

Quartus® II

Design Software

Installation & Licensing for UNIX and Linux Workstations



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QUARTUS® II

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5898628; 5898630; 5900743; 5904524; 5905675; 5909126; 5872463; 5909375; 5909450; 5914509; 5914904; 5915017; 5915756; 5923567; 5925904; 5926036; 5936425; 5939790; 5940852; 5942914; 5943267; 5945870; 5949239; 5949250; 5949710; 5949991; 5953537; 5959891; 5963049; 5963051; 5963069; 5963565; 5966597; 5968161; 5969626; 5970255; 5977791; 5977793; 5978476; 5982195; 5983277; 5986465; 5986470; 5996039; 5998263; 5998295; 5999015; 5999016; 6002182; 6005379; 6005806; 6011406; 6011730; 6011744; 6018476; 6018490; 6020758; 6020759; 6020760; 6023439; 6023753; 6025737; 6026226; 6028787; 6028808; 6028809; 6029236; 6031391; 6031763; 6032159; 6034536; 6034540; 6034857; 6037829; 6038171; 6040712; 6043676; 6045252; 6049223; 6049225; 6052309; 6052327; 6052755; 6055707; 6058452; 6060903; 6064599; 6066960; 6069487; 6014334; 6072332; 6072358; 6075380; 6076179; 6078521; 6080204; 6081449; 6084427; 6085317; 6091102; 6091258; 6094064; 6097211; 6101592; 6102964; 6104208; 6107820; 6107822; 6107824; 6107825; 6107854; 6108239; 6110223; 6112020; 6114915; 6115312; 6118302; 6118720; 6120550; 6121790; 6122209; 6122720; 6127217; 6127844; 6127846; 6127865; 6128215; 6128692; 6130552; 6130555; 6134166; 6134173; 6134705; 6134707; 6137313; 6144573; 6147511; 6150840; 6151258; 6151668; 6154055; 6154059; 6157208; 6157210; 6157212; 6160419; 6161211; 6163166; 6163195; 6166559; 6167364; 6167501; 6167502; 6169417; 6172900; 6173245; 6173389; 6175952; 6177844; 6180425; 6181159; 6181160; 6181161; 6181162; 6182020; 6182247; 6184703; 6184705; 6184706; 6184707; 6184710; 6185725; 6187634; 6191608; 6191611; 6191998; 6192445; 6195772; 6195788; 6198303; 6201404; 6202185; 6204688; 6205579; 6208162; 6212668; 6215326; 6216223; 6218859; 6218860; 6218876; 6219284; 6219776; 6219785; 6222382; 6225832; 6226201; 6232893; 6236094; 6236231; 6236237; 6236260; 6236597; 6239612; 6239613; 6239615; 6242941; 6242946; 6243296; 6243304; 6246260; 6246270; 6247147; 6247155; 6249143; 6249149; 6252419; 6252422; 6255846; 6255850; 6256683; 6259271; 6259272; 6259588; 6260082; 6262595; 6262933; 6263400; 6263482; 6265746; 6265895; 6265926; 6268623; 6269020; 6271679; 6271680; 6271681; 6271729; 6275065; 6278288; 6278291; 6279145; 6281704; 6282122; 6285211; 6286114; 6288970; 6292016; 6292017; 6292116; 6294928; 6295230; 6297565; 6298319; 6300792; 6300794; 6301694; 6311309; 6314550; 6317367; 6317771; 6317897; 6320411; 6321322; 6321367; 6321369; 6323677; 6323680; 6326807; 6326812; 6335634; 6335635; 6335636; 6337578; 6338129; 6340890; 6342792; 6342794; 6343356; 6344755; 6344758; 6344989; 6346827; 6347061; 6351144; 6351152; 6353551; 6353552; 6356108; 6356110; 6356994; 6359468; 6359469; 6362646; 6363505; 6365929; 6366119; 6366120; 6366121; 6366224; 6366498; 6366997; 6366999; 6367056; 6367058; 6369613; 6369624; 6373278; 6373280; 6377069; 6384625; 6384629; 6384630; 6389558; 6392438; 6392954; 6396304; 6397324; 6400290; 6400598; 6400635; 6401230; 6404225; 6407450; 6407576; 6408382; 6408432; 6411124; 6412812; 6414514; 6414518; 6417550; 6417692; 6417694; 6423572; 6429681; 6430677; 6433579; 6433585; 6437650; 6442073; 6446190; 6446191; 6448820; 6453367; 6453382; 6457073; 6459303; 6460148; 6462414; 6462577; 6462597; 6467017; 6467036; 6469553; 6470441; 6472272; 6472903; 6480025; 6480027; 6480028; 6480995; 6481000; 6483886; 6485843; 6486702; 6489817; 6490714; 6490717; 6492833; 6492834; 6507216; 6515507; 6515508; 6525564; 6525678; 6526461; 6531889; 6532170; 6535031; 6538469; 6538470; 6549045; 6556502; 6557094; RE37060; RE35977; and certain foreign patents. Additional patents are pending.

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Contents

Documentation Conventions	1
Installing the Quartus II Software	3
System Requirements	3
Uninstalling Previous Versions of the Quartus or Quartus II Software.....	4
The Quartus II Install Script.....	5
Installing the Quartus II Software (Solaris Only)	6
Installing the Quartus II Software (Linux Only)	8
Installing the Quartus II Software (HP-UX Only)	9
Licensing the Quartus II Software	13
Obtaining a License File.....	13
Modifying the License File	17
Setting Up a License Server	19
Upgrading the FLEXlm License Server Software	19
Rereading an Existing UNIX or Linux Workstation License File ..	20
Configuring a New UNIX or Linux Workstation License Server...	22
Installing the FLEXlm Software on Another License Server	23
Configuring Each Workstation (Solaris and HP-UX only)	23
Configuring Each UNIX Workstation (Solaris Only)	24
Configuring Each UNIX Workstation (HP-UX 11.0 Only)	25
Verifying Required Runtime Patches.....	26
Verifying Kernel Configuration	27
Configuring Each Quartus II User's Environment	29
Starting the Quartus II Software	29
Specifying the License File.....	30
Specifying the License File Using the Quartus II Software	31
Specifying the License File in the <code>.cshrc</code> File on Client UNIX and Linux Workstations	33
Specifying a Web Browser.....	34
Registering for an Altera.com Account	36
Installing Programming Hardware	37
Installing the MasterBlaster Serial/USB Communications Cable.....	37
Installing the ByteBlasterMV Parallel Port Download Cable (Linux Only)	39
Installing the Altera ByteBlaster Kernel Driver for Linux.....	40
Installing the ByteBlasterMV Parallel Port Download Cable for Linux	41
Using Alternate Programming Methods.....	43

Additional Workstation Configuration Information	44
Setting Environment Variables	44
Quartus II General Environment Variables	44
QUARTUS_ROOTDIR	45
MWFONT_CACHE_DIR	45
QUARTUS_MWWM	45
Quartus II NativeLink Environment Variables	45
QUARTUS_INIT_PATH	45
QUARTUS_INIT_LIBPATH	46
Other Workstation Configuration Information	46
Starting the Quartus II Tutorial	49
Using Quartus II Help	50
Getting Help on a Message	50
Using Context-Sensitive Help	51
Navigating Help	51
Using the Index Tab	51
Using the Search Tab	52
Using the Contents Tab	53
Printing Help Topics	53
Finding a Keyword in a Help Topic	54
Viewing a Glossary Definition	54
Quartus II File Organization	55
Contacting Altera	59
Technical Support	59
Product Information	60
Index	63

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.

Terminology



The following terminology 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: Select Chain Description File , and click OK .
“turn on”/“turn off”	Indicates that you must click a check box to turn a function on or off.

Typographic Conventions

The *Quartus II Installation & Licensing for UNIX and Linux Workstations* manual uses the following typographic conventions:

Visual Cue:	Meaning:
Bold Initial Capitals	Command names, dialog box titles, tab names, and button names are shown in bold, with initial capital letters. For example: F ind T ext command, S ave A s dialog box, and S tart button.

Visual Cue:	Meaning:
bold	Directory names, project names, disk drive names, file names, file name extensions, software utility names, and options in dialog boxes are shown in bold. Examples: quartus directory, d: drive, license.dat 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: < <i>file name</i> >, < <i>CD-ROM drive</i> >.
Courier font	Anything that must be typed exactly as it appears is shown in Courier. For example: /qdesigns/fir_filter.
■	Bullets 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.
	The feet show you where to go for more information on a particular topic.
↵	Enter or return key.

Installing the Quartus II Software

This section describes the requirements and procedures for installing the Altera® Quartus® II software on Sun Ultra workstations running Solaris version 7 or 8, Pentium II PCs running Red Hat Linux version 7.1, 7.2, or 8.0, or on HP 9000 Series 700/800 workstations running HP-UX version 11.0.

System Requirements

Your system must meet the following minimum requirements:

- One of the following workstations:
 - Sun Ultra workstation running Solaris version 7 or 8
 - Pentium II PC operating at 400 MHz or faster, running Red Hat Linux version 7.1, 7.2, or 8.0
 - HP 9000 Series 700/800 workstation running HP-UX version 11.0 with ACE dated November, 1999 or later
- ISO 9660-compatible CD-ROM drive
- Color monitor
- Serial port for use with the MasterBlaster™ communications cable
- 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**
 - **viewm**
 - **mwm**
 - **olwm**
 - **kde** (Linux workstations only. The **kde** version must be the version that is included with RedHat Linux version 7.1, 7.2, and 8.0.)

- **gnome** (Linux workstations only. The **gnome** version must be the version that is included with RedHat Linux version 7.1, 7.2, and 8.0.)
- 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.



Refer to the **readme.txt** file, which is located in the top-level directory of the Quartus II software CD-ROM, for specific information about disk space and memory for the current version of the Quartus II software. After installation, the **readme.txt** file is available from the Quartus II Help menu and in the `/usr/<Quartus II system directory>` directory.

In addition, the most current version of the *Quartus II Installation & Licensing for UNIX and Linux Workstations* manual is available in Adobe Portable Document Format (PDF) from the Literature section of the Altera web site at www.altera.com/literature, and may contain updated information about system requirements.

For the latest information on new features, device support, EDA interface support, and known issues and workarounds for the Quartus II software, refer to the *Quartus II Software Release Notes* document, which is available at www.altera.com/literature/rn/rn_qts.pdf.

For general information about Quartus II software features and how they work with your design flow, refer to the *Introduction to Quartus II* manual, which is included in your Quartus II software package and is also available from the Literature section of the Altera web site at www.altera.com/literature.

Uninstalling Previous Versions of the Quartus or Quartus II Software

If you have installed a previous version of the Quartus® or Quartus II software, Altera recommends that you uninstall that software before installing the new version of the software. However, it is not necessary to uninstall it.

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.

These installation instructions assume the following conditions:

- 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 **/usr/quartus** 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 the *<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 software installs version 8.2 of the FLEXlm License Manager Server software on the user workstation. For more information, refer to [“Setting Up a License Server” on page 19](#).

Installing the Quartus II Software (Solaris Only)

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



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**, and you need to perform only steps 3 and 5, and can skip the other steps.

1. Specify a directory on which 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. Insert the Quartus II Design Software for UNIX Workstations (Solaris 7 and 8 only) 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 ↵
```

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

```
/cdrom/cdrom0/install ↵
```

You are guided through the installation procedure.

6. 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.

7. To install the GNU Tools and Excalibur Component software, insert the GNU Tools and Excalibur Component CD-ROM into your CD-ROM drive.
8. Repeat steps 4-6 to mount and install the GNU Tools and Excalibur Component software and unmount the CD-ROM drive. However, for step 5, you should type the following command at the command prompt:

```
/cdrom/cdrom0/install.sh ↵
```

9. To install the Model Technology™ ModelSim®-Altera software, insert the Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II & MAX+PLUS® II Software (Model Technology ModelSim Software) CD-ROM into your CD-ROM drive.
10. Repeat steps 4-6 to mount and install the ModelSim-Altera software and unmount the CD-ROM drive. However, for step 5, you should type the following command at the command prompt:

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



The GNU Tools and Excalibur Component software and the ModelSim-Altera software are included in Quartus II subscriptions packages but may not be included in Altera development and Altera partner kits.

Installing the Quartus II Software (Linux Only)

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



You must have superuser or “root” privileges to mount and unmount the CD-ROM drive.

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

```
mkdir /mnt/cdrom ↵
```

2. Insert the Quartus II Design Software for Linux Workstations (Red Hat Linux 7.1, 7.2, and 8.0 Only) 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 ↵
```

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

```
/mnt/cdrom/install ↵
```

You are guided through the installation procedure.

5. 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.

6. To install the GNU Tools and Excalibur Component software, insert the GNU Tools and Excalibur Component CD-ROM into your CD-ROM drive.
7. Repeat steps 3-5 to mount and install the GNU Tools and Excalibur Component software and unmount the CD-ROM drive. However, for step 4, you should type the following command at the command prompt:

```
/mnt/cdrom/install.sh 
```

8. To install the ModelSim-Altera software, insert the Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II & MAX+PLUS II Software (Model Technology ModelSim Software) CD-ROM into your CD-ROM drive.
9. Repeat steps 3-5 to mount and install the ModelSim-Altera software and unmount the CD-ROM drive. However, for step 4, you should type the following command at the command prompt:

```
/mnt/cdrom/unix/install.ms 
```



The GNU Tools and Excalibur Component software and the ModelSim-Altera software are included in Quartus II subscriptions packages but may not be included in Altera development and Altera partner kits.

Installing the Quartus II Software (HP-UX Only)

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



You must have superuser or “root” privileges to mount and unmount the CD-ROM drive.

1. Specify a directory on which 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. Find the device ID for the CD-ROM drive so you can mount the correct device. To view a list of the possible device IDs, type the following command at the command prompt:

```
/usr/sbin/ioscan -fn -C disk ↵
```

Figure 1 shows sample output from this command, including sample device IDs.

Figure 1. Sample Device ID Output from ioscan Command

```

                                CD-ROM ID code
                                |
disk    0    10/0/14/0.0.0    sdisk CLAIMED
      DEVICE    TEAC    CD-532E-B CDROM    /dev/dsk/c0t0d0    /dev/rdisk/c0t0d0

disk    1    10/0/15/1.5.0    sdisk CLAIMED
      DEVICE    QUANTUM ATLAS10K-18LVD    /dev/dsk/c3t5d0    /dev/rdisk/c3t5d0

disk    2    10/0/15/1.6.0    sdisk CLAIMED
      DEVICE    QUANTUM ATLAS10K-18LVD    /dev/dsk/c3t6d0    /dev/rdisk/c3t6d0
  
```

The `-fn` option allows the `ioscan` command to show an extended information set, and the `-C` option filters the output to show only I/Os of disk type.

3. To create the `cdrom` directory, type the following command at the command prompt:

```
mkdir /cdrom ↵
```

4. Insert the Quartus II Design Software for UNIX Workstations (HP-UX 11.0 only) CD-ROM into your CD-ROM drive.
5. To mount the CD-ROM drive, type the following command at the command prompt:

```
/sbin/mount -o cdcase /dev/dsk/<device name of CD-ROM>
/cdrom ↵
```

The `-o cdcase` option creates lowercase file names in the CD file system. This command is followed by the device ID, and the directory on which you are mounting the CD-ROM drive.

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

```
/cdrom/install ↵
```

You are guided through the installation procedure.

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

```
/sbin/umount /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: cannot unmount /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.

8. To install the GNU Tools and Excalibur Component software, insert the GNU Tools and Excalibur Component CD-ROM into your CD-ROM drive.
9. Repeat steps 5-7 to mount and install the GNU Tools and Excalibur Component software and unmount the CD-ROM drive. However, for step 6, you should type the following command at the command prompt:

```
/cdrom/install.sh ↵
```

10. To install the ModelSim-Altera software, insert the Altera VHDL & Verilog HDL Simulation Tool for Use with the Quartus II & MAX+PLUS II Software (Model Technology ModelSim Software) CD-ROM into your CD-ROM drive.
11. Repeat steps 5-7 to mount and install the ModelSim-Altera software and unmount the CD-ROM drive. However, for step 6, you should type the following command at the command prompt:

```
/cdrom/unix/install.ms ↵
```



The GNU Tools and Excalibur Component software and the ModelSim-Altera software are included in Quartus II subscription packages but may not be included in Altera development and Altera partner kits.

Licensing the Quartus II Software

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 (UNIX only).
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, request a valid license file automatically 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 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 hp11, linux, or solaris):

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



For information about additional methods of finding your host ID number, refer to the Knowledge Database, which is available at www.altera.com/kdb. For complete information about using the FLEXlm utilities, you should refer to the *FLEXlm End Users Guide*, which is available at www.macrovision.com/solutions/esd/support/enduser/TOC.htm.

To obtain a license file, follow these steps:



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

1. Start the Quartus II software as described in the “[Starting the Quartus II Software](#)” on page 29.
2. Select **Request updated license file from web** to request a valid license file automatically from the Altera web site.

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 2 and Figure 3 show sample network license files for UNIX and Linux workstations that function as a single license server.

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

```

SERVER alice 807f1034 1800
VENDOR alterad "/usr/quartus/solaris/alterad"
USE_SERVER
FEATURE altera_mainwin alterad 2003.06 permanent 5 4432968595AB
FEATURE quartus alterad 2003.06 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"
  
```

The diagram shows a sample network license file with labels pointing to specific fields. The labels are: Server name, Server host ID number, Optional port number, Number of licenses requested, Authorization code, Feature name, Daemon name, Version, and Expiration date.

Figure 3. Sample Network License File for a Single Linux Workstation Server

```

SERVER alice 807f1034 1800
VENDOR alterad "/usr/quartus/linux/alterad"
USE_SERVER
FEATURE altera_mainwin_lnx alterad 2003.06 permanent 5 4432968595AB
FEATURE quartus alterad 2003.06 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"
  
```

If you are using the Quartus II software with a node-locked (single-user) license, skip to “[Configuring Each Workstation \(Solaris and HP-UX only\)](#)” on page 23.

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 4](#) shows a sample redundant server license file.

Figure 4. Sample Redundant Server License File

```

SERVER alice 807f1043 1800
SERVER king 807f1042 1800
SERVER queen 807f1041 1800
VENDOR alterad "/usr/quartus/solaris/alterad"
USE_SERVER
FEATURE altera_mainwin alterad 2003.06 permanent 5 4432968595AB
FEATURE quartus alterad 2003.06 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 1480 1B0A 70DE \
2220 1952 DDCD 9F4D 6D61 A177"
  
```



For additional information about setting up and administering license servers, including setting up three redundant license servers, refer to the *FLEXlm End Users Guide*, which is available at www.macrovision.com/solutions/esd/support/enduser/TOC.htm.

Modifying the License File

The **license.dat** file must be modified before it can be used by the license server. See *Application Note 229 (Troubleshooting Altera Software Licensing)* for a detailed description of the license file.



If you have a node-locked (single-user) license, you can skip this section and go to “[Starting the Quartus II Software](#)” on page 29.

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.

Table 1. Variables to Modify in the License File (license.dat) (Part 1 of 2)

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.	

Table 1. Variables to Modify in the License File (license.dat) (Part 2 of 2)

Variable Name	Description	Directory
alterad "<path to daemon executable>" (2)(3)	Path to the Altera vendor daemon executable alterad .	Solaris: /<Quartus II system directory path>/solaris/alterad HP-UX 11.0: /<Quartus II system directory path>/hp11/alterad Linux: /<Quartus II system directory path>/linux/alterad
mgcld "<path to daemon executable>" (2)(3)(4)	Path to the Mentor Graphics vendor daemon executable mgcld .	Solaris: /<ModelSim-Altera system directory>/sunos5aloem/mgls/lib/mgcld HP-UX 11.0: /<ModelSim-Altera system directory>/hp700aloem/mgls/lib/mgcld
<p><i>Notes:</i></p> <p>(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.</p> <p>(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.</p> <p>(3) If the path server has spaces in it, enclose the full path in quotation marks.</p> <p>(4) If you are not using a license file for the ModelSim-Altera software, you may delete this line.</p>		

2. Save the license file with a **.dat** extension. Altera recommends that you name your license file **license.dat**.
3. 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.



For additional information about modifying the license file for the Quartus II and MAX+PLUS II software and other EDA tools, refer to *Application Note 205 (Altera Software Licensing)* and *Application Note 229 (Troubleshooting Altera Software Licensing)*, which are available from the Literature section of the Altera web site at www.altera.com/literature.

Setting Up a License Server

This section provides instructions for configuring network licensing for the Quartus II software on Sun Ultra workstations running Solaris 7 or 8, Pentium II PCs running Red Hat Linux version 7.1, 7.2, or 8.0, or HP 9000 Series 700/800 workstations running HP-UX version 11.0 with ACE dated November, 1999 or later.

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 20](#).

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 3.0 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 location:

```
/<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**, **linux**, or **hp11**.

3. Copy the FLEXlm software utility **lmutil** from the Quartus II 3.0 installation 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 2 on page 15](#). Make sure you have also modified the license file according to the guidelines in [“Modifying the License File” on page 17](#).

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 19](#) 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.



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 22](#).

To reread your license file on a license server:

- ✓ Type the following command at a command prompt:

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

where *<operating system name>* can be `solaris`, `linux`, or `hp11`.

or

- ✓ Restart the license server.



For complete information about using the FLEXlm utilities to administer and troubleshoot the FLEXlm License Manager software, refer to the *FLEXlm End Users Guide*, which is available at www.macrovision.com/solutions/esd/support/enduser/TOC.htm.

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, Linux, or HP-UX license server before starting the Quartus II software for the first time.



1. If you have an existing FLEXlm license server, refer to [“Rereading an Existing UNIX or Linux Workstation License File” on page 20.](#)
2. Make sure you have obtained a valid license file according to the guidelines in [“Obtaining a License File” on page 13,](#) and that you have modified the license file according to the guidelines in [“Modifying the License File” on page 17.](#)
3. 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:

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

where *<operating system name>* can be *solaris*, *linux*, or *hp11*.



For more specific information about configuring a new UNIX workstation license server, refer to the **readme.txt** file, which is located in the top-level directory of the Quartus II software CD-ROM. For additional information about setting up and administering license servers, including setting up three redundant license servers, refer to the *FLEXlm End Users Guide*, which is available at www.macrovision.com/solutions/esd/support/enduser/TOC.htm.

Installing the FLEXlm Software on Another License Server

You can install the FLEXlm software on an additional Solaris, Linux, or HP-UX license server.

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

1. Create a directory named `/usr/<Quartus II system directory>/<operating system name>` on the additional license server, where `<operating system name>` can be `solaris`, `linux`, or `hp11`.
2. Copy the following files from the `/usr/<Quartus II system directory>/<operating system name>` directory of your original Quartus II software into the new `/usr/quartus/<operating system name>` directory:
 - `lmgrd`
 - `lmutil`
 - `alterad`

Configuring Each Workstation (Solaris and HP-UX only)

If you are using a Solaris or HP-UX workstation, you must configure each UNIX workstation that will run the Quartus II software.



Linux workstations do not require any configuration steps or runtime patches. If you are a Linux workstation user, skip to “[Configuring Each Quartus II User’s Environment](#)” on page 29.

Configuring Each UNIX Workstation (Solaris Only)

To configure each Sun Solaris UNIX workstation that will run the Quartus II software before starting the Quartus II software for the first time:



You must have superuser or “root” privileges to perform this step.



Make sure that each workstation has the runtime patches that are required to run the Quartus II software on a Solaris 7 UNIX workstation. (Solaris 8 UNIX workstations do not require any runtime patches to run the Quartus II software.) 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 on page 25](#) 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. Altera recommends checking the Altera Knowledge Database, which is available from the Support Center section of the Altera web site at www.altera.com/kdb, 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, may contain updated information on patches.

[Table 2 on page 25](#) lists the runtime patches for Solaris 7.

Table 2. Solaris 7 Runtime Patches

Runtime Patches	Description	Reason for Patch
Either 108376-01 or 107078-18	OpenWindows 3.6.1: Xsun patch	Xserver not thread safe
<i>Note:</i> 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.		

In addition to the runtime patches, you should install the appropriate graphics card patch for your system, as shown in [Table 3](#).

Table 3. Solaris 7 Graphics Card Patches

Graphics Card	Patches	Description
Elite3D graphics card	106144-12	SunOS 5.7: Elite3D AFB graphics patch
Creator graphics card	106145-12	SunOS 5.7: Creator 7 FFB graphics patch
M64 graphics card	106146-10	SunOS 5.7: M64 graphics patch
Raptor GFX graphics card	107851-01	SunOS 5.7: Raptor GFX graphics patch
PGX32 graphics card	107716-12	SunOS 5.7: PGX32 graphics patch
<i>Note:</i> If you do not install the appropriate graphics card patch, the Quartus II software still functions, but may have user interface problems; for example, fonts may not display correctly.		

Configuring Each UNIX Workstation (HP-UX 11.0 Only)

For each HP-UX 11.0 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.



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

Verifying Required Runtime Patches

You must install a runtime patch if one of the following patches is installed on your system:

- PHSS_20142
- PHSS_22946

Table 4 lists the required patches and descriptions for HP-UX 11.0.

Table 4. HP-UX 11.0 Runtime Patch

Runtime Patches	Description	Reason for Patch
PHSS_25447	s700_800 11.00 X/Motif 32bit Runtime OCT2001 Periodic Patch	Problems with running the Quartus II software
<i>Note:</i> You must install this patch only if one of the following patches is installed on your system: PHSS_20142 or PHSS_22946.		

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

```
/usr/sbin/swlist -v | grep <patch name and number> ↵
```

If one of the patches in each set of required patches is not installed on your system, you must download the appropriate replacement patch:

1. Back up your UNIX workstation before installing a patch.
2. Download the patch from the Hewlett-Packard support web site at **us-support.external.hp.com**.
3. Copy the patch to the **tmp** directory.
4. Type the following commands from the **tmp** directory:

```
sh <patch name and number> ↵
```

5. To start the SD Install program, type the following command:

```
swinstall ↵
```

6. Select the path to the patch.
7. To install the patch, choose **Install** (Actions menu).



Altera recommends visiting the Knowledge Database, which is available at **www.altera.com/kdb**, for late-breaking information on required 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**, may contain updated information on patches.

Verifying Kernel Configuration

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

1. Back up your UNIX workstation before modifying your kernel configuration.
2. Type the following command at the command prompt:

`sam ↵`
3. In the **SAM Areas** folder, double-click the **Kernel Configuration** icon.
4. In the **Kernel Configuration** folder, double-click the **Configurable Parameters** icon.
5. Choose **Apply Tuned Parameter Set** (Actions menu). The **Tuned Kernel Parameter Sets** dialog box appears.
6. In the **Select a Tuned Parameter Set** list, select **CAE/ME/General Eng. Workstation 64-Bit Kernel**.
7. Click **OK**.
8. In the **Configurable Parameters** list in the **Kernel Configuration** dialog box, scroll to view the configuration parameters and change them to the recommended settings, if necessary.

Check the configuration parameters listed below to make sure that the values shown in the **Current Values** column in the **Kernel Configuration** dialog box are greater than or equal to the recommended values listed below. If they are not, change the values to the recommended values.

HP-UX 11.0 Parameter: Recommended Value:

semmnu	1000
semume	100
semmni	1000
shmmax	8388608
shmseg	16

9. To close the **Configurable Parameters** list, choose **Exit** (File menu). The **Create a New Kernel** dialog box appears.
10. Click **Create New Kernel Now**.
11. Click **OK**. The system creates a new kernel, and then restarts.



If you receive an error message pertaining to `sem_lock` or `sem_unlock`, you must increase the `semmnu` parameter to a value larger than 1000 and the `semume` parameter to a value larger than 100.

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 `/usr/quartus/bin` directory. To update the `PATH` environment variable, type the following command at a command prompt:

```
setenv PATH $PATH:/usr/<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 ↵
```

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. After 30 days, you must have a valid license file in order to use the software.

- **Request updated license file from web**—This option displays the Licensing section of the Altera web site, which allows you to request a license file. See “[Obtaining a License File](#)” on page 13 for more information.
- **Specify valid license file**—This option displays the **License Setup** tab 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 34.

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



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

Specifying the License File Using 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 29](#).



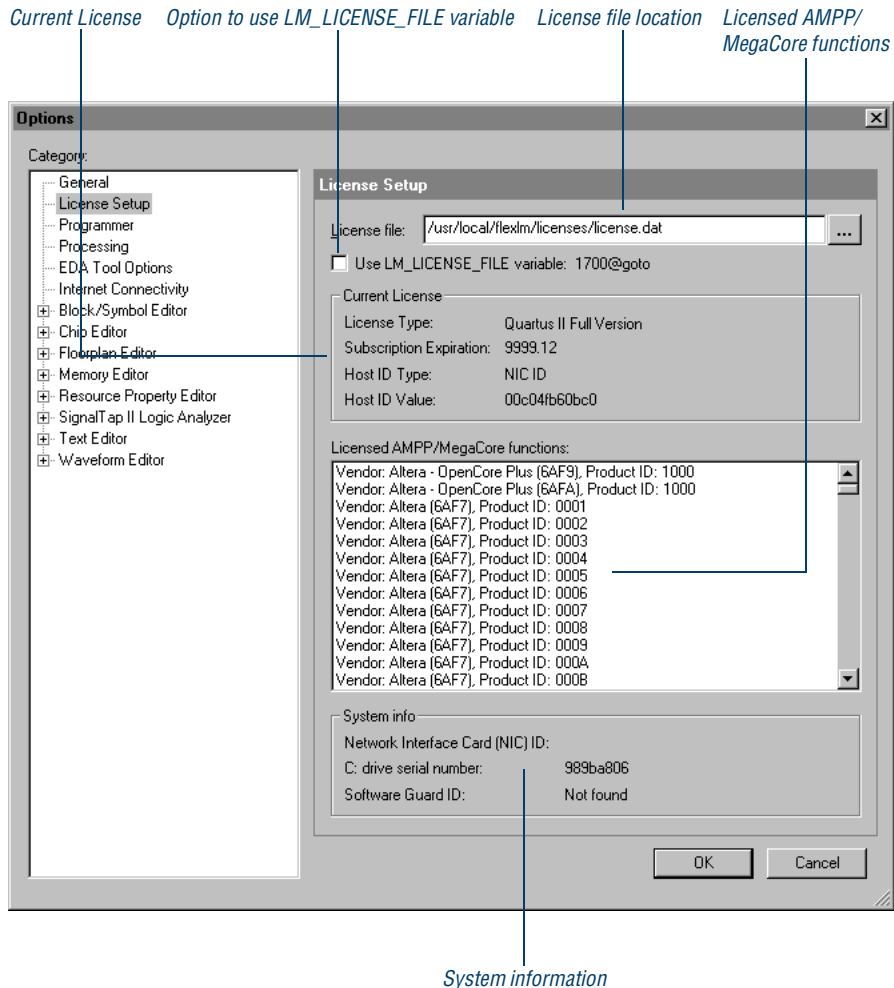
When you start the Quartus II software, if the software cannot detect a valid license file, you are asked whether you want to run in evaluation mode for 30 days, request a valid license file automatically from the Altera web site, or specify the correct location of a valid license file.

2. Select **Specify valid license file** to specify the name of the license file. The **License Setup** tab of the **Options** dialog box (Tools menu) is displayed. [Figure 5 on page 32](#) shows the **License Setup** tab.

or

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

Figure 5. License Setup Tab 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 on which the license file is stored and **<port>** is the port listed in the **license.dat** file. See [Figure 2 on page 15](#) for a sample network license file to determine your port

and server name, and refer to [Table 1 on page 17](#) for more information about port numbers. If there is no port listed in the **license.dat** file, you can simply specify `@<host>`.



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
```

or

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

4. Click OK.

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

Specifying the License File in the .cshrc File on Client UNIX and 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
```



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 2 on page 15](#) for a sample network license file to determine your port and server name, and refer to [Table 1 on page 17](#) for more information about port numbers. If there is no port listed in the `license.dat` file, you can simply specify `@<host>`.



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 the **Use LM_LICENSE_FILE variable** is turned on in the **License Setup** tab of the **Options** dialog box (Tools menu).

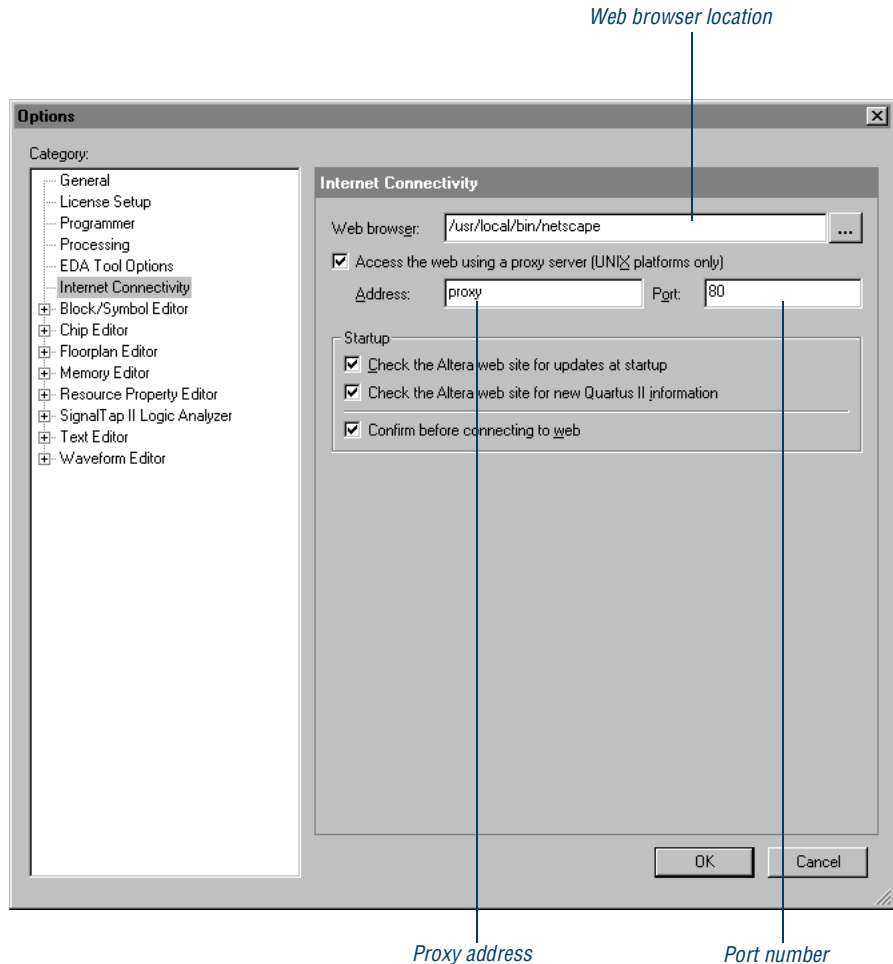
Specifying a Web Browser

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** tab appears. **Figure 6** shows the **Internet Connectivity** tab of the **Options** dialog box.

Figure 6. Internet Connectivity Tab 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**.

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**.
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.

Installing Programming Hardware

This section describes how to install the MasterBlaster communications cable and the ByteBlasterMV parallel port download cable. This section also describes alternate methods for programming Altera devices. Refer to [“Using Alternate Programming Methods” on page 43](#) for more information.

Installing the MasterBlaster Serial/USB Communications Cable

The UNIX and Linux versions of the Quartus II software currently support the MasterBlaster communications cable only for the serial port.

You can use the MasterBlaster Serial/USB communications cable to download configuration data to SRAM-based devices, such as APEX™ 20K and Mercury™ devices, and EEPROM-based devices, such as the MAX® 3000 and MAX 7000 devices; to perform in-system programming of configuration devices, such as EPC2 and EPC16 devices; or to perform SignalTap® II logic analysis.

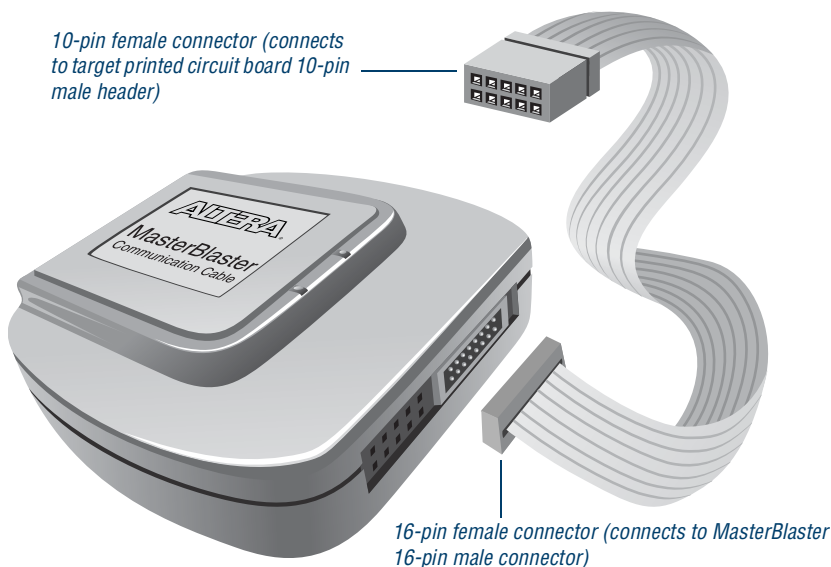
You can connect the MasterBlaster cable to an RS-232 serial port. The MasterBlaster cable can receive power from either of the following sources:

- 5.0-V or 3.3-V circuit boards
- A DC power supply, which is supplied with the MasterBlaster cable

To install and set up the MasterBlaster cable for device configuration or programming, follow these steps:

1. With a standard RS-232 cable, connect one end of the cable to the MasterBlaster cable, and connect the other end of the cable to the appropriate port on the computer.
2. Connect the 16-pin female header end of the cable to the 16-pin male MasterBlaster port, and the 10-pin female end of the cable to the 10-pin male header on the target printed circuit board. [Figure 7 on page 38](#) shows the MasterBlaster communications cable.

Figure 7. MasterBlaster Serial/USB Communications Cable



3. Open the Quartus II Programmer:
 - ✓ Choose **Programmer** (Tools menu).
 - or
 - ✓ Choose **New** (File menu). Click the **Other Files** tab, select **Chain Description File**, and click OK.
4. In the Programmer window, click **Hardware**. The **Hardware Settings** tab of the **Hardware Setup** dialog box is displayed.
5. Click **Add Hardware**. The **Add Hardware** dialog box is displayed.
6. In the **Hardware type** list, select **MasterBlaster**.
7. In the **Port** box, select the name of the appropriate serial port. Also, make sure you have read and write permission for the serial port.
8. In the **Baud rate** list, select a baud rate that is appropriate for your computer.
9. Click **OK**.

10. In the **Hardware Setup** dialog box, click **Close**.



For more information about the MasterBlaster cable, refer to the *MasterBlaster Serial/USB Communications Cable Data Sheet*, which is available from the Literature section of the Altera web site at **www.altera.com/literature**. For more information about SignalTap II logic analysis with the MasterBlaster cable, refer to “Selecting the Communications Cable for the SignalTap II Logic Analyzer” in Quartus II Help.

Installing the ByteBlasterMV Parallel Port Download Cable (Linux Only)

You can use the ByteBlasterMV download cable to download configuration data to SRAM-based devices, such as APEX 20K and Mercury devices, and EEPROM-based devices, such as the MAX 3000 and MAX 7000 devices; to perform in-system programming of configuration devices, such as the EPC2 and the EPC16 devices; or to perform SignalTap II logic analysis. You can connect the ByteBlasterMV download cable directly to your Linux workstation's parallel port.

To install the ByteBlasterMV download cable on a Linux workstation, you must perform the following steps, each of which are described in more detail in this section:

1. Install the Altera ByteBlaster™ kernel driver on a Linux workstation running Red Hat Linux version 7.1, 7.2, or 8.0.
2. Install the ByteBlasterMV download cable.

Installing the Altera ByteBlaster Kernel Driver for Linux

The Altera ByteBlaster kernel driver is required for Linux workstations running Red Hat Linux version 7.1, 7.2, or 8.0 that use the ByteBlasterMV download cable. You must install and compile the Altera ByteBlaster kernel driver outside of the Quartus II software.

To compile the Altera ByteBlaster kernel driver, you must have the following Red Hat Package Manager (RPM) packages, which are available from the Red Hat web site at www.redhat.com:

- gcc-2.96-81
- make-3.79.1-5
- binutils-2.10.91.0.2-3
- kernel-headers (RPM version must correspond to kernel version)

To verify that an RPM is installed, use the `rpm -q <name>` command. For example, `rpm -q gcc` verifies that the gcc RPM is installed.



1. You do not need to install the ByteBlasterMV download cable before installing the Altera ByteBlaster kernel driver.
2. Installing the Altera ByteBlaster kernel driver requires that you have superuser or “root” privileges.

To install the Altera ByteBlaster kernel driver for Linux workstations, follow these steps:

1. Decompress the **byteblaster.tar.gz** file, which is located in the **linux** directory, by typing the following command at the command prompt:

```
tar -xzf byteblaster.tar.gz
```

2. Access the new directory by typing the following command at the command prompt:

```
cd byteblaster
```

3. Run the **configure** install script by typing the following command at the command prompt:

```
./configure ↵
```

4. Compile the Altera ByteBlaster kernel driver by typing the following command at the command prompt:

```
make ↵
```

5. Become root and install the Altera ByteBlaster kernel driver module and device nodes by typing the following command at the command prompt:

```
make install ↵
```

Installing the ByteBlasterMV Parallel Port Download Cable for Linux

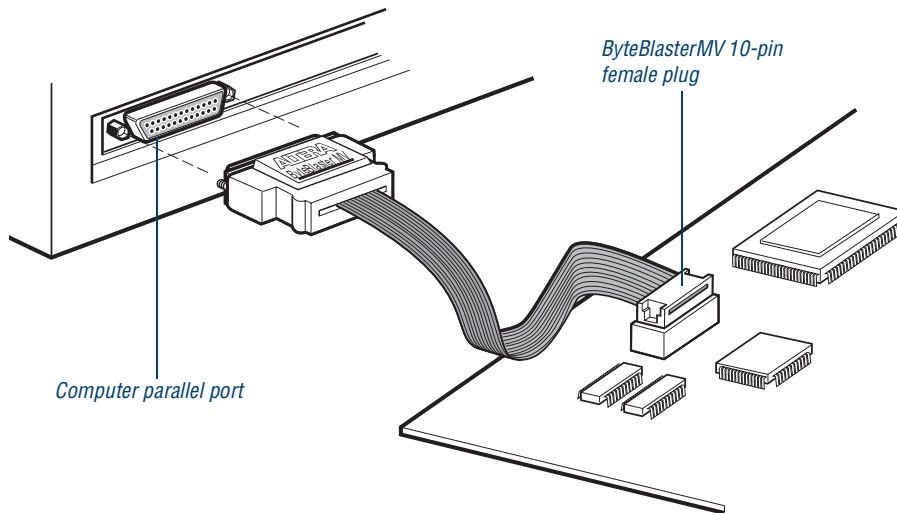
To install and set up the ByteBlasterMV parallel port download cable on a Linux workstation for device configuration or programming, follow these steps:

1. Attach the ByteBlasterMV download cable to a parallel port on your Linux workstation and insert the 10-pin female plug into the prototype system containing the target device, as shown in [Figure 8 on page 42](#).



The board must supply power to the ByteBlasterMV download cable.

Figure 8. ByteBlasterMV Parallel Port Download Cable



2. To install the Altera ByteBlaster kernel driver, type the following command at the command prompt:

```
jtagconfig --add byteblastermv /dev/byteblaster0 ↵
```
3. To determine whether the ByteBlasterMV download cable and the Altera ByteBlaster kernel driver were installed correctly, display a list of available devices by typing the following command at the command prompt:

```
jtagconfig ↵
```

You should see a list of devices on your JTAG chain, including the ByteBlasterMV download cable.

For more information about SignalTap II logic analysis with the ByteBlasterMV download cable, refer to “Selecting the Communications Cable for the SignalTap II Logic Analyzer” in Quartus II Help.

Using Alternate Programming Methods

You can also use one of the following software/hardware combinations to configure or program devices using programming files that are generated with the current UNIX and Linux versions of the Quartus II software:

- The PC version of the Quartus II software, with the MasterBlaster, ByteBlaster II, ByteBlasterMV, USB-Blaster, or Altera Programming Unit (APU) programming hardware.
- The Quartus II Stand-Alone Programmer, **quartus_pgmw**, which you can install instead of the full Quartus II software, or the Altera Stand-Alone Programmer (ASAP2) software for PCs, which is available from the Download Center section of the Altera web site at **www.altera.com**. The Quartus II Stand-Alone Programmer software can be used with the MasterBlaster, ByteBlasterMV, ByteBlaster II, USB-Blaster, and APU programming hardware. The ASAP2 software for PCs can be used with the MasterBlaster, ByteBlasterMV, MPU, or APU programming hardware.
- The PC version of the Quartus II software contains the remote JTAG server feature, which allows you to use programming hardware attached to a PC on a Unix/Linux workstation via a network. For more information about using a local JTAG server, refer to “Configuring Local JTAG Server Settings,” and “Adding a JTAG Server” in Quartus II Help.



Refer to the *Quartus II Installation & Licensing for PCs* manual or the *MAX+PLUS II Getting Started* manual for information about installing programming hardware on a PC. Both manuals are available from the Literature section of the Altera web site at **www.altera.com/literature**. Refer to the Quartus II and MAX+PLUS II online Help for more information about programming Altera devices.

Additional Workstation Configuration Information

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 `/usr/quartus`. 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>/windows`.

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 running Red Hat Linux version 7.1, 7.2, or 8.0) and the Quartus II software operates normally with all supported window managers (refer to “[System Requirements](#)” on page 3 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 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, and printers:

- 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 `windows` subdirectory within your home directory; however, having the font cache saved to this directory 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 the **mwrpcss**, **quartus_dbc**, or **quartus_cmd** processes are running. 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.

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 Basic and Advanced tutorials allows you to choose the areas of the Quartus II software that you want to learn about:

- The Basic 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**.
- The Advanced tutorial builds on the training in the Basic tutorial, focusing on the LogicLock™ feature and Excalibur™ and Stratix™ device features.

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.



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.



Refer to “Help Menu Commands” and “Using Quartus II Help Effectively” in Quartus II Help for more information.

Getting Help on a Message

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

1. In the **Processing** tab or **System** tab of 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, and **Search** 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 sub-entry.



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.

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**.



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 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.

Quartus II File Organization

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

- The **/usr/quartus** 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 5 through 8](#).
- The **/usr/qdesigns** directory contains tutorial and sample files and includes the subdirectories described in [Table 9 on page 58](#).

The **/usr/quartus** directory includes the subdirectories listed in [Table 5](#).

Table 5. Quartus II System Directory (quartus) Structure (Part 1 of 2)

Directory	Description
./adm	Contains system administration scripts.
./bin	Contains the executable software program files and device files.
./eda	Contains libraries for use with other EDA tools. Refer to Table 6 on page 56 for information on the subdirectories of this directory.
./hp11	Contains platform-specific files for HP-UX 11.0 UNIX workstation installations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
./libraries	Contains the Quartus II software directory for “self-contained” libraries. Refer to Table 7 on page 57 for information on the subdirectories of this directory.
./linux	Contains platform-specific files for Linux workstation installations, including the Altera 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.
./lmf	Contains Library Mapping Files (.lmf).
./mw	Contains files needed for the MainWin software.
./objective_studio	Contains files needed for the Objective Studio software.
./qdesigns	Contains tutorial and sample files. Refer to Table 9 on page 58 for information on the subdirectories of this directory.

Table 5. Quartus II System Directory (quartus) Structure (Part 2 of 2)

Directory	Description
<code>./solaris</code>	Contains platform-specific files for Solaris UNIX workstation installations. Also contains Tcl scripts to perform tasks in the Quartus II software and other EDA software.
<code>./sopc_builder</code>	Contains files needed for the SOPC Builder software.

The `/usr/quartus/eda` directory includes the subdirectories described in [Table 6](#).

Table 6. Quartus II EDA Directory (eda) Structure

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

The `/usr/quartus/libraries` directory includes the subdirectories described in [Table 7 on page 57](#).

Table 7. Quartus II Library Directory (libraries) Structure

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

The `/usr/quartus/sopc_builder` directory includes the subdirectories described in [Table 8](#).

Table 8. Quartus II SOPC Builder Directory (sopc_builder) Structure

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

The **/usr/qdesigns** directory includes the subdirectories described in Table 9.

Table 9. Quartus II Work Directory (qdesigns) Structure

Directory	Description
./tutorial	Contains the completed project and design files for the Basic tutorial. This directory includes a readme.txt file that contains important information about the tutorial.
./fir_filter	Directory in which you should create the fir_filter project if you are completing the Design Entry tutorial module. Use this directory to prevent accidental changes to the original design files in the /qdesigns/tutorial directory.
./fir_filter/compile	Contains the compile_fir_filter project for use when completing the Compilation tutorial module independently or nonsequentially.
./fir_filter/timing	Contains the timing_fir_filter project for use when completing the Timing Analysis tutorial module independently or nonsequentially.
./fir_filter/simulate	Contains the simulate_fir_filter project for use when completing the Simulation tutorial module independently or nonsequentially.
./fir_filter/program	Contains the program_fir_filter project for use when completing the Programming tutorial module independently or nonsequentially.
./excalibur	Contains the arm_tutorial project for use when completing the Excalibur tutorial module.
./excalibur/arm_c	Contains the arm_tutorial.c and associated Assembly Files (.s) used in Software mode when completing the Excalibur tutorial module.
./logiclock/topmult	Contains the topmult project for use when completing the LogicLock tutorial module.
./logiclock/lockmult	Contains the lockmult project for use when completing the LogicLock tutorial module.
./stratix	Contains the stratix_tutorial project for use when completing the Stratix tutorial module.

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.

Altera web site:

www.altera.com

Includes the Knowledge Database, which is available at **www.altera.com/kdb**.

mySupport web site:

www.altera.com/mysupport

or choose **Altera on the Web > Quartus II Service Request** (Help menu) in the Quartus II software. This web site allows you to submit, view, and update technical support service requests.

Telephone:

(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) 544-7000

(7:00 a.m. to 5:00 p.m. Pacific time, M–F)



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 36.](#)**

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**. You can also purchase printed sets of documentation from the Shop Altera web site at **www.shopaltera.com**.



Go to “Contacting Altera” in Quartus II Help for complete information on Altera technical support services.

Revision History

The information contained in the *Quartus II Installation & Licensing for UNIX and Linux Workstations* manual version 3.0 Revision 1 supersedes information published in previous versions.

Minor typographical changes were made to the previous version.

Index

A

Altera on the Web command 36
Altera web site 59
Altera, contacting 59
Altera.com account 36, 59

B

ByteBlasterMV cable
 installing hardware 41
 installing Linux kernel driver 40

C

CD-ROM, installing Quartus II software 5
.cshrc file 33, 44
configuration information 44
contacting Altera 59

D

directory structure 55
documentation conventions 1

E

environment variables 44
environment, configuring 29

F

FLEXlm software
 FLEXlm manual web site 14, 17, 21
 installing a license server 19
 installing an additional license
 server 23
 rereading 20
 upgrading 19

H

Hardware Setup dialog box 38
Help

Contents tab 53
 context-sensitive 51
 finding keywords in 54
 Index tab 51
 on messages 50
 printing 53
 Search tab 52
 using 50
 viewing glossary list 54

host ID number 14

HP-UX

 installing GNU Tools and Excalibur
 Component software 11
 installing ModelSim-Altera
 software 12
 installing Quartus II software 9

I

installation
 ByteBlaster kernel driver 40
 ByteBlasterMV cable 39
 MasterBlaster cable 37
 Quartus II software 3

K

kernel configuration settings 27

L

license file
 license.dat file 14
 modifying 17
 obtaining 14
 specifying 30

license server configuration, setting up on
UNIX and Linux workstations 19

license.dat file 14

Linux

installing GNU Tools and Excalibur

Component software 9

installing ModelSim-Altera software 9

installing Quartus II software 8

lmhostid utility 14

lmutil utility 14, 20, 21, 23

M

MasterBlaster cable, installing 37

MAX+PLUS II software, using with

Quartus II license file 30

messages, getting Help on 50

ModelSim-Altera software

installing 7

specifying license file 30

mounting CD-ROM drive 6, 8, 9

MWFONT_CACHE_DIR variable 45

mySupport web site 36, 59

O

Open Programmer command 38

Options command 31, 35

P

patches

HP-UX 26

Solaris 24

port number, specifying 17, 33, 34, 36

product information 60

Programmer window 38

proxy address, specifying 36

Q

qdesigns directory 55

quartus directory 55

QUARTUS_INIT_LIBPATH variable 46

QUARTUS_INIT_PATH variable 45

QUARTUS_MWMM variable 45

QUARTUS_ROOTDIR variable 45

R

readme.txt file 4, 22

registering for an Altera.com account 36

Registration & License File Request

Form 14

S

serial number 14

serial port 3

ShopAltera.com web site 60

SignalTap II logic analyzer 37, 39

Solaris

installing GNU Tools and Excalibur

Component software 7

installing ModelSim-Altera software 7

installing Quartus II software 6

T

technical support 59

troubleshooting 44

tutorial, starting 49

U

uninstalling Quartus II software 4

unmounting CD-ROM drive 6, 8, 9

W

web browser, specifying 34