

# CSM200 Expansion Tray

## Initial Setup Guide for SANtricity users or VTL environments

EC1718-1-E3, Third Edition



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## **Document Description**

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This document will remain the official reference source for all revisions and releases of this product until rescinded by an update.

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# Step 1 – Preparing for an Installation

Use this guide to install the CSM200 drive module. Refer to the Initial Setup Guide for your command module or array module for instructions on installing the entire storage array.

## Key Terms

**Environmental Services Monitor (ESM)** – A device in the drive module that monitors the status of the components. It also serves as the connection point to transfer data between the drive module and the command module or array module. Each drive module has two ESMs.

**Command Module** – A compact unit that contains controllers, power supplies, batteries, and fans.

**Array Module** – A compact unit that contains a collection of both physical components, such as drives, controllers, power supplies, and fans, and logical components, such as volume groups and volumes.

## Gathering Items

Use [Table 1](#) to verify that you have all the necessary items to install the drive module.

Table 1 Necessary Items

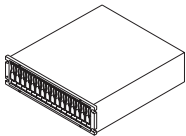
	Item	Included with Drive Module
<b>Basic Hardware</b>		
	Support rails and screws	✓

Table 1 Necessary Items (continued)

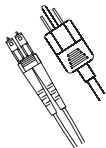




	Item	Included with Drive Module
<b>Cables and Connectors</b>		
	<p>AC power cords</p> <p>The AC power cords shipped with the drive module are for connection to an external AC power source (wall plug). Your cabinet might have special AC power cords that you use instead of the AC power cords shipped with the drive module.</p>	
	<p>(Optional) Two DC power connector cables are provided with each drive module for connection to centralized DC power plant equipment.</p> <ul style="list-style-type: none"> <li>• Four DC power connector cables are provided if additional redundancy is required.</li> <li>• <b>A qualified service person is required to make the DC power connection.</b> A two-pole 20-amp circuit breaker is required between the DC power source and the drive module for over-current and short-circuit protection. Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.</li> </ul>	  For the DC power option only

Table 1 Necessary Items (continued)

	Item	Included with Drive Module
	<p>Fiber-optic cables and Small Form-factor Pluggable (SFP) transceivers (For connections to the host and within the storage array)</p> <ul style="list-style-type: none"> <li>• Fiber-optic cables                             <ul style="list-style-type: none"> <li>• Require SFP transceivers.</li> <li>• Two cables are included with the drive module.</li> </ul> </li> <li>• SFP transceivers                             <ul style="list-style-type: none"> <li>• Provide the connection for fiber-optic cables.</li> <li>• Four included with drive module.                                     <ul style="list-style-type: none"> <li>Two are installed in the Out ports of the ESM.</li> <li>Two are included for connecting to other modules.</li> </ul> </li> </ul> </li> <li>• Depending on your connection requirements, you might need to purchase additional cables or cables of different lengths and additional SFP transceivers (two per cable).</li> </ul>	<p style="text-align: center;"></p> <p>For optical connections only</p> <p>Fiber-optic cables versus copper cables (See <a href="#">Figure 1</a> on page 5)</p>
	<p>Copper cables (For connections within the storage array)</p> <ul style="list-style-type: none"> <li>• Copper cables do not require separate SFP transceivers. The SFP transceivers are integrated into the cables themselves.</li> <li>• Two cables are included with the drive module.</li> <li>• Depending on your connection requirements, you might need to purchase additional cables or cables of different lengths.</li> </ul>	<p style="text-align: center;"></p> <p>For copper connections only</p> <p>Fiber-optic cables versus copper cables (See <a href="#">Figure 1</a>)</p>
	<p>Serial cable</p> <p>This cable is used for support only. You do not need to connect it during initial installation.</p>	

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**NOTE** Refer to the initial setup guide for your command module or array module for additional necessary items.

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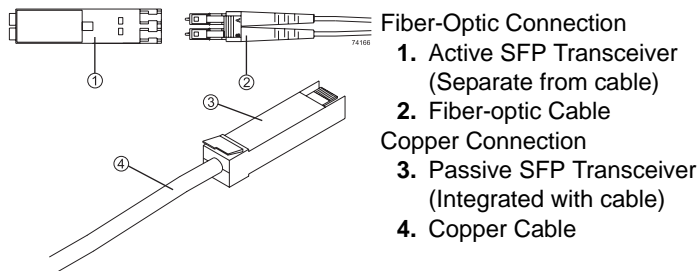


Figure 1 Fiber-optic Cable and Copper Cable with SFP Transceiver

## Things to Know – Taking a Quick Glance at the Hardware

- The top-left ESM is inverted from the bottom-right ESM.
- The top-right power-fan CRU is inverted from the bottom-left power-fan CRU.
- The drive module is in the correct (top) orientation when the lights of the drives are at the bottom (Figure 2 on page 6).
- You can order an optional DC power supply connection and connector cables for the drive module (Figure 2 on page 6). **A qualified service person is required to make the DC power connection.** A two-pole 20-amp circuit breaker is required between the DC power source and the drive module for over-current and short-circuit protection. (Figure 3 on page 7). Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.
- Four fans pull air through the drive module from front to back across the drives (Figure 4 on page 7).

Step 1 – Preparing for an Installation .....

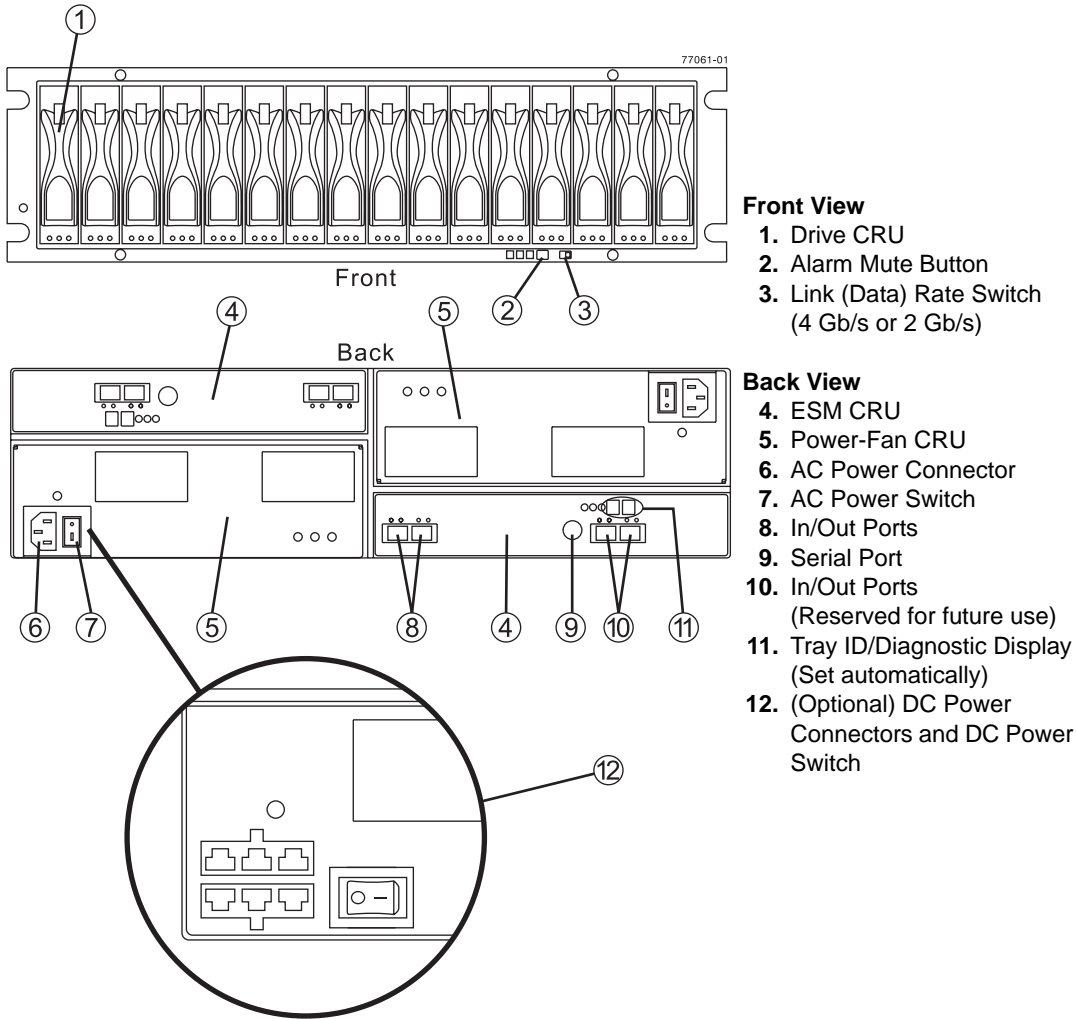


Figure 2 Front View and Back View of the CSM200 Drive Module

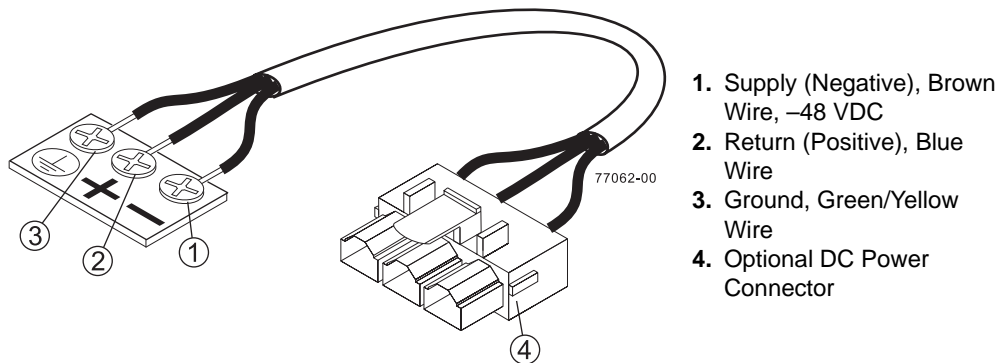


Figure 3 Optional DC Power Connector Cable and Source Wires

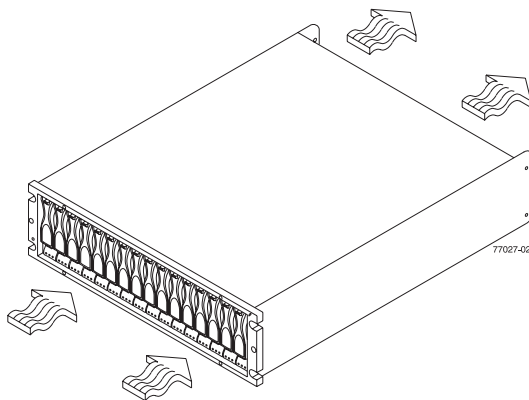


Figure 4 Airflow through the Drive Module

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**NOTE** The drive module is available in rackmount models and deskside models. The components for the deskside model are identical to the components of the rackmount model. The deskside model is situated as if the rackmount model is sitting on its left side.

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## Step 2 – Installing the Drive Module

### Things to Know

- There are no special site preparation requirements for this drive module beyond what is normally found in a computer lab environment.
- The power supplies meet standard voltage requirements for both domestic and worldwide operation.
- Add the drive module in a location within the cabinet that keeps the drive modules evenly distributed around the command module or array module. In addition, you want to keep the majority of the weight in the bottom half of the cabinet. Refer to the Initial Setup Guide for your command module or array module for more details on the installation order and the distribution of drive modules in the cabinet.

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**CAUTION Risk of equipment malfunction** – To avoid exceeding the functional and environmental limits, install only drives that have been provided or approved by the original manufacturer. Not all drive modules are shipped with pre-populated drives. System integrators, resellers, system administrators, or users of the drive module can install the drives.

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**CAUTION Electrostatic discharge can damage sensitive components** – Always use proper antistatic protection when handling components. Touching components without using a proper ground might damage the equipment.

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**IMPORTANT** Ensure that the combined power requirements of your modules do not exceed the power capacity of your cabinet. Refer to your cabinet documentation for safety, weight, and power restrictions.

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## Steps to Install – Rackmount Drive Module

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**WARNING** (W09) **Risk of bodily injury** –



>35 kg (70.5 lbs)

Three persons are required to safely lift the component.

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**1** Lower the feet on the cabinet to keep it from moving.

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**NOTE** Ensure the cabinet meets the clearance requirements, 76 cm (30 in.) in front of the cabinet and 61 cm (24 in.) in back of the cabinet.

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**2** Attach the support rails to the cabinet. For more information, refer to the installation instructions included with your support rails.

- If you are installing the support rails above an existing module, position the rails directly above the module
  - If you are installing the support rails below an existing module, allow 13.3-cm (5.25-in.) vertical clearance for a drive module
- 

**NOTE** The back of the drive module contains two ESMs. The front of the drive module contains the drives. The drive module is in the correct (top) orientation when the lights of the drives are at the bottom (see [Figure 2](#) on page 6).

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**3** With the help of two other people, slide the back of the drive module onto the support rails.

The front mounting holes on each side of the drive module should be aligned with the mounting holes on the front of the support rails.

Step 2 – Installing the Drive Module . . . . .

- 4 Secure the front of the drive module to the cabinet by using four screws to attach the front.

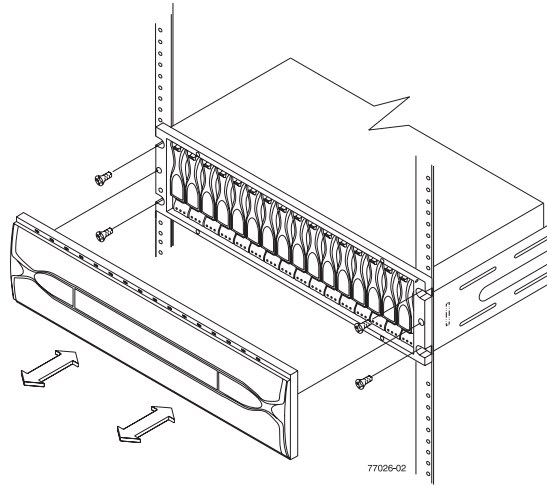


Figure 5 Securing the Drive Module to the Cabinet

- 5 Secure the back of the drive module to the cabinet by using two screws to attach the flange on each side of the back of the module to the support rails.
- 6 If you have not done so already, use [Figure 2](#) on page 6 to review the front and the back of the drive module.

## Step 3 – Setting the Link (Data) Rate Switch

### Things to Know – Link Rate Switch

- The Link Rate switch enables you to select the data transfer rate between the ESMs, drives, and controllers. The Link Rate lights are located on the ESMs on the back of the drive module (Figure 7 on page 12).
- All drive modules connected to the same drive channel must be set to operate at the same data transfer rate (speed).
- The drives in the drive module must support the selected link rate speed.
- The setting of the Link Rate switch determines the speed of the drives.
- If a drive in the drive module does not support the link rate speed, it will show up as a bypassed drive in the storage management software.

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**IMPORTANT** Change the Link Rate switch only when there is no power applied to the drive module. Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

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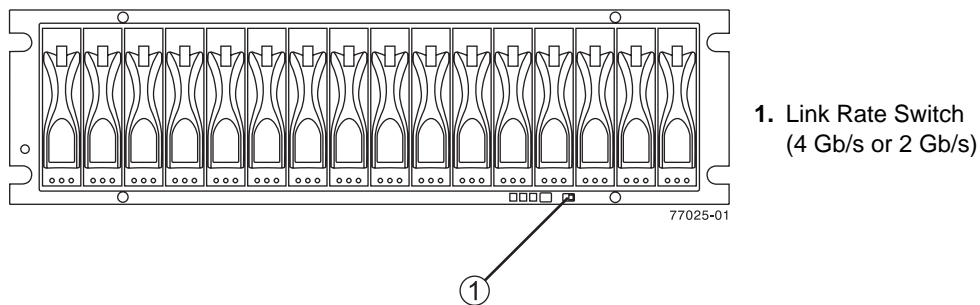


Figure 6 Setting the Link Rate Switch

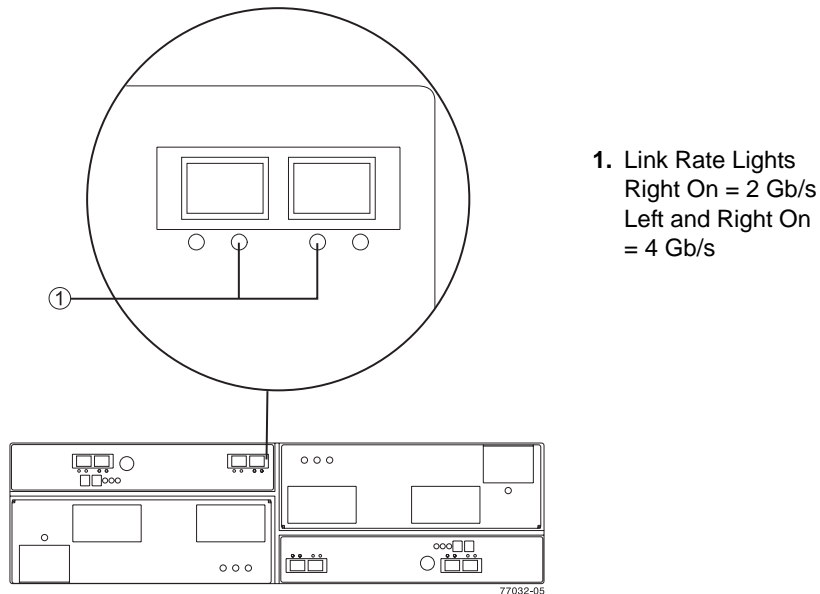


Figure 7 Link Rate Lights

## Steps to Set the Link Rate Switch

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**IMPORTANT** A drive module can be connected to either the standard AC power supply or the optional DC power supply (–48 VDC). Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

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- 1 Ensure that no power is applied to the drive module. Refer to the *CSM200 Drive Module User Guide* for instructions on turning off the power to the drive module.
- 2 Check to see if the Link Rate switch is set to the appropriate data transfer rate.
- 3 If the Link Rate switch is not set to the correct data transfer rate, move the switch to the correct position (4 Gb/s to the left or 2 Gb/s to the right).



## Step 4 – Cabling the Drive Module

### Adding Drive Modules to a New Storage Array

To cable the drive module to the storage array, refer to the Initial Setup Guide for the command module or array module to which you will connect the drive module.

### Adding Drive Modules to an Existing Storage Array

If you plan to add a new drive module to an existing storage array, select one of the three procedures listed in [Table 2](#).

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**CAUTION Potential loss of data access** – If you plan to add a drive module to an existing storage array while the storage array is powered on and receiving data I/O (method 3 below), you must contact a Customer and Technical Support representative to assist you in adding the drive module.

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**IMPORTANT** Modules can be powered by either the standard AC power supply or the optional DC power supply (–48 VDC). Before turning off any power switches on a DC-powered module, you must disconnect the two-pole 20-amp circuit breaker.

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Table 2 Procedures for Adding a Drive Module to an Existing Storage Array

Addition Methods	Storage Array Receiving Power?	Storage Array Receiving Data?	Procedure
1 – Power but no I/O activity	Yes	No	Go to “ <a href="#">Cabling A Drive Module to a Storage Array with Power but No I/O Activity</a> ” on page 14.
2 – No power and no I/O activity	No	No	Go to “ <a href="#">Cabling a Drive Module to a Storage Array with No Power and No I/O Activity</a> ” on page 15.

Table 2 Procedures for Adding a Drive Module to an Existing Storage Array (continued)

Addition Methods	Storage Array Receiving Power?	Storage Array Receiving Data?	Procedure
3 – Power and I/O activity (HotScale™ addition technology)	Yes	Yes	Contact a Customer and Technical Support representative before beginning this procedure.

### Cabling A Drive Module to a Storage Array with Power but No I/O Activity

- 1 Ensure that there is no I/O activity to the storage array.
- 2 Choose one of the following actions based on whether the drive module will be connected to the standard AC power source or the optional DC power source (–48 VDC).
  - **An AC power source will be used** – Go to step 3.
  - **A DC power source will be used** – Go to step 5.
- 3 Add the AC-powered drive module to the end of the series of existing drive modules (refer to the associated initial setup guide for the command module or array module for cabling details).
- 4 Connect an AC power cord (module end) to each AC power supply on the drive module, plug the power plug end of each cord into the cabinet AC power source, and go to step 10.
- 5 Disconnect the two-pole 20-amp DC circuit breaker for the storage array.
- 6 Ensure that all DC power switches on the DC-powered drive module and DC power switches on any connected, DC-powered drive modules or controllers are turned off.
- 7 Add the DC-powered drive module to the end of the series of existing drive modules (refer to the associated initial setup guide for the command module or array module for cabling details).
- 8 Connect the DC power connector cable to the DC power connector on the back of the drive module.

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**IMPORTANT** The three source wires on the DC power connector cable (–48 VDC) connect the drive module to centralized DC power plant equipment, typically through a bus bar located above the cabinet.

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**NOTE** It is not mandatory that the second DC power connection on each of the drive module’s DC power supplies be connected. The second DC power connection is for additional redundancy only and may be connected to a second DC power bus.

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**9 A qualified service person is required to make the DC power connection.** A two-pole 20-amp circuit breaker is required between the DC power source and DC-powered modules for over-current and short-circuit protection. Connect the DC power source wires on the other end of the DC power connector cable to the centralized DC power plant equipment as follows (see [Figure 3](#) on page 7).

- a Connect the brown –48-VDC supply wire to the negative terminal.
- b Connect the blue return wire to the positive terminal.
- c Connect the green/yellow ground wire to the ground terminal.

**10** Go to “[Step 5 – Turning on the Power and Checking for Problems](#)” on page 17.

### **Cabling a Drive Module to a Storage Array with No Power and No I/O Activity**

- 1** Add the drive module to the end of the series of existing drive modules (refer to the associated initial setup guide for the command module or array module for cabling details).
- 2** Select one of the following actions based on whether the drive module will be connected to the standard AC power source or the optional DC power source (–48 VDC).
  - **An AC power source will be used** – Go to step 3.
  - **A DC power source will be used** – Go to step 4.

Step 4 – Cabling the Drive Module . . . . .

- 3 Connect an AC power cord (module end) to each AC power supply on the drive module, plug the power plug end of each cord into the cabinet AC power source, and go to step 6.
- 4 Connect the optional DC power connector cables to the DC power connectors on the back of the drive module (see [Figure 2](#) on page 6).

---

**IMPORTANT** The three source wires on the DC power connector cable (–48 VDC) connect the drive module to centralized DC power plant equipment, typically through a bus bar located above the cabinet.

---

---

**NOTE** It is not mandatory that the second DC power connection on each of the drive module’s DC power supplies be connected. The second DC power connection is for additional redundancy only and may be connected to a second DC power bus.

---

- 5 **A qualified service person is required to make the DC power connection.** A two-pole 20-amp circuit breaker is required between the DC power source and the drive module for over-current and short-circuit protection. Connect the DC power source wires on the other end of the DC power connector cable to the centralized DC power plant equipment as follows (see [Figure 3](#) on page 7).
  - a Connect the brown –48-VDC supply wire to the negative terminal.
  - b Connect the blue return wire to the positive terminal.
  - c Connect the green/yellow ground wire to the ground terminal.
- 6 Go to “[Step 5 – Turning on the Power and Checking for Problems](#)” on page 17.

# Step 5 – Turning on the Power and Checking for Problems

## Steps to Turn on the Power and Check for Problems

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**IMPORTANT** You must turn on the power to all connected drive modules before you turn on the command module or array module. Performing this action ensures that the controllers recognize each attached drive module.

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**IMPORTANT** While the modules power on, the lights on the front and the back of the modules turn on and off intermittently.

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**IMPORTANT** Ensure that the Link Rate switch is set to the appropriate data transfer rate before turning on the power (see “[Step 3 – Setting the Link \(Data\) Rate Switch](#)” on page 11).

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- 1 Turn on both power switches on the drive module. Depending on your configuration, it can take several minutes for the drive module to power on.

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**IMPORTANT** Wait 30 seconds after turning on the power to the drive modules before you turn on the power to the command module or array module.

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- 2 Turn on the power to the command module or array module. Refer to the Initial Setup Guide for your command module or array module.
- 3 If there are any bypass lights on, check both ends of the cables to ensure that the cables are secure and that the Link Rate switch settings on the drive modules match.

Step 5 – Turning on the Power and Checking for Problems . . . . .







4 Check the lights on the front and the back of the drive module ([Table 4](#) on page 19).

5 Use [Table 3](#) to determine if any further action is required.

Table 3 Checking for Fault Lights

If	Then
There are fault lights on the modules	<ul style="list-style-type: none"> <li>• Make a note of their locations.</li> <li>• Use the storage management software to diagnose the problem. Refer to the command module or array module Initial Setup Guide for information on the storage management software.</li> </ul>
There are no fault lights on the modules	Go to “ <a href="#">Step 6 – What to Do Next</a> ” on page 22.

Table 4 Lights on the Drive Module

Light	Symbol	Location (CRUs)	Function of the Light
Power		Front frame Drive ESM	Power is applied to the drive module or CRU
Service Action Allowed		Drive ESM Power-fan	On – OK to remove the CRU See “ <a href="#">Service Action Allowed Light</a> ” on page 21.
Service Action Required (Fault)		Front frame Drive ESM Power-fan	<ul style="list-style-type: none"> <li>• Front frame – A condition has occurred on the drive module that needs attention</li> <li>• CRU – The component has failed</li> </ul>
Locate		Front frame	Assists in locating the drive module
Drive Port Bypass		ESM	Indicates if a port has been bypassed
Drive Channel Speed		ESM	Indicates the speed of the drive channel <ul style="list-style-type: none"> <li>• Right light on – 2 Gb/s</li> <li>• Both lights on – 4 Gb/s</li> </ul>

Step 5 – Turning on the Power and Checking for Problems . . . . .

Table 4 Lights on the Drive Module (continued)

Light	Symbol	Location (CRUs)	Function of the Light
AC Power	AC ~	Power-fan <b>NOTE</b> Light is directly above or below AC Power Switch and AC Power Connector	Indicates that the power supply is receiving AC input power
DC Power (Optional)	DC =	Power-fan <b>NOTE</b> Light is directly above or below DC Power Switch and DC Power Connectors	Indicates that the power supply is receiving DC input power
Direct Current (DC) Enabled	DC =	Power-fan	Indicates that the power supply is outputting DC power



## Service Action Allowed Light

Each drive, power-fan CRU, and ESM CRU has a Service Action Allowed light. The Service Action Allowed light lets you know when you can remove a component safely.

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**CAUTION** **Potential loss of data access** – Never remove a drive, a power-fan CRU, or an ESM CRU unless the Service Action Allowed light is turned on.

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If a drive, a power-fan CRU, or an ESM CRU fails and must be replaced, the Service Action Required (Fault) light on that CRU turns on to indicate that service action is required. The Service Action Allowed light will also turn on if it is safe to remove the CRU. If there are data availability dependencies or other conditions that dictate that a CRU should not be removed, the Service Action Allowed light will remain off.

The Service Action Allowed light automatically turns on or off as conditions change. In most cases, the Service Action Allowed light turns on when the Service Action Required (Fault) light is turned on for a CRU.

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**IMPORTANT** If the Service Action Required (Fault) light is turned on but the Service Action Allowed light is turned off for a particular CRU, you might have to service another CRU first. Check your storage management software to determine the action that you should take.

---

## Step 6 – What to Do Next

If you are adding a drive module to a new storage array, be sure to complete the following tasks using the storage management software:

- Set a password
- Configure email and Simple Network Management Protocol (SNMP) alerts
- Enable premium features
- Define hosts
- Configure storage

For detailed information, refer to the online help in the storage management software or to the initial setup guide for your command module or array module.

## **Regulatory Compliance Statements**

### **FCC Radio Frequency Interference Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

LSI Logic Corporation, and Sun Microsystems, Inc. are not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI Logic and Sun. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

### **Laser Products Statement**

This equipment uses Small Form-factor Pluggable (SFP) optical transceivers, which are unmodified Class 1 laser products pursuant to 21 CFR, Subchapter J, Section 1040.10. All optical transceivers used with this product are required to be 21 CFR certified Class 1 laser products. For outside the USA, this equipment has been tested and found compliant with Class 1 laser product requirements contained in European Normalization standard EN 60825-1 1994+A11. Class 1 levels of laser radiation are not considered to be hazardous and are considered safe based upon current medical knowledge. This class includes all lasers or laser systems which cannot emit levels of optical radiation above the exposure limits for the eye under any exposure conditions inherent in the design of the laser products.

LSI Logic and Sun are not responsible for any damage or injury caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by LSI Logic and Sun. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

*This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.*

*Cet appareil numérique de la classé A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.*

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## Revision Record

Edition or Revision	Date	Affected Pages or Remarks
Second edition	March 2006	Updated rail installation and cabling information.
Third edition	September 2006	Added a caution regarding the addition of unapproved drives. Added information about the DC-power option.

**Part Number:** EC1718-1-E3