

# Quartus® II

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## Installation & Licensing for UNIX and Linux Workstations

Version 5.1



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**QUARTUS® II**

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# Preface

The *Quartus® II Installation & Licensing for UNIX and Linux Workstations* manual provides the information you need to install and start the Quartus II design software.

This manual is intended for all Quartus II software users, from beginning to advanced.

This manual provides comprehensive information for installing and licensing the Quartus II software, and includes information about the following topics:

- How to install the Quartus II software and related software.
- How to license the Quartus II software correctly.
- Additional workstation configuration information that allows you to properly configure a workstation for use with the Quartus II software.
- Other documentation and technical support information.

# Documentation Conventions

The *Quartus® II Installation & Licensing for UNIX and Linux Workstations* manual uses the following conventions to make it easy for you to find and interpret information.

## Typographic Conventions

Quartus II documentation uses the typographic conventions shown in the following table:

Visual Cue	Meaning
<b>Bold Initial Capitals</b>	Command names; dialog box, page, and tab titles; and button names are shown in bold, with initial capital letters. For example: <b>Find Text</b> command, <b>Save As</b> dialog box, and <b>Start</b> button.
<b>bold</b>	Directory names, project names, disk drive names, file names, file name extensions, software utility names, software executable names, and options in dialog boxes are shown in bold. Examples: <b>quartus</b> directory, <b>d:</b> drive, <b>license.dat</b> file.
Initial Capitals	Keyboard keys, user-editable application window fields, and menu names are shown with initial capital letters. For example: Delete key, the Options menu.
“Subheading Title”	Subheadings within a manual section are enclosed in quotation marks. In manuals, titles of Help topics are also shown in quotation marks.
<i>Italic Initial Capitals</i>	Help categories, manual titles, section titles in manuals, and application note and brief names are shown in italics with initial capital letters. For example: <i>FLEXlm End Users Guide</i> .
<i>italics</i>	Variables are enclosed in angle brackets (< >) and shown in italics. For example: <file name>, <CD-ROM drive>.
Courier font	Anything that must be typed exactly as it appears is shown in Courier. For example: <code>\quartus\bin\lmulti lmhostid</code> .
	Enter or return key.
	Bullets are used in a list of items when the sequence of the items is not important.
	The checkmark indicates a procedure that consists of one step only.
	The hand points to information that requires special attention.

Visual Cue	Meaning
	The feet show you where to go for more information on a particular topic.
	The exclamation mark points to information or action that you take that can cause harm to your computer or cause you to lose data.

## Terminology

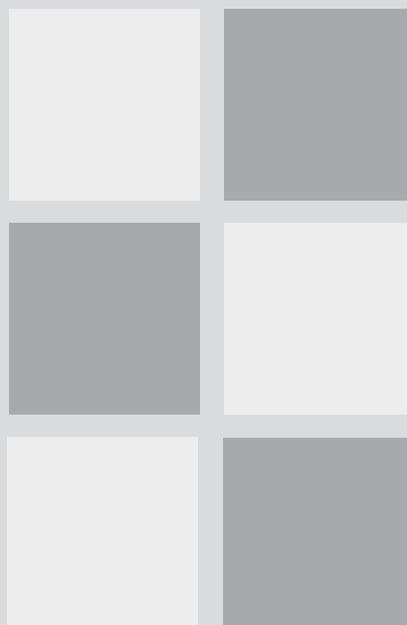
The following table shows terminology that is used throughout the *Quartus II Installation & Licensing for UNIX and Linux Workstations* manual:

Term	Meaning
“click”	Indicates a quick press and release of the left mouse button.
“double-click”	Indicates two clicks in rapid succession.
“choose”	Indicates that you need to use a mouse or key combination to start an action.
“select”	Indicates that you need to highlight text and/or objects or an option in a dialog box with a key combination or the mouse. A selection does not start an action. For example: <b>Select Chain Description File</b> , and click <b>OK</b> .
“turn on”/“turn off”	Indicates that you must click a check box to turn a function on or off.

# Chapter One

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## Installing the Quartus II Software



### What's in Chapter 1:

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# 1

# Introduction

This section describes the requirements and procedures for installing the following software CD-ROM versions (some listed CD-ROMs may not be included in your current Altera® package):

- Quartus® II Design Software for UNIX Workstations Version 5.1 (Solaris 8 and 9 only)
- Quartus II Design Software for Linux Workstations Version 5.1 (Red Hat Linux 8.0 & Red Hat Enterprise Linux 3.0 only)
- Quartus II Device Information for UNIX & Linux Workstations Version 5.1
- Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II Software (ModelSim®) Version 6.0e
- MegaCore® IP Library Version 5.1
- Nios II Embedded Processor, Evaluation Edition, Version 5.1 for Linux

## Quartus II System Requirements

Your system must meet the following minimum requirements:

- One of the following workstations:
  - Sun Ultra workstation with 256-MB system memory running Solaris version 8 or 9 (for 32-bit and 64-bit Solaris workstations)
  - Intel Pentium III or compatible processor-based PC operating at 450 MHz or faster with 256-MB system memory, running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0 (for 32-bit Linux workstations)
  - AMD64 processor or Intel EM64T processor or compatible processor-based PC with 1-GB memory, running Red Hat Enterprise Linux 3.0 (for 64-bit Linux workstations)
- The following disk space requirements:
  - For Sun Solaris workstations, 1.79 GB of available disk space on the drive or partition where you are installing the Quartus II software

- For Linux workstations, 1.73 GB of available disk space on the drive or partition where you are installing the Quartus II software
- ISO 9660-compatible CD-ROM drive
- Color monitor
- 10/100 Mb Ethernet connection for use with the EthernetBlaster download cable
- Serial port for use with the MasterBlaster™ communications cable
- USB port for use with the USB-Blaster™ download cable (Linux workstations only)
- Parallel port for use with the ByteBlasterMV™ parallel port download cable (Linux workstations only)
- A valid X-Windows display, which is required when running the Quartus II software
- One of the following window managers:
  - **dtwm**
  - **vewwm**
  - **mwm**
  - **olwm**
  - **kde** (Linux workstations only. The **kde** version must be the version that is included with Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0.)
  - **gnome** (Linux workstations only. The **gnome** version must be the version that is included with Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0.)
- A web browser with an Internet connection, which is required to enable the Quartus II software Internet connectivity features. If you are using the Netscape Navigator or Microsoft Internet Explorer browser, version 5.0 or later is required.



For Information About	Refer To
Specific disk space and memory requirements	Quartus II <b>readme.txt</b> file, which is located in the top-level directory of the Quartus II software CD-ROM. After installation, the <b>readme.txt</b> file is available from the Quartus II Help menu and in the Quartus II system directory.
Updated information about system requirements and the most current version of the <i>Quartus II Installation &amp; Licensing for UNIX and Linux Workstations</i> manual.	<i>Quartus II Installation &amp; Licensing for UNIX and Linux Workstations</i> manual on the Altera web site
Latest information on new features, device support, EDA interface support, and known issues and workarounds for the Quartus II software	<i>Quartus II Software Release Notes</i> document on the Altera web site
Quartus II software features and how they work with your design flow	<i>Introduction to Quartus II</i> manual on the Altera web site
Altera programming hardware	<i>Altera Programming Unit User Guide</i> , <i>ByteBlaster II Download Cable User Guide</i> , <i>ByteBlasterMV Download Cable User Guide</i> , <i>EthernetBlaster Download Cable User Guide</i> , <i>MasterBlaster Serial/USB Communications Cable User Guide</i> , and <i>USB-Blaster Download Cable User Guide</i> on the Altera web site

## Uninstalling Previous Versions of the Quartus or Quartus II Software

If you have installed a previous version of the Quartus® or Quartus II software, you can uninstall that software, if you wish, before installing the current version of the Quartus II software.

To uninstall a previous version of the Quartus or Quartus II software:

- ✓ Delete the Quartus II system directory (default name is **quartus**).

# The Quartus II Install Script

The Quartus II software Install script installs the Quartus II software.

You should be aware of the following information before you install the Quartus II software:

- Commands that do not fit on a single line in this manual are indicated by indentations of subsequent lines.
- The UNIX environment is case sensitive. You must enter directory names, file names, and file name extensions exactly as shown.
- The default CD-ROM directory is `/cdrom/cdrom0`. If you use a different CD-ROM directory, substitute the appropriate name in the installation steps.
- By default, the Quartus II software is installed in the `/opt/altera/quartus<version number>` directory, where *<version number>* is the number of the Quartus II software version directory. The installation procedure creates this directory, if it does not already exist. If you use a different directory name, substitute the appropriate name for *<Quartus II system directory>* in the installation steps.
- Your workstation must have drivers capable of supporting an ISO 9660 CD-ROM drive.
- If you will run the Quartus II software using a network (multiuser) license, make sure that the license server uses version 8.0 or later of the FLEXlm License Manager Server software. By default, the Quartus II software installs version 9.2 of the FLEXlm License Manager Server software on the user workstation. For more information, refer to [“Upgrading or Setting Up a License Manager Server” on page 25](#).
- You must install the Quartus II Device Information for UNIX & Linux Workstations CD-ROM in order to begin using the Quartus II software.
- If you want to preserve project compilation databases from an earlier version of the Quartus II software before installing a newer version, Altera recommends that you open the design in the earlier version of the software and export a version-compatible database for the design by using the **Export Database** command (Project menu). After you have installed a newer version of the Quartus II software, you can import the database in the new version by using the **Import Database** command

(Project menu). For more information about importing and exporting version-compatible databases, see “Overview: Using Version-Compatible Database Files” in Quartus II Help. Version-compatible database files are available in Quartus II software version 4.1 and later.

# Installing Software on Solaris Workstations

This section describes the procedures for installing the Quartus II software and related software on Solaris workstations.

## Installing the Quartus II Software on Solaris Workstations

You can install the Quartus II software on Sun Ultra workstations running Solaris 8 or 9.



### Before You Install the Quartus II Software

You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are running Volume Manager, the CD-ROM drive is mounted and unmounted automatically as **/cdrom/cdrom0** (you do not need to have root privileges to mount a CD-ROM with the Volume Manager), and you need to perform only steps 1, 3, 5, and 6 and can skip the other steps.

To install the Quartus II software and device information on a Solaris workstation, follow these steps:

1. Insert the Quartus II Design Software for UNIX Workstations (Solaris 8 and 9 only) CD-ROM or the Quartus II Design Software for UNIX Workstations (64-bit) (Solaris 8 and 9 only) CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Solaris workstations, refer to “Mounting & Unmounting CD-ROMs on Solaris Workstations” on page 66 in Appendix B.

3. To install the Quartus II software, type the following command at the command prompt:

```
/cdrom/cdrom0/install ←
```

You are guided through the installation procedure.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Solaris workstations, refer to “Mounting & Unmounting CD-ROMs on Solaris Workstations” on page 66 in Appendix B.
5. When prompted by the install script, insert the Quartus II Device Information for UNIX & Linux Workstations CD-ROM into your CD-ROM drive.
6. Repeat steps 2-4 to mount and install the Quartus II device information and unmount the CD-ROM drive.



#### Installing Device Support Required for Using the Quartus II Tutorial

You must install support for Cyclone™ EP1C6 devices if you want to complete the Quartus II tutorial.

## Installing the ModelSim-Altera Software on Solaris Workstations

You can install the ModelSim-Altera software on Sun Ultra workstations running Solaris 8 or 9. The ModelSim-Altera **readme** file in the **modelsim** directory on the CD-ROM provides information on the ModelSim-Altera software operating requirements and licensing. You should read the **readme** file before installing the ModelSim-Altera software.



### Before You Install the ModelSim Altera Software

You should be aware of the following information before you install the ModelSim Altera software:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are running Volume Manager, the CD-ROM drive is mounted and unmounted automatically as `/cdrom/cdrom0` (you do not need to have root privileges to mount a CD-ROM with the Volume Manager), and you need to perform only steps 1 and 3, and can skip the other steps.
- Your workstation must have an ISO 9660 CD-ROM drive.

To install the ModelSim-Altera software on a Solaris workstation, follow these steps:

1. Insert the Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II Software (ModelSim) CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Solaris workstations, refer to “Mounting & Unmounting CD-ROMs on Solaris Workstations” on page 66 in Appendix B.
3. To install the ModelSim-Altera software, type the following command at the command prompt:

```
/cdrom/cdrom0/unix/install.ms ←
```

You are guided through the installation procedure. The installation procedure prompts you to specify the operating system and the system directory for installing the ModelSim-Altera software.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Solaris workstations, refer to “Mounting & Unmounting CD-ROMs on Solaris Workstations” on page 66 in Appendix B.

# Installing the MegaCore IP Library on Solaris Workstations

You can install the MegaCore IP Library on Sun Ultra workstations running Solaris 8 or 9. The MegaCore IP Library **readme.txt** file in the top-level directory on the CD-ROM provides information on the MegaCore IP Library operating requirements and licensing. You should read the **readme.txt** file before installing the MegaCore IP Library.



## Before You Install the MegaCore IP Library

You should be aware of the following information before you install the MegaCore IP Library:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are running Volume Manager, the CD-ROM drive is mounted and unmounted automatically as **/cdrom/cdrom0** (you do not need to have root privileges to mount a CD-ROM with the Volume Manager), and you need to perform only steps 1 and 3, and can skip the other steps.
- Your workstation must have an ISO 9660 CD-ROM drive.

To install the MegaCore IP Library on a Solaris workstation, follow these steps:

1. Insert the MegaCore IP Library CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Solaris workstations, refer to “[Mounting & Unmounting CD-ROMs on Solaris Workstations](#)” on page 66 in [Appendix B](#).
3. To install the MegaCore IP Library, type the following command at the command prompt:

```
/cdrom/cdrom0/solaris/install ←
```

You are guided through the installation procedure.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Solaris workstations, refer to “[Mounting & Unmounting CD-ROMs on Solaris Workstations](#)” on page 66 in [Appendix B](#).



#### For Information About

Using MegaCore functions with the Quartus II design software

#### Refer To

MegaCore user guides that are installed with the MegaCore IP Library and on the Altera web site.

## Installing Software on Linux Workstations

This section describes the procedures for installing the Quartus II software and related software on Linux workstations.

### Installing the Quartus II Software on Linux Workstations

You can install the Quartus II software on PCs running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0.



#### Before You Install the Quartus II Software

You should be aware of the following information before you install the MegaCore IP Library:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are logged in on a console, you do not need to have root privileges to mount a CD-ROM.
- Your workstation must have an ISO 9660 CD-ROM drive.

To mount the CD-ROM drive and install the Quartus II software and device information on a Linux workstation, follow these steps:

1. Insert the Quartus II Design Software for Linux Workstations (Red Hat Linux 8.0 & Red Hat Enterprise Linux 3.0 Only) CD-ROM into your CD-ROM drive.

2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Linux workstations, refer to “Mounting & Unmounting CD-ROMs on Linux Workstations” on page 68 in Appendix B.
3. To install the Quartus II software, type the following command at the command prompt:

```
/mnt/cdrom/install ←
```

You are guided through the installation procedure.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Linux workstations, refer to “Mounting & Unmounting CD-ROMs on Linux Workstations” on page 68 in Appendix B.
5. When prompted by the install script, insert the Quartus II Device Information for UNIX & Linux Workstations CD-ROM into your CD-ROM drive.
6. Repeat steps 2-4 to mount and install the Quartus II device information and unmount the CD-ROM drive.



#### Installing Device Support Required for Using the Quartus II Tutorial

You must install support for Cyclone EP1C6 devices if you want to complete the Quartus II tutorial.

## Installing the ModelSim-Altera Software on Linux Workstations

You can install the ModelSim-Altera software on PCs running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0. The ModelSim-Altera **readme** file in the **modelsim** directory on the CD-ROM provides information on the ModelSim-Altera software operating requirements and licensing. You should read the **readme** file before installing the ModelSim-Altera software.



### Before You Install the ModelSim-Altera Software

You should be aware of the following information before you install the ModelSim-Altera software:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are logged in on a console, you do not need to have root privileges to mount a CD-ROM.
- Your workstation must have an ISO 9660 CD-ROM drive.

To install the ModelSim-Altera software on a Linux workstation, follow these steps:

1. Insert the Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II Software (ModelSim) CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Linux workstations, refer to “[Mounting & Unmounting CD-ROMs on Linux Workstations](#)” on page 68 in [Appendix B](#).
3. To install the ModelSim-Altera software, type the following command at the command prompt:

```
/mnt/cdrom/unix/install.ms ←
```

You are guided through the installation procedure. The installation procedure prompts you to specify the operating system and the system directory for installing the ModelSim-Altera software.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Linux workstations, refer to “[Mounting & Unmounting CD-ROMs on Linux Workstations](#)” on page 68 in [Appendix B](#).

# Installing the MegaCore IP Library on Linux Workstations

You can install the MegaCore IP Library on PCs running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0. The MegaCore IP Library **readme.txt** file in the top-level directory on the CD-ROM provides information on the MegaCore IP Library operating requirements and licensing. You should read the **readme.txt** file before installing the MegaCore IP Library.



## Before You Install the MegaCore IP Library

You should be aware of the following information before you install the MegaCore IP Library:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are logged in on a console, you do not need to have root privileges to mount a CD-ROM.
- Your workstation must have an ISO 9660 CD-ROM drive.

To install the MegaCore IP Library on a Linux workstation, follow these steps:

1. Insert the MegaCore IP Library CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Linux workstations, refer to “[Mounting & Unmounting CD-ROMs on Linux Workstations](#)” on page 68 in Appendix B.
3. To install the MegaCore IP Library, type the following command at the command prompt:

```
/mnt/cdrom/linux/install ←
```

You are guided through the installation procedure.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Linux workstations, refer to “[Mounting & Unmounting CD-ROMs on Linux Workstations](#)” on page 68 in Appendix B.



#### For Information About

Using MegaCore functions with the Quartus II design software

#### Refer To

MegaCore user guides that are installed with the MegaCore IP Library and on the Altera web site

## Installing the Nios II Embedded Processor Software on Linux Workstations

You can install the Nios II Embedded Processor Evaluation Edition software on PCs running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0. The Nios II Embedded Processor **readme** file in the top-level directory on the CD-ROM provides information on the Nios II Embedded Processor software. You should read the **readme** file before installing the Nios II Embedded Processor software.



#### Before You Install the Nios II Embedded Processor Software

You should be aware of the following information before you install the Nios II Embedded Processor software:

- You must have superuser or “root” privileges to mount and unmount the CD-ROM drive.
- Your workstation must have an ISO 9660 CD-ROM drive.

To install the Nios II Embedded Processor software on a Linux workstation, follow these steps:

1. Insert the Nios II Embedded Processor, Evaluation Edition for Linux CD-ROM into your CD-ROM drive.
2. Mount the CD-ROM into your CD-ROM drive. For information about mounting CD-ROMs on Linux workstations, refer to “[Mounting & Unmounting CD-ROMs on Linux Workstations](#)” on page 68 in Appendix B.

3. To install the Nios II Embedded Processor software, type the following command at the command prompt:

```
/mnt/cdrom/install ←
```

You are guided through the installation procedure.

4. Unmount the CD-ROM drive. For information about unmounting CD-ROMs on Linux workstations, refer to [“Mounting & Unmounting CD-ROMs on Linux Workstations”](#) on page 68 in Appendix B.

## Using the 64-bit Version of the Quartus II Software on Solaris or Linux Workstations

If your project requires addressability of computer memory greater than 4 GB for the `quartus_map`, `quartus_fit`, and `quartus_tan` executables, you can use a 64-bit version of the Quartus II software for Solaris or Linux workstations. Compiling designs with the 64-bit version of the Quartus II software requires more system memory. You may notice a decrease in compilation times if there is not sufficient physical memory to accommodate the increased memory usage. This effect can be mitigated by increasing the total physical memory on the system.

When you install the Quartus II software, the 64-bit version of the Quartus II software is automatically installed.



### Availability of 64-bit Processing Controls on 32-bit Systems

If the host system does not support 64-bit processing, the controls in the **Processing** page for enabling or disabling 64-bit processing are not available.

To enable 64-bit processing in the Quartus II software:

1. Start the Quartus II software as described in the [“Starting the Quartus II Software”](#) on page 34.
2. Choose **Options** (Tools menu).

3. In the **Category** list, select **Processing**. The **Processing** page appears.
4. If you want to enable 64-bit processing in the Quartus II software, click **Always use 64-bit processing**.



#### Enabling 64-bit Processing Via Other Methods

You can also enable 64-bit processing via other methods. To enable 64-bit processing via the `QUARTUS_64BIT` environment variable, go to “[QUARTUS\\_64BIT](#)” on page 45. To enable 64-bit processing via the `--64bit` flag, go to “[Other Workstation Configuration Information](#)” on page 46. Be aware that the **Always use 32-bit processing** or **Always use 64-bit processing** options in the **Processing** page override the settings specified with the `QUARTUS_64BIT` environment variable or the `--64bit` flag.

# Chapter Two

---

## Licensing the Quartus II Software



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# 2

# Introduction

This section describes how to license the Quartus II software. To set up your license for the Quartus II software, you must perform the following steps, each of which are described in more detail in this section:

1. If necessary, obtain a license file. The Quartus II software requires a **license.dat** license file for each server that supports a valid, unexpired network (multiuser) license or for each node-locked (single-user) license. This same license file can also enable the additional Altera synthesis and simulation tools included with Altera software subscriptions, as well as the MAX+PLUS II software.
2. Modify the license file for your network license (FLOATPC, FLOATNET, or FLOATLNX).
3. Set up and configure the FLEXlm license manager server for a UNIX or Linux workstation.
4. Configure each workstation.
5. Configure each Quartus II user's environment.
6. Start the Quartus II software.
7. Specify the location of the license file.
8. Specify a web browser.
9. Register for an Altera.com account.

## Obtaining a License File

When you start the Quartus II software, if the software cannot detect a valid license file, you are asked whether you want to run in evaluation mode for 30 days, perform an automatic license retrieval from the Altera web site, or specify the correct location of a valid license file.

You can also obtain an ASCII license file, **license.dat**, from the Licensing section of the Altera web site at [www.altera.com/licensing](http://www.altera.com/licensing) if you have the following information:

- Your Altera ID, which is a six-digit number that is provided when you purchase the Quartus II development system. This number can be found on the packing list that is shipped with the Quartus II software.
- Your serial number, which is printed on the side of the Quartus II software shipping box and on the *Registration & License File Request Form*, which is also included with the Quartus II software package. This number begins with the letter G, and is followed by five digits (*Gxxxxx*).
- The host ID number, for UNIX or Linux network license servers. To find your UNIX or Linux network license server host ID by using FLEXlm utilities, type the following command at a command prompt (where *<operating system>* represents `linux` or `solaris`):

```
/usr/<Quartus II system directory>/<operating system>/lmutil
lmhostid ←
```



For Information About	Refer To
Additional methods of finding your host ID number	Altera Find Answers page, which is available from the Support Center section of the Altera web site at <a href="http://www.altera.com/answers"><b>www.altera.com/answers</b></a>
Using the FLEXlm utilities	<i>FLEXlm End Users Guide</i> , which is available from the Support Services section of the Macrovision web site at <a href="http://www.macrovision.com"><b>www.macrovision.com</b></a>



#### Saving Previous **license.dat** Files

Altera recommends that you save any previous **license.dat** file in a temporary directory, in case you need to refer to it later.

To obtain a license file, follow these steps:

1. Start the Quartus II software as described in the “Starting the Quartus II Software” on page 34.

2. Select **Perform automatic web license retrieval** to request a valid license file automatically from the Altera web site. You are guided through the licensing procedure.

*or*

To request a license file at a later time, point your web browser to the Altera web site at **www.altera.com/licensing**. The Altera Software Licensing page is displayed.

3. If you are using a network (multiuser) license, select the FLOATPC, FLOATNET, or FLOATLNX license option.
4. Specify the requested information.
5. You will receive an e-mail from Altera with a **license.dat** file attached, as well as the license file text. You may either use the attached license file, or copy the lines from the attached license file to an existing license file. When you receive the license file text, save it in the **/usr/local/flexlm/licenses** directory. If you are using your **license.dat** file with both the Quartus II software and the MAX+PLUS II software, Altera recommends that you save it in a top-level directory named **flexlm**.

Figure 1 and Figure 2 show sample network license files for UNIX and Linux workstations that function as a single license server.

**Figure 1. Sample Network License File for a Single UNIX Workstation Server**

```

SERVER alice 807f1034 1800
VENDOR alterad "/opt/altera/quartus51/solaris/alterad"
USE_SERVER
FEATURE altera_mainwin alterad 2006.12 permanent 5 391A92407D4B SIGN="0191 120C \
BB64 BC39 E5C8 EBBB 7894 E064 D348 61CC 5C6F 16DD 1269 F246 D07E 19C8 CAE3 \
E3E3 6965 E38D 1452 BB74 20E9 E6F6 5718 89AC 0E23 B5B2 1581 E453 "
FEATURE quartus alterad 2006.12 permanent 5 7A496D25A602 SIGN="1C66 DAC6 1DAB C886 \
727B 65DF FAC2 B479 3E3C 656D 3561 E5D0 BBA3 C45C 4DDC 0F2F 68F5 4DF1 6F63 \
7785 2F5D 1480 1B0A 70DE 2220 1952 DDCD 9F4D 6D61 A177 "

```

Labels for Figure 1:

- Server name: alice
- Server host ID number: 807f1034
- Optional port number: 1800
- Number of licenses requested: 5
- Authorization code: 391A92407D4B
- Feature name: altera\_mainwin
- Daemon name: alterad
- Release date: 2006.12
- Expiration date: permanent

**Figure 2. Sample Network License File for a Single Linux Workstation Server**

```

SERVER alice 807f1034 1800
VENDOR alterad "/opt/altera/quartus51/linux/alterad"
USE_SERVER
FEATURE altera_mainwin_lnx alterad 2006.12 permanent 5 391A92407D4B SIGN="0191 \
120C BB64 BC39 E5C8 EBBB 7894 E064 D348 61CC 5C6F 16DD 1269 F246 D07E 19C8 \
CAE3 E3E3 6965 E38D 1452 BB74 20E9 E6F6 5718 89AC 0E23 B5B2 1581 E453 "
FEATURE quartus alterad 2006.12 permanent 5 7A496D25A602 SIGN="1C66 DAC6 1DAB C886 \
727B 65DF FAC2 B479 3E3C 656D 3561 E5D0 BBA3 C45C 4DDC 0F2F 68F5 4DF1 6F63 \
7785 2F5D 1480 1B0A 70DE 2220 1952 DDCD 9F4D 6D61 A177 "

```

Labels for Figure 2:

- Server name: alice
- Server host ID number: 807f1034
- Optional port number: 1800
- Number of licenses requested: 5
- Authorization code: 391A92407D4B
- Feature name: altera\_mainwin\_lnx
- Daemon name: alterad
- Release date: 2006.12
- Expiration date: permanent

If you are using the Quartus II software with a node-locked (single-user) license, skip to “Configuring Each Workstation” on page 29.

The FLEXlm licensing scheme also allows you to set up three redundant license servers to serve a network (multiuser) license. You can obtain a license file for redundant servers by performing the steps described earlier in this section for obtaining a license file. Figure 3 shows a sample redundant server license file.

**Figure 3. Sample Redundant Server License File**

	<i>Server name</i>	<i>Server host ID number</i>	<i>Optional port number</i>		<i>Number of licenses requested</i>	<i>Authorization code</i>
SERVER	alice	807f1043	1800			
SERVER	king	807f1042	1800			
SERVER	queen	807f1041	1800			
VENDOR	alterad "/opt/altera/quartus51/solaris/alterad"					
USE_SERVER						
FEATURE	altera_mainwin	alterad	2006.12	permanent	5	391A92407D4B SIGN="0191 120C \
	BB64 BC39 E5C8 EBBB 7894 E064 D348 61CC 5C6F 16DD 1269 F246 D07E 19C8 CAE3 \					E3E3 6965 E38D 1452 BB74 20E9 E6F6 5718 89AC 0E23 B5B2 1581 E453"
FEATURE	quartus	alterad	2006.12	permanent	5	7A496B23A403 SIGN="1C66 DAC6 1DAB C886 \
	727B 65DF FAC2 B479 3E3C 656D 3561 E5D0 BBA3 C45C 4DDC 0F2F 68F5 4DF1 6F63 \					7785 2F5D 148C 1B0A 70DE 2220 1952 DDCD 9F4D 6D61 A177"
	<i>Feature name</i>	<i>Daemon name</i>	<i>Release date</i>	<i>Expiration date</i>		



**For Information About**

Setting up and administering license servers, including setting up three redundant license servers

**Refer To**

*FLEXlm End Users Guide*, which is available from the Support Services section of the Macrovision web site at [www.macrovision.com](http://www.macrovision.com)

# Modifying the License File

The `license.dat` file must be modified before it can be used by the license server.



## Node-Locked (Single-User) License

If you have a node-locked (single-user) license, you can skip this section and go to [“Starting the Quartus II Software” on page 34](#).

The first few lines of the license file are shown in the following example (your license file may not contain all the `VENDOR` entries, depending on which software you have enabled):

```
SERVER <host name> <8- or 12-character host or NIC ID> <port number>
VENDOR alterad "<path to daemon executable>"
VENDOR mgcld "<path to daemon executable>"
```

To modify the license file, follow these steps:

1. In the `license.dat` file, type the variables that are described in [Table 1](#). The host or NIC ID will already be entered in the license file.
2. Make sure the license file meets these guidelines:
  - The license file name must have a `.dat` extension. If your text editor adds `.txt` or another extension to the file name, such as `license.dat.txt`, you must rename the file to have only a `.dat` extension.
  - The license file must have a carriage return at the end of the last `FEATURE` line.
  - Any `FEATURE` line that wraps to a second or third line must contain a backslash (`\`) at the end of the line to indicate that it continues.

**Table 1. Variables to Modify in the License File (license.dat)**

Variable Name	Description	Directory
<host name>	The host name of the server; for example, my_server.	
<port number> (1)	The port number for the license manager service on the server; for example, 1800. The port number is optional and should be different from the port number for any other service on the machine.	
alterad "<path to daemon executable>" (2)(3)	Path to the Altera vendor daemon executable <b>alterad</b> .	Solaris: /<Quartus II system directory>/solaris/alterad Linux: /<Quartus II system directory>/linux/alterad
mgcld "<path to daemon executable>" (2)(3)(4)	Path to the Mentor Graphics vendor daemon executable <b>mgcld</b> .	Solaris: /<ModelSim-Altera system directory>/sunos5aloem/mgls/lib/mgcld Linux: /<ModelSim-Altera system directory>/linuxaloem/mgls/lib/mgcld

**Notes:**

- (1) If you do not specify a port number in the license file, the FLEXlm License Manager will automatically choose a free port between 27000 and 27009. However, to prevent port number conflicts, you can specify a port number. If three redundant servers are being used, you must specify a port number. Choose a port number greater than 1024, because port numbers less than 1024 are privileged port numbers on UNIX servers.
- (2) In some network environments, the license server does not have an installation of the software tool(s) that provides the necessary vendor daemon (**alterad** or **mgcld**). In this case, copy the required daemon from another machine that does have an installation of the software. Find the file in the directory location specified. Save the file in a similarly named directory or any other location on the license server. Specify the daemon location on the license server in the license file.
- (3) If the path server has spaces in it, enclose the full path in quotation marks.
- (4) If you are not using a license file for the ModelSim-Altera software, you may delete this line.



**For Information About**

The license file and modifying the license file for the Quartus II and MAX+PLUS II software and for other EDA tools

**Refer To**

*Application Note 340 (Altera Software Licensing)*, which is available from the Literature section of the Altera web site at [www.altera.com/literature](http://www.altera.com/literature)

# Upgrading or Setting Up a License Manager Server

This section provides instructions for configuring network licensing for the Quartus II software on Sun Ultra workstations running Solaris 8 or 9, or Intel Pentium III or compatible processor-based PCs running Red Hat Linux 8.0 or Red Hat Enterprise Linux 3.0.

## Upgrading the FLEXlm License Server Software

To support network licensing, the Quartus II software requires the FLEXlm License Manager server software version 8.0 or later. The install script installs the FLEXlm License Manager server software automatically on your user workstation, but you should also verify that the version of the FLEXlm License Manager software or the license server software is 8.0 or later. If the FLEXlm License Manager software is version 8.0 or later, skip to [“Rereading an Existing UNIX or Linux Workstation License File” on page 26](#).

To determine which version of the FLEXlm License Manager server software you are using:

- ✓ On the computer running the FLEXlm License Manager server software, type the following commands at a command prompt:

```
/<FLEXlm system directory path>/lmgrd -v ↵  
/<FLEXlm system directory path>/alterad -v ↵
```

If the **lmgrd** or **alterad** daemons are not from the FLEXlm software version 8.0 or later, you must upgrade both daemons with the versions provided in the installation of the Quartus II software.

To upgrade an older version of the FLEXlm License Manager server software, follow these steps:

1. Make a backup copy of the **lmgrd** and **alterad** daemons you are currently using.

2. Copy the new versions of the files to the computer running the license server over the daemons you are currently using. You may have to shut down the license server software to complete this step.

If you used the install script to install the FLEXlm License Manager server software, the current version of the **lmgrd** and **alterad** daemons are located in the following directories:

```
/<Quartus II system directory path>/<operating system name>/alterad  
/<Quartus II system directory path>/<operating system name>/lmgrd
```

where *<operating system name>* can be **solaris** or **linux**.

3. Copy the FLEXlm software utility **lmutil** from the Quartus II system directory to the license server computer.
4. Restart the FLEXlm license server by typing the following commands at a command prompt:

```
/<FLEXlm system directory path>/lmutil -c lmdown <license file  
path> ↵  
/<FLEXlm system directory path>/lmgrd -c <license file path>  
[-l <optional log path>] ↵
```

## Rereading an Existing UNIX or Linux Workstation License File

The Quartus II software uses the FLEXlm software to administer licensing for single users or for multiple users in a network installation. If you have an existing FLEXlm license server with an existing license file for the MAX+PLUS II software or software from another vendor, and the FLEXlm license server is version 8.0 or later, you can add, by copying and pasting, the Altera **FEATURE** lines from your Quartus II **license.dat** file into your existing license file. Paste the Quartus II **FEATURE** line as shown in the sample license file in [Figure 1 on page 21](#). Make sure you have also modified the license file according to the guidelines in [“Modifying the License File” on page 23](#).

If you make these changes to your license file, you must reread the license file or restart the license server before you can run the Quartus II software for the first time.

Refer to “Upgrading the FLEXlm License Server Software” on page 25 to verify that you are using the latest supported version of the FLEXlm License Server software, or if you need to upgrade an older version of the FLEXlm License Server software.



### Configuring a New License Server

If you do not have an existing FLEXlm license server, and you need to configure a new license server, skip to “Configuring a New UNIX or Linux Workstation License Server” on page 27.

To reread your license file on a license server:

- ✓ Type the following command at a command prompt:

```
/<Quartus II system directory>/<operating system name>/lmutil  
lmreread ↵
```

where *<operating system name>* can be *solaris* or *linux*.

or

- ✓ Restart the license server.



#### For Information About

Using the FLEXlm utilities to administer and troubleshoot the FLEXlm License Manager software

#### Refer To

*FLEXlm End Users Guide*, which is available from the Support Services section of the Macrovision web site at [www.macrovision.com](http://www.macrovision.com)

## Configuring a New UNIX or Linux Workstation License Server

The Quartus II software uses the FLEXlm software to administer licensing for single users or for multiple users in a network installation. If you do not have an existing FLEXlm license server, you must configure a new Solaris or Linux license server before starting the Quartus II software for the first time.

You should be aware of the following information before you configure a new license server:

- If you have an existing FLEXlm license server, refer to “Rereading an Existing UNIX or Linux Workstation License File” on page 26.
- Make sure you have obtained a valid license file according to the guidelines in “Obtaining a License File” on page 18, and that you have modified the license file according to the guidelines in “Modifying the License File” on page 23.
- These instructions assume that you have installed the **license.dat** file in the **/usr/local/flexlm/licenses** directory. If you have installed the license file in a different directory, substitute the appropriate path name for that directory.

To configure a new license server:

- ✓ Type the following command at a command prompt:

```
/<Quartus II system directory>/<operating system name>/lmgrd -c  
/usr/local/flexlm/licenses/license.dat ↵
```

where *<operating system name>* can be *solaris* or *linux*.



#### For Information About

#### Refer To

Configuring a new UNIX workstation license server

**readme.txt** file, which is located in the top-level directory of the Quartus II software CD-ROM

Setting up and administering license servers, including setting up three redundant license servers

*FLEXlm End Users Guide*, which is available from the Support Services section of the Macrovision web site at **www.macrovision.com**

## Installing the FLEXlm Software on Another License Server

You can install the FLEXlm software on an additional Solaris or Linux license server.

To install the FLEXlm software on another license server, perform the following steps:

1. Create a directory named */<Quartus II system directory>/<operating system name>* on the additional license server, where *<operating system name>* can be **solaris** or **linux**.
2. Copy the following files from the */<Quartus II system directory>/<operating system name>* directory of your original Quartus II software into the new */opt/altera/quartus<version number>/<operating system name>* directory:
  - **lmgrd**
  - **lmutil**
  - **alterad**

## Configuring Each Workstation

Before starting the Quartus II software for the first time, you must configure each UNIX or Linux workstation that will run the Quartus II software.

### Configuring Each Solaris Workstation

For each Sun Solaris UNIX workstation that will run the Quartus II software, you must verify the required runtime patches and kernel configuration before starting the Quartus II software for the first time.



#### Before You Configure a Solaris Workstation

You should be aware of the following information before you configure a Solaris workstation:

- You must have superuser or “root” privileges to install runtime patches or modify kernel configuration.
- Solaris 9 workstations do not require runtime patches.

## Verifying Required Runtime Patches (Solaris 8 Only)

Make sure that each workstation has the runtime and graphics card patches that are required to run the Quartus II software on a Solaris 8 UNIX workstation. The last two numbers of the patches represent the version number and can be substituted with a more recent version number. Refer to [Table 2](#) for a list of patches and descriptions.

- ✓ To determine which patch is installed on your system, type the following command at a command prompt:

```
showrev -a | grep <patch number> ←
```

If the patches are not installed on your system, you should download the appropriate replacement patch from the Sun Microsystems support web site at [sunsolve.sun.com](http://sunsolve.sun.com). Altera recommends checking the Altera Find Answers page, which is available from the Support Center section of the Altera web site at [www.altera.com/answers](http://www.altera.com/answers), for late-breaking information on required and optional operating system patches. In addition, the latest version of the *Quartus II Installation & Licensing for UNIX and Linux Workstations* manual, which is available in PDF format from the Altera web site at [www.altera.com/literature](http://www.altera.com/literature), may contain updated information on patches.

[Table 2](#) lists the runtime patches for Solaris 8.

**Table 2. Solaris 8 Runtime Patches**

Runtime Patches	Description	Reason for Patch
109147-12 or later	SunOS 5.8 Linker patch	Correct dynamic load and unload of shared libraries

*Note:* If you are unable to install this runtime patch, the Quartus II software still functions, but online Help is not available and the graphical user interface performance and general stability may be affected.

## Verifying Kernel Configuration (Solaris Only)

You should perform the following steps on a UNIX workstation running Solaris 8 or 9 to ensure that the system's kernel configuration meets the minimum system requirements to run the Quartus II software, if necessary:

1. Check the configuration parameters listed below to make sure that the values listed in the **system** file, which is located in the **etc** directory, are greater than or equal to the recommended values listed below.

Solaris Parameter	Recommended Value
pt_cnt	200
shmmax	8388608
shmmni	1000
shmseg	16

2. If one or more of the parameters do not have the recommended values, change the values to the recommended values by adding one or more of the following lines to the **system** file:

```
set pt_cnt=200
set shmsys:shminfo_shmmax=8388608
set shmsys:shminfo_shmmni=1000
set shmsys:shminfo_shmseg=16
```

3. Restart the workstation.

## Configuring Each Linux Workstation

For each Linux workstation that will run the Quartus II software, you must verify the libraries and kernel configuration before starting the Quartus II software for the first time.



### Before You Configure Each Linux Workstation

You must have superuser or "root" privileges to install runtime patches or modify kernel configuration.

## Verifying Required Libraries (Linux Only)

To use the Visual MainWin software, which is required to run the Quartus II software on Linux workstations, the Linux workstation requires the GNU libc libraries (**glibc**). Table 3 lists the **glibc** versions required for each version of the Red Hat Linux supported by the Quartus II software.

**Table 3. Required glibc Version for Linux Workstations**

Red Hat Linux Version	glibc Version
8.0	<b>glibc 2.2.93-5</b>
Enterprise 3.0	<b>glibc 2.3.2-95</b>

The GNU libc libraries are available at the Red Hat Linux web site, which is [www.redhat.com](http://www.redhat.com).

## Verifying Kernel Configuration (Linux Only)

You should perform the following steps to ensure that the system's kernel configuration meets the minimum system requirements to run the Quartus II software:

1. Check the configuration parameters listed below to make sure that the values listed in the **limits.conf** file, which is located in the **/etc/directory** directory, are greater than or equal to the recommended values listed below.

Linux Parameter	Recommended Value
hard nofile	32768
soft nofile	32768

2. If one or more of the parameters do not have the recommended values, change the values to the recommended values by adding one or more of the following lines to the **limits.conf** file:

```
* hard nofile 32768
* soft nofile 32768
```



### Asterisks (\*) in limits.conf File

The asterisks (\*) in the previous lines are part of the code and must be included in the your **limits.conf** file.

3. Type the following command at the command prompt:

```
echo 356 40000 32 32000 > /proc/sys/kernel/sem ←
```



### Adding Kernel Configuration Command to Linux Workstation Startup Scripts

The previous command takes effect immediately; however, Altera recommends that your system administrator also add the commands to the workstation's startup scripts, because the command is reset whenever you restart the workstation.

## Configuring Each Quartus II User's Environment

Make sure that the following steps have been performed for each Quartus II software user before starting the Quartus II software for the first time:

1. Update each user's PATH environment variable in the **.cshrc** file, which is located in the home directory, to include the **bin** directory in the Quartus II system directory, which is usually the **/opt/altera/quartus<version number>/bin** directory. To update the PATH environment variable, type the following command at a command prompt:

```
setenv PATH ${PATH} : /<Quartus II system directory>/bin ←
```

2. Save the changes to the **.cshrc** file, and then type the following commands at a command prompt:

```
cd ←  
source .cshrc ←
```

# Starting the Quartus II Software

After you have followed all the guidelines for configuring each workstation and each user environment, you can start the Quartus II software by typing the following command at a command prompt:

```
quartus ←
```



## Avoid Starting the Quartus II Software from Platform-Specific Directories

Make sure you do not start the `quartus` command in the `/<Quartus II system directory>/<operating system name>` directory (for example, the `/<Quartus II system directory>/linux` directory or the `/<Quartus II system directory>/solaris` directory). If you start the Quartus II software in a platform-specific directory, the software may not function correctly. For more information, refer to “[Configuring Each Quartus II User’s Environment](#)” on page 33.

When you start the Quartus II software, if the software cannot detect a valid license file, you will see a prompt with the following options:

- **Enable 30-day evaluation period with no license file (no programming file support)**—This option allows you to continue to use the Quartus II software for 30 days without programming file support. After 30 days, you must have a valid license file in order to use the software.
- **Perform automatic web license retrieval**—This option allows you to request a license file automatically from the Licensing section of the Altera web site and guides you through the procedure. See “[Obtaining a License File](#)” on page 18 for more information.
- **Specify valid license file**—This option displays the **License Setup** page of the **Options** dialog box (Tools menu), which allows you to specify the location of your license file. See the next section, “[Specifying the License File](#),” for more information.

If you want to enable the Internet connectivity features of the Quartus II software, you should also follow the guidelines in “[Specifying a Web Browser](#)” on page 39.

# Specifying the License File

Once you have obtained a license file and set up a license server, you must specify the location of the license file for each user (or “client”). You can specify the license file with either of the following methods, which are described in more detail in this section:

- Specify the license file using the Quartus II software
- Specify the license file using the `.cshrc` file on client workstations



## Specifying the License File with the ModelSim-Altera Software and MAX+PLUS II Software

If you are using the Altera-provided ModelSim-Altera simulation software, which is included with Altera software subscriptions, and/or you are using the MAX+PLUS II software, you should specify the license file with the `.cshrc` file.

## Specifying the License File within the Quartus II Software

To specify the license file within the Quartus II software, follow these steps on each workstation that will be running the Quartus II software:

1. If you have not already done so, start the Quartus II software, as described in [“Starting the Quartus II Software” on page 34](#).



## Starting the Quartus II Software for the First Time

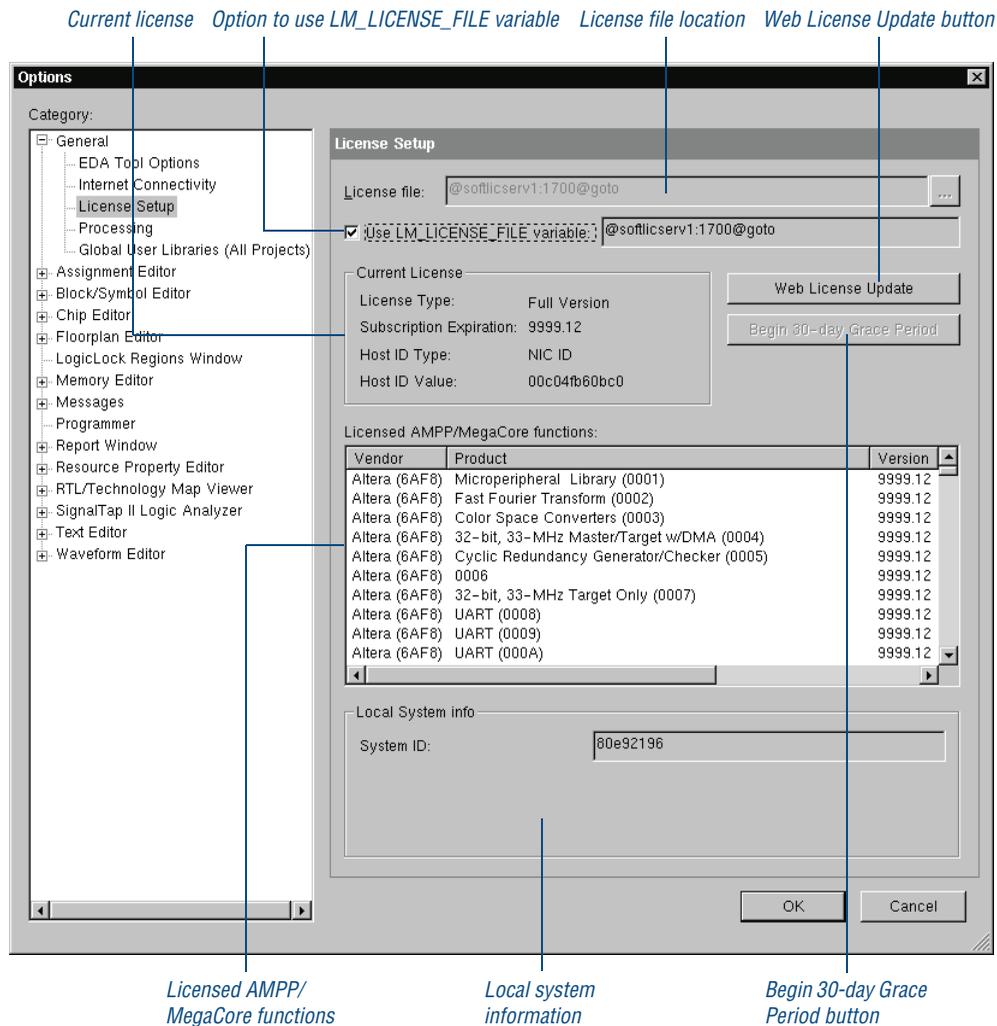
When you start the Quartus II software, if the software cannot detect a valid license file, you are asked whether you want to run in evaluation mode for 30 days, request a valid license file automatically from the Altera web site, or specify the correct location of a valid license file.

2. Select **Specify valid license file** to specify the name of the license file. The **License Setup** page of the **Options** dialog box (Tools menu) is displayed. [Figure 4](#) shows the **License Setup** page.

*or*

To specify the license file at a later time, choose **License Setup** (Tools menu). The **License Setup** page is displayed.

**Figure 4. License Setup Page of the Options Dialog Box**



3. In the **License file** box, specify the full path name of the **license.dat** file. You can click **Browse (...)** to locate the **license.dat** file. Altera recommends that you store the **license.dat** file in a directory named **/usr/local/flexlm/licenses**.

You can also specify the location of the license file by typing a name of the format `<port>@<host>` instead of a license file path name, where `<host>` is the name of the server where the license file is stored and `<port>` is the port listed in the `license.dat` file. See [Figure 1 on page 21](#) for a sample network license file to determine your port and server name, and refer to [Table 1 on page 24](#) for more information about port numbers. If there is no port listed in the `license.dat` file, you can simply specify `@<host>`.



#### Specifying Multiple License Files and/or Servers

If you have more than one license file or server, separate the port and host specifications with colons (:), with no spaces between the names and numbers. For example:

```
1800@king:/usr/local/lib/license.dat:270000@queen
```

If you want to use the current `LM_LICENSE_FILE` value specified in the `.cshrc` file, turn on **Use `LM_LICENSE_FILE` variable**.

4. If you want to check the Altera web site for license file updates, click **Web License Update**.
5. If you want to use the Quartus II software in the “Subscription Expiration” grace period, click **Begin 30-day Grace Period**. The “Subscription Expiration” grace period allows you to use the Quartus II software with programming file support for 30 days. When the grace period expires, you must obtain an updated license file at the Altera web site to continue using the Quartus II software with programming file support.
6. Click **OK**.

The **Licensed AMPP/MegaCore** functions list of the **License Setup** page lists all of the features and products that are available for the license.

## Specifying the License File in the .cshrc File on Client UNIX & Linux Workstations

To specify the license file in the `.cshrc` file on each client (user) workstation, make sure that you update the `LM_LICENSE_FILE` variable that is specified in the `.cshrc` file located in each user's home directory. You must edit this file for each user, or provide clear instructions that describe which lines the user needs to enter or edit:

- ✓ Make sure that each user has an `LM_LICENSE_FILE` variable that is set to the full directory path name of the license file. To update this variable, add the following line to the `.cshrc` file for each user:

```
setenv LM_LICENSE_FILE /usr/local/flexlm/licenses/  
license.dat
```



### Using the `setenv` Environment Variable with Multiple Applications

If more than one application uses this environment variable, separate the different paths with a colon (:) with no spaces between the path names. For example:

```
setenv LM_LICENSE_FILE /usr/local/flexlm licenses/license.dat:/  
tmp/license.xyz
```

or

- ✓ If you want to specify the name of the server on which the license file is stored, add the following line to the `.cshrc` file for each user:

```
setenv LM_LICENSE_FILE <port>@<host>
```

where `<host>` is the name of the server and `<port>` is the port listed in the `license.dat` file. See [Figure 1 on page 21](#) for a sample network license file to determine your port and server name, and refer to [Table 1 on page 24](#) for more information about port numbers. If there is no port listed in the `license.dat` file, you can simply specify `@<host>`.



### Using the `setenv` Environment Variable with Multiple Applications

If you have more than one license file or server, separate the port and host specifications with colons (:), with no spaces between the names and numbers. For example:

```
1800@king:/usr/local/lib/license.dat:270000@queen
```

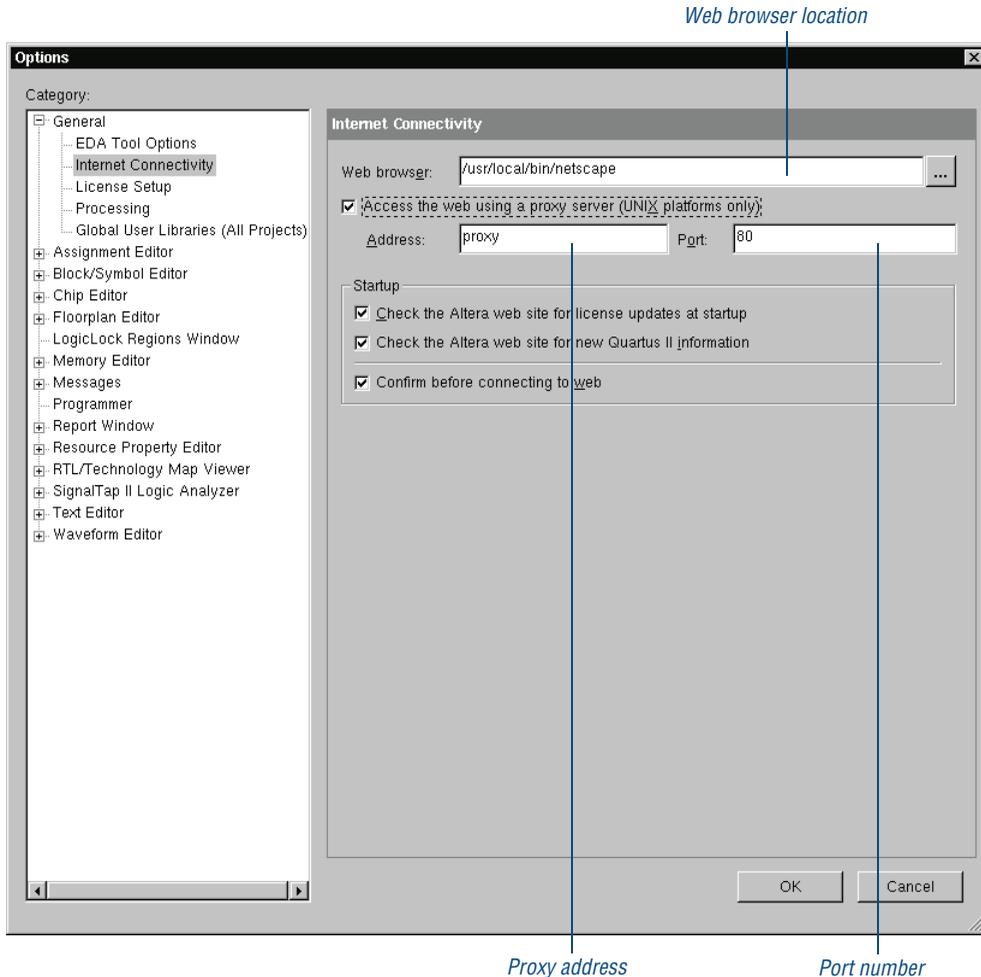
If you want the Quartus II software to use the `LM_LICENSE_FILE` setting from your `.cshrc` file, make sure **Use `LM_LICENSE_FILE` variable** is turned on in the **License Setup** page of the **Options** dialog box (Tools menu).

## Specifying a Web Browser

You must specify your web browser location in the **Options** dialog box to enable the Internet connectivity features of the Quartus II software. To specify your web browser location, follow these steps:

1. Start the Quartus II software.
2. Choose **Options** (Tools menu).
3. In the **Category** list, select **Internet Connectivity**. The **Internet Connectivity** page appears. Figure 6 on page 48 shows the **Internet Connectivity** page of the **Options** dialog box.
4. In the **Web browser** box, specify the full path name of your web browser. You can click **Browse** to locate your web browser.
5. If you are using a proxy server, specify the proxy address and port:
  - a. Turn on **Access the web using a proxy server (UNIX platforms only)**.
  - b. In the **Address** box, type the proxy address.
  - c. In the **Port** box, type the port number.
6. Click **OK**.

**Figure 5. Internet Connectivity Page of the Options Dialog Box**



## Registering for an Altera.com Account

Your copy of the Quartus II software is registered at the time of purchase; however, in order to use the mySupport web site to view and submit service requests, you must also register for an Altera.com account. An Altera.com account is required only for using the mySupport web site; however, having an Altera.com account will also make it easier for you to use many other

Altera web site features, such as the Download Center, Licensing Center, Altera Technical Training online class registration, or Buy On-Line-Altera eStore features.

To register for an Altera.com account, follow these steps:

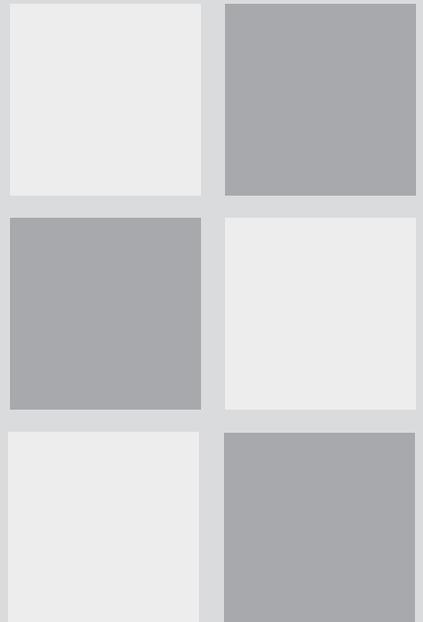
1. Go to the mySupport web site:
  - ✓ To start your web browser and connect to the mySupport web site while running the Quartus II software, choose **Altera on the Web > Quartus II Service Request** (Help menu).
  - or*
  - ✓ Point your web browser to the mySupport web site at **[www.altera.com/mysupport](http://www.altera.com/mysupport)**.
2. Follow the instructions on the mySupport web site to register for an Altera.com account.

If you are not a current Altera subscription user, you can still register for an Altera.com account.

# Chapter Three

---

## More Configuration Information



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# 3

# Introduction

This section describes how to change additional workstation configuration items including Quartus II general environment variables, Quartus II NativeLink® environment variables, user names, language settings, and fonts.

## Setting Environment Variables

This section describes the environment variables that the Quartus II software uses to configure various options and locate files.

If you are using the C shell, environment variables are located in your `.cshrc` file, and have the following format:

```
setenv <environment variable> <value>
```

If you are using the Bourne or Korn shell, environment variables are located in your `.profile` file, and have the following format:

```
set <environment variable> = <value>
```

## Quartus II General Environment Variables

The Quartus II software installation process initializes the following variables, but you may wish to change them to optimize your system performance.

### QUARTUS\_ROOTDIR

The `QUARTUS_ROOTDIR` variable specifies the name of the Quartus II system directory. The default directory is `/opt/altera/quartus<version number>`. You should change this variable only if the system displays an error message indicating that Quartus II files cannot be found when you start the program.

## MWFONT\_CACHE\_DIR

The `MWFONT_CACHE_DIR` variable specifies the name of the Quartus II font cache directory. The default directory is */<user's home directory>/mw*.

## QUARTUS\_MWWM

The `QUARTUS_MWWM` variable specifies how the Quartus II software should interact with the system's window manager. By default, the `QUARTUS_MWWM` environment variable is set to `allwm` (except for Linux workstations) and the Quartus II software operates normally with all supported window managers (refer to “[Quartus II System Requirements](#)” on page 2 for a list of supported window managers). If you are not using one of the default window managers, make sure you set the `QUARTUS_MWWM` environment variable to `allwm` to allow the Quartus II software to determine the most compatible mode.

## QUARTUS\_64BIT

The `QUARTUS_64BIT` variable specifies the 64-bit version of the Quartus II software. To enable 64-bit processing in the Quartus II software, set the environment variable to `1` before running the Quartus II software. This variable is supported in systems with 64-bit processing only.

# Quartus II NativeLink Environment Variables

The Quartus II software installation process initializes the following variables, but you must set them to use the NativeLink features of the Quartus II software.

## QUARTUS\_INIT\_PATH

The `QUARTUS_INIT_PATH` variable specifies the path(s) of the EDA tool(s) to be launched from within the Quartus II software. You must set this variable to launch other EDA tools from within the Quartus II software.

## QUARTUS\_INIT\_LIBPATH

The `QUARTUS_INIT_LIBPATH` specifies the `LD_LIBRARY_PATH` variable needed by some EDA tools. You should set this variable to the EDA tool's `LD_LIBRARY_PATH` if the EDA tool requires an `LD_LIBRARY_PATH` variable.

# Other Workstation Configuration Information

This section describes other workstation configuration information, including user names, language settings, fonts, printers, and 64-bit processing:

- If you want to change user names at a workstation using the `su` command, you must type the following command at the command prompt before starting the Quartus II software:

```
su - <username> ↵
```

Changing user names using the `su <username>` command (without the dash) causes the new user to use the environment settings from the previous user, which may cause the Quartus II software to stop responding.

- The Quartus II software does not support UNIX language settings other than English. The `LANG` variable must be set to `C` for the Quartus II software to function correctly.
- By default, generated fonts are saved to the `/<user's home directory>/.mw` directory; however, having the font cache saved to these directories for each user may cause unnecessary duplication of fonts. You can avoid this problem by specifying a directory to contain all the generated fonts for the display. To specify this directory, type the following command at the command prompt:

```
setenv MWFONT_CACHE <new directory name> ↵
```

- If the Quartus II software stops responding due to an internal error, determine whether any of the following processes are running:

<code>mwrpcss</code>	<code>quartus_eda</code>
<code>quartus</code>	<code>quartus_sim</code>
<code>quartus_map</code>	<code>quartus_pow</code>
<code>quartus_fit</code>	<code>quartus_stp</code>
<code>quartus_tan</code>	<code>quartus_pgm</code>
<code>quartus_asm</code>	<code>quartus_cpf</code>
<code>quartus_drc</code>	<code>quartus_sh</code>
<code>quartus_cdb</code>	<code>quartus_cmd</code>

You can determine which processes are running by typing the following command at the command prompt:

```
/usr/bin/ps -ef ←
```

You must then terminate these processes by typing the following command at the command prompt:

```
kill - 9 <process ID number> ←
```

- You can use the **mwcleanup** utility to clean up system resources and terminate all MainWin applications by typing the following command at the command prompt:

```
mwcleanup ←
```

- If you want to configure a printer with the MainWin control panel, follow these steps:
  - a. Become non-root and run **mwcontrol**, which is located in the `/<Quartus II system directory>/bin` directory. The **MainWin Control Panel** dialog box appears.
  - b. Double-click **Printers**. The **MainWin Printers** dialog box appears.
  - c. Double-click **Add New Printer**. The **Add New Printer** wizard appears.
  - d. Click **Next**. The **Identify your Unix Printer** wizard appears.
  - e. Select the printer you want to use with the Quartus II software.
  - f. Click **Next**. The **Print Command** wizard appears.

- g.** In the **Print Command** box, type the following command:

```
/bin/sh -c "cat %s | lpr -P <printer name>; rm %s"
```

- h.** Click **Next**. The **Printer Name** wizard appears.
- i.** Type a name for the printer and click **Next**. The **Finish Adding New Printer** wizard appears.
- j.** Verify that the printer information is correct and click **Finish**.

If you want to test the printer, follow these steps:

- a.** Start the Quartus II software and open a text file.
  - b.** Choose **Print** (File menu) and select the printer you configured in the above procedure.
  - c.** Click **OK**. If the printer is properly configured, the text file will print on the specified printer.
- You can enable 64-bit processing by passing the `--64bit` flag to the **quartus\_map**, **quartus\_fit**, and/or **quartus\_tan** executables. For example, you can enable 64-bit processing with the **quartus\_map** executable by typing the following at the command prompt:

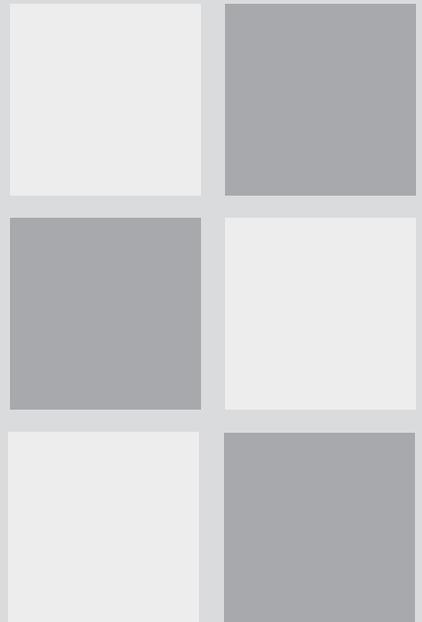
```
quartus_map --64bit ↵
```

The `--64bit` flag is supported in systems with 64-bit processing only

# Chapter Four

---

## Documentation & Technical Support



# 4

### What's in Chapter 4:

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# Starting the Quartus II Tutorial

The online tutorial introduces you to the features of the Quartus II design software. It shows you how to create and process your own logic designs quickly and easily. The modular design of the tutorial allows you to choose the areas of the Quartus II software that you want to learn about. The tutorial guides you through the steps required to create, compile, perform timing analysis on, simulate, and program a sample finite impulse response (FIR) filter design, called `fir_filter`.

To start the Quartus II tutorial after you have successfully installed the Quartus II software:

- ✓ Choose **Tutorial** (Help menu).

After you start the tutorial, the Quartus II window resizes to allow you to view the Tutorial window and the Quartus II software simultaneously.



## Before You Start the Quartus II Tutorial

You should be aware of the following information before you start the Quartus II tutorial:

- You must have installed support for Cyclone EP1C6 devices if you want to complete the tutorial. If you did not install support for these devices, refer to “The Quartus II Install Script” on page 5 in Chapter 1, “Installing the Quartus II Software.”
- The tutorial is designed for display online. However, if you want to print one or more of the tutorial modules, click the **Printing Options** button located at the beginning of each module and then click the link to open the appropriate printable version.

## Using Quartus II Help

The Quartus II software includes a platform-independent Help system that provides comprehensive documentation for the Quartus II software and more details about the specific messages generated by the Quartus II software. You can view Help in one of the following ways:

- Press F1 from a highlighted menu command or active dialog box for context-sensitive help.

- Choose **Index** (Help menu) to view the **Index** tab. The Index lets you search for and display all Help topics related to a keyword or phrase.
- Choose **Contents** (Help menu) to view the **Contents** tab. The Contents outlines the design flow and groups related topics into folders, but does not list all the topics in Quartus II Help.
- Choose **Search** (Help menu) to perform a search with the **Search** tab. The Search finds a maximum of 500 topics containing the search keyword.
- Choose **Messages** (Help menu) to view the Messages list. The Messages list provides an alphabetical list of all messages and offers detailed Help on each message.
- Choose **Glossary** (Help menu) to view the Glossary list. The Glossary list provides definitions to key terminology in the Quartus II software.



For Information About	Refer To
Using Quartus II Help	"Help Menu Commands" in Quartus II Help
	"Using Quartus II Help Effectively" in Quartus II Help

## Getting Help on a Message

To view Help on an individual message, follow these steps:

1. In the Messages window, select the message on which you want to receive Help.
2. Choose **Help** (right button pop-up menu).

To view the entire alphabetical list of messages:

- ✓ Choose **Messages** (Help menu).

*or*

- ✓ Choose **Contents** (Help menu), and select **Messages List** from the end of the Contents.

## Using Context-Sensitive Help

To view context-sensitive help for a specific item:

- ✓ Press F1 from a highlighted menu command or active dialog box for context-sensitive help.

*or*

- ✓ Press Shift+F1 or choose the **Context-Sensitive Help** button  on the toolbar. The pointer turns into a Help pointer. You can then point to a menu command or active window and click for context-sensitive help.

## Navigating Help

The Help window includes a **Contents** tab, **Index** tab, **Search** tab, and **Favorites** tab that can help you navigate through thousands of Help topics.

### Using the Index Tab

To find and display a Help topic using the Index, follow these steps:

1. Choose **Index** (Help menu) or, if the Help window is already open, click the **Index** tab.
2. Type the entry you want to find in the **Type in the keyword to find** box.
3. In the list of keywords, select the entry or subentry.



#### Finding Cross-Reference Entries in Quartus II Help

If the entry you are looking for refers to a cross-reference entry in parentheses that is preceded with **See** or **See also**, you can type that entry in the **Type in the keyword to find** box to locate additional topics.

4. To open the topic, click **Display** or double-click the entry.

## Using the Search Tab

To search all topics in Quartus II Help for specific keywords, follow these steps:

1. Choose **Search** (Help menu) or, if the Help window is already open, click the **Search** tab.
2. Type the word or words that you want to find:
  - To find topics with adjacent words, type the words in double quotation marks. For example, “this and that” finds topics that contain the exact phrase “this and that.”
  - To find topics that contain the words, type the words without double quotation marks. For example, this and that finds topics that contain any combination of the words “this,” “and,” and “that.”
3. If necessary to narrow your search, select **AND**, **OR**, **NEAR**, or **NOT** from the list.
4. If necessary, turn on **Search previous results**, **Match similar words**, or **Search titles only**.
5. Click **List Topics**.
6. Select the topic you want to display.
7. Click **Display**.

## Using the Contents Tab

To view groups of related topics, follow these steps:

1. Choose **Contents** (Help menu) or, if the Help window is already open, click the **Contents** tab.
2. Select the Help folder topic you want to view.
3. Click the + icon to expand the folder and view the names of individual Help topics.
4. Select the topic you want to display.

## Using the Favorites Tab

To add Help topics to your **Favorites** list:

1. Open the Help window.
2. Open the topic that you want to add to your **Favorites** list.
3. Click the **Favorites** tab to open it.
4. Click **Add** to add the topic to your list of favorite Help topics.

## Printing Help Topics

To print Quartus II Help topics from the **Contents** tab, follow these steps:

1. In the **Contents** tab, select the Help folder or Help topic that you want to print.
2. Choose **Print** (right button pop-up menu).

*or*

Click the **Print** button  on the toolbar.

3. Select the appropriate print option:
  - To print the selected topic, select **Print the selected topic**.
  - To print the selected folder and all the topics in the folder, select **Print the selected heading and all subtopics**.
4. Click **OK**.



### Printing Individual Help Topics

You can also use the **Print** command or **Print** button to print any individual Help topic you are viewing.

## Finding a Keyword in a Help Topic

To search for a keyword in an open Quartus II Help topic, follow these steps:

1. To open the **Find** dialog box, press Ctrl + F.
2. In the **Find what** box, type the search text.
3. If necessary, turn on one or both of the following options:
  - **Match whole word only**
  - **Match case**
4. In the **Direction** list, select a search direction.
5. Click **Find Next**.
6. If necessary, click **Find Next** again to find the next instance of the search text.
7. To end the search, click **Cancel**.

## Viewing a Glossary Definition

To view the alphabetical glossary list:

- ✓ Choose **Glossary** (Help menu).

*or*

- ✓ Choose **Contents** (Help menu), and select **Glossary List** from the end of the Contents.

# Contacting Altera

You can contact Altera for technical support and product information.

## Technical Support

If you need technical support, you can visit the Altera web site or the mySupport web site, or you can call the Altera Applications Department.

**Table 1. Quartus II Technical Support Resources**

Resource	Description
<b>Altera web site:</b>	<b>www.altera.com</b>  Includes the Altera Find Answers page, which is available from the Support Center section of the Altera web site at <b>www.altera.com/answers</b> .
<b>mySupport web site:</b>	<b>www.altera.com/mysupport</b>  or choose <b>Altera on the Web &gt; Quartus II Service Request</b> (Help menu) in the Quartus II software. This web site allows you to submit, view, and update technical support service requests.
<b>Telephone:</b>	(800) 800-EPLD (7:00 a.m. to 5:00 p.m. Pacific time, M–F) You will need your 6-digit Altera ID to access the hotline.  (408) 544-8767 (7:00 a.m. to 5:00 p.m. Pacific time, M–F)



### Registering for an Altera.com Account

In order to use the mySupport web site to view and submit service requests, you must also register for an Altera.com account. An Altera.com account is required only for using the mySupport web site; however, having an Altera.com account will also make it easier for you to use many other Altera web site features, such as the Download Center, Licensing Center, Altera Technical Training online class registration, or Buy On-Line-Altera eStore features. For more information, refer to “Registering for an Altera.com Account” on page 40 in Chapter 2, “Licensing the Quartus II Software.”

## Product Information

If you need the latest Altera product information or literature, go to the Literature section of the Altera web site at [www.altera.com/literature](http://www.altera.com/literature). You can also purchase printed sets of documentation from the Shop Altera web site at [www.shopaltera.com](http://www.shopaltera.com).

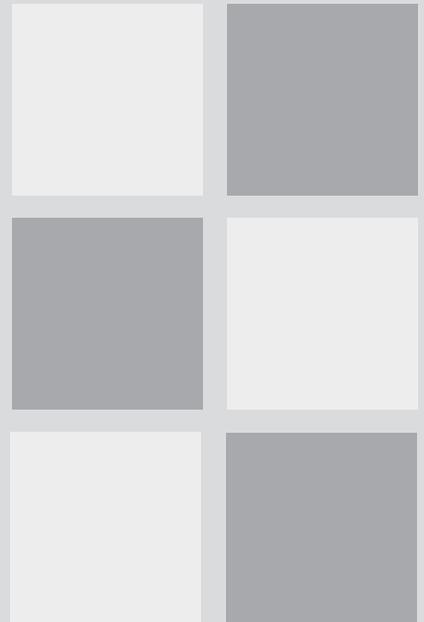


For Information About	Refer To
Altera technical support services	The Contact Altera section of the Altera web site

# Appendix A

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## Quartus II File Organization



# A

### What's in Appendix A:

Quartus II File Organization

60

# Quartus II File Organization

During the Quartus II software installation, the following directories are created on your workstation:

- The `/opt/altera/quartus<version number>` directory (the main directory where the Quartus II software files are installed) contains system software and data files and includes the subdirectories described in Tables 1 through 5.
- The `/opt/altera/qdesigns` directory contains tutorial and sample files and includes the subdirectories described in Table 5 on page 63.

The `/opt/altera/quartus<version number>` directory includes the subdirectories listed in Table 2.

**Table 1. Quartus II System Directory (`quartus<version number>`) Structure (Part 1 of 2)**

Directory	Description
<code>./adm</code>	Contains system administration scripts.
<code>./bin</code>	Contains wrapper scripts.
<code>./common</code>	Contains device information files and other data files.
<code>./eda</code>	Contains libraries for use with other EDA tools. Refer to Table 2 for information on the subdirectories of this directory.
<code>./libraries</code>	Contains the Quartus II software directory for “self-contained” libraries. Refer to Table 3 on page 62 for information on the subdirectories of this directory.
<code>./linux</code>	Contains platform-specific files for 32-bit Linux workstation installations, including the ByteBlaster driver, which is required to use the ByteBlasterMV download cable with Linux workstations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
<code>./linux64</code>	Contains platform-specific files for 64-bit Linux workstation installations with Linux workstations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
<code>./lmf</code>	Contains Library Mapping Files ( <b>.lmf</b> ).
<code>./mw</code>	Contains files needed for the MainWin software.

**Table 1. Quartus II System Directory (*quartus*<version number> Structure (Part 2 of 2))**

Directory	Description
<b>./objective_studio</b>	Contains files needed for the Objective Studio software.
<b>./qdesigns</b>	Contains tutorial and sample files. Refer to <a href="#">Table 5 on page 63</a> for information on the subdirectories of this directory.
<b>./solaris</b>	Contains platform-specific files for 32-bit Solaris UNIX workstation installations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
<b>./solaris64</b>	Contains platform-specific files for 64-bit Solaris UNIX workstation installations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
<b>./sopc_builder</b>	Contains files needed for the SOPC Builder software.

The `/opt/altera/quartus<version number>/eda` directory includes the subdirectories described in [Table 2](#).

**Table 2. Quartus II EDA Directory (*eda*) Structure**

Directory	Description
<b>./cadence</b>	Contains technology libraries for Cadence EDA tools.
<b>./ibis</b>	Contains input files that allow the Quartus II software to generate design-specific IBIS Output Files for EDA tools.
<b>./mentor</b>	Contains technology libraries for Mentor Graphics EDA tools.
<b>./sim_lib</b>	Contains VHDL and Verilog HDL simulation libraries that are compatible with EDA tools from other vendors.
<b>./synopsys</b>	Contains technology libraries for Synopsys EDA tools.
<b>./innoveda</b>	Contains technology libraries for Innoveda EDA tools.
<b>./fv_lib</b>	Contains formal verification model libraries.

The `/opt/altera/quartus<version number>/libraries` directory includes the subdirectories described in [Table 3](#).

**Table 3. Quartus II Library Directory (libraries) Structure**

Directory	Description
<b>./megafunctions</b>	Contains megafunctions, including Library of Parameterized Modules (LPM) functions, corresponding Include Files ( <b>.inc</b> ) that contain their AHDL Function Prototypes, and corresponding Block Symbol Files ( <b>.bsf</b> ).
<b>./others</b>	Contains libraries of logic functions that provide compatibility between the Quartus II software and the MAX+PLUS II software.
<b>./primitives</b>	Contains Block Symbol Files ( <b>.bsf</b> ) for Quartus II primitives.
<b>./software</b>	Contains the boot loader library file that generates flash programming files with the Quartus II software and the ADS Toolset.
<b>./vhdl87</b>	Contains the library of IEEE Std. 1076–1987 VHDL packages.
<b>./vhdl93</b>	Contains the library of IEEE Std. 1076–1993 VHDL packages.

The `/opt/altera/quartus<version number>/sopc_builder` directory includes the subdirectories described in [Table 4](#).

**Table 4. Quartus II SOPC Builder Directory (sopc\_builder) Structure**

Directory	Description
<b>./bin</b>	Contains the executable software program files for the SOPC Builder software.
<b>./bin/europa</b>	Contains the HDL library generator.
<b>./components</b>	Contains the SOPC Builder software components.
<b>./placeholders</b>	Contains the SOPC Builder placeholders for the available components.
<b>./examples</b>	Contains the SOPC Builder example files.
<b>./documents</b>	Contains the SOPC Builder documentation.
<b>./tutorials</b>	Contains the SOPC Builder tutorial files.

The `/opt/altera/qdesigns` directory includes the subdirectories described in [Table 5](#).

**Table 5. Quartus II Work Directory (*qdesigns*) Structure**

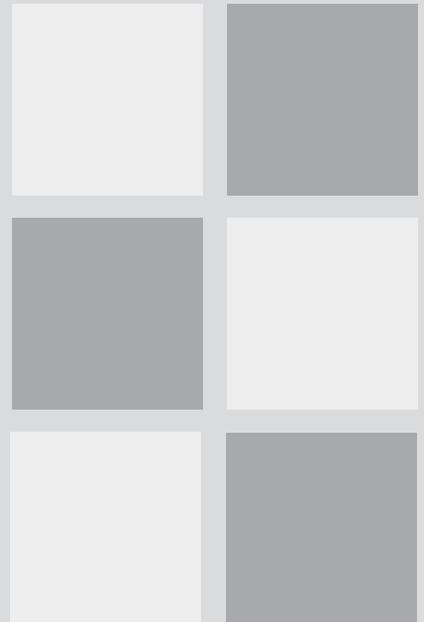
Directory	Description
<b>./tutorial</b>	Contains the completed project and design files for the Basic tutorial. This directory includes a <b>readme.txt</b> file that contains important information about the tutorial.
<b>./fir_filter</b>	Directory in which you should create the <b>fir_filter</b> project if you are completing the Design Entry tutorial module. Use this directory to prevent accidental changes to the original design files in the <b>/qdesigns/tutorial</b> directory.
<b>./fir_filter/compile</b>	Contains the <b>compile_fir_filter</b> project for use when completing the Compilation tutorial module independently or nonsequentially.
<b>./fir_filter/timing</b>	Contains the <b>timing_fir_filter</b> project for use when completing the Timing Analysis tutorial module independently or nonsequentially.
<b>./fir_filter/simulate</b>	Contains the <b>simulate_fir_filter</b> project for use when completing the Simulation tutorial module independently or nonsequentially.
<b>./fir_filter/program</b>	Contains the <b>program_fir_filter</b> project for use when completing the Programming tutorial module independently or nonsequentially.

# Appendix

# B

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## Mounting & Unmounting CD-ROMs



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# B

# Introduction

The following appendix describes how to mount and unmount the Quartus II CD-ROMs and related CD-ROMs on UNIX and Linux workstations.

## Mounting & Unmounting CD-ROMs on Solaris Workstations



### Before You Mount a CD-ROM

You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are running Volume Manager, the CD-ROM drive is mounted and unmounted automatically as **/cdrom/cdrom0** (you do not need to have root privileges to mount a CD-ROM with the Volume Manager), and you do not need to perform the mounting and unmounting procedures.

To mount a CD-ROM on a Solaris workstation, follow these steps:

1. Specify the directory where you want to mount the CD-ROM drive. The CD-ROM drive is usually placed in the top-level directory. To access this directory, type the following command at the command prompt:

```
cd / ←
```

2. To create the **/cdrom/cdrom0** directory, type the following command at the command prompt:

```
mkdir /cdrom/cdrom0 ←
```

3. If you have not already done so, insert the CD-ROM into your CD-ROM drive.
4. To mount the CD-ROM drive, type the following command at the command prompt:

```
/sbin/mount -F hsfs -o ro /dev/dsk/  
<device name of CD-ROM> /cdrom/cdrom0 ←
```

If you have previously mounted and unmounted this CD-ROM, a number may be appended to the device name of the CD-ROM, in which case you should use the complete name and number for *<device name of CD-ROM>*. For example, if the device name appears as `model.sim`, use that name.

To unmount a CD-ROM on a Solaris workstation, follow this step:

- ✓ To unmount the CD-ROM drive, type the following command at the command prompt:

```
/sbin/umount /cdrom/cdrom0 ↵
```

To successfully unmount the CD-ROM drive, you must make sure no one is accessing the directory structure at or below the **cdrom** directory. If another user is using the CD-ROM drive, you may receive the following message:

```
umount: cannot unmount /cdrom/cdrom0: Device busy
```

To determine whether you are accessing the CD-ROM drive yourself, type the following command at the command prompt:

```
pwd ↵
```

You should see the `/` prompt on your screen. If you do not, you should type `cd /` ↵ again.

# Mounting & Unmounting CD-ROMs on Linux Workstations



## Before You Mount a CD-ROM

You must have superuser or “root” privileges to mount and unmount the CD-ROM drive. If you are logged in on a console, you do not need to have root privileges to mount a CD-ROM.

To mount a CD-ROM on a Linux workstation, follow these steps:

1. If the `/mnt/cdrom` directory does not exist, type the following command at the command prompt:

```
mkdir /mnt/cdrom ↵
```

2. If you have not already done so, insert the CD-ROM into your CD-ROM drive.
3. To mount the CD-ROM drive, type the following command at the command prompt:

```
/bin/mount /mnt/cdrom ↵
```

If you have previously mounted and unmounted this CD-ROM, a number may be appended to the device name of the CD-ROM, in which case you should use the complete name and number for `<device name of CD-ROM>`. For example, if the device name appears as `modelsim`, use that name.

To unmount a CD-ROM on a Linux workstation, follow this step:

- ✓ To unmount the CD-ROM drive, type the following command at the command prompt:

```
/bin/umount /mnt/cdrom ↵
```

To successfully unmount the CD-ROM drive, you must make sure that no one is accessing the directory structure at or below the `cdrom` directory. If another user is using the CD-ROM drive, you may receive the following message:

```
umount:/mnt/cdrom : Device busy
```

To determine whether you are accessing the CD-ROM drive yourself, type the following command at the command prompt:

```
pwd ↵
```

You should see the `/` prompt on your screen. If you do not, you should type `cd /` ↵ again.

## **Revision History**

The information contained in the *Installation & Licensing for UNIX and Linux* manual version 5.1 revision 1 supersedes information published in previous versions.

Minor typographical changes were made to the previous version.

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