



Cisco UCS C-Series Servers Linux Installation Guide

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Preface

This preface includes the following sections:

- [Audience, page v](#)
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- [Related Cisco UCS Documentation, page vi](#)
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Audience

This guide is intended primarily for data center administrators with responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security

Conventions

This document uses the following conventions:

Convention	Indication
bold font	Commands, keywords, GUI elements, and user-entered text appear in bold font .
<i>italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
<code>courierfont</code>	Terminal sessions and information that the system displays appear in <code>courier font</code> .

Convention	Indication
[]	Elements in square brackets are optional.
{x y z}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
<>	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

**Note**

Means *reader take note*.

**Tip**

Means *the following information will help you solve a problem*.

**Caution**

Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

**Timesaver**

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Warning**

Means *reader be warned*. In this situation, you might perform an action that could result in bodily injury.

Related Cisco UCS Documentation

Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/b-series-doc>.

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: <http://www.cisco.com/go/unifiedcomputing/c-series-doc> .

Other Documentation Resources

An ISO file containing all B and C-Series documents is available at the following URL: <http://www.cisco.com/cisco/software/type.html?mdfid=283853163&flowid=25821> . From this page, click **Unified Computing System (UCS) Documentation Roadmap Bundle**.

The ISO file is updated after every major documentation release.

Follow [Cisco UCS Docs on Twitter](#) to receive document update notifications.

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to ucs-docfeedback@external.cisco.com. We appreciate your feedback.



CHAPTER 1

Installation Checklists and Prerequisites

This chapter includes the following sections:

- [Installation Overview Checklist, page 1](#)
- [Installation Prerequisites Checklist, page 2](#)
- [Mounting the Installation ISO Image, page 3](#)
- [Configuring the Server Boot Order Using the KVM Console, page 4](#)

Installation Overview Checklist

Complete the following tasks to install an operating system (OS) on your C-Series Rack-Mount Server.



Note

Cisco has developed the Cisco UCS Server Configuration Utility for C-Series Rack-Mount Servers, which can perform an unattended installation of some Window and Linux operating systems. This utility is shipped with new servers on the CD, and you can also download the ISO from Cisco.com. See the user documentation for the latest release of this utility at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html

Completed?	Task	Additional Information
	Complete the prerequisites described in Installation Prerequisites Checklist, on page 2 .	For more information about installation or licensing requirements, see the documentation for the operating system you are going to install.
	Launch the KVM Console and mount the installation media.	For details, see Mounting the Installation ISO Image, on page 3 .

Completed?	Task	Additional Information
	Complete the installation as described in the procedure for your OS.	<p>For details, see one of the following:</p> <ul style="list-style-type: none"> • Installing Linux on an Internal Drive, on page 7 • Installing Linux on a Bootable SAN LUN, on page 8 • Installing Linux Using a PXE Network Environment, on page 10

Installation Prerequisites Checklist

Before you begin installing the operating system (OS), make sure that you have the following items or have completed the following tasks:

Completed?	Prerequisite
	<p>Make sure the installation-target server supports the version of the operating system (OS) you plan to install.</p> <p>For the supported versions, see the appropriate PDF or use the interactive <i>UCS Hardware and Software Interoperability Utility</i>. Both are available at the following URL: http://www.cisco.com/web/techdoc/ucs/interoperability/matrix/matrix.html.</p>
	<p>Make sure you have a configured IP address for CIMC GUI, as well as a login account with administration privileges.</p>
	<p>Make sure you have the installation media for the OS, either on a DVD or as an ISO image. If the software requires an activation key, make sure you have that information as well.</p> <p>Tip We recommend that you install the OS by placing the installation disk into the DVD drive because it is comparatively faster than using an ISO image. However, steps are also provided for mapping an ISO image as a virtual disk.</p>
	<p>Make sure you have the <i>Cisco UCS C-Series Drivers DVD</i>, or the ISO image of this DVD, for the type of C-Series server that you are using.</p> <p>The driver DVD ISO image is available from the Cisco.com support site under Unified Computing and Servers > Cisco UCS Rack-Mount Standalone Server Software > server_model Server Software > Unified Computing System (UCS) Drivers.</p> <p>To view the list of available server models, go to the following URL: http://www.cisco.com/cisco/software/navigator.html?mdfid=283612685&flowid=26802.</p> <p>Note If you download the ISO image, you need to burn the image to a DVD or use a third-party utility to mount the image on a laptop hard drive.</p> <p>During the installation, you will need to extract the appropriate driver image file from this DVD to a location accessible to the server so that it can be mounted as a virtual floppy.</p>

Completed?	Prerequisite
	If your server has an LSI MegaRAID controller, configure RAID settings for the drives in your server. If you do not configure your LSI MegaRAID LUNs before installing the OS, disk discovery failures might occur during the installation and you may see error messages such as “No Device Found.”

Mounting the Installation ISO Image

Before You Begin

Make sure you have completed the prerequisites described in [Installation Prerequisites Checklist](#), on page 2.

Procedure

-
- Step 1** In your web browser, type or select the web link for CIMC GUI.
 - Step 2** In the login window, enter your administrator username and password.
The default username is admin and the default password is password.
 - Step 3** In the **Navigation** pane, click **Remote Presence** on the **Server** tab.
 - Step 4** (Optional) If you are going to use any virtual media, such as an ISO installation image or a driver IMG file, do the following:
 - a) Go to the **Virtual Media** tab in the **Work** pane.
 - b) If the **Enabled** check box in the **Virtual Media Properties** area is not checked, check it.
 - c) If you changed the settings, click **Save Changes**.
 - Step 5** Go to the **Virtual KVM** tab in the **Work** pane.
 - Step 6** If the **Enabled** check box in the **vKVM Properties** area is not checked, check it and click **Save Changes**.
 - Step 7** Click **Launch KVM Console** in the **Actions** area.
CIMC GUI opens the **KVM Console** in a separate window.
 - Step 8** How you access virtual media depends on the version of the **KVM Console** that you are using. Do one of the following to access virtual media:
 - Click the **Virtual Media** tab.
 - Click the **VM** tab.
 - Select **Tools > Virtual Media**.
 - Step 9** Click **Add Image** and navigate to the directory containing the installation ISO image.
 - Step 10** Select the ISO image file and click **Open**.
 - Step 11** In the **Client View** area, check the check box in the **Mapped** column associated with the ISO file, then wait for mapping to complete.

Tip Click **Details** to see the mapping progress.
-

What to Do Next

Install the OS as described in the installation procedure that matches the OS you are installing.

Configuring the Server Boot Order Using the KVM Console



Note If you want to configure the boot order using CIMC GUI or CIMC CLI, see the GUI or CLI *Cisco Integrated Management Controller Configuration Guide* for the version of CIMC that you are using. The configuration guides are available at the following URL: http://www.cisco.com/en/US/products/ps10739/products_installation_and_configuration_guides_list.html

Procedure

- Step 1** If it is not already open, launch the **KVM Console**.
- Step 2** Reboot the server.
- Step 3** In the **KVM** tab of the **KVM Console**, watch the boot messages and press F2 when prompted to enter BIOS setup.
- Note** After you press F2, there is a small time interval before the BIOS setup utility is displayed because the server continues to initialize devices. It displays the utility only after initialization is complete.
- Step 4** On the BIOS setup utility screen, click the **Boot Options** tab.
- Step 5** Perform the following steps based on how your system is configured:

Install Type	Description
Internal install on a single hard drive system	<ol style="list-style-type: none"> 1 Select Boot Option #1 and press Enter. 2 In the pop-up menu, select the installation-target drive and press Enter.
Internal install on a multiple hard drive system	<ol style="list-style-type: none"> 1 On the Boot Options tab, select Hard Disk Order and press Enter. 2 On the Hard Disk Order tab, select Boot Option #1 and press Enter. 3 In the pop-up menu, select the installation-target drive and press Enter. 4 Press Esc to return to the main Boot Options tab.

Install Type	Description
Install on a Bootable SAN LUN	<ol style="list-style-type: none"><li data-bbox="747 315 1518 346">1 On the Boot Options tab, select Hard Disk Order and press Enter.<li data-bbox="747 367 1518 399">2 On the Hard Disk Order tab, select Boot Option #1 and press Enter.<li data-bbox="747 420 1518 472">3 In the pop-up menu, select the installation target SAN LUN and press Enter.<li data-bbox="747 493 1518 525">4 Press Esc to return to the main Boot Options tab.

Step 6 Press F10 to save your changes and reboot the server.



CHAPTER 2

Linux Installation

This chapter includes the following sections:

- [Installing Linux on an Internal Drive, page 7](#)
- [Installing Linux on a Bootable SAN LUN, page 8](#)
- [Installing Linux Using a PXE Network Environment, page 10](#)

Installing Linux on an Internal Drive

This procedure describes how to install Red Hat Enterprise Linux (RHEL) or SUSE Linux Enterprise Server (SLES) on an internal drive using CIMC GUI and the **KVM Console**.



Note

Cisco has developed the Cisco UCS Server Configuration Utility for C-Series Rack-Mount Servers, which can perform an unattended installation of some Window and Linux operating systems. This utility is shipped with new servers on the CD, and you can also download the ISO from Cisco.com. See the user documentation for the latest release of this utility at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html

Before You Begin

- Make sure you have completed the prerequisites described in [Installation Prerequisites Checklist, on page 2](#).
- If the hard drive in the server does **not** use the Itanium (ia64) architecture, make sure that it uses DOS MBR partitioning format for its boot device.

RHEL 4 and 5 provide support for drives that are larger than 2.2TB through the alternative partitioning scheme GUID partition table (GPT). However, the legacy PC BIOS is unable to boot off of GPT-partitioned disks and so the boot disk must use the DOS MBR partition table if it does not use the Itanium (ia64) architecture.

Procedure

- Step 1** If you are installing the OS or drivers from virtual media, launch the **KVM Console** and mount the media as described in [Mounting the Installation ISO Image](#), on page 3.
- Step 2** Power cycle the server using one of the following methods:
- In the **KVM Console**, go to the **KVM** tab and select **Macros > Ctrl-Alt-Del**.
 - In CIMC GUI, click **Summary** in the **Navigation** pane, then click **Power Cycle Server** in the **Actions** area of the **Server Summary** tab.
 - On the physical server, press the Power button.
- Step 3** (Optional) If you want to set the boot order that the server will use after the OS is installed, watch the boot messages and press F2 when prompted to enter BIOS setup, then set the boot order. For details, see [Configuring the Server Boot Order Using the KVM Console](#), on page 4.
- Step 4** To override the normal boot order and boot from the installation media, in the **KVM** tab of the **KVM Console**, watch the boot messages and press F6 when prompted to enter the Boot Menu.
- Step 5** On the **Boot Menu** screen, do one of the following:
- If you are using an ISO image, select **Cisco Virtual CD/DVD** and press Enter.
 - If you are using a physical install disk, select the disk drive in which that disk resides and press Enter.

The server reboots from the selected device and begins installing the OS from the image or disk.

- Step 6** When the installation splash screen displays, press Enter to install Linux in graphical mode.
- Step 7** Complete the installation according to the requirements and standards of your company by continuing to monitor the installation progress and answering prompts as required. After the installation is complete, the installer software ejects any physical disks, unmaps any virtual drives, and reboots the server again. The installation target that is first in the boot order is booted with the OS. For information about customizing the OS, see your OS documentation.
-

Installing Linux on a Bootable SAN LUN

This section describes how to install Red Hat Enterprise Linux (RHEL) or SUSE Linux Enterprise Server (SLES) on a bootable SAN LUN logical disk or RAID volume using CIMC GUI and the **KVM Console**.



Note

Cisco has developed the Cisco UCS Server Configuration Utility for C-Series Rack-Mount Servers, which can perform an unattended installation of some Window and Linux operating systems. This utility is shipped with new servers on the CD, and you can also download the ISO from Cisco.com. See the user documentation for the latest release of this utility at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html

Before You Begin

- Make sure you have completed the prerequisites described in [Installation Prerequisites Checklist](#), on page 2.
- Configure a LUN or RAID volume on your SAN, then connect to the SAN and verify that one (and only one) path exists from the SAN HBA to the LUN.

If you are using an LSI RAID controller or the onboard Intel ICH10R controller, see [RAID Controller Considerations](#), on page 15 for more information.

Procedure

-
- Step 1** If you are installing the OS or drivers from virtual media, launch the **KVM Console** and mount the media as described in [Mounting the Installation ISO Image](#), on page 3.
- Step 2** Power cycle the server using one of the following methods:
- In the **KVM Console**, go to the **KVM** tab and select **Macros > Ctrl-Alt-Del**.
 - In CIMC GUI, click **Summary** in the **Navigation** pane, then click **Power Cycle Server** in the **Actions** area of the **Server Summary** tab.
 - On the physical server, press the Power button.
- Step 3** (Optional) If you want to set the boot order that the server will use after the OS is installed, watch the boot messages and press F2 when prompted to enter BIOS setup, then set the boot order. For details, see [Configuring the Server Boot Order Using the KVM Console](#), on page 4.
- Step 4** To override the normal boot order and boot from the installation media, in the **KVM** tab of the **KVM Console**, watch the boot messages and press F6 when prompted to enter the Boot Menu.
- Step 5** On the **Boot Menu** screen, do one of the following:
- If you are using an ISO image, select **Cisco Virtual CD/DVD** and press Enter.
 - If you are using a physical install disk, select the disk drive in which that disk resides and press Enter.

The server reboots from the selected device and begins installing the OS from the image or disk.

- Step 6** When the installation splash screen displays, press Enter to install Linux in graphical mode.
- Step 7** At the **boot** prompt on the first installation screen, enter the kernel modifier command.
boot: linux pci=noms mpath
- Step 8** When prompted for an installation number, skip this step and continue with the installation.
- Step 9** When prompted, select **install** instead of **upgrade**.
- Step 10** When the **Partitioning** dialog appears:
- a) Select **Remove all partitions on selected drives and create default layout** from the pull-down menu.
 - b) Disable **sda** by clearing that check box.
 - c) Select **Review and modify partitioning layout**.

d) Click **Next** to continue, then click **Yes** to confirm your selections.

Step 11 Review and modify your partitioning layout or click **Next** to continue.

Step 12 When you are prompted for boot loader configuration, select **Configure advanced boot loader options** and click **Next**.

Step 13 When prompted, click **Change Drive Order**.

Step 14 On the **Edit Drive Order** screen, move **/dev/mapper/mpath0** to the top of the list and click **OK**.

Step 15 Complete the installation according to the requirements and standards of your company by continuing to monitor the installation progress and answering prompts as required.
After the installation is complete, the installer software ejects any physical disks, unmaps any virtual drives, and reboots the server again. The installation target that is first in the boot order is booted with the OS.

For information about customizing the OS, see your OS documentation.

Installing Linux Using a PXE Network Environment

This section describes how to boot RHEL or SLES from a PXE network environment using CIMC GUI and the **KVM Console**.

Before You Begin

- Make sure you have completed the prerequisites described in [Installation Prerequisites Checklist](#), on [page 2](#).
- To use PXE to boot the installation media over the network:
 - Configure the network server (NFS, FTP, or HTTP) to export the installation tree.
 - Configure the files on the TFTP server that are necessary for PXE booting.
 - Configure the MAC network port address to boot from the PXE configuration.
 - Configure the Dynamic Host Configuration Protocol (DHCP) on your DHCP server.

Follow the PXE network installation instructions in the administration guide for your OS.

If you are installing Red Hat, the administration guide is available at: <http://www.redhat.com/docs/>. If you are using SUSE Linux, the administration guide is available at: <http://www.novell.com/documentation/>.

- Create a KickStart or AutoYaST image to perform the installation. This image can be burned on a physical disk or stored on a PXE server available on the network.

Follow the KickStart installation instructions in the administration guide for your OS.

**Note**

KickStart is Red Hat's automated installation tool. AutoYaST is SUSE Linux's automated installation tool. These tools enable a system administrator to create a single image that contains the settings for some or all installation and configuration parameters that are normally provided during a typical installation. Typically, a pre-boot image is placed on a single network server and is read by multiple systems for installation, but you can also burn the image to a DVD if you want to install from physical media.

Procedure

-
- Step 1** If you are installing the OS or drivers from virtual media, launch the **KVM Console** and mount the media as described in [Mounting the Installation ISO Image, on page 3](#).
- Step 2** Power cycle the server using one of the following methods:
- In the **KVM Console**, go to the **KVM** tab and select **Macros > Ctrl-Alt-Del**.
 - In CIMC GUI, click **Summary** in the **Navigation** pane, then click **Power Cycle Server** in the **Actions** area of the **Server Summary** tab.
 - On the physical server, press the Power button.
- Step 3** To override the normal boot order and boot from the installation media, in the **KVM** tab of the **KVM Console**, watch the boot messages and press F6 when prompted to enter the Boot Menu.
- Step 4** On the **Boot Menu** screen, do one of the following:
- If you are using a KickStart or AutoYaST image residing on a network server, select the network adapter that is configured to communicate with your PXE network install server and press Enter.
 - If you are using a physical install disk, select the disk drive in which that disk resides and press Enter.

The server reboots from the selected device and begins installing the OS from the image or disk.

- Step 5** Complete the installation according to the requirements and standards of your company by continuing to monitor the installation progress and answering prompts as required. After the installation is complete, the installer software ejects any physical disks, unmaps any virtual drives, and reboots the server again. The installation target that is first in the boot order is booted with the OS. For information about customizing the OS, see your OS documentation.
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APPENDIX A

Installation Driver Information

This appendix includes the following sections:

- [Linux Installation Drivers](#), page 13

Linux Installation Drivers

The required installation drivers and detailed driver information is available on the *Cisco UCS C-Series Drivers DVD*.



Note

The *Cisco UCS C-Series Drivers DVD* ISO image is available from the Cisco.com support site under **Unified Computing and Servers > Cisco UCS Rack-Mount Standalone Server Software > server_model Server Software > Unified Computing System (UCS) Drivers** .

To view the list of available server models, go to the following URL: <http://www.cisco.com/cisco/software/navigator.html?mdfid=283612685&flowid=26802>.

The drivers are organized into top-level folders by operating system, and each operating system folder has a hierarchically structured series of subfolders that become increasing specific so that you can find the exact drivers you need. When you navigate to a folder that contains drivers, it will also contain one or more README files that describes what those particular drivers are used for.

An example of the folder structure for Linux follows:

```
Linux
  ChipSet
    Intel
      RHEL
        OS-version-number
      SLES
        OS-version-number
  Network
    vendor
      model-number
      RHEL
        OS-version-number
      SLES
        OS-version-number
  Security
    TPM
      RHEL
```

```
    OS-version-number
  SLES
    OS-version-number
Storage
  vendor
    model-number
    RHEL
      OS-version-number
    SLES
      OS-version-number
Video
  vendor
    model-number
    RHEL
      OS-version-number
    SLES
      OS-version-number
```

For example, the RHEL6.2 drivers for the Cisco UCS M81KR Virtual Interface Card can be found in the folder `Linux/Network/Cisco/M81KR/RHEL/RHEL6.2`.



APPENDIX **B**

RAID Controller Considerations

This appendix includes the following sections:

- [RAID Controller Options, page 15](#)
- [Enabling the ICH10R Onboard Controller, page 16](#)
- [Launching Option ROM-Based Controller Utilities, page 16](#)
- [Additional LSI Documentation Resources, page 17](#)

RAID Controller Options

Cisco UCS C200 M1 Server and C210 M1 Server

These servers have the following options:

- There is an Intel ICH10R onboard SATA controller on the motherboard. This controller supports RAID 0 and 1 for up to four SATA drives. This controller must be enabled in the system BIOS before you can use it, as described in [Enabling the ICH10R Onboard Controller, on page 16](#).
- You can add an LSI 1064-based controller mezzanine card. This card provides RAID 0, 1, and 1E support for up to four SAS or SATA drives.

Cisco UCS C250 M1 Server

You can add an LSI 3081-based controller card. This card provides RAID 0 and 1 support for up to eight SAS or SATA drives.

All Other UCS C-Series Servers

You can add an LSI MegaRAID controller card. These cards provide RAID 0, 1, 5, 6, 10, 50, and 60 support for up to twenty four SAS or SATA drives, depending on the LSI MegaRAID controller supported by your UCS server.

**Tip**

If you do not have a record of which option is used in the server, you can check the **Inventory** tabs in the CIMC GUI or you can reboot the server and watch the messages displayed as the system boots.

Enabling the ICH10R Onboard Controller

**Important**

The Intel ICH10R SAS controller is installed in Cisco UCS C200 and C210 servers only.

Procedure

- Step 1** In the **KVM** tab of the **KVM Console**, watch the boot messages and press F2 when prompted to enter BIOS setup.
- Note** After you press F2, there is a small time interval before the BIOS setup utility is displayed because the server continues to initialize devices. It displays the utility only after initialization is complete.
- Step 2** Go to the **Advanced** tab of the BIOS Setup utility.
- Step 3** Select **Mass Storage Controller Configuration** and press Enter.
- Step 4** Ensure that the **Onboard SATA Controller** option is set to **Enabled**.
- Step 5** Select **SATA Mode** and press Enter.
- Step 6** Select **SW RAID** and press Enter.
- Step 7** Press F10 to save your changes.
- Step 8** Press Enter to confirm your changes and reboot the server.

Launching Option ROM-Based Controller Utilities

To alter the RAID configurations on your hard drives, you can use your host-based utilities that you install on top of your host OS, or you can use the LSI option ROM-based utilities that are installed on the server.

**Note**

Cisco has also developed the Cisco Server Configuration Utility for C-Series servers, which can assist you in setting up some RAID configurations for your drives. For details, see the user documentation for the appropriate release of this utility at the following URL: http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html

Procedure

Reboot the server and watch for the appropriate prompt during boot.

- The prompt for LSI controller card utility is Ctrl-H.

- The prompt for the onboard Intel ICH10R controller utility is Ctrl-M.

For details, see the documentation for your controller.

Additional LSI Documentation Resources

For basic information on RAID and how to use the LSI utilities, see the documentation included with the utility.

You can also access the following LSI documentation on Cisco.com:

- *LSI MegaRAID SAS Software User Guide*. For LSI MegaRAID. Document number 80-00156-01, Rev. I, June 2010.

http://www.cisco.com/en/US/docs/unified_computing/ucs/3rd-party/lsi/mrsas/userguide/LSI_MR_SAS_SW_UG.pdf

- *LSI Fusion-MPT Device Management User's Guide*. For LSI 3081E. Document number DB15-000186-02, Version 1.3, January 2007.

http://www.cisco.com/en/US/docs/unified_computing/ucs/3rd-party/lsi/fmpt/userguide/LSI_FusionMPT_DevMgrUG.pdf

- *LSI SAS2 Integrated RAID Solution User Guide*. For LSI SAS1064E. Document number DB15-000543-02, Version 2.0, August 2010.

http://www.cisco.com/en/US/docs/unified_computing/ucs/3rd-party/lsi/irsas/userguide/LSI_IR_SAS_UG.pdf



Important

Cisco makes these versions available for your convenience only. You should always use the latest documentation for your LSI product.
