

Hardware Overview

EMC Data Domain DD4200, DD4500, and DD7200 Systems

Hardware Overview

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This document describes the hardware components of Data Domain DD4200, DD4500, and DD7200 systems.

◆ Related Documentation	2
◆ System Features	3
◆ Storage Capacity	5
◆ Front Panel	6
◆ Back Panel	10
◆ IO Modules and Slot Assignments	11
◆ Internal System Components	13

Related Documentation

Note

Hard copies of a document may be out of date. Always check for the current version of a document on the EMC Support website at <https://support.emc.com>.

There are various types of documents available that are related to the use of Data Domain products:

- ◆ End user documents, for example, user guides, hardware installation guides, administrator guides, software guides, part replacement guides, release notes and others.
- ◆ Integration documents about how to integrate Data Domain systems with third party backup applications.
- ◆ Compatibility matrices that show which components are compatible with each other.

View EMC Data Domain Documents

Procedure

1. Connect to the EMC Support website at <https://support.emc.com>.
2. If you are a registered user, log in and skip to the next step. Otherwise, perform the following:
 - a. Click **Register Here**.
 - b. Follow the online registration steps, filling in all required fields.
 - c. Once your registration is processed, you will receive an email confirmation.
3. Click the **Support by Product** option.
4. Enter a product name in the **Find a Product** field, for example, DD990. Click the search icon at the right of this field.
5. On the next screen, click **Documentation**.
6. On the right side of the screen, all documents are displayed that fit the criteria. A menu on the left side of the screen automatically populates with various categories of the displayed documents, for example, *Manual and Guides*.
7. You can store a search by clicking **Add to my favorites**.
8. When you revisit the **Support by Product** page, your most recent searches are displayed at the bottom of the screen.

Your suggestions help us continue to improve the accuracy, organization, and overall quality of the user publications. Please send your opinions of any document to DPAD.Doc.Feedback@emc.com.

System Features

The table summarizes the DD4200, DD4500, and DD7200 system features.

Table 1 DD4200, DD4500, and DD7200 System Features

Feature	DD4200, DD4500, and DD7200
Rack Height	4U, supported in four-post racks only
NVRAM	One 4-GB NVRAM module (and companion BBU) for data integrity during a power outage
Power	1 +1 redundant, hot-swappable power units
Fans	Hot-swappable, redundant, 5
Drives	SSD drives, 3 x 200 GB (base 10)
IO Module Slots	Nine replaceable IO module (Fibre Channel, Ethernet, and SAS) slots, one BBU, one NVRAM, and one Management module slot. See Management Module and Interfaces on page 10 and IO Modules and Slot Assignments on page 11 .
Memory	<p>DD4200:</p> <ul style="list-style-type: none"> A system (128 GB of memory) supports up to 8 x 2-TB or 5 x 3-TB shelves adding up to 189 TB of usable external capacity. DD4200 systems enabled with DD Extended Retention software have 128 GB of memory installed and support up to 24 x 2-TB or 16 x 3-TB shelves adding up to 569 TB of usable external capacity. If lower-capacity 1 TB-drive-based shelves are used, the maximum configuration will also be limited by a maximum shelf count of 32. <p>DD4500:</p> <ul style="list-style-type: none"> A system (192 GB of memory) supports up to 12 x 2-TB or 8 x 3-TB shelves adding up to 285 TB of usable external capacity. DD4500 systems enabled with DD Extended Retention software have 192 GB of memory installed and support up to 32 shelves adding up to 1140 TB of usable external capacity. If lower-capacity 1 TB-drive-based shelves are used, the maximum configuration will also be limited by a maximum shelf count of 40. <p>DD7200:</p> <ul style="list-style-type: none"> Systems with 128 GB of memory installed support up to 12 x 2-TB or 8 x 3-TB shelves adding up to 285 TB of usable external capacity. Systems with 256 GB of memory installed support up to 18 x 2-TB or 12 x 3-TB shelves adding up to 428 TB of usable external capacity. DD7200 systems enabled with DD Extended Retention software have 256 GB of memory installed and support up to 56 shelves adding up to a maximum of 1.7 PB of usable external capacity.
Rack Mounting	Rack mount kit included with each system. Adjustable between 24 - 36 in. (60.9 - 76.2 cm).

Table 1 DD4200, DD4500, and DD7200 System Features (continued)

Feature	DD4200, DD4500, and DD7200
Processors	Two 8-core processors

Storage Capacity

The table lists the capacities of the systems. EMC Data Domain system internal indexes and other product components use variable amounts of storage, depending on the type of data and the sizes of files. If you send different data sets to otherwise identical systems, one system may, over time, have room for more or less actual backup data than another.

Table 2 DD4200, DD4500, and DD7200 Storage Capacity

System/ Installed Memory	Internal Disks (SATA SSDs)	Data Storage Space	External Storage ²
DD4200 (2 SAS IO modules) 128 GB	2.5 in. 3 @ 200 GB No User Data	189 TB	Up to a maximum of 8 x 2-TB or 5 x 3-TB shelves.
DD4200 with Extended Retention software ¹ (4 SAS IO modules) 128 GB	2.5 in. 3 @ 200 GB No User Data	569 TB	Up to a maximum of 24 x 2-TB and 16 x 3-TB shelves.
DD4500 (2 SAS IO modules) 128 GB	2.5 in. 3 @ 200 GB No User Data	285 TB	Up to a maximum of 12 x 2-TB or 8 x 3-TB shelves.
DD4500 with Extended Retention software ¹ (4 SAS IO modules) 128 GB	2.5 in. 3 @ 200 GB No User Data	1140 TB	Up to a maximum of 32 x 2 or 3-TB shelves.
DD7200 (2 SAS IO modules) 128 GB	2.5 in. 3 @ 200 GB No User Data	285 TB	Up to a maximum of 12 x 2-TB or 8 x 3-TB shelves.
DD7200 (2 SAS IO modules) 256 GB	2.5 in. 3 @ 200 GB No User Data	428 TB	Up to a maximum of 18 x 2-TB or 12 x 3-TB shelves.
DD7200 with Extended Retention software ¹ (4 SAS IO modules) 256 GB	2.5 in. 3 @ 200 GB No User Data	1.7 PB	Up to a maximum of 56 shelves.

¹ EMC Data Domain DD4200, DD4500, and DD7200 controller with DD Extended Retention software

² The capacity will differ depending on the size of the external storage shelves used. This data based on ES30 shelves.

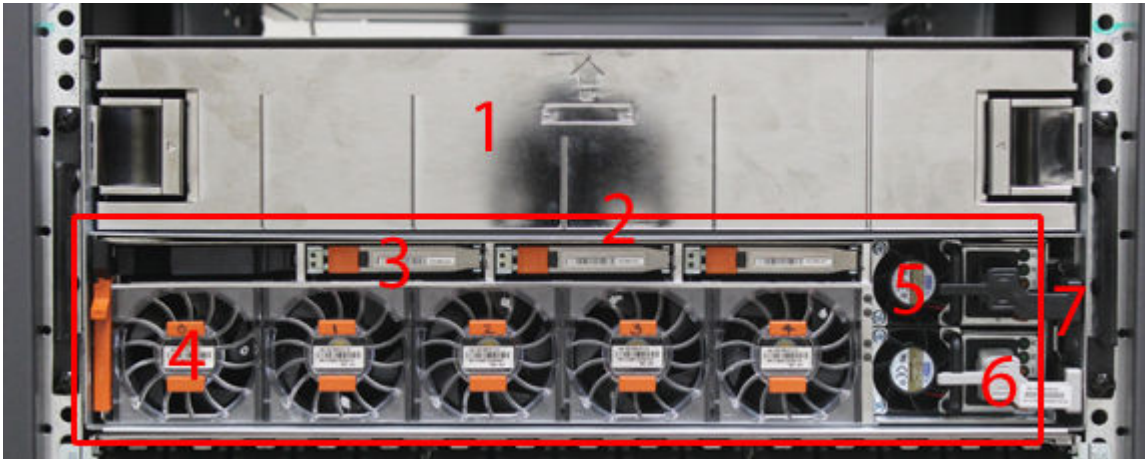
Note

For information about Data Domain expansion shelves, see the separate document, *EMC Data Domain Expansion Shelf Hardware Guide*.

Front Panel

The photo shows the hardware features and interfaces on the front of the system.

Figure 1 Front panel components



(1)	Filler panel
(2)	The red box indicates the system processor (SP) module
(3)	SSD drive #1
(4)	Fan #0
(5)	Power supply #B
(6)	AC power disconnect plug
(7)	AC power extender module

Power Supply Units

A system has two power supply units, numbered A and B from the bottom up. Each power supply has its own integral cooling fan. Each power unit has three LEDs (see [Figure 3 on page 8](#)) that indicates the following states:

- ◆ AC LED: Glows green when AC input is good
- ◆ DC LED: Glows green when DC output is good
- ◆ Symbol “!”: Glows solid or blinking amber for fault or attention

The AC power plugs are located to the right of each power supply. These plugs are pulled to disconnect AC power to each power supply.

AC Power Extender Module

AC power entry is connected at the rear of the system. The AC power extender module provides power to the two power supplies located at the front of the system. AC Power

plugs are located in the front. The module is adjacent to the SP module and can be removed and replaced.

Cooling Fans

A system contains five hot-swappable cooling fans in a 4+1 redundant configuration. The fans provide cooling for the processors, DIMMs, IO modules, and the management module. Each fan has a fault LED which causes the fan housing to glow amber. A system can run with one fan faulted or removed.

Solid State Drives (SSD)

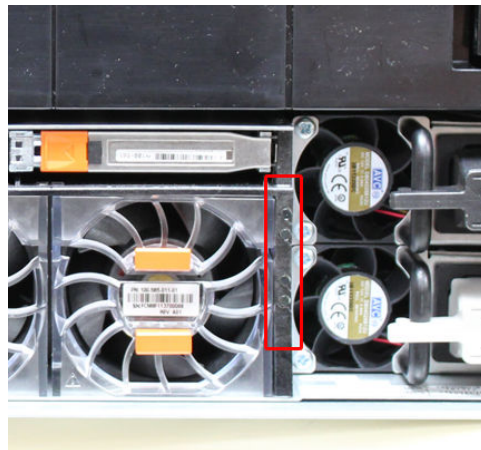
A system contains three hot-swappable 2.5" SSD drive bays located in the front and on top of the fan modules. There are four drive bays, with the leftmost bay containing a blank. The next drive to the right of the blank is SSD #1, the next is #2, and the right-most bay contains SSD #3. No user backup data is kept on the SSDs.

Each drive has a blue colored power LED and an amber fault LED.

Front LED Indicators

The photo below indicates the location of the four system LEDs.

Figure 2 System LEDs



The next photo shows the location of the system LED legend label. [Figure 4 on page 8](#) shows the power supply LEDs. Other front LEDs are shown in [Figure 5 on page 9](#). LED states are described in [Table 3 on page 9](#).

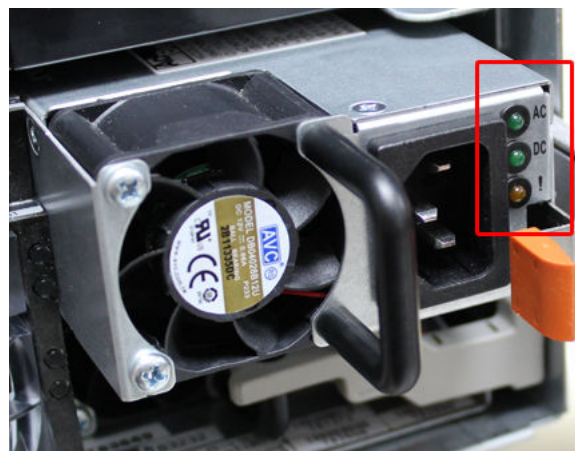
Figure 3 System LED legend label



The power supply LEDs include:

- ◆ AC LED on top
- ◆ DC LED in the middle
- ◆ Failure LED on the bottom

Figure 4 Power supply LEDs



Each SSD has two LEDs as shown in the following figure. The lower left corner of the housing around each fan acts as an LED, glowing amber when the fan has failed.

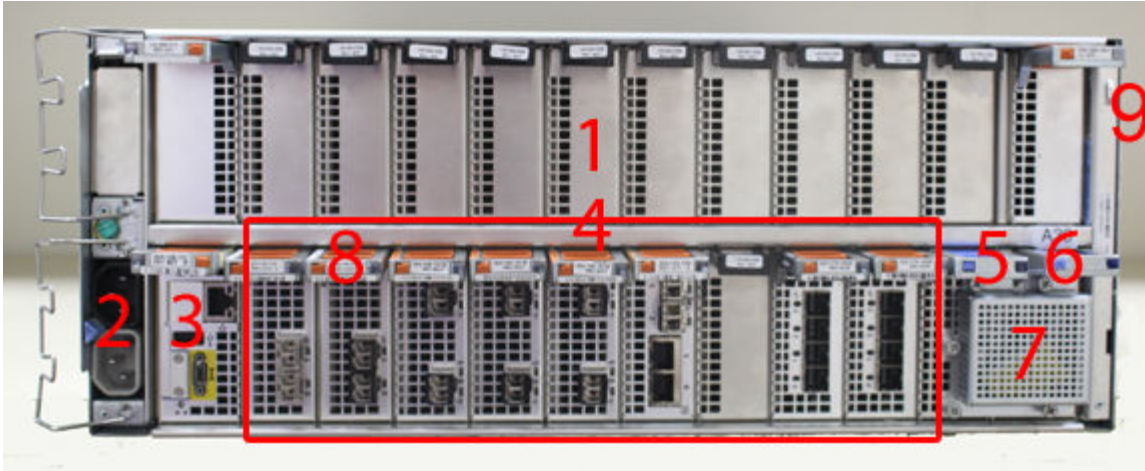
Figure 5 Fan and SSD LEDs**Table 3** LED status indicators

Part	Description or Location	State
System	Dot within a circle (top LED)	Blue indicates power on and normal operation.
System, SP fault	Exclamation point within a triangle	Dark indicates normal operation. Amber indicates failure.
System, chassis fault	Exclamation point within a triangle with a light below	Dark indicates normal operation. Yellow indicates a fault condition.
System	Marked out hand within a black square (bottom LED)	White warns not to remove the unit.
Power supply	AC LED	Steady green indicates normal AC power.
Power supply	DC LED	Steady green indicates normal DC power.
Power supply	Failure LED	Solid amber indicates a failed power supply.
SSD	Top LED	Solid blue, disk ready, blinks while busy.
SSD	Bottom LED	Dark indicates healthy. Solid amber indicates disk fail.
Fan	Fan housing	The fan housing glows an amber color during fan failure.

Back Panel

The photo shows the hardware features and interfaces on the back of the system.

Figure 6 Features on rear of chassis



(1)	Upper level contains all blanks
(2)	AC power extender module
(3)	Management module (slot Mgmt A)
(4)	Red box indicating IO modules (slots 0-8)
(5)	Battery backup (BBU in slot 9)
(6)	NVRAM module (slot 10)
(7)	Cage covering the BBU and NVRAM combination module
(8)	IO LED at the end of each IO module handle
(9)	Location of serial number label/tag

Note

For modules containing multiple ports, the bottom port is numbered as zero (0) with numbers increasing going upward.

IO Module LEDs

Each IO module ejector handle contains a bi-colored LED. Green indicates normal function, while an amber color indicates a fault condition.

Management Module and Interfaces

The management module is located on the far left side when facing the back of the system, in slot Mgmt A. The process to remove and add a management module is the same as the IO modules, however, the management module can only be accommodated in Mgmt A slot.

The management module contains one external LAN connection for management access to the SP module. One micro DB-9 connector is included to provide the console. A USB port is provided for use during service of the system to allow booting from a USB flash device.

Figure 7 Interfaces on the management module



(1)	Ethernet port
(2)	USB port
(3)	Micro serial port

IO Modules and Slot Assignments

The table shows the IO module slot assignments for the systems. See [Figure 6 on page 10](#) for a view of the slot positions on the back panel and [Figure 8 on page 13](#) for a top view.

Table 4 DD4200, DD4500, and DD7200 Slot Assignments

Slot Number	DD4200, DD4500, and DD7200	DD4200, DD4500, and DD7200 with Extended Retention Software ¹
MGMT A	Management module	Management module
0	Fibre Channel (FC), Ethernet or empty	FC, Ethernet or empty
1	FC, Ethernet or empty	FC, Ethernet or empty
2	FC, Ethernet or empty	FC, Ethernet or empty
3	FC, Ethernet or empty	FC, Ethernet or empty
4	Ethernet or empty	Ethernet or empty
5	Ethernet or empty	SAS
6	Empty	SAS
7	SAS	SAS
8	SAS	SAS

Table 4 DD4200, DD4500, and DD7200 Slot Assignments (continued)

Slot Number	DD4200, DD4500, and DD7200	DD4200, DD4500, and DD7200 with Extended Retention Software ¹
9	BBU	BBU
10	NVRAM	NVRAM

¹EMC Data Domain controller with the DD Extended Retention software option

Slot Addition Rules

- ◆ A maximum of six optional IO modules (FC plus Ethernet) are allowed in systems without Extended Retention software, and a maximum of five optional IO modules (FC plus Ethernet) are allowed in systems with Extended Retention software.
- ◆ Additional FC module(s) should be installed in numerically increasing slot numbers immediately to the right of the existing FC modules, or starting in slot 0 if no FC modules were originally installed. A maximum of four FC modules are allowed in a system.
- ◆ Additional Ethernet modules should be installed in numerically decreasing slot numbers immediately to the left of the existing Ethernet modules or starting in slot 4 if no Ethernet modules were originally installed. For systems without Extended Retention software, a maximum of six (limited to four of any one type) Ethernet modules can be present. For systems with Extended Retention software, a maximum of five (limited to four of any one type) Ethernet modules can be present.
- ◆ All systems include two SAS modules in slots 7 and 8. Systems with Extended Retention software must have two additional SAS modules in slots 5 and 6.
- ◆ For systems without Extended Retention software, if adding IO modules results in the allowed maximum of six IO modules present, slot 5 will also be used. Slot 5 should only be used for an Ethernet module. Adding FC modules in this specific case will require moving an existing Ethernet module to slot 5. Other than this specific case, it is not recommended to move IO modules between slots.
- ◆ Adding Extended Retention software to a system involves adding two SAS modules in slots 5 and 6. If the system originally had the maximum of 6 optional IO modules, the IO module in slot 5 must be permanently removed from the system.

Fibre Channel (FC) IO Module Option

An FC IO module is a dual-port Fibre Channel module. The optional virtual tape library (VTL) feature requires at least one FC IO module. Boost over Fiber Channel is optional and the total FC HBAs cannot exceed more than allowable Fibre Channel cards per controller.

Ethernet IO Module Options

The available Ethernet IO modules are:

- ◆ Dual Port 10GBase-SR Optical with LC connectors
- ◆ Dual Port 10GBase-CX1 Direct Attach Copper with SPF+ module
- ◆ Quad Port 1000Base-T Copper with RJ-45 connectors
- ◆ Quad port 2 port 1000Base-T Copper (RJ45) / 2 port 1000Base-SR Optical

Internal System Components

The photo shows the system with the system processor (SP) module removed from the chassis and the SP cover removed.

Figure 8 Top view of SP module with SP cover removed



(1)	Front of system
(2)	Four groups of 4 DIMM cards

DIMM Modules

- ◆ DD4200 systems contain 16 x 8 GB of memory DIMM.
- ◆ DD4500 systems contain 8 x 8 GB and 8 x 16 GB of memory DIMM. DIMMs must be in specific slots based on DIMM size.
- ◆ DD7200 systems with 128 GB of memory contain 8 x 16 GB DIMMs, with 8 empty DIMM slots.
- ◆ DD7200 systems with 256 GB of memory contain 16 x 16 GB DIMMs.

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