS DX60/DX80 model.

Note

This section explains the procedure for the setup using GUI. For the setup using the CLI commands, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

For setting-related details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide". Also refer to the "ETERNUS Disk storage systems Server Connection Guide" as required.

Refer

"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS Disk storage systems Server Connection Guide (SAS)"

For Fibre Channel

On the [Set FC Port Parameters] screen, set the information for the connection (detailed Fibre Channel port information) between the ETERNUS DX60/DX80 Fibre Channel port and the server.

Procedure

1. In the GUI screen, click [Set FC Port Parameters] under the [Host I/F Management] menu on the [Global Settings] tab.
   The [Set FC Port Parameters] screen appears.
2. Select a port and specify the necessary items in "Port Settings", and click the [Set] button.
   - Connection
     Select "FC-AL" or "Fabric".
     Select "Fabric" when using the Fibre Channel switch connection.
   - Set Loop ID
     Select "Manual" if "Connection" has been set to "FC-AL".
   - Loop ID
     Enter the Loop ID if "Connection" has been set to "FC-AL".
   - Transfer Rate
     Select the fixed transfer rate according to the destination server or Fibre Channel switch.
     - For the ETERNUS DX60
       Select from 4Gbps, 2Gbps, or 1Gbps
     - For the ETERNUS DX80
       Select from 8Gbps, 4Gbps, or 2Gbps

- Host Affinity
  When the Host Affinity function is used, select "Enable".
  When the Host Affinity function is not used, select "Disable".
- Host Response
  When "Disable" is selected in "Host Affinity", set this item.

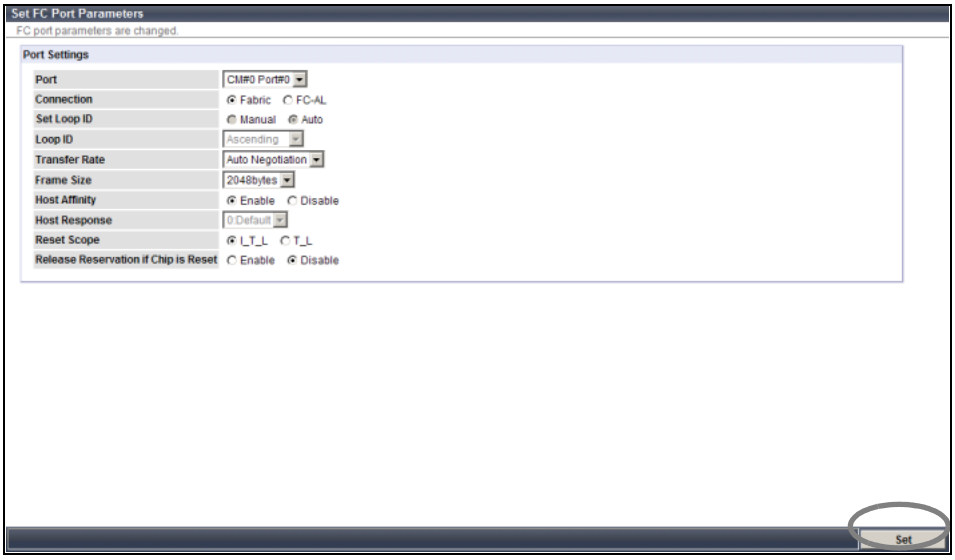


Figure 4.26 [Set FC Port Parameters] screen

End of procedure

For iSCSI

On the [Set iSCSI Port Parameters] screen, set the information for the connection (detailed iSCSI port information) between the ETERNUS DX60/DX80 iSCSI port and the server.

Procedure

1. In the GUI screen, click [Set iSCSI Port Parameters] under the [Host I/F Management] menu on the [Global Settings] tab.
   The [Set iSCSI Port Parameters] screen appears.
2. Select a port and specify the necessary items in "Select Port", and click the [Set] button.
   - TCP/IP Settings
     Input the IP address and subnet mask for the selected iSCSI port.
   - iSCSI Settings
     Input the iSCSI name and alias name.

- General Settings
  - Host Affinity
    When the Host Affinity function is used, select "Enable".
    When the Host Affinity function is not used, select "Disable".
  - Host Response
    Set this item if "Host Affinity" has been set to "Disable".
- Security
  Select "ON" and input the CHAP user name and password if CHAP authentication is to be used.

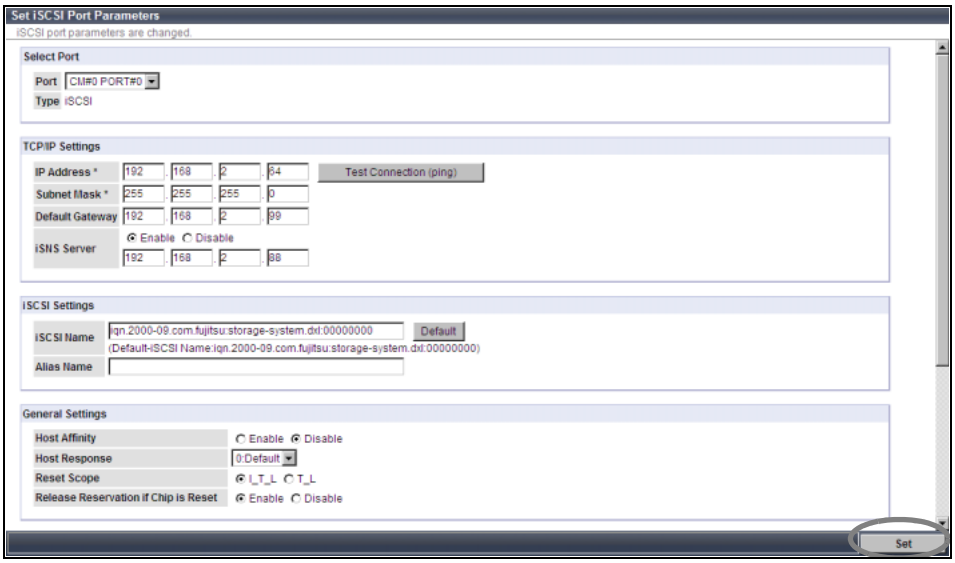


Figure 4.27 [Set iSCSI Port Parameters] screen (1/2)

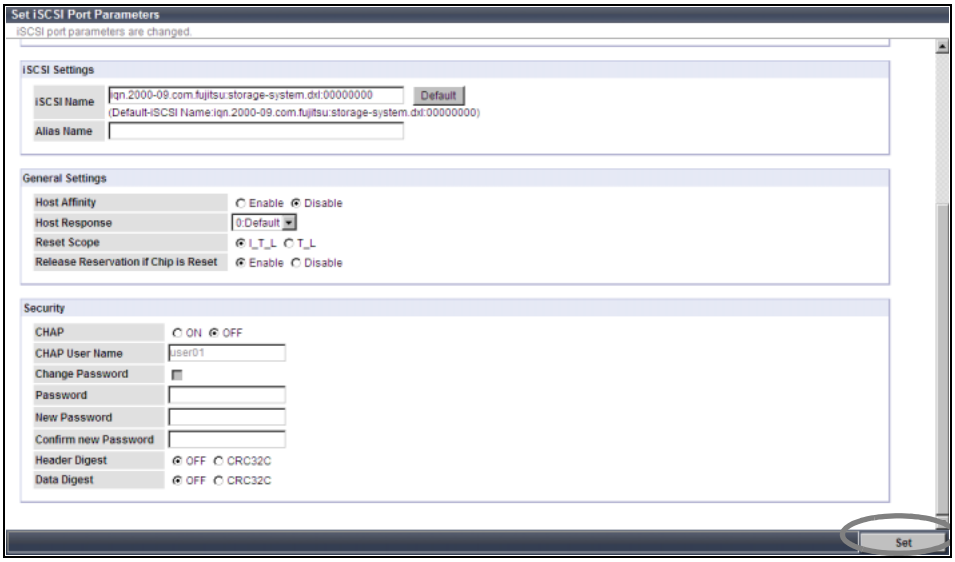


Figure 4.28 [Set iSCSI Port Parameters] screen (2/2)

End of procedure

For SAS

On the [Set SAS Port Parameters] screen, set the information for the connection (detailed SAS port information) between the ETERNUS DX60/DX80 SAS port and the server.

Procedure

1. In the GUI screen, click [Set SAS Port Parameters] under the [Host I/F Management] menu on the [Global Settings] tab.
   The [Set SAS Port Parameters] screen appears.
2. Select a port and specify the necessary items in "Port Settings", and click the [Set] button.
   - Host Affinity
     When the Host Affinity function is used, select "Enable".
     When the Host Affinity function is not used, select "Disable".
   - Host Response
     Set this item if "Host Affinity" has been set to "Disable".

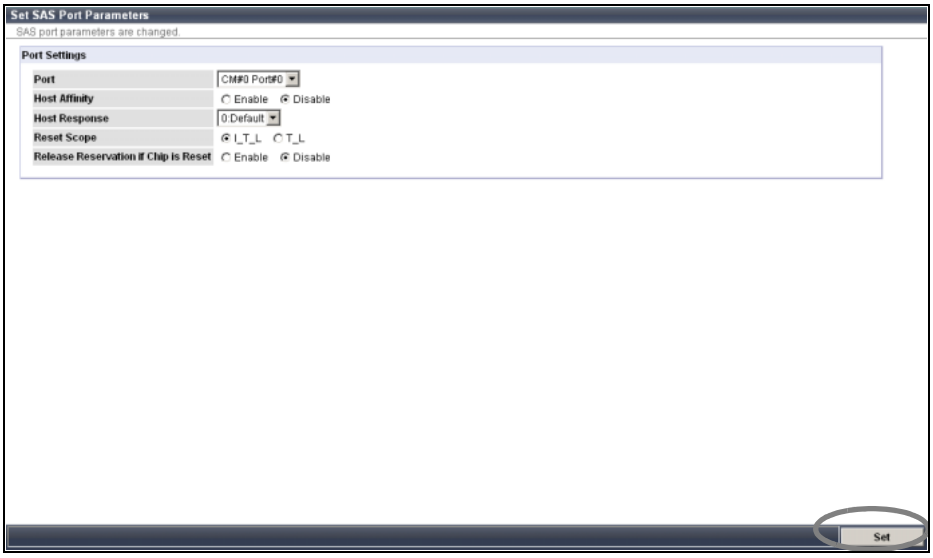


Figure 4.29 [Set SAS Port Parameters] screen

End of procedure

IMPORTANT	This completes the basic settings of the ETERNUS DX60/DX80. When performing other detailed settings, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

4.3.6 Advanced Copy Setup

Setup the Advanced Copy function before use.
For details on usage and overview of the Advanced Copy function, refer to "1.3.3 Advanced Copy" (page 35).

IMPORTANT

- Some Advanced Copy functions can be used without purchase and activation of the Advanced Copy Feature.
  However, purchasing the Advanced Copy Feature allows all the Advanced Copy functions to be used.
- Purchasing the optional software "ETERNUS SF AdvancedCopy Manager" or VSS environment is required to use copy functions in conjunction with operations.
- To use copy functions in a VSS environment, "ETERNUS VSS Hardware Provider" (free) must be downloaded and installed in the server. For details about "ETERNUS VSS Hardware Provider" and its installation procedure, refer to the following web-site.

  http://www.fujitsu.com/global/support/computing/storage/system/vsshp.html

4.3.6.1 Registering the Advanced Copy License

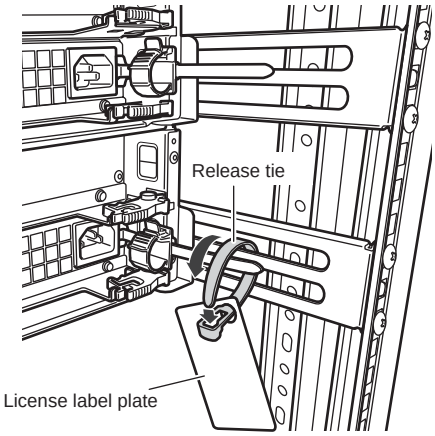
After the Advanced Copy Feature is purchased, it is activated by registering an Advanced Copy license key in the ETERNUS DX60/DX80.

To obtain this license key, refer to "ETERNUS DX60/DX80 Disk storage system Feature activation licenses" document provided with the Advanced Copy Feature for the appropriate web-site URL.

"ETERNUS DX60/DX80 Disk storage system Feature activation licenses"

Note

- When the Advanced Copy Feature is purchased at the same time as the ETERNUS DX60/DX80 (base unit), this procedure is not necessary because the license is registered as a factory setting.
  Attach the license label plate provided with the Advanced Copy Feature to the rack rail near the ETERNUS DX60/DX80 which holds its license, for future reference.



- Check whether the license has already been registered using the provided license label plate or the GUI screen.
  - The license key (bar code and 16-digit numeric number) is printed in the "License Key" column in the provided license label plate.
  - The "Advanced Copy License" field in the Advanced Copy Status screen of GUI is set to "Registered".

Register the license key according the following procedure.

Procedure

1 Obtain the Advanced Copy license key.

1-1 Prepare and check the following in advance.

- "ETERNUS DX60/DX80 Disk storage system Feature activation licenses"
  This is provided with the Advanced Copy Feature.
- License label plate
  This is provided with the Advanced Copy Feature. The license label is attached to the license label plate, and TAN etc. are indicated.
- Serial Number of the ETERNUS DX60/DX80
  The serial number can be checked via the GUI screen.

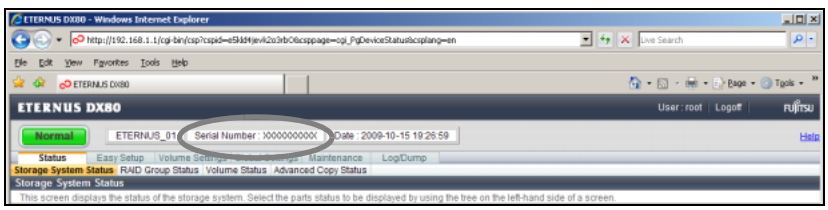


Figure 4.30 Display location of the serial number (GUI screen)

1-2 Access the license issuance URL, and click the "ETERNUS DX60/DX80 Advanced Copy License" link under the [Select a product to register].
For the URL of the web-site, refer to "ETERNUS DX60/DX80 Disk storage system Feature activation licenses".

IMPORTANT

The actual contents of the license key issuance screen that is described here may differ according to the time that the Advanced Copy Feature is purchased.
The latest version of this manual is open to the public on the following web-site. Refer to this manual if required.
http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx60-dx80/

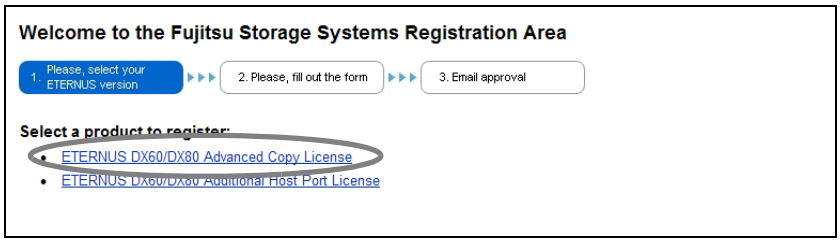


Figure 4.31 Advanced Copy Feature License Key Web Screen 1

1-3 Enter the necessary items on the following screen.

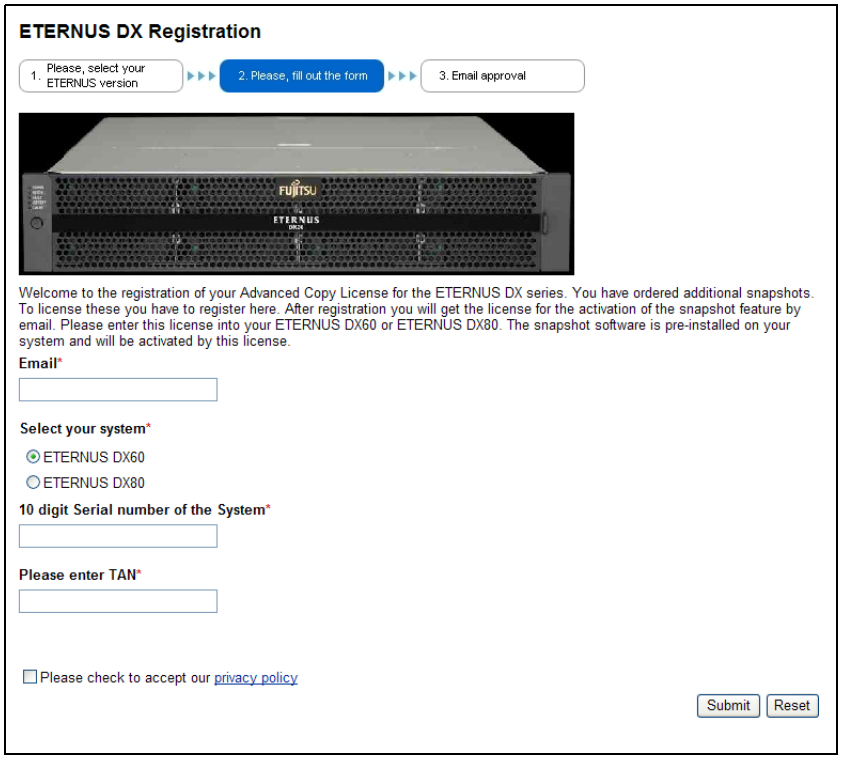


Figure 4.32 Advanced Copy Feature License Key Web Screen 2

Enter and select the following items.

- Email
  Enter the destination E-mail address to which the license key notification E-mail is to be sent.

  CAUTION

  Do

  - Make sure not to enter a wrong E-mail address.

- Select your system
  Select ETERNUS DX60 or ETERNUS DX80.
- 10 digit Serial number of the System
  Enter the serial number of the ETERNUS DX60/DX80.
  To prevent incorrect input of the serial number, copy and paste the "Serial Number" that is displayed in the GUI screen.

  1 Select the character string of "Serial Number" displayed in the GUI screen, and press the [Ctrl] + [c] key, or right-click and select [Copy].

  2 Move the cursor to the serial number input field of the license issuance screen, and press the [Ctrl] + [v] key, or right-click and select [Paste].

  CAUTION

  Do

  - Make sure not to enter a wrong serial number.
    If an incorrect serial number is entered, an invalid license key is issued, and it cannot be registered in the ETERNUS DX60/DX80.

- Please enter TAN
  Enter an 8-digit numeric number that is indicated in [TAN] on the license label plate.

1-4 Click [Submit].
The license key is issued, and displayed on the screen. The license key notification E-mail is sent to the specified E-mail address.

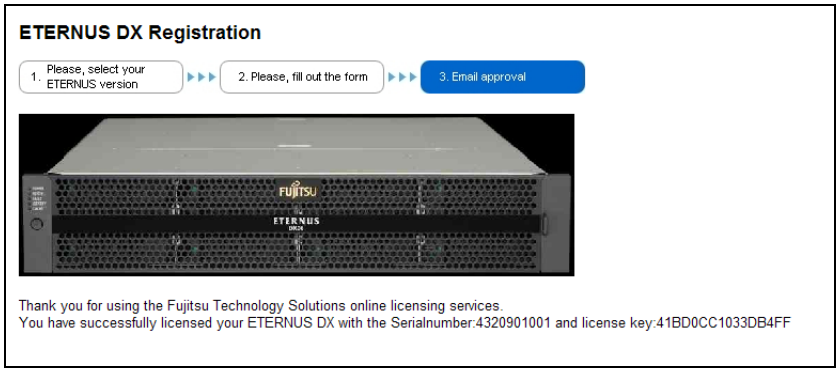


Figure 4.33 Advanced Copy Feature License Key Web Screen 3

IMPORTANT Make sure to take a note of the displayed license key.

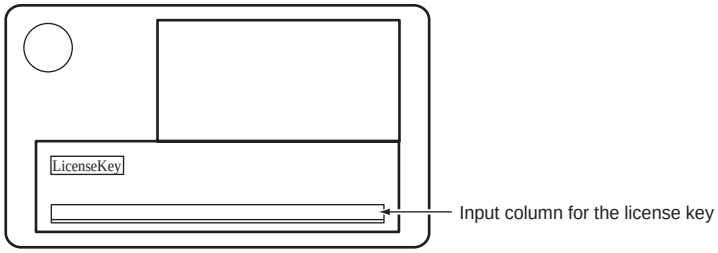
2 Check the contents of the notification E-mail.

Check that the [Serialnumber] (device serial number) that is described in the notification E-mail is correct.

IMPORTANT If the serial number that is described in the notification E-mail is wrong, contact your sales representative as soon as possible.

3 Write down the license key on the provided license label plate.

IMPORTANT Make sure to write down the license key.
Write the license key directly on an empty column of "License Key" on the license label plate, or print the notification E-mail on paper, cut out the part of the 16-digit numeric number of license key, and attach it to the license label plate.



4 Register the license key in the ETERNUS DX60/DX80.

4-1 Start GUI.

4-2 Click the [Register Copy License] under the [Advanced Copy Management] menu on the [Configuration] tab in the GUI screen.
The [Register Copy License] screen appears.

4-3 Input the license key that is obtained in Step 1 in the "License Key" field, and click the [Register Copy License] button.

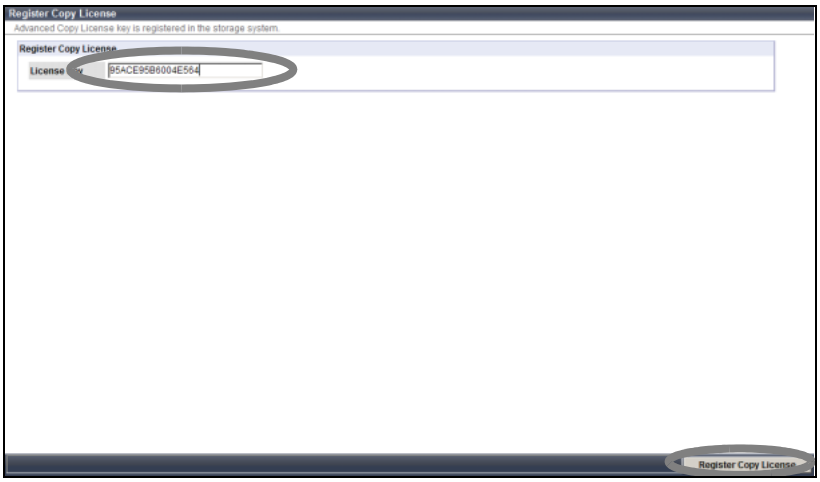


Figure 4.34 [Register Copy License] screen

A confirmation screen appears.

4-4 Click the [OK] button.
The Advanced Copy license is registered.

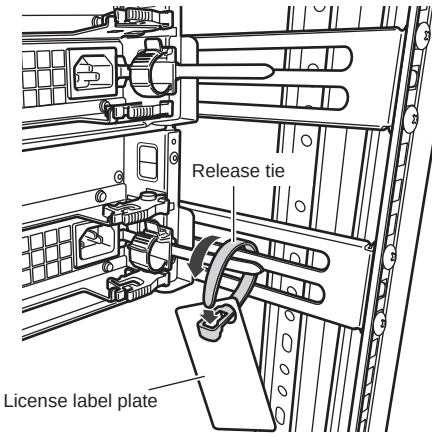
5 Check that the license key is registered.

5-1 Click the [Advanced Copy Status] menu on the [Status] tab of in the GUI screen.
The [Advanced Copy Status] screen appears.

5-2 Check that the "Advanced Copy License" is set to "Registered".

Figure 4.35 [Advanced Copy Status] screen

6 Attach the license label plate provided with the Advanced Copy Feature to the rack rail near the ETERNUS DX60/DX80 which holds its license.



End of procedure

4.3.6.2 Advanced Copy Settings

For settings and operations to use the Advanced Copy functions, refer to "ETERNUS DX60/DX80 Web GUI User Guide" or "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".
For operation settings when using ETERNUS SF AdvancedCopy Manager or ETERNUS VSS Hardware Provider, refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide" or ETERNUS VSS Hardware Provider manual.

Refer
"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"
"ETERNUS SF AdvancedCopy Manager Installation Guide"
"ETERNUS VSS Hardware Provider manual"

4.3.7 AC Automatic Linkage Mode Setup

When AC automatic linkage mode is enabled, the ETERNUS DX60/DX80 is automatically turned on when the power supply recovers after a power failure. This section explains how to setup the AC automatic linkage mode.

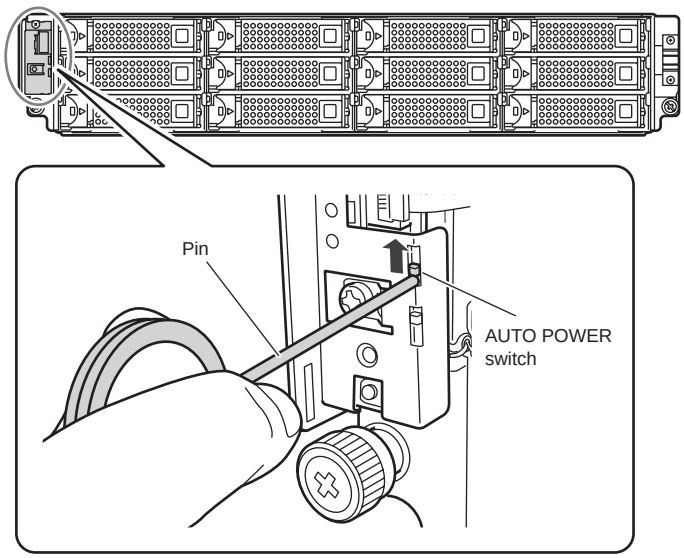
Procedure

1 Remove the front cover from the controller enclosure.

For details on how to remove the front cover, refer to "2.2.3 Attaching and Removing the Front Cover" (page 58).

2 Turn the AUTO POWER switch of the controller enclosure to ON.

Push up the AUTO POWER switch to the "ON" side using the pin that is provided with the ETERNUS DX60/DX80.



IMPORTANT

- The AUTO POWER switch of the drive enclosure is set to "OFF" as the factory setting, and should not be set to "ON".
- If AC power is being supplied, turning the AUTO POWER switch of the controller enclosure to the ON position will cause the ETERNUS DX60/DX80 to turn on.
- If the AUTO POWER switch of the controller enclosure is the ON position, connecting the power cord to the outlet will cause the ETERNUS DX60/DX80 to turn on.

3 Re-attach the front cover to the controller enclosure.

For details on how to attach the front cover, refer to "2.2.3 Attaching and Removing the Front Cover" (page 58).

End of procedure

4.4 Maintenance Setup

If required, set maintenance to be performed easily after starting an operation.

Note

This section explains the procedure for the setup using GUI. For setting-related details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide". For the setup using the CLI commands, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

Refer

"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

4.4.1 Event Notification by E-mail Setup

If an error occurs in the ETERNUS DX60/DX80, the event (error information, etc.) is reported to a specified address.
The procedure to set the E-mail notification is as follows:

Procedure

1. Start GUI.
2. Click [Setup E-Mail Notification] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
   The [Setup E-Mail Notification] screen appears.

3 Set the necessary items in the [Notification E-mail] area.

- Select "Enable" in "Notification E-Mail".
- Specify the E-mail destination address in "Destination E-Mail Address".

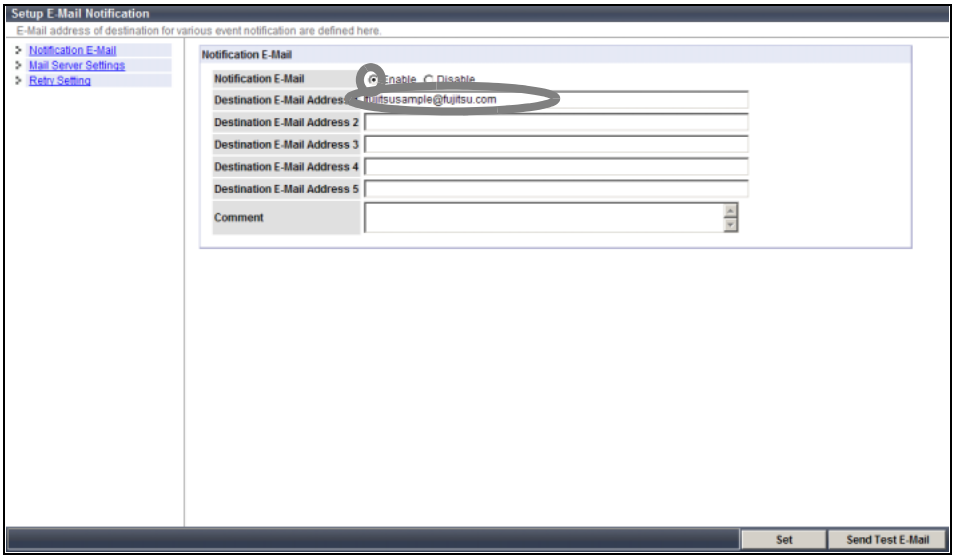


Figure 4.36 [Setup E-Mail Notification] screen (Notification E-Mail)

4 Click the "Mail Server Settings" link.

The [Mail Server Settings] screen appears.

5 Set the necessary items in the [Mail Server Settings] area.

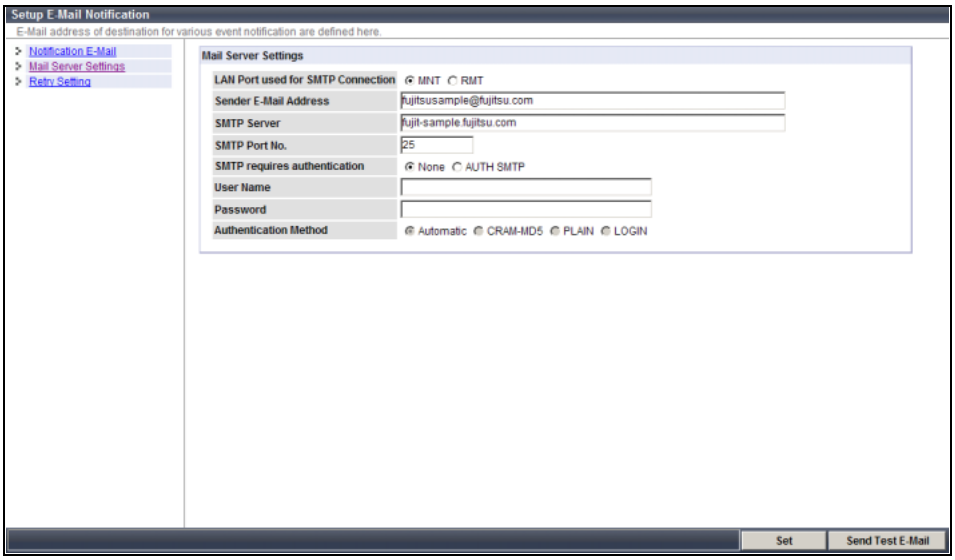


Figure 4.37 [Setup E-Mail Notification] screen (Mail Server Settings)

6 After finishing the necessary settings, click the [Set] button.

A confirmation screen appears.

7 Click the [OK] button.

The specified send E-mail setting is registered.

8 Click the [Send Test E-mail] button to check that an E-mail can be sent to the specified E-mail destination address.

Figure 4.38 Send Test E-mail

End of procedure

4.4.2 SNMP Device Monitoring Setup

This section explains how to perform settings to monitor event notification (Trap) by SNMP using "ServerView", when the ETERNUS DX60/DX80 is connected to the Industry standard server PRIMERGY.

IMPORTANT
- Use ServerView whose version is V3.60L20 or later.
- For the details on the Industry standard server side settings, refer to "ServerView User's Guide" that is provided with the PC server.

Refer "ServerView User's Guide"

Also, for events that are detected by ServerView when monitoring the device, refer to "Appendix B Events detected by ServerView" (page 195).

Procedure

1 Set the network environment of the ETERNUS DX60/DX80.

When the ETERNUS DX60/DX80 and ServerView management device are in different subnet environments, set the Gateway IP address and destination network address in the [Setup Network Environment] screen of GUI.

1-1 Start GUI.

1-2 Click [Setup Network Environment] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup Network Environment] screen appears.

1-3 Specify the necessary items, and click the [Set] button.
Enter the default gateway and any "Allowed IP List" devices.

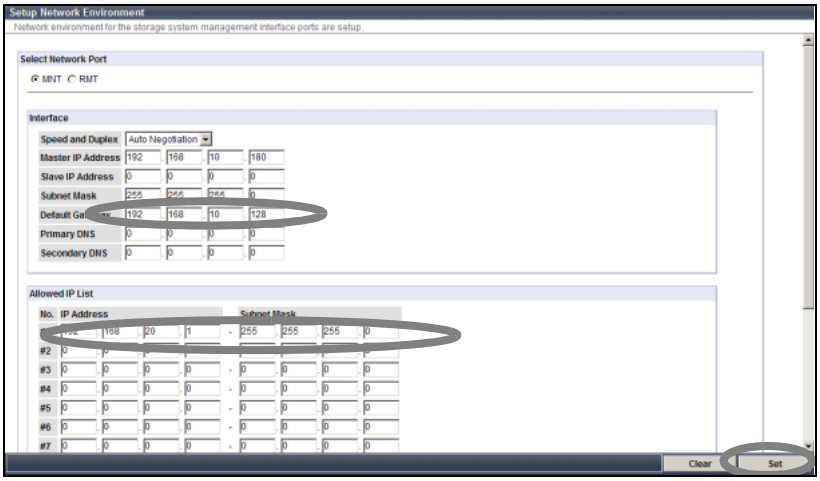


Figure 4.39 [Setup Network Environment] screen (when ServerView is running)

A confirmation screen appears.

1-4 Click the [OK] button.
The network environment is set, and the [Setup Network Environment] screen is closed.

2 Setup destination of SNMP Trap.

2-1 Select [Setup SNMP Agent] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Setup SNMP Agent] menu screen appears.

2-2 Click the [Trap] link on the left of the screen.
The SNMP Trap destination setup screen appears.

2-3 Enter a new destination for the SNMP Trap, and click the [Add New Destination] button.

- Enter the IP address of the ServerView management device (SNMP Manager) in "IP Address".
- Enter the Community name to transfer the SNMP Trap to (if not specified, "public" is used) in "Community Name".

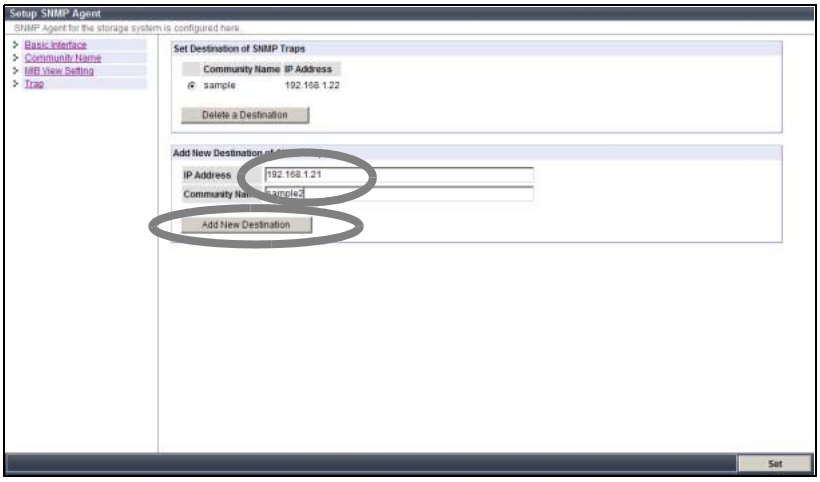


Figure 4.40 [Trap] screen

The new destination for the SNMP is added in the "Set Destination of SNMP Traps" field.

2-4 Click the [Set] button.
A confirmation screen appears.

2-5 Click the [OK] button.
The settings are reflected.

3 Download the MIB definition file for SeverView monitoring.

Export the MIB definition file for ServerView monitoring (FJDARY-E60.MIB) in the ETERNUS DX60/DX80.

3-1 Click the [Download MIB File] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Download MIB File] screen appears.

3-2 Select the checkbox of "The ServerView control code is added to the comment line of the MIB definition file" in "Option", and click the [Download] button.

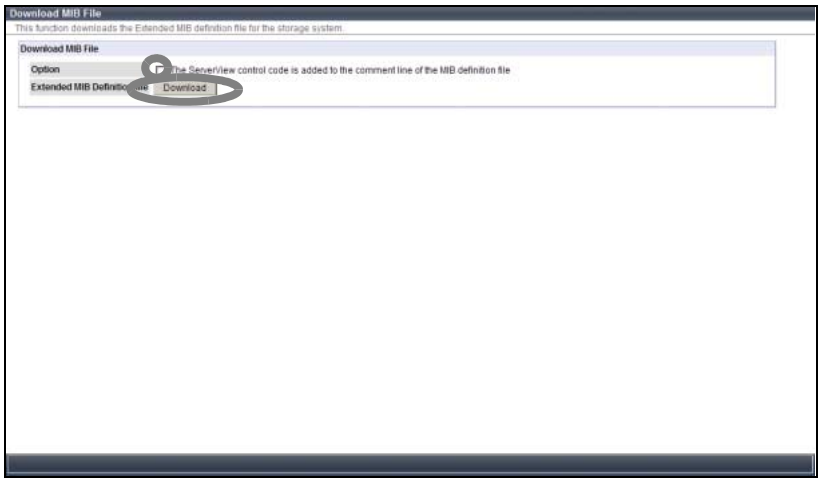


Figure 4.41 [Download MIB File] screen

A confirmation screen appears.

3-3 Click the [OK] button.
The MIB definition file for SeverView monitoring is downloaded. A screen to save the downloaded MIB definition file appears.

3-4 Save the downloaded file.

4 Set ServerView.

Install and set ServerView on the Industry standard server side.
Refer to "ServerView User's Guide" that is provided with the Industry standard server to install and set ServerView.

IMPORTANT	When registering the MIB information of an optional device, make sure to specify "FJDARY-E60.MIB" that was exported in Step 3 Download the MIB definition file for SeverView monitoring.

5 Confirm notification for when an event occurs.

After setting up the ETERNUS DX60/DX80 and Industry standard server, sending trap from the ETERNUS DX60/DX80 (SNMP Agent) to the Industry standard server (SNMP Manager) can be confirmed by performing SNMP Trap Test.

5-1 Start GUI.

5-2 Click [Perform SNMP Trap Test] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
The [Perform SNMP Trap Test] screen appears.

5-3 Click the [Send] button.

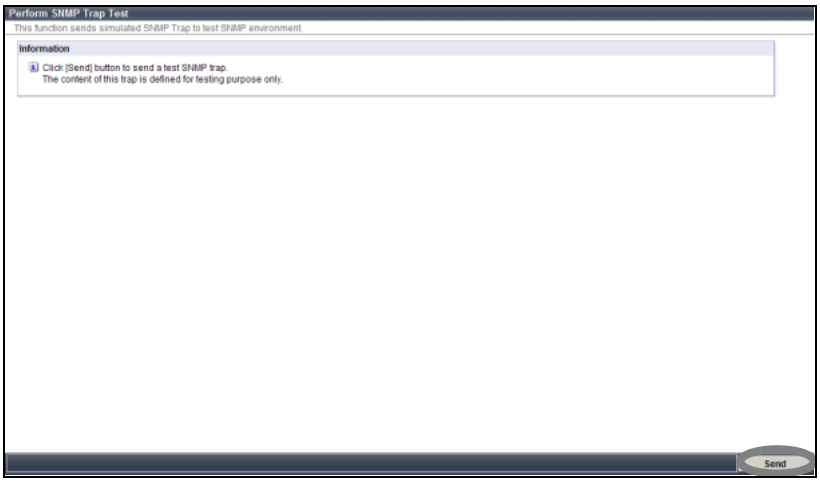


Figure 4.42 [Perform SNMP Trap Test] screen

A confirmation screen appears.

5-4 Click the [OK] button.
The SNMP Trap Test is performed.

5-5 Confirm that the SNMP notification (Item fault) is displayed.
The Item fault message (hardware failure report) displayed by this sending test does not show actual failure.
If a message is not displayed, check that the network has no trouble, and the settings for the ETERNUS DX60/DX80 is correct.

- Is the LAN between ServerView management device and ETERNUS DX60/DX80 connected correctly?
  Execute the "ping" command from MS-DOS prompt of the ServerView management device, confirm reply from ETERNUS DX60/DX80.

```
> ping IP address of ETERNUS DX60/DX80
```

(Example)

```
> ping 192.168.1.180
```

If the following messages are output, the LAN is connected correctly.

```
Pinging 192.168.1.180 with 32 bytes of data:

Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
Reply from 192.168.1.180: bytes=32 time<10ms TTL=252
```

If the above messages are not displayed, check LAN related items such as LAN cable (for operation management), network environment settings of ETERNUS DX60/DX80, and LAN card setup of ServerView management device.

- Is ServerView set correctly to monitor the ETERNUS DX60/DX80?
- Is the notification receiver of ETERNUS DX60/DX80's SNMP trap set correctly?

Start GUI and check if ServerView management device's IP address is set correctly in the Trap setting of [Setup SNMP Agent].

End of procedure

4.4.3 Event Notification Setup

Set how to notify of an event and its level when a problem occurs in the ETERNUS DX60/DX80.

Note

There are three methods to notify of an event: E-Mail, SNMP trap, and host sense.
When notifying of an event by E-mail, "Setup E-Mail Notification" must be set. When notifying of an event by the SNMP trap, "Setup SNMP Agent" must be set. Refer to "ETERNUS DX60/DX80 Web GUI User Guide" for details of the settings.

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

Procedure

1. Start GUI.
2. Click [Setup Event Notification] under the [Network Settings] menu on the [Global Settings] tab in the GUI screen.
   The [Setup Event Notification] screen appears.

3 Select the necessary items in "Setting based on Severity".

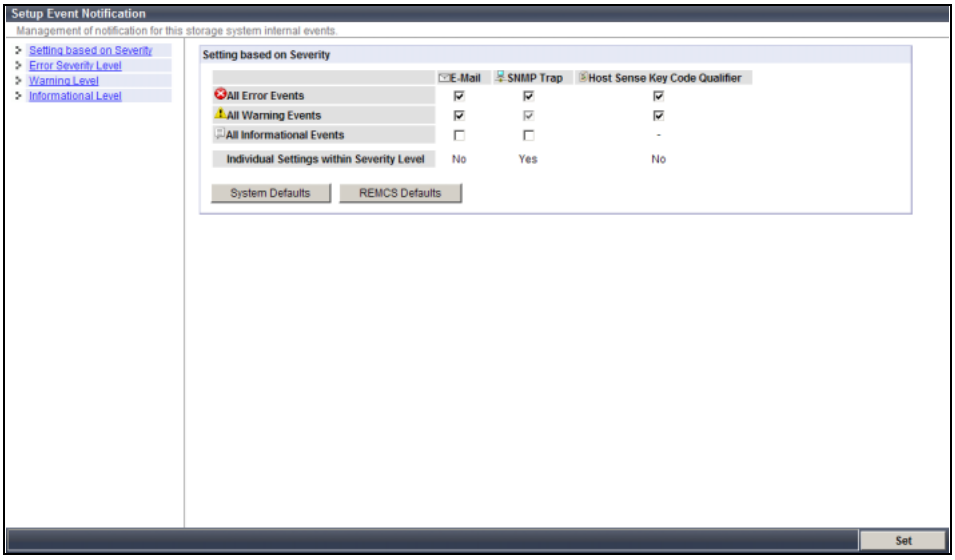


Figure 4.43 [Setup Event Notification] screen (Setting based on Severity)

4 Click the "Error Severity Level" link.
The [Error Severity Level] screen appears.

5 Select the necessary items in "Error Severity Level".

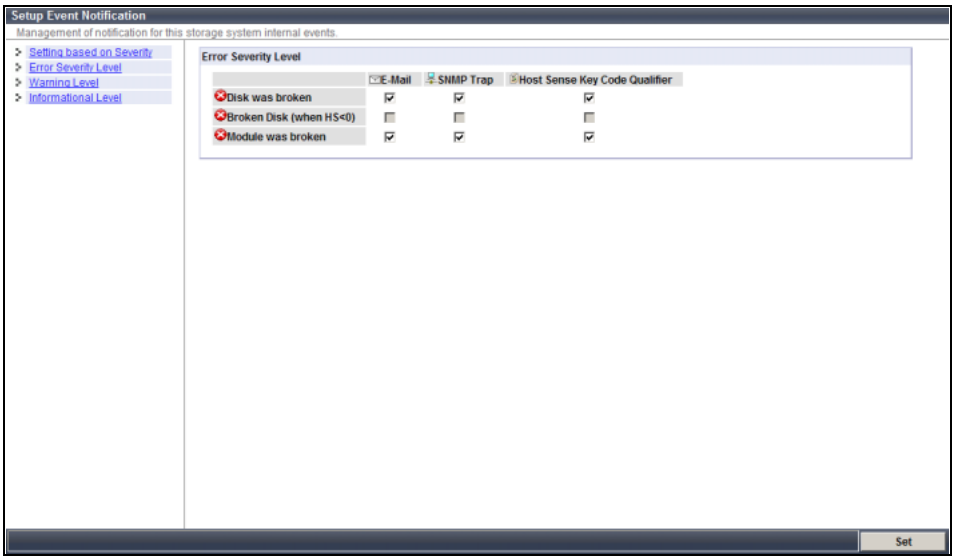


Figure 4.44 [Setup Event Notification] screen (Error Severity Level)

6 Click the "Warning Level" link.
The [Warning Level] screen appears.

7 Select the necessary items in "Warning Level".

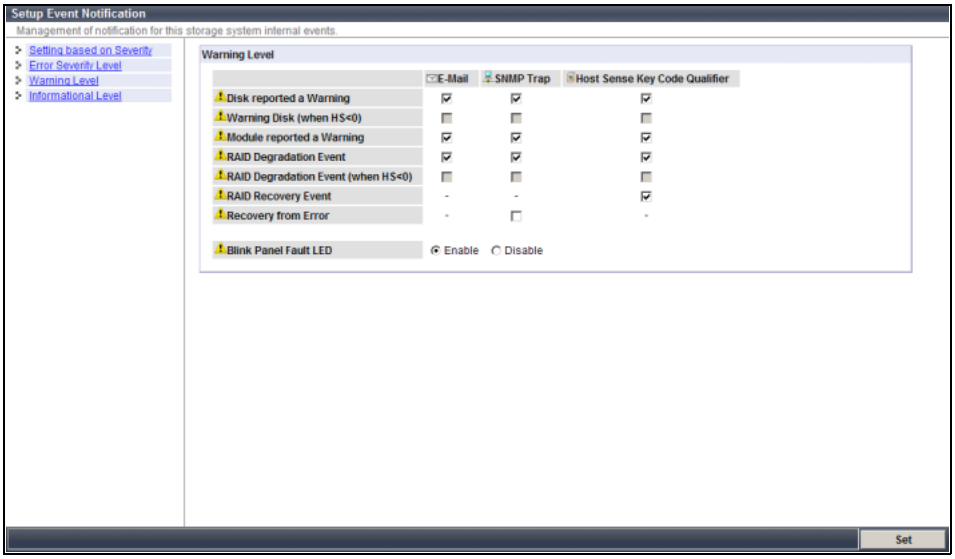


Figure 4.45 [Setup Event Notification] screen (Warning Level)

8 Click the "Informational Level" link.
The [Informational Level] screen appears.

9 Select the necessary items in "Informational Level".

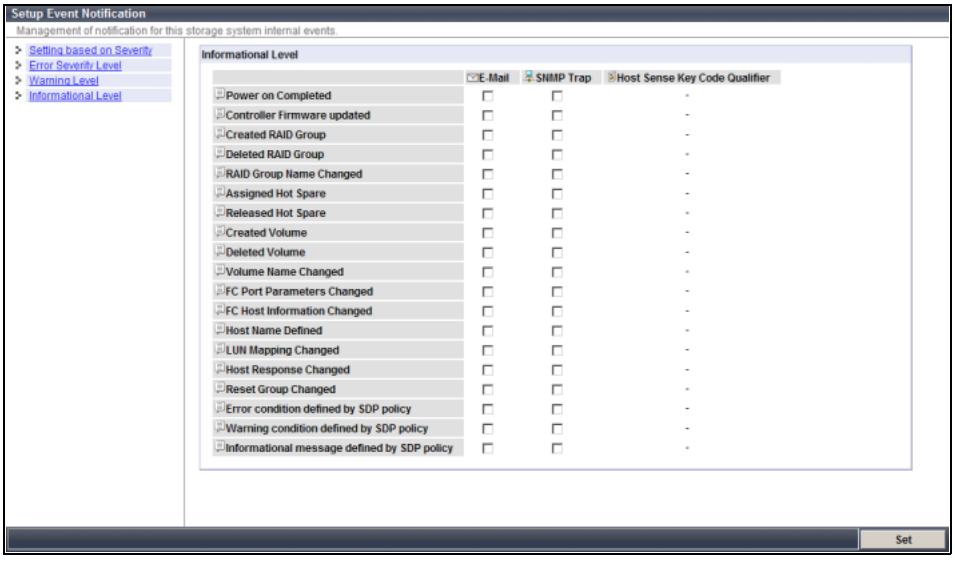


Figure 4.46 [Setup Event Notification] screen (Informational Level)

10 After the necessary settings have completed, click the [Set] button.
A confirmation screen appears.

11 Click the [OK] button.
The specified event notification setting is enabled.

End of procedure

4.4.4 Remote Support Setup

When using remote support service, set to report any ETERNUS DX60/DX80 problems to the remote support center.

Note

Remote support service enables problems to be found and resolved quickly.

The following explains how to set the device for remote support.
In the remote support setting, register the setting environment to connect to the remote support center, and customer information to send to the remote support center.
For details on the setting, refer to "ETERNUS DX60/DX80 Web GUI User Guide".

Refer "ETERNUS DX60/DX80 Web GUI User Guide"

Procedure

1. Start GUI.
2. Click [Setup Remote Support] under the [Remote Support] menu on the [Global Settings] tab in the GUI screen.
   The [Setup Remote Support] screen appears.
3. Set each item under "Customer Information" and "Communication Environment Information" in the [Setup Remote Support] screen.

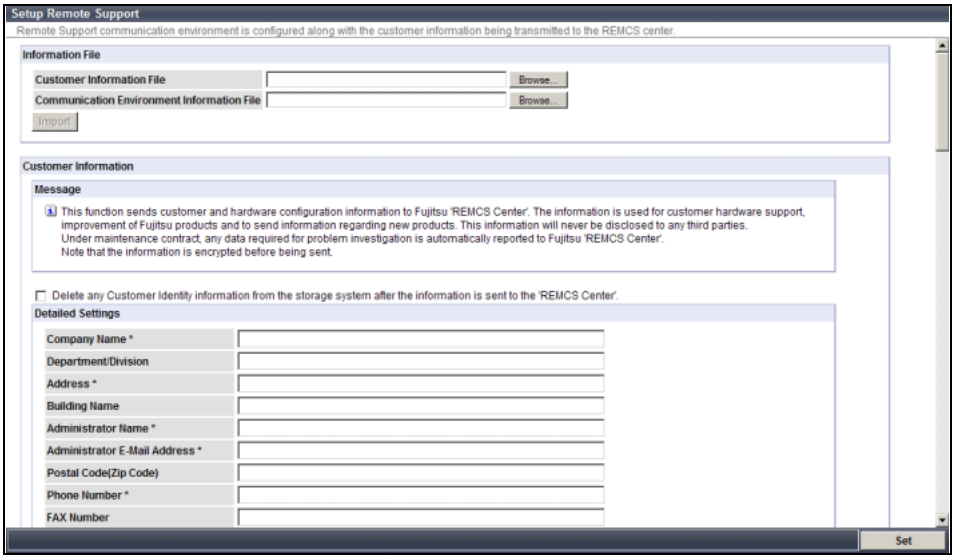


Figure 4.47 [Setup Remote Support] screen

4 Click the [Set] button.

The set information is sent to the Remote Support center, and the connection between the ETERNUS DX60/DX80 and Remote Support center is checked. The result of connection check is sent to "Mail Address".

End of procedure

4.5 Setting up the Server Connection

Perform the settings required to connect to the server and install the required drivers. Perform the settings required for network devices connecting the server and the ETERNUS DX60/DX80. Check the connection between the server and the device.

Refer
"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS Disk storage systems Server Connection Guide (SAS)"
Manuals of the drives to be installed

4.6 System Status Check

Check the following status using GUI or CLI.

- ETERNUS DX60/DX80 parts status
- RAID group status
- Volume status

Note
This section explains the procedure using GUI. For the setup using the CLI commands, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

For status check details, refer to the "ETERNUS DX60/DX80 Web GUI User Guide".

Refer
"ETERNUS DX60/DX80 Web GUI User Guide"

Component status display

The status of the ETERNUS DX60/DX80 can be checked by general status in the upper left of GUI screen.

When the general status image is Normal, the ETERNUS DX60/DX80 is in normal status.

When the general status image is other than Normal (Error, Warning, etc.), an abnormality has been detected in the ETERNUS DX60/DX80. Check the status of each component on the Storage System Status screen.

On the device tree in the left of the Storage System Status screen, components whose status is ⊗ or ⚠ have a failure or require preventive maintenance. Contact your sales representative or maintenance engineer.

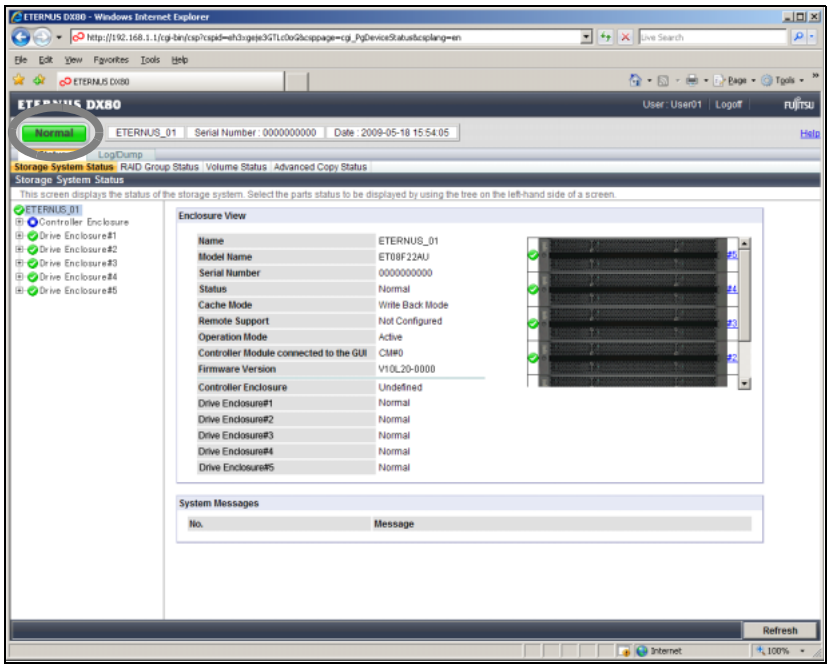


Figure 4.48 Storage System Status screen

Display RAID group status

On the RAID Group Status screen of GUI, the status of RAID groups that you have registered is displayed. Check if RAID configuration is set correctly.

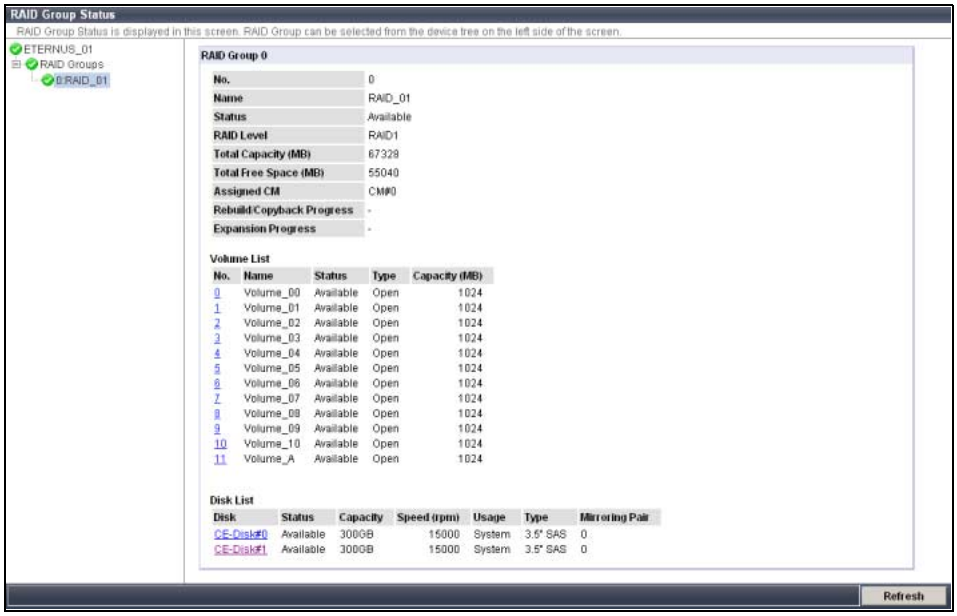


Figure 4.49 RAID Group Status screen

Display volume status

On the Volume Status screen of GUI, the status of volumes that you have registered is displayed. Check if volumes are set correctly.

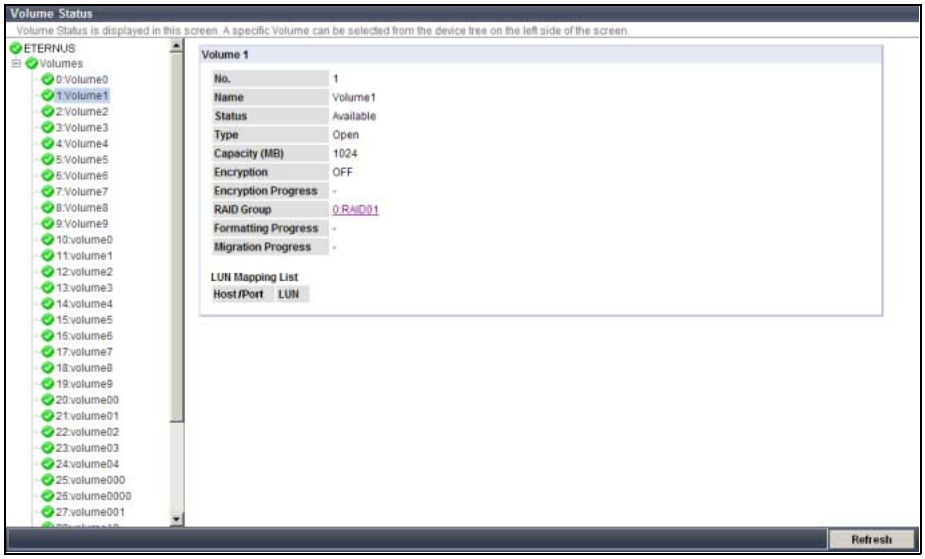


Figure 4.50 Volume Status screen

Chapter 5 Installing Optional Products

The following optional products may be installed while the ETERNUS DX60/DX80 is running (hot-expansion procedures).

- Disk
- Drive Enclosure

This chapter explains how to install these optional products.

Be sure to read "ETERNUS DX60/DX80 Disk storage system Using Optional Products" before performing any of these installation procedures.

"ETERNUS DX60/DX80 Disk storage system Using Optional Products"

5.1 Disk Installation

This section describes how to install optional disks in the ETERNUS DX60/DX80.

5.1.1 Disk Handling Instructions

■ About condensation

CAUTION

Do

- When moving a disk from a cold place, such as an un-conditioned store house in winter, to a warmer places such as an air-conditioned room, the severe temperature change may result in condensation forming.
  To avoid this, allow the packed disks sufficient time in the warmer place (one hour for each 10°C of temperature difference) to adapt to the new temperature.

About static electricity

CAUTION

Do

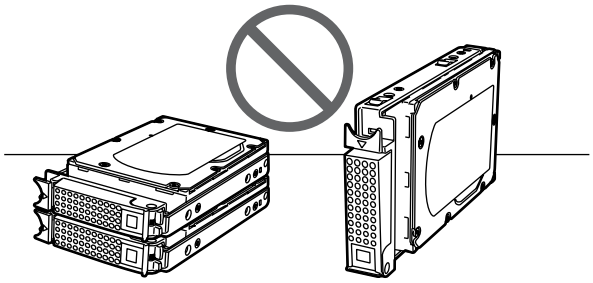
- When handling disks, make sure to wear a wrist strap. Failure to discharge static electricity may cause device failure.
  Do not remove it until the operation is complete.
- Leave the disk in its package until ready to install it.
- Do not touch the circuitry on boards or soldered parts when handling the disks.

About shock

CAUTION

Do Not

- Do not lay the disks directly on a desk or similar hard surface. Always use a rubber mat or other soft material to cushion the disks against physical shocks.
- Do not stand the disks on end.



- Do not apply external force to the interface connectors.
- Do not knock or drop the disks on hard objects.

5.1.2 Installable Disks

Refer to "A.2.1 Disks" (page 190) for a list of disks that may be installed.
At the time of purchase, the disk model names may be different from those described.
The latest manual is available via the following web-site, and should be referred to as necessary.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx60-dx80/

5.1.3 Disk Installation Positions

3.5" disks can be installed in the front of the controller enclosure or drive enclosure, as shown in Figure 5.1.

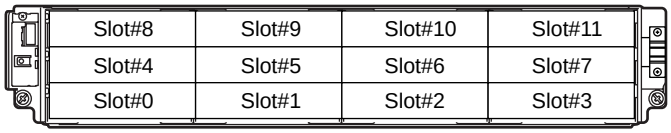


Figure 5.1 Position of 3.5" disk slots

IMPORTANT Install disks starting from Slot#0, without skipping any slots.

5.1.4 Additional Disk Installation Procedure

This section describes how to install additional disks in the ETERNUS DX60/DX80.

WARNING

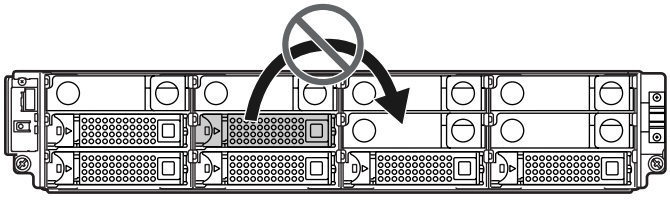
Do Not

- Do not install any disks that are not FUJITSU authorized, as they may damage the device and/or cause fire or electrical shock.
- Do not damage or modify the internal cables or ETERNUS DX60/DX80 when installing the disks, as this may damage the device and/or cause fire or electrical shock.

CAUTION

Do

- If additional disks are installed in a way other than by the methods described herein, damage to the device and/or failure or electrical shock may occur.
- Disks which contain RAID groups or volumes, or disks which are hot spares should not be moved to another slot.



CAUTION

Do Not

- Do not install disks that are for use in other devices.

Procedure

1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" and check that no items are missing.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Check that all components of the ETERNUS DX60/DX80 are in normal status, using the Storage System Status screen of GUI.

3 Remove the front cover.

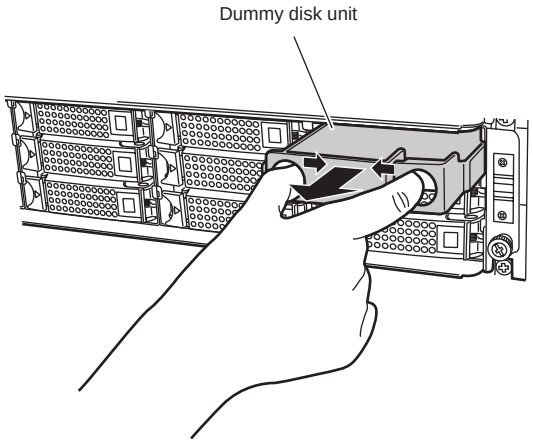
Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the appropriate procedure.

4 Wear a wrist strap.

For how to wear a wrist strap, refer to "2.2.4 Wearing the Wrist Strap" (page 61).

5 Remove the dummy disk unit from the slot in which the disk is to be installed.

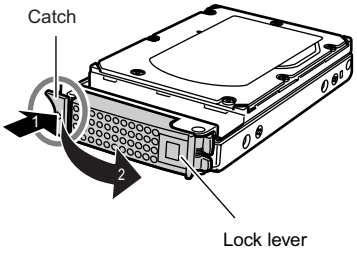
Hook your fingers and push into the holes of the dummy disk unit, and pull it straight out of the disk slot.



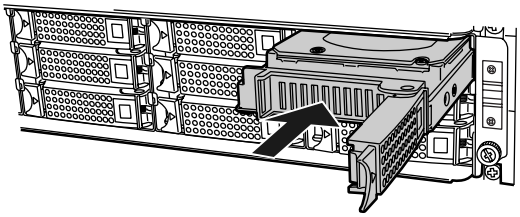
IMPORTANT The removed dummy disk unit should be retained for future use.

6 Install the new disk.

6-1 Press the catch on the disk lock lever to unlock it.



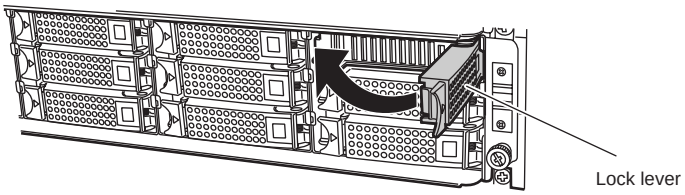
6-2 Insert the disk all the way into in the slot, making sure that it is firmly seated and keeping the lock lever open.



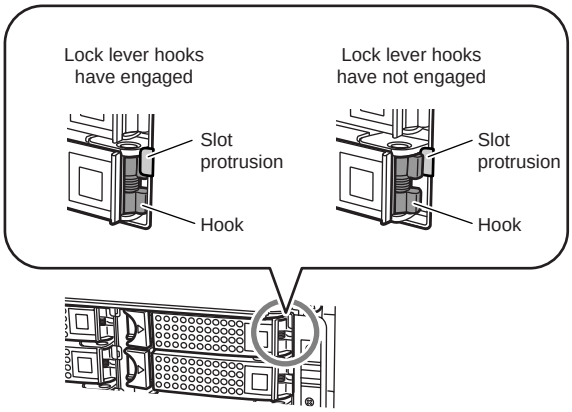
IMPORTANT

- Hold the disk with both hands to protect against jarring.
- Insert the disk until the lock lever hooks reach the slot protrusions.

6-3 Swing the lock lever in the direction of the arrow, until the lock clicks shut.



IMPORTANT Make sure that the lock lever hooks have engaged the slot protrusions.



6-4 Check that the newly installed disk's STATUS LED lights up green after approximately 30 seconds.

7 Repeat Step 5 and Step 6 for each additional disk.

8 Remove the wrist strap.

9 Re-attach the front cover.

Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the appropriate procedure.

10 On the Storage System Status screen of GUI, check that the added disks have been recognized.

11 Set up RAID groups, volumes, hot spares, and Host Affinity settings on the new disks, as required.

End of procedure

5.2 Drive Enclosure Installation

This section describes how to install a drive enclosure in the ETERNUS DX60/DX80.

5.2.1 Drive Enclosure Handling Instructions

About condensation

CAUTION

Do

- When moving a drive enclosure from a cold place, such as an un-conditioned store house in winter, to a warmer place such as an air-conditioned room, the severe temperature change may result in condensation forming.
  To avoid this, allow the packed drive enclosures sufficient time in the warmer place (one hour for each 10°C of temperature difference) to adapt to the new temperature.

About static electricity

CAUTION

Do

- When handling the drive enclosure, make sure to wear a wrist strap. Failure to discharge static electricity may cause device failure.
  Do not remove it until the operation is complete.

About shock

CAUTION

Do Not

- Do not handle the drive enclosure roughly or subject it to physical shocks when laying it down.
- Do not stack the drive enclosures.
- Do not knock or drop the drive enclosure on hard objects.

5.2.2 Installable Drive Enclosures

Refer to "A.2.2 Drive Enclosures" (page 192) for a list of drive enclosures that may be installed. At time of purchase, the drive enclosure model may be different from those described.

The latest manual is available via the following web-site, and should be referred to as necessary.

http://www.fujitsu.com/global/services/computing/storage/eternus/products/diskstorage/dx60-dx80/

5.2.3 Drive Enclosure Rack Mounting Procedure

This section describes how to mount a drive enclosure in a rack.

CAUTION

- If drive enclosures are installed in a way other than by the methods described herein, damage to the device and/or failure or electrical shock may occur.
- Make sure to install the drive enclosures in order, above the controller enclosure.
- Take care not to knock or drop the drive enclosure on the rack when installing it.
- When no other components are to be installed in a drive slot, install the dummy disk units provided with the rack.

IMPORTANT

- When expanding multiple drive enclosures, by installing them into the rack or expanding settings via GUI, make sure to expand one by one.
- Do not install the miniSAS cable (for drive enclosures) or power cord when installing the drive enclosure in the rack. Connect them in Step 5 and Step 6 in "5.2.4 Additional Drive Enclosure Installation".
- Install the disk after expanding the drive enclosure.

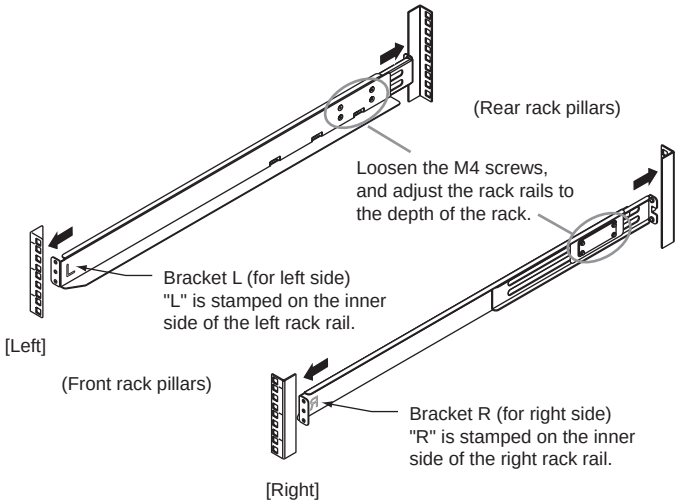
Procedure

1 Refer to "ETERNUS DX60/DX80 Disk storage system Package Contents" and check that no rack mount kit components are missing.

Refer "ETERNUS DX60/DX80 Disk storage system Package Contents"

2 Adjust the rack rails (bracket L (for left side) and bracket R (for right side)) sizes to fit the rack.

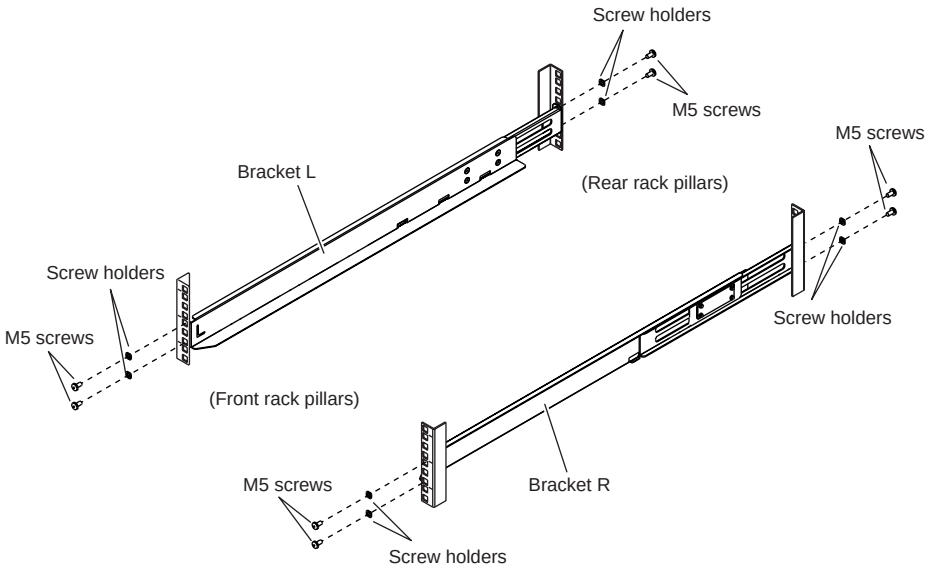
Reposition the M4 screws to adjust the length of the rack rails (brackets) to match the distance between the front and rear rack pillars. Leave the M4 screws slightly unscrewed, as the bracket must be attached to the rack before they can be completely tightened.



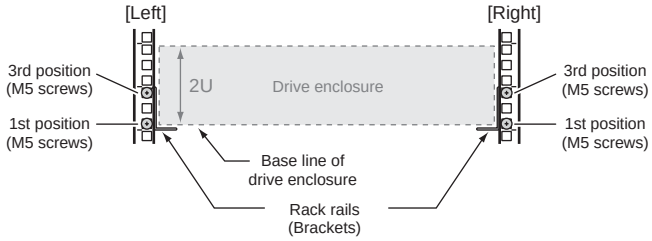
3 Attach the rack rails (brackets) to the rack.

Note

- If the rack pillars have square (approx. 9mm) holes, screw holders will need to be used when attaching the rack rails (brackets).
- Make sure to attach the rack rails (brackets) and rack pillars so that they fit exactly together without any space between them.



The four M5 screw positions for the rack rails (brackets) are determined relative to the drive enclosure base line.
The M5 screws should be inserted in the 1st and 3rd holes above the base line.



4 Tighten the M4 screws of the rack rails (brackets) that were slightly unscrewed in Step 2.

5 First remove the front cover.

Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the appropriate procedure.

6 Install the drive enclosure in the rack.

CAUTION

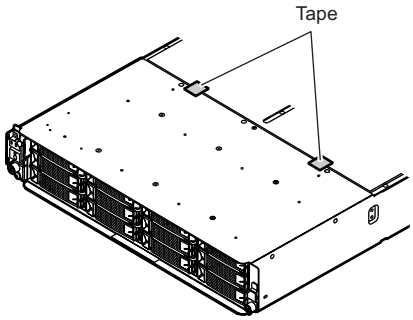
Do

- When installing or removing the drive enclosure to or from the rack, make sure to have the right and left sides and the bottom of the drive enclosure by two or more people. Failure to do so may cause injury.

CAUTION

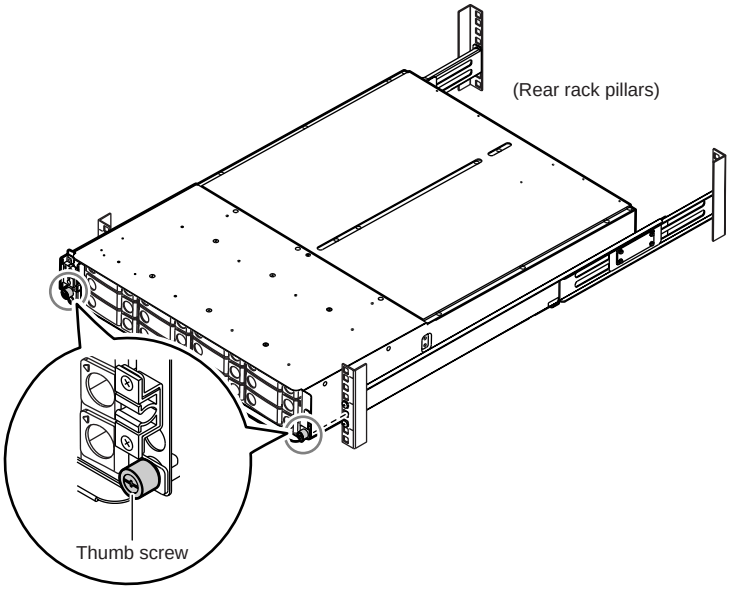
Do

- Two pieces of tape are attached to the top of the controller enclosure. Make sure that this tape does not come off.



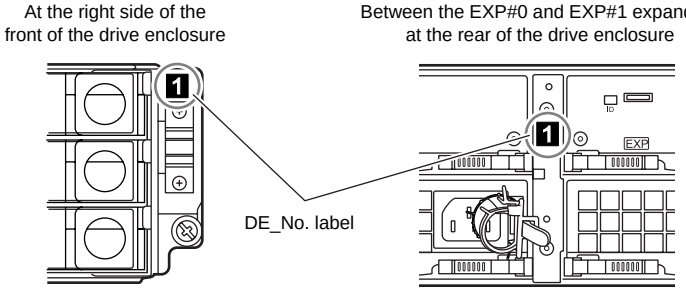
7 Fix the drive enclosure in the rack.

Use the two thumb screws at the front of the drive enclosure to fasten it in the rack.



8 Attach the "DE_No." label to the following positions.

Attach the label starting at the top (miniSAS cable (for drive enclosures) connection order) on the controller enclosure.

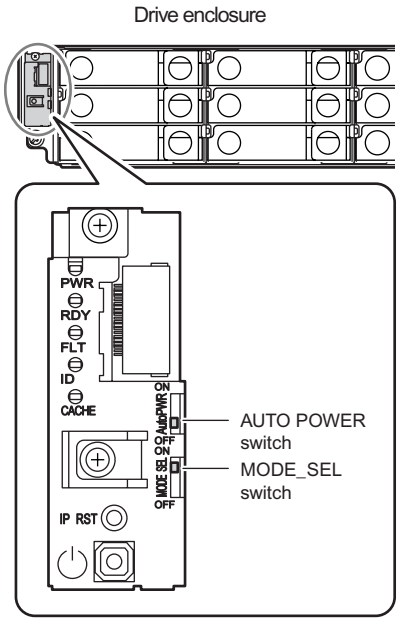


Note

DE_No. label is attached to the base device.

9 Check the settings of the AUTO POWER switch and the MODE_SEL switch.

- AUTO POWER switch
  Check that the AUTO POWER switch is set to the OFF position. Do not change to ON.
- MODEL_SEL switch
  Check that the MODEL_SEL switch is set to the ON position. Do not change to OFF.



End of procedure

5.2.4 Additional Drive Enclosure Installation

This section describes how to install a drive enclosure for the ETERNUS DX60/DX80.

Procedure

1 First check that all the components of the ETERNUS DX60/DX80 are in normal status, using the Storage System Status screen of GUI.

2 Wear a wrist strap.
For how to wear a wrist strap, refer to "2.2.4 Wearing the Wrist Strap" (page 61).

3 Click [Add Drive Enclosure] under the [Hardware Maintenance] menu on the [Maintenance] tab in the GUI screen.
The [Add Drive Enclosure] initial screen appears.

4 Click the [Next >] button.

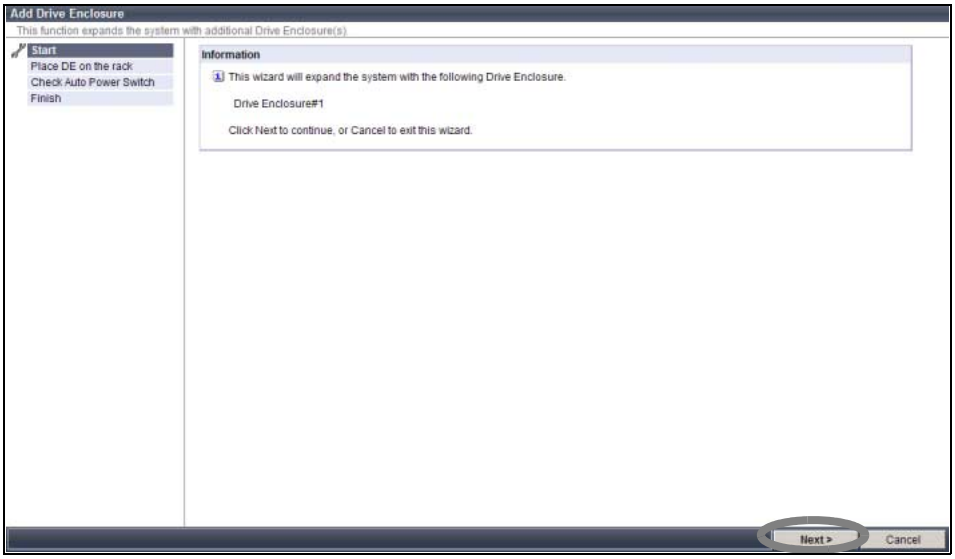


Figure 5.2 [Add Drive Enclosure] initial screen

The screen that indicates a procedure for adding drive enclosures appears.

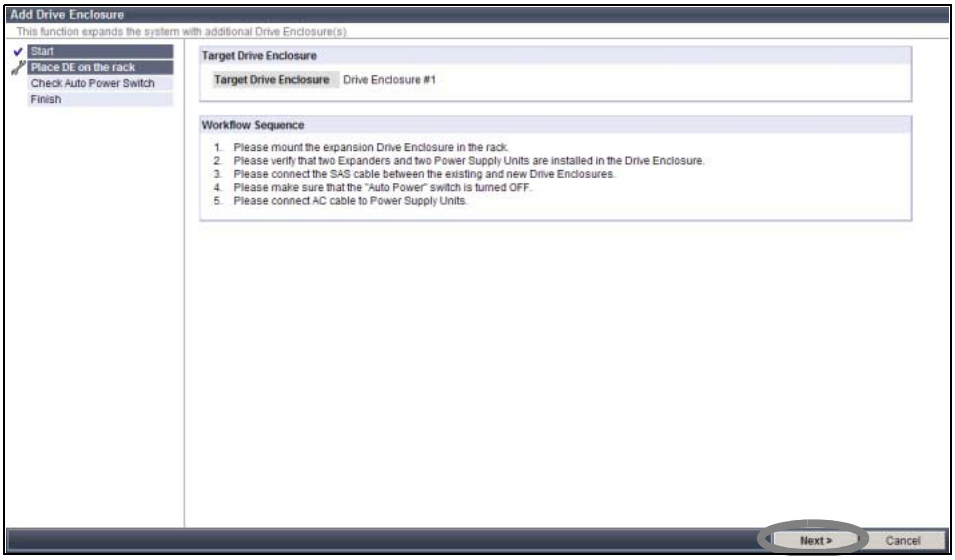


Figure 5.3 [Add Drive Enclosure] - Workflow Sequence screen1

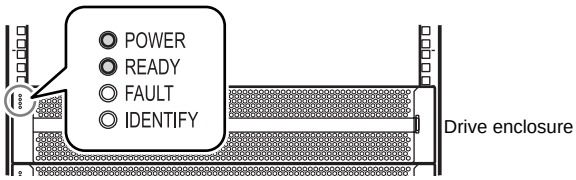
5 Connect the miniSAS cable (for drive enclosures).

Refer to "4.2.5 MiniSAS Cable Connection (For Drive Enclosures)" (page 94) for the appropriate procedure.

6 Connect the drive enclosure's power cord.

The drive enclosure turns on.
Refer to "4.2.6 Power Cord Connection" (page 100) for the appropriate procedure.

7 Check that the drive enclosure's POWER LED and READY LED are on.



8 Click the [Next >] button.

The drive enclosure recognition process is performed. When the process completes, the drive enclosure's AUTO POWER switch check procedure screen is displayed.

9 Check the drive enclosure's AUTO POWER switch is OFF, and click the [Next >] button.

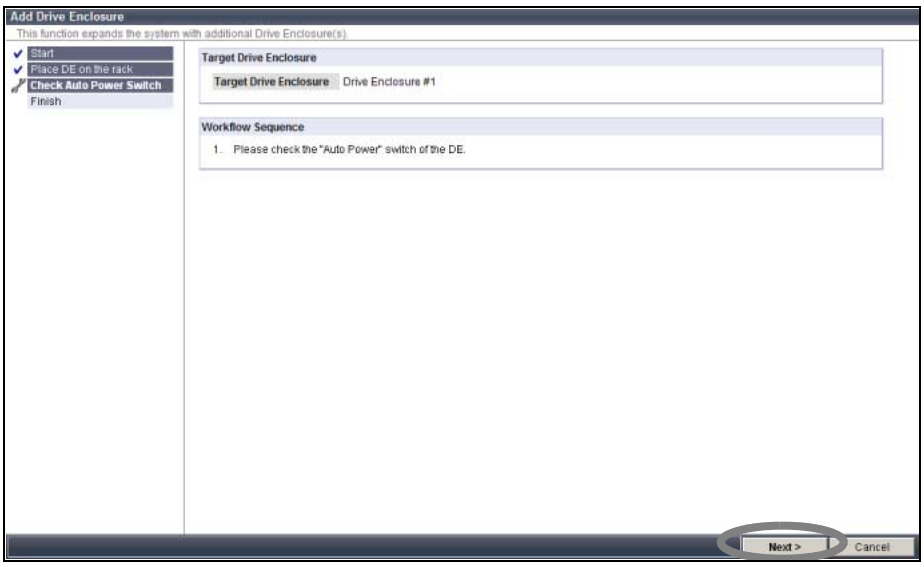


Figure 5.4 [Add Drive Enclosure] - Workflow Sequence screen 2

The expansion completion screen is displayed.

10 On the Storage System Status screen, check that the added drive enclosures have been recognized.

11 Install the disks.

Refer to "5.1.4 Additional Disk Installation Procedure" (page 161) for the appropriate procedure.

12 Remove the wrist strap.

13 Finish by replacing the front cover.

Refer to "2.2.3 Attaching and Removing the Front Cover" (page 58) for the appropriate procedure.

End of procedure

Chapter 6 Operation and Troubleshooting

This chapter describes various operation, maintenance and troubleshooting related matters.

6.1 Checking the ETERNUS DX60/DX80 Status

Check the status of the ETERNUS DX60/DX80 regularly by checking its LEDs, or status display function of GUI or CLI.

CAUTION

Do

- Impending trouble may be indicated by the warning message LEDs of the ETERNUS DX60/DX80. The LEDs should be checked regularly to prevent any serious trouble from occurring.

Also, Setting the device monitoring enables e-mail notification message or SNMP trap message of problems with the ETERNUS DX60/DX80.
Using remote report service enables automatic notification of hardware failure to remote maintenance center and enables problems to be resolved quickly.

6.2 Backing up Data

In case of a system failure, important data should be regularly backed up to a tape drive or similar device.

CAUTION

Do

- We recommend that you backup important data regularly.
  If the ETERNUS DX60/DX80 fails and the data has not been backed up, it may be lost.

6.3 Maintenance Service

This section explains the ETERNUS DX60/DX80 maintenance service.

IMPORTANT	When performing service maintenance, the maintenance engineer connects a PC used for maintenance to the device. Also, the maintenance engineer may require information that is necessary for performing maintenance operations. If the main ten ace engineer has any require, we ask that they be handled.

6.3.1 Maintenance Support Period

The maintenance support period for the ETERNUS DX60/DX80 is 5 years from the date of purchase of the ETERNUS DX60/DX80.

6.4 Post Start-of-Operation Changes to the Configuration

This section explains the procedure to change the configuration after starting the system operation, using the following example. Refer to necessary part of this section.

- Replacing Fibre Channel Cards
- Replacing LAN Cards / iSCSI HBAs
- Replacing SAS Cards

⚠ CAUTION

- When you detect abnormality of the ETERNUS DX60/DX80, Contact your maintenance engineer immediately.
- When changing the configuration, record the change by using the memo page in "ETERNUS Disk storage systems Server Connection Guide" and so on.

"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS Disk storage systems Server Connection Guide (SAS)"

6.4.1 Replacing Fibre Channel Cards

The following explains how to replace a failed Fibre Channel card.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

Refer
User guide for Fibre Channel card
"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

If ETERNUS SF Storage Cruiser is installed, refer to the ETERNUS SF Storage Cruiser manuals and check necessary settings.

Refer
ETERNUS SF Storage Cruiser manuals

The procedure to replace a Fibre Channel card is as follows:

Procedure

1 Before performing this procedure, use the ETERNUS DX60/DX80's GUI or CLI to check the WWN (World Wide Name) or host affinity of the Fibre Channel card that is to be replaced, and record this setting for later replication.

2 Replace the server-side Fibre Channel card.

2-1 Turn off the server for which the Fibre Channel card is to be replaced.

2-2 Replace the Fibre Channel card.
For details of the replacement procedure, refer to the user guide attached with the Fibre Channel card.

3 Adjust the settings as necessary, using the ETERNUS DX60/DX80's GUI or CLI.

3-1 Delete the setting of WWN or host affinity set to the uninstalled Fibre Channel card.

3-2 Referring to the information recorded in Step 1, Register the information such as WWN or host affinity of the new Fibre Channel card in the ETERNUS DX60/DX80.

4 When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80.

End of procedure

6.4.2 Replacing LAN Cards / iSCSI HBAs

The following explains how to replace a failed LAN card or iSCSI HBA.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

User guide for LAN card / iSCSI HBA
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

The procedure to replace a LAN card / iSCSI HBA is as follows:

Procedure

1. Turn off the server whose LAN card or iSCSI HBA is to be replaced.
2. Replace the LAN card / iSCSI HBA.
   Refer to the documentation supplied with the LAN card or iSCSI HBA for the detailed replacement procedure.
3. When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80.

End of procedure

6.4.3 Replacing SAS Cards

The following explains how to replace a failed SAS card.
Note that this is only an overview of the replacement procedure. Refer to the relevant manuals for more details.

User guide for SAS card
"ETERNUS Disk storage systems Server Connection Guide (SAS)"
"ETERNUS DX60/DX80 Web GUI User Guide"
"ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

The procedure to replace a SAS card is as follows:

Procedure

1 Before performing this procedure, use the ETERNUS DX60/DX80's GUI or CLI to check the SAS address or host affinity of the SAS card that is to be replaced, and record this setting for later replication.

2 Replace the server-side SAS card.

2-1 Turn off the server whose SAS card is to be replaced.

2-2 Replace the SAS card.
For details of the replacement procedure, refer to the user guide attached with the SAS card.

3 Adjust the settings as necessary, using the ETERNUS DX60/DX80's GUI or CLI.

3-1 Delete the SAS address or host affinity setting assigned to the removed SAS card.

3-2 Referring to the information recorded in Step 1, register the SAS address or host affinity of the new SAS card in the ETERNUS DX60/DX80.

4 When the setting is complete, confirm that the server can access the ETERNUS DX60/DX80.

End of procedure

6.5 Troubleshooting

If you notice anything unusual during operation, then refer to "6.5.1 Check List" (page 178) to check the ETERNUS DX60/DX80 status, accurately record the status on the form given "6.5.2 Trouble Record" (page 184), and contact your maintenance engineer.

- Unusual phenomena during operation of the ETERNUS DX60/DX80
- When the ETERNUS DX60/DX80 is turned off
- When the ETERNUS DX60/DX80 refuses to be turned on
- When the READY LED is not on
- When the FAULT LED is on
- When the FAULT LED blinks
- When an IP address is forgotten
- When the license key cannot be registered
- When an ETERNUS DX60/DX80 related error message is displayed by the server
- When volume capacity is short
- When I/O access is slow
- When the server does not recognize the disks

6.5.1 Check List

Unusual phenomena during operation of the ETERNUS DX60/DX80

If the ETERNUS DX60/DX80 exhibits any of the following symptoms, unplug the ETERNUS DX60/DX80 and cut the AC power at the distribution board, then contact your maintenance engineer.

- Abnormally hot
- Unusual odor
- Emission of smoke
- Unusual noise
- Abnormal shaking

WARNING

- If the ETERNUS DX60/DX80 overheats, gives off smoke or an unusual odor, makes an unusual sound, or shakes abnormally, or is likely to be damaged by a power abnormality, immediately turn the ETERNUS DX60/DX80 off and then pull the power plug from the outlet.
  After a while, check that unusual phenomena has disappeared, then contact your maintenance engineer.

When the ETERNUS DX60/DX80 is turned off

Check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80 alone and contact your maintenance engineer.

- Is the ETERNUS DX60/DX80's power cord disconnected?
- Is main line switch of AC outlet box (MAIN LINE SWITCH) turned to OFF (O)?
- Is there a power failure?
- Has there been a recent main power failure?
  If the ETERNUS DX60/DX80 is in AC automatic power mode (i.e. AUTO POWER switch is turned to ON), the ETERNUS DX60/DX80 turns on automatically after the power is restored.

When the ETERNUS DX60/DX80 refuses to be turned on

Check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80 alone and contact your maintenance engineer.

- Is the ETERNUS DX60/DX80's power cord disconnected?
- Is main line switch of AC outlet box (MAIN LINE SWITCH) turned to OFF (O)?
- Is the main power correctly being supplied?
- Is the miniSAS cable (for drive enclosures) disconnected?

When the READY LED is not on

If more than 10 minutes has passed since the ETERNUS DX60/DX80's power was turned on, and the READY LED still hasn't turned on, contact your maintenance engineer.

When the FAULT LED is on

Check the general status of GUI and perform the necessary action. If none of these resolve the problem, leave the ETERNUS DX60/DX80 alone and contact your maintenance engineer.

Note

When checking the general status via CLI, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

Refer "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

- When the general status of GUI is Error
  - Check whether one side of the miniSAS cable (for drive enclosures) is connected. If not, install the connector in the SAS port.
  - Check if the miniSAS cable (for drive enclosures) is connected. If the miniSAS cable (for drive enclosures) is not connected, connect it with the following procedure.

Procedure

1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80.
   Drive enclosures with no miniSAS cables connected will remain on.
2. Connect the miniSAS cable while the drive enclosure is on.
3. Press the controller enclosure's Power Switch to turn on the ETERNUS DX60/DX80.

End of procedure

- When the general status of GUI is Not Ready

  Check whether the miniSAS cables (for drive enclosures) are connected in the correct order. If not, reconnect the miniSAS cables in the following order.

Procedure

1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80, and turn off the AC power.
2. Re-connect the miniSAS cable.
3. Make sure that power is being supplied, then turn the ETERNUS DX60/DX80 on.

End of procedure

When the FAULT LED blinks

Check the General Status in GUI. A General Status of Warning indicates that the ETERNUS DX60/DX80 contains a component that requires preventive maintenance.
Use the Storage System Status screen's device tree to check the detailed information on the component whose ⚠ image is on, and contact your maintenance engineer.

Note

When checking the general status and detailed information on products via CLI, refer to "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide".

Refer "ETERNUS DX60/DX80 Command Line Interface (CLI) User's Guide"

When an IP address is forgotten

Set a new IP address according to the following procedure.

Procedure

1. Remove the front cover of the controller enclosure.
   For how to remove the front cover, refer to "2.2.3 Attaching and Removing the Front Cover" (page 58).
2. Press the IP RESET Switch twice in a row within two seconds.
   The setting information related to the network is returned to the factory default.
3. Set a new IP address and other network information via GUI or CLI.
4. Write down the newly set IP address on the Network Setting label.

End of procedure

When the license key cannot be registered

A wrong serial number may have been input when issuing the license key. If the problem persists, contact your sales representatives.
When issuing the license key again, make sure to check that [SER.NO.] (device serial number) that is described in the notification E-mail is correct.

When an ETERNUS DX60/DX80 related error message is displayed by the server

While you can continue using the ETERNUS DX60/DX80 for any work that is not affected by this problem, contact your maintenance engineer to determine the cause of the problem.

When volume capacity is short

Volume-adding function (LUN concatenation and RAID migration) and RAID-group-adding function (Logical Device Expansion function) can be used to resolve the capacity shortage of volumes.
Refer to "ETERNUS DX60/DX80 Web GUI User Guide" for details on how to use these functions.

"ETERNUS DX60/DX80 Web GUI User Guide"

Refer to the following sections for details on these functions.

- "1.3.4 RAID Migration" (page 37)
- "1.3.5 Logical Device Expansion" (page 39)
- "1.3.6 LUN Concatenation" (page 40)

When I/O access is slow

Check the following:

- Check that the ambient temperature does not exceed the operating environment conditions. If so, Nearline SAS disk performance may be reduced.
- Click the icon of each part in the Storage System Status screen of GUI to check if an abnormality is detected in ETERNUS DX60/DX80 parts.
  If an abnormality is detected, contact your maintenance engineer.
- Check the path status.
  - When using ETERNUS Multipath Driver, start ETERNUS Multipath Manager.
    For Windows®, click [Start] - [Program] - [ETERNUS Multipath Driver] - [ETERNUS Multipath Manager] to start ETERNUS Multipath Manager.
    If an abnormality is detected in a path, refer to ETERNUS Multipath Driver manuals and follow the direction given in the manuals.

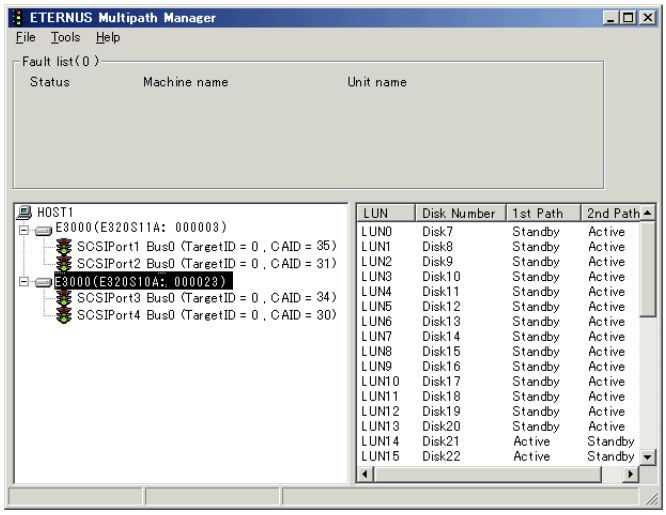


Figure 6.1 ETERNUS Multipath Manager Window

  - When not using ETERNUS Multipath Driver, use the path management tool and check the path status that each software provides, and handle the problem if necessary.
- Check the loading of the ETERNUS DX60/DX80. If the load is out of balance because of operation content changing and so forth.
- When the cause is not identified, contact your maintenance engineer.

Refer "ETERNUS DX60/DX80 Web GUI User Guide"
ETERNUS Multipath Driver manuals

When the server does not recognize the disks

When the server does not recognize the disks, points to be checked depend on the situation.

- All servers do not recognize the disks
- Check the status of the ETERNUS DX60/DX80 and other devices such as network devices connecting the server and the ETERNUS DX60/DX80, and ensure that there are no problems with the power supply.

- Check if the drive enclosure is turned on. If the drive enclosure is not turned on, check if the miniSAS cables (for drive enclosures) are connected. If the miniSAS cables are not connected, connect them with the following procedure.

  Procedure

  1. Press the controller enclosure's Power Switch for four seconds or more to turn off the ETERNUS DX60/DX80.
  2. Connect the miniSAS cables.
  3. Press the controller enclosure's Power Switch to turn on the ETERNUS DX60/DX80.

  End of procedure

- Specific servers do not recognize the disks

  If the specific servers do not recognize the disks (while other servers can), check the following points. If none of these resolve the problem, leave the ETERNUS DX60/DX80 alone and contact your maintenance engineer.

  - Check the path status.
    Check if an error occurs in a path by using a path management tool such as ETERNUS Multipath Manager. When an error occurs, contact your maintenance engineer
  - If an error occurs in a Fibre Channel card or adapter in the server, replace the Fibre Channel card or adapter, referring to "6.4.1 Replacing Fibre Channel Cards" (page 175), "6.4.2 Replacing LAN Cards / iSCSI HBAs" (page 176), or "6.4.3 Replacing SAS Cards" (page 177).

ETERNUS Multipath Driver manuals
User guides for server-side cards and adapters
"ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)"
"ETERNUS Disk storage systems Server Connection Guide (iSCSI)"
"ETERNUS Disk storage systems Server Connection Guide (SAS)"
"ETERNUS DX60/DX80 Web GUI User Guide"

6.5.2 Trouble Record

If trouble occurs, record the ETERNUS DX60/DX80 conditions in Figure 6.2 and Figure 6.3, and contact your maintenance engineer.

Trouble Record

1: Please identify your ETERNUS DX60/DX80 Disk storage system:
(Check the Manufacturer's label)
MODEL _____
SER.NO. _____

2: Please enter the following information about your ETERNUS DX60/DX80:
Number of drive enclosures _____
Number of disks _____

3: Are you using a UPS? If so, what model?
_____

4: Are you using a PMAN? If so, what model?
_____

5: What is the state of the following Controller Enclosure LEDs?

POWER	(Yes, No)
READY	(Yes, No)
FAULT	(Yes, No, Blinking)
IDENTIFY	(Yes, No)
CACHE	(Yes, No, Blinking)

6: What is the state of the following Drive Enclosure LEDs?

POWER	(Yes, No)
READY	(Yes, No)
FAULT	(Yes, No, Blinking)
IDENTIFY	(Yes, No)

Figure 6.2 Trouble record (1/2)

7: Other

Figure 6.3 Trouble record (2/2)

Appendix A Specifications

This appendix explains the specifications of the ETERNUS DX60/DX80 and its optional products.

A.1 Base Device Specifications

This section explains the specifications of the ETERNUS DX60/DX80 base device.

A.1.1 ETERNUS DX60 Specifications

Table A.1 ETERNUS DX60 specifications

Item			Specification	
			2-port single-controller model (*4)	4-port dual-controller model
Model name	Fibre Channel model		ET06F12AU	ET06F22AU
	iSCSI model		ET06L12AU	ET06L22AU
	SAS model		ET06S12AU	ET06S22AU
Supported RAID level			RAID0, RAID1, RAID1+0, RAID5, RAID5+0, RAID6	
Maximum capacity (*1)	Physical capacity (*2)	SAS disks	10.8TB	
		Nearline SAS disks	24.0TB	
	Logical capacity (*3)	SAS disks	7.5TB	
		Nearline SAS disks	16.9TB	
Number of controllers			1	2
Host interface			Fibre Channel (4Gbps/2Gbps/1Gbps) iSCSI (1Gbps) SAS (3Gbps)	
Number of host interfaces			2	4
Maximum number of servers to be connected	Fibre Channel iSCSI		32	64
	SAS		2	4
Cache			1GB	2GB
Number of disks			2 to 24	

Item			Specification	
			2-port single-controller model (*4)	4-port dual-controller model
Disk (*1)	SAS disks	Capacity/ Speed	450GB/300GB (15,000rpm)	
		Drive interface	SAS (up to 3Gbps)	
	Nearline SAS disks	Capacity/ Speed	1TB/750GB (7,200rpm)	
		Drive interface	SAS (up to 3Gbps)	
Dimensions (W × D × H)	Basic		483 × 650 × 88 (mm) [2U]	
	Maximum (*1)		483 × 650 × 178 (mm) [4U]	
Service area requirements			Front: 800mm or larger, Rear: 800mm or larger	
Maximum weight (*1)			70kg	
Power	Voltage		AC 100 – 120V, AC 200 – 240V	
	Phase		Single	
	Frequency		50Hz/60Hz	
Maximum power consumption (*1)		AC 100 – 120V	782W	
		AC 200 – 240V	776W	
Maximum heat generation (*1)		AC 100 – 120V	2,816kJ/h	
		AC 200 – 240V	2,794kJ/h	
Environmental conditions	Temperature		5 – 40°C (operating)	
	Humidity		20 – 80%RH (operating)	
Noise emission	Sound Power Level (LWAd)		5.9B (*5)	
	Sound Pressure Level (LpAm)		42.0dB(A) (*5)	

*1: This value is for maximum configuration (when optional devices are installed to the utmost limit)

*2: Physical capacity is calculated based on the assumption 1TB=1,000GByte, 1GB=1,000MByte.

*3: Logical capacity is calculated based on the assumption 1TB=1,024GByte, 1GB=1,024MByte and being formatted in the recommended RAID5 configuration. The possible capacity for use depends on the environment conditions.

*4: The controller module is not duplicated. Therefore, if a problem occurs, operation may not be continued.

*5: Value for a single controller enclosure.

A.1.2 ETERNUS DX80 Specifications

Table A.2 ETERNUS DX80 specifications

Item			Specification	
			2-port single-controller model (*4)	4-port dual-controller model
Model name	Fibre Channel model		ET08F12AU(4G FC) ET08E12AU(8G FC)	ET08F22AU (4G FC) ET08E22AU (8G FC)
	iSCSI model		ET08L12AU	ET08L22AU
	SAS model		ET08S12AU	ET08S22AU
Supported RAID level			RAID0, RAID1, RAID1+0, RAID5, RAID5+0, RAID6	
Maximum capacity (*1)	Physical capacity (*2)	SAS disks	54.0TB	
		SSD(*5)	1.0TB	1.8TB
		Nearline SAS disks	120.0TB	
	Logical capacity (*3)	SAS disks	39.5TB	
		SSD(*5)	0.5TB	1.0TB
		Nearline SAS disks	88.5TB	
Number of controllers			1	2
Host interface			Fibre Channel (4Gbps/2Gbps/1Gbps) Fibre Channel (8Gbps/4Gbps/2Gbps) iSCSI (1Gbps) SAS (3Gbps)	
Number of host interfaces			2	4
Maximum number of servers to be connected	Fibre Channel iSCSI		64	128
	SAS		2	4
Cache			2GB	4GB
Number of disks			2 to 120	
Disk (*1)	SAS disks	Capacity/ Speed	450GB/300GB (15,000rpm)	
		Drive interface	SAS (up to 3Gbps)	
	SSD	Capacity	200GB/100GB	
		Drive interface	SAS (up to 3Gbps)	
	Nearline SAS disks	Capacity/ Speed	1TB/750GB (7,200rpm)	
		Drive interface	SAS (up to 3Gbps)	
Dimensions (W × D × H)	Basic		483 × 650 × 88 (mm) [2U]	
	Maximum (*1)		483 × 650 × 889 (mm) [20U]	
Service area requirements			Front: 800mm or larger, Rear: 800mm or larger	
Maximum weight (*1)			350kg	

Item			Specification	
			2-port single-controller model (*4)	4-port dual-controller model
Power	Voltage		AC 100 – 120V, AC 200 – 240V	
	Phase		Single	
	Frequency		50Hz/60Hz	
Maximum power consumption (*1)		AC 100 – 120V	3,774W	
		AC 200 – 240V	3,805W	
Maximum heat generation (*1)		AC 100 – 120V	13,587kJ/h	
		AC 200 – 240V	13,698kJ/h	
Environmental conditions	Temperature		5 – 40°C (operating)	
	Humidity		20 – 80%RH (operating)	
Noise emission	Sound Power Level (LWAd)		5.9B (*6)	
	Sound Pressure Level (LpAm)		42.0dB(A) (*6)	

*1: This value is for maximum configuration (when optional devices are installed to the utmost limit)

*2: Physical capacity is calculated based on the assumption 1TB=1,000GByte, 1GB=1,000MByte.

*3: Logical capacity is calculated based on the assumption 1TB=1,024GByte, 1GB=1,024MByte and being formatted in the recommended RAID5 configuration. The possible capacity for use depends on the environment conditions.

*4: The controller module is not duplicated. Therefore, if a problem occurs, operation may not be continued.

*5: Up to five SSDs can be installed in the single controller model, and up to nine SSDs can be installed in the dual controller model.

*6: Value for a single controller enclosure.

A.2 Optional Product Specifications

This section explains the specifications of the ETERNUS DX60/DX80 optional products.

A.2.1 Disks

For 3.5" disks

- 300GB/15krpm SAS disks

Table A.3 300GB/15krpm SAS disk specifications

Item	Specification
Model name	ETLSA3HAU, ETLSA3MAU, ETLSA3PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	3.5" hard disk
Capacity	300GB
Speed	15,000rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.9 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 450GB/15krpm SAS disks

Table A.4 450GB/15krpm SAS disk specifications

Item	Specification
Model name	ETLSA4HAU, ETLSA4MAU, ETLSA4PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	3.5" hard disk
Capacity	450GB
Speed	15,000rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.9 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 750GB/7.2krpm Nearline SAS disks

Table A.5 750GB/7.2krpm Nearline SAS disk specifications

Item	Specification
Model name	ETLNS7HAU, ETLNS7MAU, ETLNS7PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	3.5" hard disk
Capacity	750GB
Speed	7,200rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	1.0 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 1TB/7.2krpm Nearline SAS disks

Table A.6 1TB/7.2krpm Nearline SAS disk specifications

Item	Specification
Model name	ETLNS1HAU, ETLNS1MAU, ETLNS1PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	3.5" hard disk
Capacity	1TB
Speed	7,200rpm
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	1.0 kg

*1: Specification per one disk.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 100GB SSDs

Table A.7 100GB SSD specifications

Item	Specification
Model name	ETLSS1HAU, ETLSS1MAU, ETLSS1PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	Flash memory
Capacity	100GB
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.5 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

- 200GB SSDs

Table A.8 200GB SSD specifications

Item	Specification
Model name	ETLSS2HAU, ETLSS2MAU, ETLSS2PAU
Drive Interface	Serial Attached SCSI (3Gbps)
Storage medium	Flash memory
Capacity	200GB
Dimensions (W × D × H)	109 × 196 × 27 (mm)
Weight	0.5 kg

*1: Specification per one SSD.

*2: The capacity is calculated based on the assumption 1GB=1,000^{3}Byte.

A.2.2 Drive Enclosures

Table A.9 Drive enclosure specifications

Item		Specification	
Model name		ETLDE2AU	ETLDE1AU
Drive interface		Serial Attached SCSI (3Gbps)	
Number of disk slots		12	
Number of expanders		2	1
Dimensions (W × D × H)		483 × 650 × 88 (mm) [2U]	
Maximum weight		35kg	
Power	Voltage	AC 100 – 120V, AC 200 – 240V	
	Phase	Single	
	Frequency	50Hz/60Hz	
Maximum power consumption	AC 100 – 120V	370W	
	AC 200 – 240V	375W	
Maximum heat generation	AC 100 – 120V	1,332kJ/h	
	AC 200 – 240V	1,348kJ/h	
Environmental condition	Temperature	5 – 35°C (operating)	
	Humidity	20 – 80%RH (operating)	

A.2.3 AC Outlet Box

For 1U

Table A.10 AC outlet box (1U) specifications

Item		Specification
Model name		ETLAC2U1U
Power	Voltage	AC 200 – 240V
	Phase	Single
	Frequency	50Hz/60Hz
Inlet	Connection type and length	Plug: IEC320-C13 ⇔ NEMA L6-15P / 4m
	Number of inlets	2
Outlet	Connection type and length	Plug: IEC320-C13 ⇔ IEC320-C14 / 3m
	Number of outlets	4
Dimensions (U)		1U
Weight		2.0 kg

For 2U

Table A.11 AC outlet box (2U) specifications

Item		Specification
Model name		ETLAC2U2U
Power	Voltage	AC 200 – 240V
	Phase	Single
	Frequency	50Hz/60Hz
Inlet	Connection type and length	Straight-through ⇔ NEMA L6-20P / 4m
	Number of inlets	2
Outlet	Connection type and length	Plug: IEC320-C13 ⇔ IEC320-C14 / 3m
	Number of outlets	12
Dimensions (U)		2U
Weight		11kg

A.2.4 Expansion Controller

Table A.12 AC outlet box (1U) specifications

Item	Specification
Model name	ETLC8F8AU, ETLC8F4AU, ETLC6F4AU, ETLC8L1AU, ETLC6L1AU, ETLC8S3AU, ETLC6S3AU
Dimensions (W × D × H)	205 × 375 × 42 (mm)
Weight	2.5 kg

A.2.5 Expansion Expander

Table A.13 Expansion expander specifications

Item		Specification
Model name		ETLEXAU
Dimensions (W × D × H)		205 × 375 × 42 (mm)
Maximum weight		1.8kg
miniSAS cable	Connection type and length	SFF-8088 ⇔ SFF-8088 / 0.75m
	Number of cables	1

A.2.6 MiniSAS Cable Kit

Table A.14 MiniSAS cable kit specifications

Item	Specification
Model name	ETLCAMS1U
Connection type and length	SFF-8088 ⇔ SFF-8088 / 3m
Number of cables	1

Appendix B Events detected by ServerView

This chapter explains the ETERNUS DX60/DX80 events detected by ServerView.

Table B.1 ServerView event list

Event	Severity	Meaning
Item fault	Critical	Hardware error occurred • HDD error • FAN error etc.
Partially broken	Critical	Preventive Maintenance Hardware has been detected. • Memory Multiple correctable errors. etc.
Sensor status changed	Critical	Temperature abnormality has been detected. • Controller Enclosure Temperature abnormality • Drive Enclosure Temperature abnormality etc.
Maintenance required	Critical	An error that requires maintenance has been detected. • Pinned Data is occurred. etc.

Appendix C About Using of Open Sources

The SMI-S interface of the ETERNUS DX60/DX80 uses the following open sources.

- OpenPegasus
- OpenSSL

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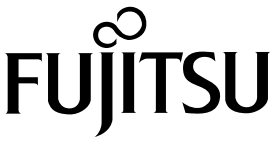
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