Installation and Setup Guide

EMC DATA DOMAIN DD4500 STORAGE SYSTEM WITH EXTENDED RETENTION SOFTWARE

300-119-201 Rev. 02

Installation and Setup Steps

The steps for a complete installation and configuration are:

1. Install hardware
2. Define the Data Domain system information for your site
3. Perform initial system configuration
4. Configure the system for data access
5. Configure optional software
6. Perform optional additional system configuration

1 Install Hardware

1. **Unpack the Data Domain system.** A system consists of a DD4500 with Extended Retention Software controller and up to 1440 TB of raw storage in optional expansion shelves.
   - Open the "Open Me First" box, then open the remaining boxes for the controller and expansion shelves.
   - Remove the accessories and rack mount kits for all system components.
2. **Install the appropriate rack mounting hardware** for the controller and expansion shelves into one or more 19-inch, four-post racks. Ensure that the rack is securely anchored to prevent tipping. Load the rack or cabinet beginning at the bottom to prevent the rack from becoming top-heavy. Be sure to plan appropriate vertical space to accommodate the 4U controller and 3U for each expansion shelf.
   - See the instructions included with the controller and shelf rails.
3. **Install the controller and expansion shelves in the rack.**
   - Remove the controller and expansion shelves from the shipping boxes.
   - Install each component horizontally on the corresponding rails and slide into the rack in the order described in the *ES30 Expansion Shelf Hardware Guide*. Be sure one person is at each side of each component for proper and safe installation.
   - Secure the components in the rack; see respective hardware manual.
4. **Connect expansion shelves to the controller.** Connect the controller's SAS ports to the expansion shelves based on the cabling diagrams for expansion shelf connectivity. See Figure 4. Use the Cable Management Bar and Velcro strips to support and organize all cables.
5. **Connect an administrative console.** Attach a serial console to the controller's serial port. See Figure 1.
6. **Enable data transfer connectivity.** Repeat for each connection.
   - **Ethernet connection:** If using 1 Gb copper Ethernet, attach a Cat 5e or Cat 6 copper Ethernet cable to each RJ45 Ethernet network port on the controller, and attach the other end to an Ethernet switch or to an Ethernet port on your server. If using 1 Gb fiber Ethernet, use multimode fiber cables with LC connectors. If using 10 Gb copper Ethernet with an SFP+ connector, use a qualified SFP+ copper cable. If using 10 Gb fiber Ethernet, use MMF-850nm cables with LC duplex connectors. See Figure 1.
   - **Fibre Channel connection:** Attach a Fibre Channel fiber optical cable (LC connector) to an IO module port on the controller, and attach the other end (LC connector) to a Fibre Channel switch or to a Fibre Channel port on your server. See Figure 1 for locations of the IO modules.
7. **Provide power and power-on the systems.**

   Note: Power on all shelves first and the controller last.
   - **Expansion shelf power:** Connect power cables to each receptacle and attach the power cable retention clips. Each shelf power cable should connect to a different power source. The ES30 powers on when plugged in. Wait approximately 3 minutes after all expansion shelves are turned on before powering on the controller. See Figure 3.
   - **Controller power:** Connect power cables to each receptacle. Ensure that each power supply is connected to a different power source. The controller powers on when plugged in.
8. **Attach the bezels.**
9. **Collect the information needed for installation.** Record the information in Section 2 of this document.

Safety

All plug-in modules and blank plates are part of the fire enclosure and must be removed only when a replacement can be added immediately. The system must not be run without all parts in place.

- Operate a controller from a power input of 200-240 VAC, 50–60 Hz; shelves use 100-240 VAC, 50–60 Hz.
- Each component is intended to operate with all working power supplies installed.
- Provide a suitable power source with electrical overload protection.
- A safe electrical earth connection must be provided to the power cord. Check the grounding of the power sources before applying power.
- The plug on each power supply cord is used as the main disconnect device. Ensure that the socket outlets are located near the equipment and are easily accessible.
- Permanently unplug the unit if you think it is damaged in any way and before moving it. If the unit is powered by multiple sources, disconnect all supplied power for complete isolation.
- The power connections must always be disconnected prior to removal or replacement of a power supply module from any of the components in the system.
- A faulty power supply module must be replaced within 24 hours.
- Do not lift system components by yourself. A controller weighs up to 80 lbs (36.3 kg) and an expansion shelf weighs up to 78 lbs (35.5 kg).
- Do not lift an expansion shelf by the handles on any modules. The handles are not designed to support the weight of the populated shelf.
- To comply with applicable safety, emission, and thermal requirements, covers must not be removed and all bays must be fitted with plug-in modules.
- Load the rack beginning at the bottom to prevent the rack from becoming top-heavy.
- Do not extend components on slide rails until you have loaded at least three or more similarly weighted items in the rack, or unless the rack is bolted to the floor or overhead structure to prevent tipping.

Caution: If the system is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Caution: The RJ45 sockets on the motherboard/IO modules are for Ethernet connection only and must not be connected to a telecommunications network.

ESD PRECAUTIONS

Data Domain recommends that you fit and check a suitable antistatic wrist or ankle strap and observe all conventional ESD precautions when handling plug-in modules and components.

Data Domain DD4500 with Extended Retention Software Storage System

FIGURE 1: REAR PANEL AND INPUT/OUTPUT CONNECTIVITY

Slot MGMT A	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8	Slot 9	Slot 10
Management module	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	Ethernet or empty	SAS	SAS	SAS	SAS	BBU	NVRAM

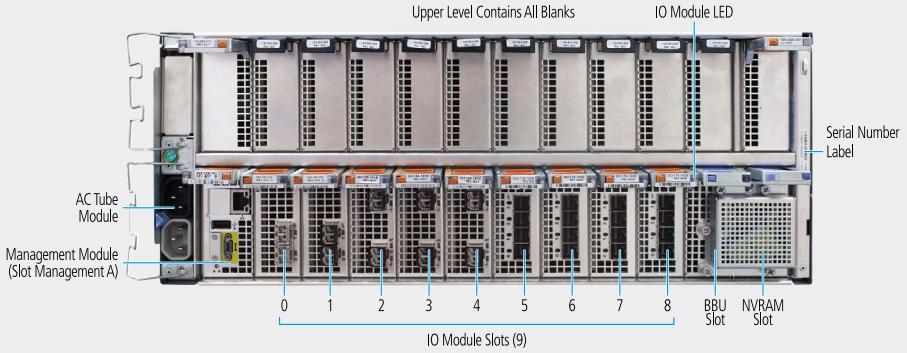


FIGURE 2: FRONT PANEL AND DISK LOCATIONS

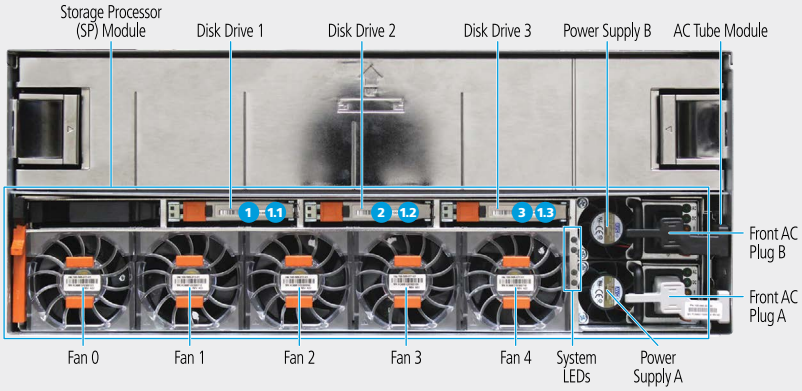
Hot-swappable disks

Physical location: 1 2 3

Logical numbering: 1.1 1.2 1.3

System Fault LED

Display	Meaning
Blue	Normal operation
Amber	Chassis fault
Yellow	Storage processor fault
White	Do not remove storage processor

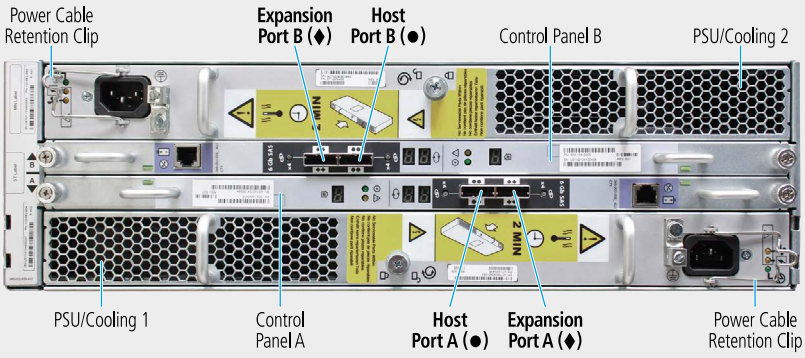


Data Domain Expansion Shelves

FIGURE 3: ES30 EXPANSION SHELF

Expansion shelf disk-drive numbering and components:

Note: Physical numbering of the disks is 0-14 while the logical numbering is 1-15.



Connecting Multiple Expansion Shelves

NOTE: This guide describes the installation of new systems comprised of all ES30 SAS shelf models. Configurations including a mix of ES20, ES30 SATA, and ES30 SAS shelves are subject to additional configuration constraints. The instructions for mixing shelf types are in the *ES30 Hardware Guide*.

EXPANSION SHELF CABLING

The system supports any combination of 30 and 45 TB ES30 SAS shelves up to a maximum of 32 shelves with 1440 TB of raw storage. Multiple expansion shelves are connected together and to the controller with qualified SAS cables. Save extra SAS cables for future use. See Figure 4 for the recommended cabling and component placement of a system. The cables provided support the DD4500 with Extended Retention Software and ES30s in the rack positions as shown.

Note: Cables have an HD-mini-SAS end that connects to the controller and a mini-SAS end that connects to the shelves.

ES30 Expansion Shelves

- Use a SAS cable with mini-SAS connectors for any ES30 SAS connection.
- Cables should be dressed to the side of the rack and supported with Velcro straps to allow for easy removal of a shelf controller or power supply.
- In the DD4500 with Extended Retention Software the strings are not contiguous. The order of shelf addition is designed for easy expansion from a standard DD4500 system and to (nearly) fill a rack before adding the next rack. The gaps in the racks are positioned to create a standard expansion rack that is just re-cabled based on its position.

CABLING INSTRUCTIONS

String	IO port	Shelf port	Length*
1	A7 Port 1	B controller HOST ● port of shelf V1.1	2M
1	A8 Port 0	A controller HOST ● port of the highest number shelf in V1	2M/3M
2	A7 Port 0	B controller HOST ● port of shelf V2.1	2M
2	A8 Port 1	A controller HOST ● port of the highest number shelf in V2	2M/5M
3	A7 Port 3	B controller HOST ● port of shelf V3.1	2M
3	A8 Port 2	A controller HOST ● port of the highest number shelf in V3	2M/5M
4	A7 Port 2	B controller HOST ● port of shelf V4.1	3M
4	A8 Port 3	A controller HOST ● port of the highest number shelf in V4	3M/5M
5	A6 Port 0	B controller HOST ● port of shelf V5.1	3M
5	A5 Port 1	A controller HOST ● port of the highest number shelf in V5	3M/5M
6	A5 Port 0	B controller HOST ● port of shelf V6.1	3M
6	A6 Port 1	A controller HOST ● port of the highest number shelf in V6	3M/5M

* When two lengths are shown, the longer is used when a string is split between racks. When a string is split between racks the shelf to shelf cable lengths are: 2M for V2, V3, V4, V5, or V6. Cable lengths shown are designed for EMC racks. Other racks may require longer cables.

HOT ADDITION OF EXPANSION SHELVES

NOTE: In Figure 4 the shelves are labeled VN.M. VN refers to string "N" and the "M" is the number of the shelf in the string. The cabling and racking are designed so that shelves are added from the bottom up in a rack. Therefore, shelves are added V1.1, V1.2, V1.3, V1.4, V2.1, V2.2, and so on. Add shelves in order, one at a time. Refer first to the Cabling Instructions table for adding or moving HBA-to-shelf cables. Then add the necessary shelf-to-shelf cables between shelves in a string as shown in Figure 4. Note that the added shelf will become the highest number shelf in its string, requiring one HBA-to-shelf cable to be moved to connect to its controller A or controller B HOST port.

Cabling between adjacent shelves in a string is done with the 1M SAS cables that are delivered with the shelves. Cable from the B Controller EXPANSION ♦ port of lower shelf to the B controller HOST ● port of the next higher shelf. Then cable from the A Controller HOST ● port of lower shelf to the A controller EXPANSION ♦ port of the next higher shelf.

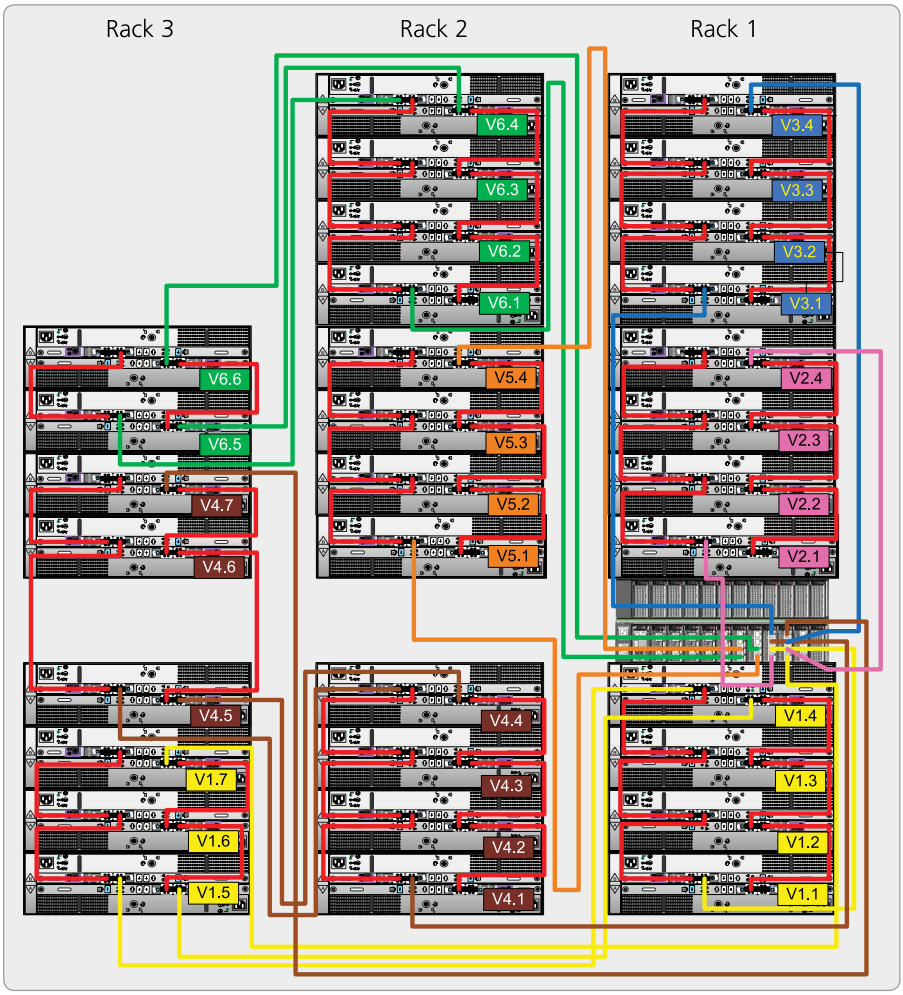
When adding shelves to an existing string, move the cable from the B controller HOST ● port to the new shelf and then add the shelf-to-shelf 1M cables. 2M, 3M, and 5M cables are supplied to best match the routing requirement. Loop any excess and use the Velcro straps to attach to a convenient place in the rack. "3" is the top HBA port and "0" is the bottom.

Shelves are added to rack1 from bottom to top in the positions shown. Then rack2 is filled from bottom to top, leaving the gap. The third rack is added in order. Because strings are split between racks, the cables connecting one shelf to another are longer.

Power-Up and Final Configuration

Follow the steps described in Chapter 4, Post Installation Tasks, of the *ES30 Expansion Shelf Hardware Guide* to complete hot addition of expansion shelves to an existing system.

FIGURE 4: RECOMMENDED ES30 CABLING DIAGRAM (matches factory configuration)



2 Define the Data Domain System Information for Your Site

SYSTEM SETUP WORKSHEET

An installation requires information unique to your site. Before starting the installation, provide values for the system information listed below.

1. A fully qualified host name for the system: _____

2. The DNS domain name: _____

3. Use Table 1 (below) to enter Ethernet connectivity information.

4. A default gateway IP address (if no DHCP): _____

5. DNS server IP addresses (if no DHCP) (fill in below):

Primary	Secondary	Tertiary

6. Select the CIFS authentication method:

Workgroup ❑ **Active Directory** ❑

Workgroup name: _____ Realm name: _____

Backup user name: _____ Domain admin name: _____

Password: _____ Password: _____

7. Host name from which to administer the system:

_____

8. Administrator's email address (or admin group alias):

_____

9. (Optional) Description of the system's physical location:

10. Mail server (SMTP) host name: _____

11. Time zone name (default is US/Pacific): _____

12. System Controller ID from the License Code document provided in the accessory kit. Use this ID to obtain the unique WWPN for this controller using the WWPN tool at https://my.datadomain.com/US/en/wwpn.jsp

_____

13. Record the serial number (SN) found on the back of the chassis, center right edge.

_____

14. Record all license keys from the license code document provided in the accessory kit.

_____

TABLE 1:

Ethernet Connectivity	ethMa	eth0x	eth1x	eth2x	eth3x	eth4x	eth5x
Enable		eth0a	eth1a	eth2a	eth3a	eth4a	eth5a
Enable		eth0b	eth1b	eth2b	eth3b	eth4b	eth5b
Enable		eth0c	eth1c	eth2c	eth3c	eth4c	eth5c
Enable		eth0d	eth1d	eth2d	eth3d	eth4d	eth5d
Use DHCP*	❑	❑	❑	❑	❑	❑	❑
IP address (if no DHCP)							
Netmask (if no DHCP)							

* DHCP is not recommended for production systems

3 Perform Initial System Configuration

NOTE: Refer to the NVRAM Battery Charging Instructions for information on battery charge time at initial system installation.

Log into the system with the user name of sysadmin. The password is the system's serial number. At the first login, the CLI configuration utility starts.

- You will be prompted to enter the Name, and Domain Name of the system
- You will next be prompted to configure the initial IP port. You can choose DHCP or enter a static IP address and Net Mask.
- You will then be asked to either exit the configuration utility and continue configuring the system using the Graphical User Interface, or to continue using the CLI configuration utility

Both the CLI configuration utility and GUI configuration wizard contain six sections: Licenses, Network, File System, System, CIFS, and NFS. The GUI also includes a section to configure VTL.

USING THE CLI CONFIGURATION UTILITY

The list entries in the utility can be comma-separated, space-separated, or both.

- At each prompt, enter a value, OR
- Enter a question mark (?) for more details, OR
- Press Enter to accept the value displayed in braces.

Follow the configuration utility instructions for entering appropriate values. At the end of each configuration section, you can choose to: Save, Cancel, or Retry (restart the input entry as the beginning of the current section).

4 Configure the System for Data Access

The Data Domain system provides multiple protocols for data access: NFS,CIFS, VTL, and DD Boost. You need to configure one or more protocols for data access, depending on your environment. You also need to configure the clients for accessing the Data Domain system with the protocol of your choice.

NFS

The NFS configuration section in the configuration utility sets up the NFS clients to allow access to `/backup` on the Data Domain system. You also need to set up the NFS clients to allow access to `/backup` on the Data Domain system. This can be done using the following steps:

- Create a mount point (directory) such as `/dd/rstr01/backup` and create an administrative mount point such as `/dd/rstr01/ddvar`.
- NFS mount the directories on the new mount points. For example:

```
mount -F nfs -o hard,intr,vers=3,proto=tcp,
rstr01:/backup /dd/rstr01/backup
mount -F nfs -o hard,intr,vers=3,proto=tcp,
rstr01:/ddvar /dd/rstr01/ddvar
```

- Add the following lines to the file `/etc/vfstab` (the file name may be different depending on your UNIX-based system). The lines mount the directories at every reboot. For example:

```
system:/backup - /dd/rstr01/backup nfs - yes
hard,intr,vers=3,proto=tcp
system:/ddvar - /dd/rstr01/ddvar nfs - yes
hard,intr,vers=3,proto=tcp
```

- To cause backup software to abort when the system is not mounted, create a backup directory within the mounted file system, such as `/dd/rstr01/backup/disk1`.
- For more configuration information, see the specific Data Domain Integration Documentation at https://my.datadomain.com/US/en/integration.jsp.

CIFS

The CIFS configuration section in the configuration utility sets up the CIFS clients to allow access to `/backup` on the Data Domain system. You also need to set up the CIFS clients to allow access to `/backup` on the Data Domain system. For additional configuration information, see the specific Data Domain Integration Documentation at https://my.datadomain.com/US/en/integration.jsp.

VTL

For the VTL software option, see the Data Domain technical note *Integrating the Data Domain Appliance VTL with SANs*. See the specific Data Domain Integration Documentation for setting up backup software from other vendors: https://my.datadomain.com/US/en/integration.jsp.

DD BOOST FOR OPENSTORAGE (OPTIONAL LICENSE REQUIRED)

For setting up the Data Domain DD Boost feature, see the *EMC Data Domain Boost for OpenStorage Administration Guide* available at https://my.datadomain.com/US/en/platform.jsp.

APPLICATION INTEGRATION

For information about how to integrate the Data Domain system with backup software, see the documentation for the applicable application at the Data Domain Integration Documentation section on the Data Domain Support web site https://my.datadomain.com/US/en/integration.jsp.

5 Configure Optional Software

If you purchased optional software for the Data Domain system such as Replicator or Retention Lock, the licenses are enabled on your Data Domain system prior to shipment. You need to configure them for use. Details on configuring the optional software can be found in the *EMC Data Domain Operating System Administration Guide.* Access the latest documents at https://my.datadomain.com/US/en/platform.jsp.

6 Perform Optional Additional System Configuration

ADDITIONAL SYSTEM CONFIGURATION

Any system command that accepts a list, such as a list of IP addresses, accepts entries separated by either commas or spaces. See the *EMC Data Domain Operating System Command Reference Guide* for command details.

Give access to additional backup servers:

```
# nfs add /backup {*|client-list}
[options]
```

Add users to the email list that reports system problems:

```
# alerts notify-list add group-name
```

Add users to the system report email list:

```
# autosupport add {alert-summary|asup-detailed}
emails email-list
```

Enable FTP or TELNET:

```
# adminaccess enable {ftp|telnet}
```

Add remote hosts to use FTP or TELNET:

```
# adminaccess add {ftp|telnet}
fqdn-host-list
```

Add a user:

```
# user add name [role {admin|user}]
```

Change a user's password:

```
# user change password username
```

Enable remote management:

Refer to the *EMC Data Domain Operating System Administration Guide*.

TO SHUT DOWN THE SYSTEM

Important: Never shut down the system by pressing the power button. Instead, use:

```
# system poweroff
```

Troubleshooting Tips

For troubleshooting information see the Data Domain Support web site https://my.datadomain.com.

Where to Go for More Information

For information about	Go to https://my.datadomain.com/US/en/documentation.jsp for
How to configure the system	*EMC Data Domain Operating System Initial Configuration Guide*
New features, enhancements, known issues, and late-breaking news	*EMC Data Domain Operating System Release Notes* for your software release
How to manage the Data Domain operating system	*EMC Data Domain Operating System Administration Guide* for your software release
How to install and use the DD Boost software and plug-in	*EMC Data Domain Boost for OpenStorage Administration Guide* for your platform
How to replace Data Domain hardware components	Part Installation Guides
How to use third-party applications	Integration Documentation and Compatibility Matrices
How to configure mixed ES20 and ES30 systems	*ES30 Hardware Guide*

Specifications

Model	System Heat Output Watts	System Heat Output BTU/hr	Power (VA)	Weight	Rack Mounted Dimensions WxDxH		
DD4500 with Extended Retention	800	2730	800	80 lb / 36.3 kg	17.5 in / 44.5 cm	33 in / 84 cm	7 in / 17.8 cm
ES30	235	800	280	68 lb / 30.8 kg	19 in / 48.3 cm	14 in / 35.5 cm	5.25 in / 13.3 cm

Operating Temperature	50° to 95° F (10° to 35° C), derate 1.1° C per 1000 feet, above 7500 feet up to 10,000 feet
Operating Humidity	20% to 80%, non-condensing
Non-operating Temperature	-40° to +149° F (-40° to +65° C)
Operating Acoustic Noise	DD4500: Sound power, L_{WAd}: 7.52 bels. Sound pressure, L_{pAm}: 56.4 dB. (Declared noise emission per ISO 9296.) Expansion Shelves: Sound power, L_{WAd}: 6.5 bels, Sound pressure, L_{pAm}: 48.5 dB. (Declared noise emission per ISO 9296.)

Site Requirements

Requirement	Description and Specification
Vertical Space in Standard 19", Four Post Rack	DD4500 with Extended Retention Software Controller: 4U. Expansion Shelf: 3U. Do not use a two-post rack. See the included slide rail and installation documentation instructions for installing in a rack.
Air Conditioning	Use air conditioning that can cope with the maximum BTU/hr thermal rating.
Temperature Controls	Use adequate temperature control with a gradient (change) not to exceed 20° C in an hour.
Ventilation and Airflow	In a closed or multi-unit rack, ensure that the unit has adequate airflow through the front bezel and back panel and that the ambient air temperature requirements are met. Ensure that the front bezel and back panel clearances are met. Ensure that cables at rear of unit do not obstruct exhaust airflow. If installing in a closed cabinet, ensure that the front and rear doors have at least 65% open area to ensure adequate airflow for cooling.
Front Bezel Clearance	1.56 inches (4.0 cm) of unobstructed clearance.
Back Panel Clearance	5 inches (12.7 cm) of unobstructed clearance.
Power / Grounding	AC power outlets provided with an earth ground conductor (safety ground). A safe electrical earth connection must be provided to each power cord. **Voltage:** 200-240 V~. **Frequency:** 50 to 60 Hz.

Contact Information

TECHNICAL CONTACTS

To resolve issues with Data Domain products, contact your contracted support provider or visit us online at https://my.datadomain.com.

CORPORATE CONTACTS

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