# Lattice Radiant Software 2023.1 Installation Guide for Linux/Ubuntu

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## Trademarks



## Disclaimers

## Type Conventions Used in This Document

| Convention | Meaning or Use |
|---|---|
| **Bold** | Items in the user interface that you select or click. Text that you type into the user interface. |
| <*Italic*> | Variables in commands, code syntax, and path names. |
| **Ctrl+L** | Press the two keys at the same time. |
| `Courier` | Code examples. Messages, reports, and prompts from the software. |
| `...` | Omitted material in a line of code. |
| `.`<br>`.`<br>`.` | Omitted lines in code and report examples. |
| `[ ]` | Optional items in syntax descriptions. In bus specifications, the brackets are required. |
| `( )` | Grouped items in syntax descriptions. |
| `{ }` | Repeatable items in syntax descriptions. |
| `\|` | A choice between items in syntax descriptions. |

# Contents

# Lattice Radiant Software 2023.1 Installation Guide for Linux/Ubuntu

This document provides instructions on installing Lattice Radiant® software in a Linux/Ubuntu environment. Radiant software supports iCE40 UltraPlus™ CertusPro™NX (LFCPNX) Certus™-NX (LFD2NX) CrossLink™-NX (LIFCL) Certus™-NX-RT (UT24C) CertusPro™-NX-RT (UT24CP) Avant™ (LAV-AT-E) MachXO5-NX (LFMXO5).

**Note**

The devices available vary depending on the type of license.

## System Requirements

The following are the basic system requirements for Radiant software on Linux/Ubuntu:

- Intel Pentium or Pentium-compatible PC, or AMD Opteron system support:

  For Radiant Programmer:

  - Radiant software contains a 64-bit driver to support the 64-bit system.
- Red Hat Enterprise Linux version 7.7 or 8.6 operating system.

  The host operating system can only be 64-bit.

  - Radiant software has 64-bit specific application programs to run on Red Hat 64-bit platforms.
  - Radiant software is available in a 64-bit version and can only be installed on a 64-bit system.
- Ubuntu version 18.04 or 20.04 LTS operating system.

  The host operating system can only be 64-bit.

  - Radiant software has 64-bit specific application programs to run on Ubuntu 64-bit platforms.
  - Radiant software is available in a 64-bit version and can only be installed on a 64-bit system.
- Approximately 50 GB free disk space.
- Network adapter and network connectivity.

  **Note**

  A floating license requires access to the license server, so both a network adapter and connectivity are required.

- 1024 x 768 graphics display.
- JavaScript-capable Web browser.
- Adobe Acrobat Reader, or equivalent PDF reader.

# Contacting Technical Support

**FAQs** The first place to look. The Answer Database provides solutions to questions that many of our customers have already asked. Lattice Applications Engineers are continuously adding to the Database.

To access the Answer Database, go to **www.latticesemi.com > Support > Answer Database**.

**Telephone Support Hotline** Receive direct technical support for all Lattice products by calling Lattice Applications from 5:30 a.m. to 6 p.m. Pacific Time.

- For USA & Canada: 1-800-LATTICE (528-8423)
- For other locations: +1 503 268 8001

In Asia, call Lattice Applications from 8:30 a.m. to 5:30 p.m. Beijing Time (CST), +0800 UTC. Chinese and English language only.

- For Asia: +86 21 52989090

**E-mail Support**

- techsupport@latticesemi.com

**For Local Support** Contact your nearest Lattice Sales Office.

# Installer Contents

The Radiant software installation package is available for download from http://www.latticesemi.com/latticeradiant. Click the **Downloads** tab. Some documents and downloads are not visible to anonymous visitors. To view all items, please log in to your Lattice account. Follow the product download instructions and uncompress the software.

The following describes the contents of the Radiant software installer.

- The Lattice Radiant, Power Estimator, Programmer, and Reveal file names are as follows:
  - 2023.1.0.43.3_Radiant_lin.run
  - 2023.1.0.43.3_Radiant_PowerEstimator_lin.run
  - 2023.1.0.43.3_Radiant_Programmer_lin.run
  - 2023.1.0.43.3_Radiant_Reveal_lin.run
- The Radiant software “base” installation file installs Radiant software and Synplify Pro for Lattice.
- The Lattice Power Estimator installation file installs the stand-alone Radiant Power Estimator. It is not necessary to install this package if the Radiant software Base is installed. See “Installing Stand-Alone Power Estimator” on page 16 for more information.
- The Radiant Programmer installation file installs the stand-alone Radiant Programmer. It is not necessary to install this package if the Radiant Base is installed. See “Installing Stand-Alone Radiant Programmer” on page 15 for more information.
- The Lattice Reveal installation file installs the stand-alone Radiant Reveal Analyzer. It is not necessary to install this package if the Radiant software Base is installed. See “Installing Stand-Alone Reveal Analyzer” on page 14 for more information.
- The Installation Notice contains installation and licensing information.

# Radiant Software Installed Directory Structure

Table 1 shows the Radiant software directory structure after installation:

**Table 1: The Radiant Software Directory Structure**

| File or Directory | Description |
|---|---|
| bin/lin64/ | This directory contains files for running the Radiant software 64-bit GUI. |
| cae_library/ | This directory contains synthesis header libraries for Synplify Pro in both Verilog and VHDL formats. It also contains the libraries for interface kits (ispLSI® design and simulation libraries). |
| data/ | This directory contains files for the Radiant software. |
| docs/ | This directory contains Radiant software documentation, including manuals, tutorials, and the online Help. |
| examples/ | This directory contains Lattice design examples. |
| ip/ | This directory contains files, documentation, and example for the ip. |
| ispfpga/ | This directory contains files for the Radiant software. |

**Table 1: The Radiant Software Directory Structure (Continued)**

| File or Directory | Description |
|---|---|
| license/ | This directory contains the license agreement. |
| modeltech/ | This directory contains files for the ModelSim for Lattice software. |
| programmer/ | This directory contains files for Radiant Programmer. |
| scripts/ | This directory contains Lattice script files. |
| synpbase/ | This directory contains files for the Synplify Pro for Lattice software. |
| tcltk/ | This directory contains tcl/tk related files. |

# Installing Radiant Software on 64-Bit Platform

Download the installation files from the Lattice Semiconductor Web site. For more information on how to download Radiant software, go to http://www.latticesemi.com/latticeradiant. Click the **Downloads** tab. Some documents and downloads are not visible to anonymous visitors. To view all items, please log in to your Lattice account. Follow the product download instructions and uncompress the software.

Radiant software is installed with the **2023.1.0.43.3_Radiant_lin.run** installation file. The file installs all Lattice Semiconductor FPGA devices on your 64-bit system, as well as Synplify Pro for Lattice. The following step guides you through the installation procedure.

**To install the Radiant software on 64-bit systems:**

1. Go to Radiant software installers directory and execute the Radiant run file.

   ```
   % cd <directory_with_RUN>
   % ./2023.1.0.43.3_Radiant_lin.run
   ```

2. The Welcome To Lattice Radiant Software 2023.1 Setup dialog box opens.
3. Click **Next** to open the Installation Folder dialog box.
4. The default destination folder is $HOME/lscc/radiant/2023.1. Click **Browse** to change the destination folder.
5. Click **Next** to open the Product Options dialog box.
6. Select the Radiant software components that you want to install by selecting or clearing each of the listed options.

   The FPGAs product option has additional options for selecting the Lattice FPGA devices that you want to install. To set the additional options, select **FPGAs** and click the device.

   Click **Next** to open the License Agreement dialog box.

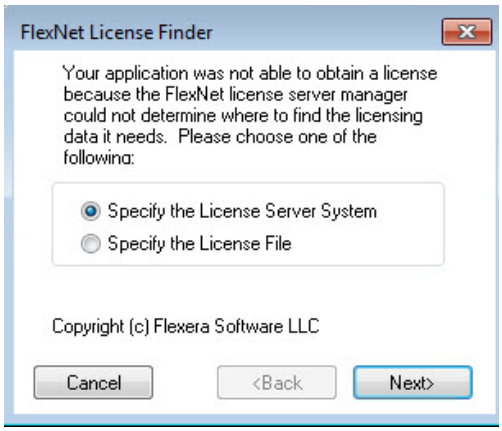
7. Read the license agreement. If you agree, click **I accept the license** to continue the installation process.
8. Click **Next** to display the Ready to Install dialog box and review the current settings. If everything is correct, select **Install** to start the installation.
9. In the Installation Wizard Complete dialog box, read the confirmation note and click **Finish**.

**Note**

Do not close the installation window. The window automatically closes once the installation is completed.

If you have never installed any Lattice Software before, the FlexNet License Finder dialog box will pop up to ask you for the license. Select the desired license option and click **Next** to complete the license installation.

**Figure 1: Flex License Finder**




# To Install the Radiant Software Using Console Mode

Go to Radiant software installers directory and execute the command in one line.

```
% cd <directory_with_RUN>
% ./2023.1.0.43.3_Radiant_lin.run --console --prefix
<install_path>
```

# Radiant Software 2023.1 System Library Dependencies

The Radiant software package depends on a set of packages that provide 64-bit system libraries. Some of these packages may depend on lower level packages, or indirect dependencies. To fulfill this dependency, these packages must be installed before Radiant software can be installed.

The following are the packages 2023.1.0.43.3_Radiant_lin.run depends on. This list does not include packages that are included with Radiant software 2023.1.

## Installing System Library Packages on Red Hat 64-bit Operating System

Check which packages are already present on your system by entering the following command and confirming that the named package appears in the results.

```
rpm -qa | grep <package name>
```

The command to install package:

```
sudo yum install <package name>
```

**Installing system library packages manually**

You can type the following command to determine the required libraries.

```
% ./bin/lin64/check_systemlibrary_radiant.csh
```

If you wish to install system library packages manually, the following is a list of commands to install required libraries:

```
sudo yum install glibc-2.17
sudo yum install libjpeg
sudo yum install libieee1284
sudo yum install libusb-0.1.4
sudo yum install libX11
sudo yum install libICE
sudo yum install libSM
sudo yum install libXt
sudo yum install libXext
sudo yum install libXrender
sudo yum install libXi
sudo yum install libXft
sudo yum install libxslt
sudo yum install libXrandr
sudo yum install libXfixes
sudo yum install libXdamage
sudo yum install libXcursor
sudo yum install libXcomposite
sudo yum install libGL
sudo yum install libXinerama
```

```
sudo yum install libXScrnSaver
sudo yum install libxcb
sudo yum install libxkbcommon
sudo yum install libxkbcommon-x11
sudo yum install libXau
sudo yum install libXv
sudo yum install libnsl
sudo yum install xcb-util-wm
sudo yum install xcb-util-image
sudo yum install xcb-util-keysyms
sudo yum install xcb-util-renderutil
sudo yum install nss-softokn-freebl
sudo yum install atk
sudo yum install cairo
sudo yum install nss
sudo yum install pango
sudo yum install mesa-dri-drivers
sudo yum install pulseaudio
sudo yum install gstreamer1
sudo yum install cdparanoia-libs
sudo yum install opus
sudo yum install libtheora
sudo yum install iso-codes
sudo yum install libvisual
sudo yum install libglvnd-glx
sudo yum install libglvnd
sudo yum install gstreamer1-plugins-base
```

**Note**

User needs to make sure libusb-0.1.so.4 and libXss.so.1 are installed in Red Hat 7/8, and they are default installed in Red Hat 6.9 or earlier.

# Installing System Library Packages on Ubuntu 64-bit Operating System

Check which packages are already present on your system by entering the following command and confirming that the named package appears in the results.

```
dpkg -l | grep <package name>
```

The command to install package:

```
sudo apt-get install <package name>
```

### Installing system library packages manually

You can type the following command to determine the required libraries.

```
% ./bin/lin64/check_systemlibrary_radiant.bash
```

If you wish to install system library packages manually, the following is a list of required libraries:

```
atk
cairo
pango
pulseaudio
libc6
libjpeg-dev
libieee1284-3
libusb-0.1.4
lsb-core
libnss3
libice
libgl
libgl1
libglx0
libgl-mesa-glx
libsm
libxt
libxtst6
libdbus-1-3
libxext
libxrender
libxi
libxft
libxslt
libxrandr
libxfixes
libxdamage
libxcursor
libxcomposite
libxinerama
libxss1
libxcb-image0
libxcb-keysyms1
libxcb-render-util0
libxcb-xkb1
libxcb-shape0
libxcb-xinput0
libxcb-xinerama0
libxkbcommon0
libxkbcommon-x11-0
libxcb-icccm4
libx11
libgl1-mesa-dri
libgstreamer1.0-0
libxv1
cdparanoia
opus
libtheora
iso-codes
libvisual
gstreamer1.0-plugins-base
```

# Installing 32-bit System Library Packages for ModelSim

These 32-bit system libraries are required to run ModelSim.

**32-bit system libraries:**

```
bzip2
fontconfig
    |---- expat
freetype
ncurses
nss-softokn-freebl
zlib
libXft
libXrender
libpng
libuuid
libX11
  |---- libxcb
           |------ libXau
libXext
libstdc++
```

**Manually install system library packages on Ubuntu 18.04 64-bit Operating System:**

```
bzip2:i386
libexpat1:i386
libfontconfig1:i386
libfreetype6:i386
libncurses5:i386
zlib1g:i386
libxft2:i386
libxrender1:i386
libpng16-16:i386
libuuid1:i386
libx11-6:i386
libxau6:i386
libxcb1:i386
libxext6:i386
libstdc++6:i386
```

# Installing Radiant Software Tools

This section describes how to install Radiant software tools including Stand-Alone Reveal Analyzer and Stand-Alone Programmer.

## Installing Stand-Alone Reveal Analyzer

Reveal Analyzer is included in the Radiant software installation, but can be used without installing the Radiant software. Use one of the following files to install the stand-alone version of Radiant Reveal Analyzer:

- 2023.1.0.43.3_Radiant_Reveal_lin.run for 64-bit systems.

**To install the stand-alone Reveal Analyzer:**

1. Close all applications before starting installation
2. Go to Radiant software installers directory and execute the Radiant Reveal run file.

```
% cd <directory_with_RUN>
% ./2023.1.0.43.3_Radiant_Reveal_lin.run
```

3. The Welcome To Lattice Radiant Reveal setup dialog box opens.
4. Click **Next** to open the Installation Folder dialog box.
5. The default destination folder is /home/lattice/lscc/reveal/radiant/2023.1. Click **Browse** to change the destination folder.
6. Click **Next** to open the Select Components dialog box.
7. Click **Next** to open the License Agreement dialog box.
8. Read the license agreement. If you agree, click **I accept the license** to continue the installation process.
9. Click **Next** to Ready to Install dialog box. Review the destination folder and components selected. If everything is correct, select **Install** to start the installation.
10. In the Installation Wizard Complete dialog box, read the note and click **Finish**.

# Installing Stand-Alone Radiant Programmer

Radiant Programmer is included in the Radiant software installation and consists of four tools:

- Radiant Programmer
- Deployment Tool
- Download Debugger
- Programming File Utility

If you want to use Radiant Programmer, Deployment Tool, Download Debugger, or Programming File Utility, without installing Radiant software, use one of the following files to install the stand-alone Radiant Programmer:

- 2023.1.0.43.3_Radiant_Programmer_lin.run for 64-bit systems.

**To install the stand-alone Radiant Programmer:**

1. Close all applications before starting installation
2. Go to Radiant software installers directory and execute the Radiant Programmer run file.

```
% cd <directory_with_RUN>
% ./2023.1.0.43.3_Radiant_Programmer_lin.run
```

3. The Welcome To Lattice Radiant Programmer setup dialog box opens.

4. Click **Next** to open the Installation Folder dialog box.
5. The default destination folder is /home/lattice/lscc/programmer/radiant/2023.1. Click **Browse** to change the destination folder.
6. Click **Next** to open the Select Components dialog box.
7. Click **Next** to open the License Agreement dialog box.
8. Read the license agreement. If you agree, click **I accept the license** to continue the installation process.
9. Click **Next** to Ready to Install dialog box. Review the destination folder and components selected. If everything is correct, select **Install** to start the installation.
10. In the Installation Wizard Complete dialog box, read the note and click **Finish**.

# Installing Stand-Alone Power Estimator

Power Calculator is included in the Radiant software installation, but can be used without installing the Radiant software. Use one of the following files to install the stand-alone version of Radiant Power Estimator:

- 2023.1.0.43.3_Radiant_PowerEstimator_lin.run for 64-bit systems.

**To install the stand-alone Power Estimator:**

1. Close all applications before starting installation
2. Go to Radiant software installers directory and execute the Radiant Power Estimator run file.

```
% cd <directory_with_RUN>
% ./2023.1.0.43.3_Radiant_PowerEstimator_lin.run
```

3. The Welcome To Lattice Radiant Power Estimator setup dialog box opens.
4. Click **Next** to open the Installation Folder dialog box.
5. The default destination folder is /home/lattice/lscc/powerestimator/radiant/2023.1. Click **Browse** to change the destination folder.
6. Click **Next** to open the Select Components dialog box.
7. Click **Next** to open the License Agreement dialog box.
8. Read the license agreement. If you agree, click **I accept the license** to continue the installation process.
9. Click **Next** to Ready to Install dialog box. Review the destination folder and components selected. If everything is correct, select **Install** to start the installation.
10. In the Installation Wizard Complete dialog box, read the note and click **Finish**.

## Downloading and Installing Soft IP

Soft IP can be downloaded from the Lattice website. Use the **Install a User IP** feature of IP Catalog to install a Soft IP.

**To download and install a Soft IP:**

1. Using a web browser, download the Soft IP installer from the Lattice website.
2. In the Radiant IP Catalog, click on the **Install a User IP** button.
3. In the **Select user IP package file to install** dialog box, browse to the Radiant Software IP Package (.ipk) file, and click **Open**.

- The Soft IP will be installed into a folder in the user's personal directory. For example: /home/Users/<*username*>/RadiantIPLocal/<*IP_name*>.
- The Soft IP will be added into the IP Catalog.

# Installing and Configuring USB Cables

This section provides information on USB cable installation and configuration. These instructions are applicable 64-bit Linux/Ubuntu/CentOS systems.

## Lattice USB Download Cable Configuration

Radiant Programmer software can directly access USB devices using libusb, which accesses the USB file system. To verify that you have the USB library installed, do the following:

1. Plug in the USB cable.
2. In the command line, type:

   ```
   % /sbin/lsusb
   ```

   You should see an entry similar to the following:

   ```
   > Bus 002 Device 002: ID 1134:8001 for Lattice USB2A
   > Bus 002 Device 003: ID 0403:6010 for Lattice HW-USBN-2B
   (FTDI) USB Download Cable
   ```

3. If you receive an error when you type `/sbin/lsusb`, you probably do not have libusb installed. To install the libusb, go to:

   http://libusb.sourceforge.net/

   The recommend version is libusb-0.1.4-3.el7.x86_64.rpm

4. Unplug the USB cable.

**Note**

The USB cable must be disconnected from the PC when performing the installations. You must have root access and be able to log in as a super user.

## Giving Lattice USB2A Drivers Read/Write Permission to Selected Individuals

1. Plug in the USB cable.
2. In the command line, type:

   ```
   % /sbin/lsusb
   ```

   You should see an entry similar to the following:

   ```
   > Bus 002 Device 002: ID 1134:8001 for Lattice USB2A
   Download Cable
   ```

3. This mean the USB2A is in Bus 002 and device 002. Go to the directory

   ```
   % cd /proc/bus/usb/002
   ```

4. Grant execute permissions to the device. On the command line, type:

   ```
   % sudo chmod 755 002
   ```

## Giving HW-USBN-2B (FTDI) USB Drivers Read/ Write Permission to Selected Individuals

1. Plug in the USB cable.
2. In the command line, type:

   ```
   % /sbin/lsusb
   ```

   You should see an entry similar to the following:

   ```
   > Bus 002 Device 003: ID 0403:6010 for Lattice HW-USBN-2B
   (FTDI) USB Cable
   ```

3. This mean the FTDI chip is in Bus 002 and device 003. Go to the directory

   ```
   % cd /proc/bus/usb/002
   ```

4. Grant execute permissions to the device. On the command line, type:

   ```
   % sudo chmod 755 003
   ```

5. Unload the ftdi_sio driver if it is attached to your device.

   ```
   % sudo /sbin/rmmod ftdi_sio
   ```

6. Unload the usbserial driver if it is attached to your device.

   ```
   % sudo /sbin/rmmod usbserial
   ```

# Driver Setup for Lattice USB2A and HW-USBN-2B (FTDI) USB Download Cable on Red Hat Linux Enterprise 7/8

**Note**

User needs to download and install libusb-0.1.4-3.el7.x86_64.rpm first in Red Hat 7.

### Manual UDEV Method Configuration:

1. Find your username which is given in /etc/group file. Log out if required. For example :

   ```
   username:x:1000:username
   ```

2. Create a working file called 10-local.rules.
3. Add the following information to the 10-local.rules file:

```
#Lattice
SUBSYSTEM=="usb",ACTION=="add",ATTRS{idVendor}=="1134",ATTRS{idProduct}=="8001",MODE==
"0660",GROUP=="username",SYMLINK+="lattice-%n"
#FTDI
SUBSYSTEM=="usb",ACTION=="add",ATTRS{idVendor}=="0403",ATTRS{idProduct}=="6010",MODE==
"0666",GROUP=="username",SYMLINK+="ftdi-%n"
SUBSYSTEM=="usb",ATTRS{idVendor}=="0403",ATTRS{idProduct}=="6010",RUN+="/bin/sh -c
'basename %p > /sys/bus/usb/drivers/ftdi_sio/unbind'"
```

**Note**

Replace the username with your username in above rules.

4. Copy the file into the /etc/udev/rules.d/10-local.rules directory. If a file by this name already exists, simply append the working file to it. For example:

   ```
   % sudo cp 10-local.rules /etc/udev/rules.d/
   Or, if the file already exists:
   % sudo cat 10-local.rules >>/etc/udev/rules.d/10-local.rules
   ```

5. Give permission to 10-local.rules as follows :

   ```
   % sudo chmod 755 10-local.rules
   ```

6. Now reload the udev rules by adding the following:

   ```
   % sudo udevadm control --reload-rules
   ```

7. Plug in the USB cable.

# Driver Setup for Lattice USB2A and HW-USBN-2B (FTDI) USB Download Cable on Red Hat Linux Enterprise 6

## Automated UDEV Method Configuration

1. Create an entry called “plugdev” in the /etc/group file, and then add anyone logging into the system into that group. Make sure /usr/bin/id shows you as a member of the plugdev group. Log out if required.

   Example:

   ```
   plugdev:x:501:username
   ```

2. Type the following command to execute the script:

   ```
   % sudo <install_path>/data/vmdata/udevsetup_rh6
   ```

   The script should terminate with a “Setup successful” output.

## Manual UDEV Method Configuration

1. Create an entry called “plugdev” in the /etc/group file, and then add anyone logging into the system into that group. Make sure /usr/bin/id shows you as a member of the plugdev group. Log out if required. For example:

   ```
   plugdev:x:501:username
   ```

2. Create a working file called 10-local.rules.
3. Add the following information to the 10-local.rules file:

```
#Lattice
BUS=="usb",ACTION=="add",SYSFS{idVendor}=="1134",SYSFS{idProduct}=="8001",MODE=="0660"
,GROUP=="plugdev",SYMLINK+="lattice-%n"
#FTDI
BUS=="usb",ACTION=="add",SYSFS{idVendor}=="0403",SYSFS{idProduct}=="6010",MODE=="0660"
,GROUP=="plugdev",SYMLINK+="ftdi-%n"
SUBSYSTEM=="usb",DRIVER=="ftdi_sio",ATTRS{idVendor}=="0403",SYSFS{idProduct}=="6010",A
TTR{bInterfaceNumber}=="00",RUN+="/bin/sh -c 'basename %p >/sys/bus/usb/drivers/
ftdi_sio/unbind'"
```

**Note**

Each BUS and SUBSYSTEM entry must be a single line, or split using the “\” line continuation character.

4. Copy the file into the /etc/udev/rules.d/10-local.rules directory. If a file by this name already exists, simply append the working file to it. For example:

   ```
   % sudo cp 10-local.rules /etc/udev/rules.d/
   ```

   Or, if the file already exists:

   ```
   % sudo cat 10-local.rules >>/etc/udev/rules.d/10-local.rules
   ```

5. Make the new UDEV settings active, as follows:

```
% sudo /usr/bin/skill -HUP udevd
```

6. Plug in the USB cable.

# Driver Setup for Lattice USB2A and HW-USBN-2B (FTDI) USB Download Cable on Ubuntu 18.04/20.04 LTS and CentOS 7.4

**Note**

User needs to download and install libusb-0.1.4 first in Ubuntu 18.04.

### Automated UDEV Method Configuration

1. Create an entry called “plugdev” in the /etc/group file, and then add anyone logging into the system into that group. Make sure /usr/bin/id shows you as a member of the plugdev group. Log out if required.

   Example:

   ```
   plugdev:x:501:username
   ```

2. Type the following command to execute the script:

   ```
   % sudo <install_path>/data/vmdata/udevsetup_ubuntu
   ```

The script should terminate with a “Setup successful” output.

### Manual UDEV Method Configuration:

1. Create an entry called “plugdev” in the /etc/group file, and then add anyone logging into the system into that group. Make sure /usr/bin/id shows you as a member of the plugdev group. Log out if required.

   Example:

   ```
   plugdev:x:501:username
   ```

2. In the /etc/udev/rules.d/ directory, change the permission of the 70-persistent-net.rules file

   ```
   % sudo chmod 755 /etc/udev/rules.d/ 70-persistent-net.rules
   ```

   If the file isn’t exists, create a working file called 70-persistent-net.rules.

3. Add the following information to the 70-local.rules file:

```
#Lattice
SUBSYSTEM=="usb", ACTION=="add", ATTRS{idVendor}=="1134", ATTRS{idProduct}=="8001",
MODE=="0666", GROUP=="plugdev", SYMLINK+="lattice-%n"
#FTDI
SUBSYSTEM=="usb", ACTION=="add", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="6010",
MODE=="0666", GROUP=="plugdev", SYMLINK+="ftdi-%n"
SUBSYSTEM=="usb", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="6010", RUN+="/bin/sh -c
'basename %p >/sys/bus/usb/drivers/ftdi_sio/unbind'"
```

**Note**

Each SUBSYSTEM entry must be a single line, or split using the "\" line continuation character..

4. Save and close the file. Make the new UDEV settings active, as follows:

```
% sudo udevadm control --reload-rules
% sudo udevadm trigger
```

5. Plug in the USB cable.

# Licensing the Radiant Software

The Radiant software development tool is licensed software. In order for you to launch the tool you must configure a FLEXlm license. The license can be either node-locked to the local machine, or acquired from a license server accessible from a LAN connection.

**Note**

Radiant software permits the creation of configuration bitstreams for all of Lattice Semiconductor's FPGAs. However, a license is required for some devices.

The default location of the license file is `<install_path>/license/license.dat`. If this location is changed, you must set the LM_LICENSE_FILE environment variable to include the new path name.11.16.4.0

**Note**

In order to change the LM_LICENSE_FILE variable, you may need to edit the .cshrc or .bashrc configuration file located in your home directory.

# License Management Versions

Table 2 lists the version numbers of the FLEXlm lmutil utility, the FLEXlm lmgrd utility, and the Lattice daemon used for license management for 64-bit systems.

**Table 2: License Management Utility Versions**

| Filename | Version | Description |
|---|---|---|
| lmutil | 11.16.4.0 | FLEXlm license server utility |
| lmgrd | 11.16.4.0 | FLEXlm end-user utility |
| lattice | 11.16.4.0 | The Lattice Semiconductor licensing daemon |

# Obtaining a License

**To register and license your Radiant software:**

1. Obtain the host ID of your license server with the following command:

   ```
   % <install_path>/ispfpga/bin/lin64/lmutil lmhostid
   ```

2. Go to the Licensing section of the Lattice Semiconductor Web site (www.latticesemi.com/license) and follow the on-screen instructions.

   **Note**

   Lattice Semiconductor supports licensing for a single server or three redundant servers. If you are using three redundant servers, enter all three server host IDs on the License File/Registration Form.

   Lattice Semiconductor will email your Radiant software license file (license.dat) to you within one working day. After you receive the license file, copy the license.dat file to the Radiant software license directory as follows:

   ```
   % <install_path>/license/license.dat
   ```

# Editing the License File

You must edit a floating license file to specify the server name and the path to the Lattice daemon.

The following example shows part of a floating license file:

```
SERVER nodename 1234abcd 1710
DAEMON lattice daemon_path
FEATURE LSC_RADIANT lattice 2023.1 01-jan-9999 100 85B686493C86
\
  VENDOR_STRING="LSC_RADIANT "
```

Edit the SERVER line by replacing the *nodename* with the host name and the port ID (1710). The port ID, 1710 in this example, must be assigned a TCP/IP port number that is not already in use on the server, so you might need to change it.

Edit the Lattice DAEMON line, replacing *daemon_path* with the path to Radiant software. For lmgrd V11, the path is:

```
% <install_path>/ispfpga/bin/lin64
```

Edit the ModelSim DAEMON line, replacing *daemon_path* with the path to ModelSim Lattice Edition. For ModelSim, the path is:

```
% <install_path>/radiant/2023.1/modeltech/linuxloem/mgcld
```

When editing these lines, type them exactly as you received them. All entries are case-sensitive.

**Note**

The encryption codes are in hexadecimal format (digits 0-9, and lower-case letters a-f or upper-case letters A-F).

$HOME/.flexlmrc can be used to set LM_LICENSE_FILE variable, and you should do the cleanup if it's necessary.

# Starting the License Manager

Type the following command on one line to start the license manager daemon:

```
% <install_path>/ispfpga/bin/lin64/lmgrd
  -l <install_path>/license/license.log
  -c <install_path>/license/license.dat
```

Redirecting output to a log file is helpful when you debug licensing problems. The -l switch tells the license manager to send its output to a log file (license.log), and -c tells it which license to serve. The log file contains information on the status of the server and the daemon and TCP port in use. It also shows which users have checked out the license and the checkout time.

# Stopping the License Manager

If it is necessary to stop the FLEXlm license manager, follow this procedure:

1. Confirm that the daemon is running by typing the following command:

   ```
   % ps -ef | grep lmgrd
   ```

2. If **lmgrd.exe** is running, type the following command on one line to stop the daemon:

   For 64-bit systems:

   ```
   % <install_path>/ispfpga/bin/lin64/lmutil lmdown -c
   <install_path>/license/license.dat
   ```

   The following prompt appears:

   ```
   Shutting down FLEXlm on nodes: <hostname>
   Are you sure? [y/n]:
   ```

3. Type **Y** and press **Enter** to shut down the license daemon.

# Installing and Running the License Manager on a Remote Server

You can install and run the License Manager from a location other than the default directory.

To install the License Manager to a different location, copy the files lattice, lmgrd, and lmutil from the following directory:

```
% <install_path>/ispfpga/bin/lin64/
```

to the desired location. For example:

```
% <remote_server_install_path>/my_machine/lattice_license/
```

### Starting the License Manager from a Remote Server

Type the following command on one line to start the license manager daemon:

```
% <remote_server_install_path>/lmgrd
  -l <install_path>/license/license.log
  -c <install_path>/license/license.dat
```

### Stopping the License Manager on a Remote Server

If it is necessary to stop the FLEXlm license manager running on a remote server, follow this procedure:

1. Confirm that the daemon is running by typing the following command:

   ```
   % ps -ef | grep lmgrd
   ```

2. If lmgrd.exe is running, type the following command on one line to stop the daemon:

   ```
   % <remote_server_install_path>/lmutil lmdown -c
   <install_path>/license/license.dat
   ```

   The following prompt appears:

   ```
   Shutting down FLEXlm on nodes: <hostname>
   Are you sure? [y/n]:
   ```

3. Type **Y** and press **Enter** to shut down the license daemon.

## Setting Up a Floating License on Linux/ Ubuntu

The licensing steps outlined in the previous sections can be performed on a centralized license server. Then each client points to the license file on that machine.

To gain access to the licenses on the remote license server, you need to set the environment variable LM_LICENSE_FILE value to *license_port_number@linux/ubuntu_host_name*.

## Installing System Library Packages to Set up Floating License Server

If the dynamic linker/loader ld-lsb-x86-64 cannot be found it's an indication that LSB packages are missing.

### Installing system library package on Red Hat 64-bit Operating System manually

If you wish to install system library package manually, the following is the command to install required library:

```
sudo yum install redhat-lsb
```

### Installing system library package on Ubuntu 64-bit Operating System manually

If you wish to install system library package manually, the following is the command to install required library:

```
sudo apt-get install lsb-core
```

**Note**

Radiant software uses the following network communication ports (TCP/IP socket ports):

- Port 80 – This is the standard HTTP web access port. Radiant software uses this port in the following cases:
  - When the Radiant software has updates from the Lattice web site.
  - IP or reference designs are downloaded from the Lattice web site.
  - When message ID's are sent.
- Port 7788 – This is the port used by the Radiant software to check the floating license between the software and license server. This port is configurable by changing the license files.

# Troubleshooting a Floating License

The following procedures can be useful in troubleshooting common floating license issues.

## Check the Network

Use the ping command to check network status. For example, type:

```
% ping <license_server>
```

If the license server is running, you can expect a return as follows:

```
64 bytes from <license_server> <IP_address>
```

To end, type **CTRL+C**.

### Check License File with lmutil

Use the lmutil tool to troubleshoot the status of your license file. The lmutil tool is located in the following location:

<*install_path*>/ispfpga/bin/lin64

The **lmstat** command determines the features of your license file.

- The -a argument displays all information.
- The -c argument uses the specified license files.

The following is an example of using the **lmutil lmstat** command to check the license file status:

```
% ./lmutil lmstat -a -c <license_port>@<license_server>
```

The license status is returned, including feature lines, number of licenses issued, and licenses in use.

## Running the Radiant Software GUI

Radiant software 2023.1has a graphical user interface (GUI). When you run the Radiant software 2023.1 executable file, the software automatically performs the environment setup.

**To start the Lattice Radiant Software GUI:**

1. Set up the license as follows:

   If your license file (license.dat) is not under <*install_path*>/2023.1/license, you must set the LM_LICENSE_FILE variable to the location of your license file. For example:

   For CSH users:

   ```
   % setenv LM_LICENSE_FILE $LM_LICENSE_FILE  (/
   <license_directory>/license.dat)
   ```

   For BASH users:

   ```
   % export LM_LICENSE_FILE=$LM_LICENSE_FILE:/
   <license_directory>/license.dat
   ```

2. Run the Radiant software executable file in the command line as follows:

   ```
   % <install_path>/bin/lin64/radiant &
   ```

   With the Radiant software script, you can also run the following tools in stand-alone mode.

To invoke stand-alone Reveal Analyzer, run:

```
% revealrva
```

Refer to the Radiant software online Help for more information about the Radiant software GUI.

## Finding the Installation History

The Radiant software records a log of your installation history. You can find the history in the Radiant software main window.

**To view the installation history:**

1. Open the Radiant software GUI.
2. Choose **Help > About Lattice Radiant Software.**

# Running Radiant Software from the Command Line

There are two ways to run the Radiant software from the command line:

- Through Radiant Tcl Console.
- By running executable files directly.

## Running Stand-Alone Radiant Tcl Console

Radiant software development environment includes Tcl Console, which allows you to run scripts for automating common tasks. Tcl Console is also available outside of the user interface in order to run custom scripts. To launch the stand-alone Tcl Console, enter the following on a command line:

```
% <install_path>/bin/lin64/radiantc
```

These commands configure the environment allowing all of the underlying design tools to be run. Refer to the online Help for more information about the command line.

## Running Using CSH or BASH Interpreters

BASH users must run the following commands:

```
% export bindir=<install_path>/bin/lin64
```

```
% source $bindir/radiant_env
```

Next, you can run the executable files directly. For example, you can invoke the Radiant software GUI by using:

```
% pnmain &
```

Or, you can run Power Calculator by running:

```
% pwcmain &
```

# Running Synplify Pro for Lattice

To run Synplify Pro for Lattice, do the following:

1. Open the Radiant software GUI.
2. Open any project to enable the commands on the Tools menu.
3. Choose **Tools > Synplify Pro for Lattice**.

# Running Stand-Alone Radiant Reveal Analyzer

After the installation, you can invoke the stand-alone Radiant Reveal Analyzer in the command line:

```
% <install_path>/bin/lin64/revealrva &
```

# Running Stand-Alone Radiant Power Estimator

After the installation, you can invoke the stand-alone Radiant Power Estimator in the command line:

```
% <install_path>/bin/lin64/powercal &
```

# Running Stand-Alone Radiant Programmer

After the installation, you can invoke the stand-alone Radiant Programmer in the command line:

```
% <install_path>/programmer/bin/lin64/programmer &
```

# Running Stand-Alone Deployment Tool

After Programmer installation, you can invoke the stand-alone Deployment Tool in the command line:

```
% <install_path>/programmer/bin/lin64/deployment &
```

# Running Stand-Alone Debugger

After Programmer installation, you can invoke the stand-alone Debugger in the command line:

Running Download Debugger on 64-bit systems:

```
% <install_path>/programmer/bin/lin64/debugger &
```

# Running Stand-Alone Programming File Utility

After the installation, you can invoke the stand-alone Programming File Utility in the command line:

```
% <install_path>/programmer/bin/lin64/fileutility &
```

# Running Multiple Versions of Lattice Software

The Radiant software enables you to run FPGA designs on platforms on which the Radiant software and previous Lattice Diamond/ iCE are installed.

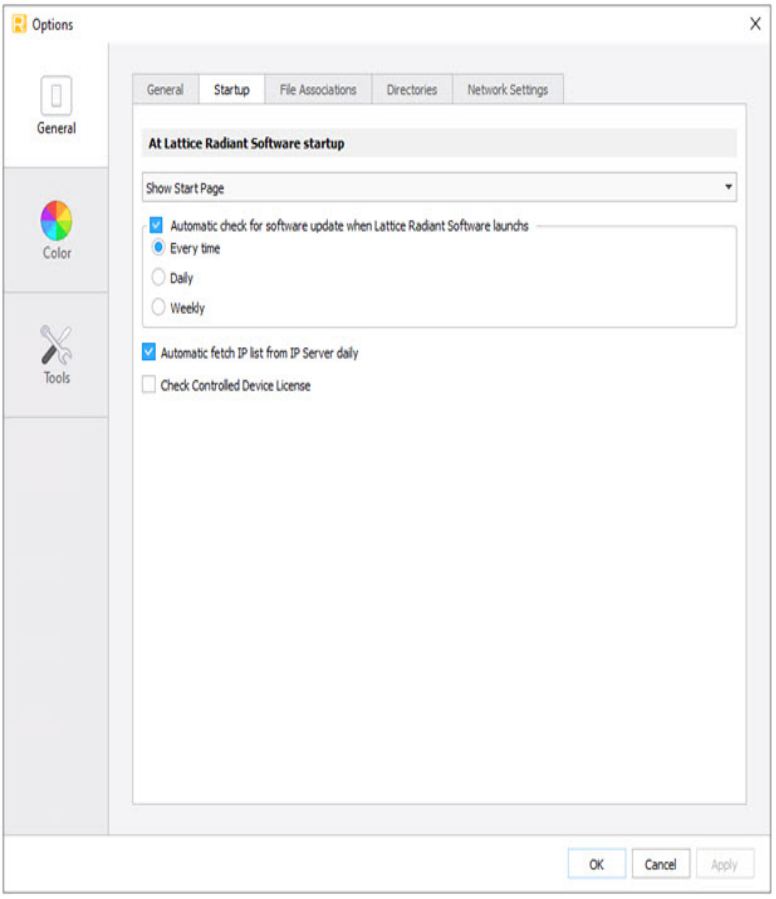
# Updating Lattice Radiant Software

After you have registered and licensed your installation, check the Lattice Semiconductor Web site for new software updates, device support, and enhancements. Make sure that you have the latest software by checking for updates regularly.

**To activate UPDATE:**

1. To enable automatically check for software update when Radiant software is launched, if you don't see Update window pops up. In Start page do as follows:
   - Select the **Startup** tab of the Options dialog box in Tools, click "Automatically check for software update when Lattice Radiant Software launches" and choose how often it will check.

**Figure 2: Startup Tab of the Options Dialog box**

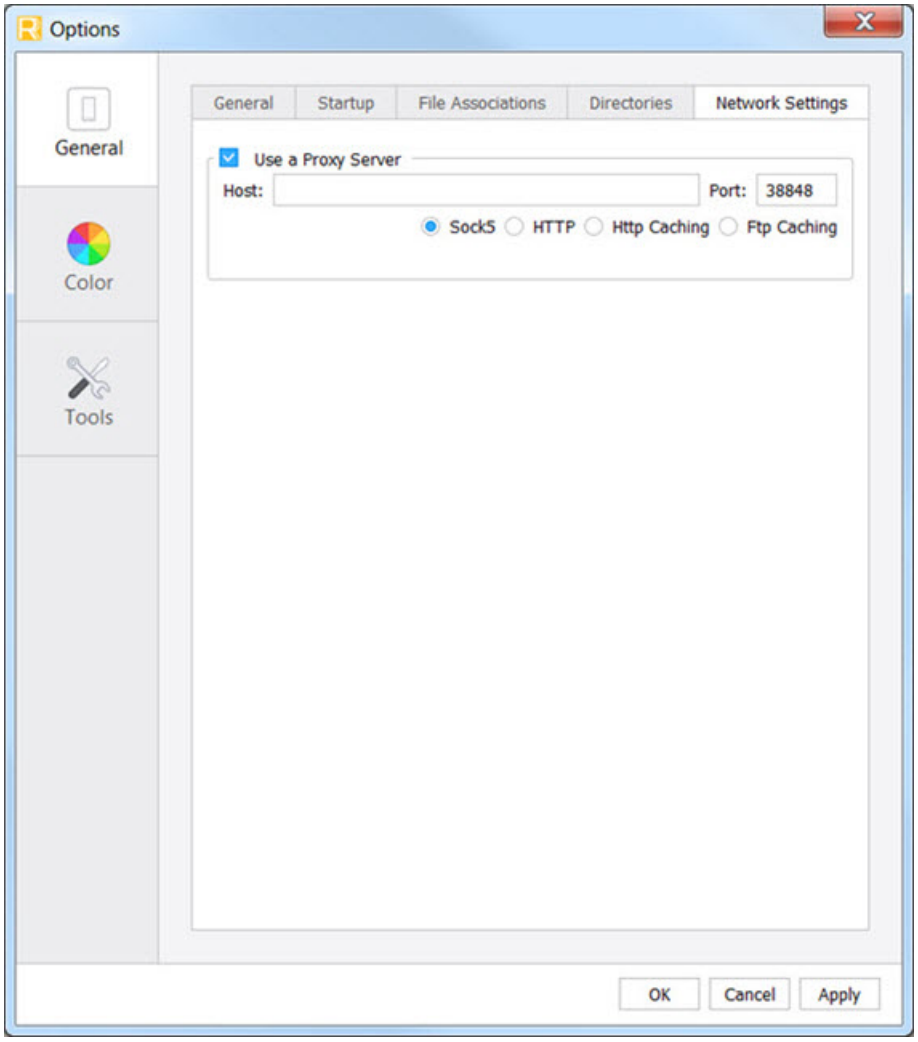



When Radiant software is launched, it will connect to the Internet automatically to check for updates.

## Changing the Network Setting

To enable automatic checking, you must indicate how your computer accesses the Internet.

**Figure 3: Network Settings of the Options dialog box**




**To change the Internet connection settings:**

1. Select the **Network Setting** tab of the Options dialog box in Tools.
2. Select the **Use a Proxy Server** option if you must go through a proxy server before connecting to the Internet. The proxy server prevents outsiders from breaking into your organization's private network. Ask your system administrator for the URL address and port assignment. This option is turned on by default.

   If you use direct Internet access, do not select the **Use a Proxy Server** option on this tab.

## Installing Updates

When you use the Auto Check feature, UPDATE notifies you whenever an update version of Radiant software becomes available. You receive notification when you open the Radiant software main window.

**To check and install the recommended update:**

- Launch Radiant software and the UPDATE software goes online to check for an update. If one is available, the Radiant software update version will be displayed in the **Available update versions** field.
- Click **Download** to save the update to a directory and install it later.
- Click **Install** to download and install the selected update version (as the version number specified in the **Available update versions** field) right away.

**To install a downloaded update:**

1. Close all Radiant tools.
2. Go to the location where you saved the update version.

Run the update file and follow the on-screen instructions.

# Revision History

The following table gives the revision history for this document.

| Date | Version | Description |
|---|---|---|
| **02/20/2018** | 1.0 | Initial Release. |
| **04/12/2019** | 1.1 | ▶ Update for Radiant software 1.1.<br>▶ Added Ubuntu support.<br>▶ Add content to update system library dependencies; install system library packages to set up floating license server. |
| **06/15/2021** | 1.2 | ▶ Update for Radiant software 3.0.<br>▶ Added System Library Packages on Ubuntu. |
| **12/08/2021** | 1.3 | ▶ Update for Radiant software 3.1.<br>▶ Added System Library Packages on Ubuntu. |
| **03/10/2022** | 1.4 | ▶ Added System Library Packages on both Red Hat and Ubuntu. |
| **06/23/2022** | 1.5 | ▶ Update for Radiant software 3.2. |
| **12/01/2022** | 1.6 | ▶ Update for Radiant software 2022.1. |
| **06/26/2023** | 1.7 | ▶ Update for Radiant software 2023.1.<br>▶ Added System Library Packages on both Red Hat andUbuntu. |