

Carbon Model Studio

Version 8.1

Installation Guide

Non-Confidential



Carbon Model Studio

Installation Guide

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Release Information

The following changes have been made to this document.

Change History			
Date	Issue	Confidentiality	Change
February 2016	A	Non-Confidential	Update for 8.1

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The information in this document is final, that is for a developed product.

Web Address

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Chapter 1

Installing Carbon Model Studio Software

This document provides instructions for installing the Carbon Model Studio™ software, and includes information about system requirements, environment variables, and licensing.

1.1 Intended Audience

This guide is intended for system administrators or other users familiar with shell commands and installation packages.

1.2 System Requirements

1.2.1 General Requirements:

- 3 GB of disk space for unpacked media (see [“Carbon Installation Packages”](#) on page 9 for platform-specific details).
- RAM and working memory general guidelines:
Carbon Model Studio software: 500MB–2G
Carbon Model: 10MB per 1 million gates (if you replicate blocks within a design model, the incremental memory will be less than 10MB).

1.2.2 For Windows Users

- The supported Windows operating systems is Windows 7 (64-bit) (runtime only, no compilation).
- Visual Studio 2013 Update 4 has been qualified for compiling the model.

To compile components (such as for SoCDesigner Plus) using the Windows version of the Carbon Model Studio GUI, you must have Visual Studio 2013 Update 4 installed on the machine before running Carbon Model Studio. If it is not necessary to compile components, then at a minimum the Visual C++ Redistributable Package for Visual Studio 2013 must be installed.

1.2.3 For Linux Users

- GCC 4.7.2 has been qualified for compiling the model. This is included by Carbon in your Carbon Model Studio installation.
- The supported Linux operating systems are:
 - Red Hat Enterprise Linux 6.6 (64-bit)
 - CentOS 6.6 (64-bit)

On CentOS and Red Hat machines, you must install certain additional packages and group packages as described below:

Note: If you are using a package manager other than yum, refer to its documentation for instructions on installing the required additional packages.

1. Add the following line to `/etc/yum.conf`.
`multilib_policy=all`
2. Execute the following command to install the necessary group packages:
`yum groupinstall "Additional Development" "Compatibility Libraries" "Development tools" "Perl Support"`
3. Execute the following command to install additional required font packages:
`yum install xorg-x11-fonts-75dpi xorg-x11-fonts-100dpi`
4. Execute the following command to install additional required packages:
`yum install libXext libXext-devel libXrender libXrender-devel glibc-devel`

For SoC Designer Plus users:

- SoC Designer Plus 8.0

For SystemC users:

- SystemC Versions 2.3.1

For Synopsys Platform Architect users:

- Platform Architect version K-2015.06

1.3 Accessing the Carbon Model Studio Software File

You can access Carbon software from the *Downloads* page on the *Support* section of the Carbon web site (www.carbondesignsystems.com). You will need to register for an account to get access to this web page. Contact your Carbon Design Systems Applications Engineer if you have any questions.

Then you can copy the Carbon software file, or files, for your specific configuration and platform requirements to your host machine.

1.3.1 Carbon Installation Packages

Carbon Design Systems™ provides installation packages that are intended for specific platforms and operating systems. There are two versions of each Linux installation: one that provides a tarball, and one that provides a graphical installation wizard. Select the version that you prefer to use.

To ensure you are installing the correct package, refer to the following table (substitute the current release number for <release#>):

If you wish to install...	Use this Installation Package
The full Carbon release containing Carbon Model Studio for Linux and Windows packaged as a single TGZ.	tar: carbon-release-<release#>.tgz
Standard Windows installer containing libraries and support files for using Carbon Models on Windows.	carbon-install-Windows-<release#>.msi

1.4 Configuring Carbon for Remote and Local Compilation

Carbon Model Studio supports two types of compilation usage models:

- Native Linux compilation
- Remote Linux compilation from Windows

1.4.1 Configuring for Native Linux Compilation

Native Linux compilation means launching and compiling a Carbon Model from within a Carbon Model Studio session that was launched on a Linux platform.

For example, you would open an X-Window session on your Linux machine and launch Carbon Model Studio. You would then add your RTL source files to a project and compile them. In this traditional Linux usage scenario, everything is done locally.

1.4.2 Configuring for Remote Linux Compilation

You can choose to run Carbon Model Studio on Windows as well. However, since the Carbon compiler is not available for Windows, you still need to be able to cross-compile your Carbon Models on Linux, and then build any Windows-based, platform-specific components, such as Carbon components for SoC Designer Plus, on a Windows machine.

Carbon Model Studio supports this configuration with the following conditions:

1. There must be a shared read/write file system mounted on both the Windows and Linux machines. This can be accomplished using an application such as Samba or other shared file systems, such as a Network Appliance.
2. The version of Carbon's software must be the same on both the Windows and Linux machines. This is specified in the *Remote CARBON_HOME* property in the *Project Properties* view in Carbon Model Studio, and is verified before compilation proceeds.
3. The Carbon Model Studio project must reside on the shared file system. It cannot be located in C:\ or any other local disk.
4. The remote Linux machine must support the SSH protocol.

Note: Carbon Model Studio connects to the remote host running SSH on port 22. If you need to use a different port, you can use the environment variable *CARBON_PLINK_ARGS* and the "-P" argument. For example, "*CARBON_PLINK_ARGS=-P 25*" sets the port number to 25.

1.5 Installing Carbon Software

Installation can be done on Linux machines, or on Windows computers (runtime only). The following installation sections are described in this chapter:

- [Linux Installation Procedure](#)
- [Windows Installation Procedure](#)

During the installation you will need to define the licensing environment variable. This variable points to the license that will be used with your Carbon Model Studio software. Typically, a license server is set up prior to the installation by a system administrator to host the Carbon licenses. The license server details are described in Chapter A Chapter A, [Installing and Managing Carbon FLEXnet License Files](#).

1.5.1 Linux Installation Procedure

The Carbon software can be installed using two different methods for Linux computers:

- [Installing Using the Tar File](#)
- [Setting Environment Variables](#)

1.5.1.1 Installing Using the Tar File

Follow the steps below to install Carbon Model Studio software on Linux machines using the provided tar file:

1. Create a directory where you want to install the Carbon software:

```
mkdir <installation directory>
```
2. Change the working directory to the Carbon installation directory (if you are not already in that directory):

```
cd <installation directory>
```

3. Untar the Carbon Model Studio software kit that you downloaded:

```
tar xzf <carbon-release-package>.tgz
```

1.5.1.2 Setting Environment Variables

Setting the CARBON_HOME and PATH environment variables is done using setup scripts. The two computing environment preparation commands that are used in Linux to prepare for running the Carbon Model Studio tool are:

- Bourne shell — `source <CMS install path>/etc/setup.sh`
- C-Shell — `source <CMS install path>/etc/setup.csh`

Carbon Model Studio users often find it convenient to insert one of these command lines into their login files. As a root user Administrator, you can insert the appropriate command line into the global logins of all users who require access the Model Studio tools.

Setting the License Environment Variable

Prior to running Carbon Model Studio or simulations using Carbon Models, you need to set the Carbon specific license environment variable, CARBOND_LICENSE_FILE, or the standard FLEXnet license environment variable, LM_LICENSE_FILE.

FLEXnet checks for the CARBOND_LICENSE_FILE license variable first, and then checks for the LM_LICENSE_FILE variable.

Linux csh shell

For the Linux csh shell, set one of the following:

```
setenv CARBOND_LICENSE_FILE licenseFile
setenv LM_LICENSE_FILE licenseFile
```

where *licenseFile* is either a license file or <socket>@<hostname> (i.e. 7275@licserver). For example:

```
setenv CARBOND_LICENSE_FILE 7275@licserver
```

Linux Bourne shell

For the Linux Bourne shell, set:

```
CARBOND_LICENSE_FILE=licenseFile
export CARBOND_LICENSE_FILE
```

or

```
LM_LICENSE_FILE=licenseFile
export LM_LICENSE_FILE
```

where *licenseFile* is either a license file or <socket>@<hostname> (i.e. 7275@licserver). For example:

```
CARBOND_LICENSE_FILE=7275@licserver
export CARBOND_LICENSE_FILE
```

Setting System Architecture Variables

When you have installed the Linux 64-bit version of Carbon Model Studio software, the following environment variables are used to determine how the Carbon Model will be built:

```
CARBON_HOST_ARCH=<Linux | Linux64>
CARBON_TARGET_ARCH=<Linux | Linux64>
```

CARBON_HOST_ARCH determines whether the 32-bit or 64-bit compiler is used to create the Carbon Model.

CARBON_TARGET_ARCH determines whether the Carbon Model will be built as a 32-bit or 64-bit executable.

1.5.2 Windows Installation Procedure

The Windows version of Carbon Model Studio software can be installed on Windows 7 computers.

1.5.2.1 Installing using .tar

Using the Windows Setup Wizard to install Carbon Model Studio on Windows machines installs all required libraries.

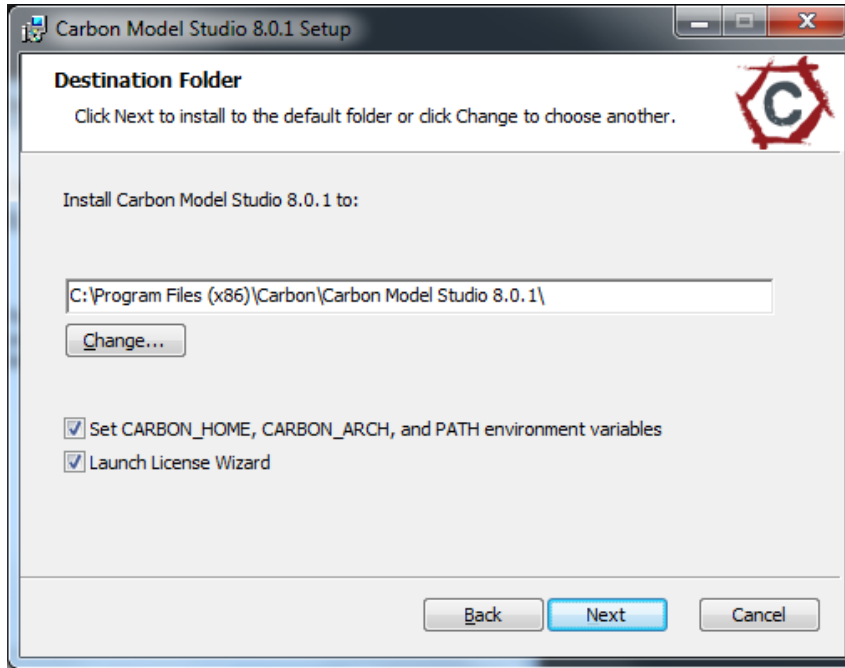
1.5.2.2 Installing Using the Windows Setup Wizard

Follow the steps below to install Carbon Model Studio on Windows machines:

1. Download the appropriate Carbon software kit, *carbon-install-Windows-<version>.msi*.
2. Run the executable and the *Welcome* screen appears:



3. Click **Next** and the *Destination Folder* dialog box appears:

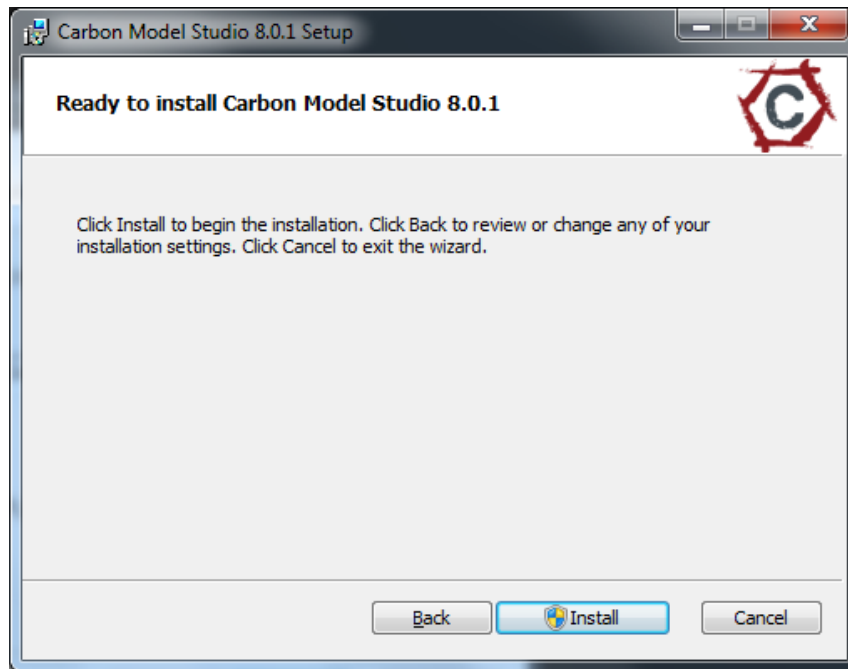


4. Accept the default installation location of *C:\Program Files\Carbon\Carbon Model Studio <version>*, or click **Change** to define the location where the Carbon software will be installed.
5. By default, the two check-boxes under the installation location are enabled. You can uncheck either of these boxes to disable the feature:
 - *Set CARBON_HOME, CARBON_ARCH, and PATH environment variables.* When checked, the listed environment variables are set during the installation. Note that the path *%CARBON_HOME%\Win\lib* is added, and it should be at, or close to, the beginning of the PATH statement.

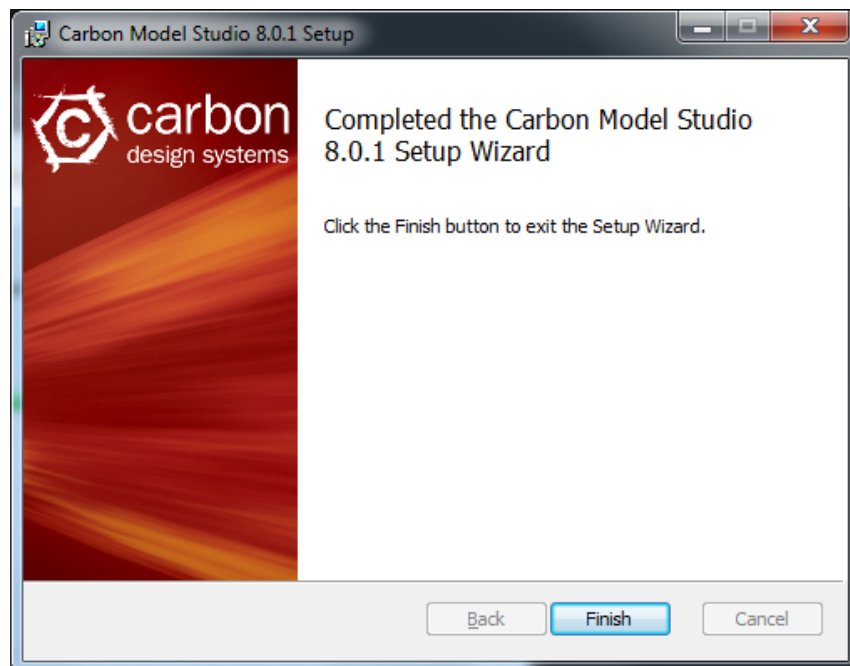
If you do not want this to occur automatically, uncheck the box. Later you can set these variables as described in [“Setting Environment Variables”](#) on page 18.

- *Launch License Wizard.* When checked, the Carbon License Wizard is launched immediately after the Carbon Model Studio installation finishes. You will need to run this wizard to license Carbon Model Studio. If you uncheck this feature here, you can run the wizard manually later from the Windows Start menu.

6. Click **Next** and the *Ready to Install* screen appears.



7. Click **Install** and the installation process begins. After the installation is complete, the *Completed* screen appears.



8. Click **Finish** and the installation completes and the window closes.

If the *Launch License Wizard* check-box was enabled checked, the Carbon License Wizard starts so you can install your Carbon license. See [“Carbon License Setup on Windows”](#) on page 16 for more information.

You can install multiple versions of Carbon Model Studio software on your Windows machine. Note that the last installation sets the CARBON_HOME user environment variable. However,

when you run Carbon Model Studio (*Start-> Programs->Carbon ->Carbon Model Studio <version> ->Carbon Model Studio*), it checks the location from which it is being launched and sets CARBON_HOME to the appropriate directory location.

If you are planning to develop your own Carbon applications using Microsoft® Visual Studio, refer to the *Windows Visual C++ Integration Application Note* in the Carbon Documentation for additional project settings required by Carbon.

1.5.2.3 Uninstalling Carbon Model Studio on Windows

You can uninstall Carbon Model Studio using the **Add or Remove Programs** dialog from the **Control Panel**.

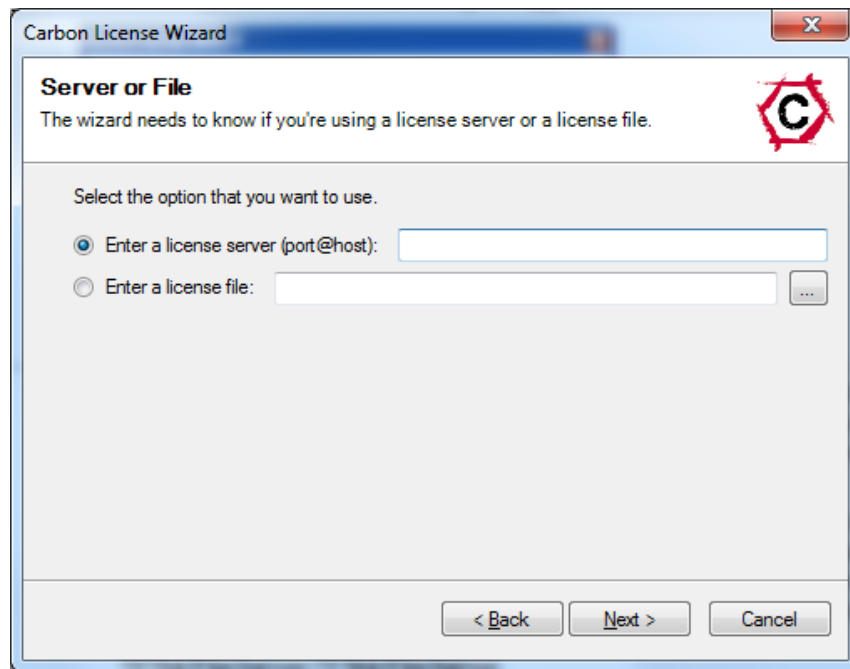
1.5.2.4 Carbon License Setup on Windows

Use the *Carbon License Wizard* to install the Carbon license. Follow the steps below:

1. Click **Start-> Programs->Carbon ->Carbon Model Studio <version> -> License Wizard** to launch the Carbon License Wizard.



2. Click **Next** and the *Server or File* dialog box appears.



3. This dialog box allows you to specify the license you will use to run Carbon Model Studio. If a Carbon license file already exists as an environment variable on this computer, that value will appear in this dialog. Check the appropriate button as described below:
 - If you are using a *floating license*, select **Enter a license server** and enter the license in the format *port@host*, for example, **7275@FlexServer**. A floating license requires that your system administrator install the license on a license server and provide you with the server name and port number. To list multiple floating licenses, separate each license with a semi-colon, for example, **7275@FlexServer;7276@FlexServer**.
 - If you are using a node-locked license, select **Enter a license file** and browse to the location on the local computer where the license file (*.lic) is located. A node-locked license only works on this one computer.
4. Click **Next** and the *License Complete* screen appears. As described on this screen, the user environment variable CARBOND_LICENSE_FILE is set with the value entered in the previous dialog.
5. Click **OK** and the license installation completes and the window closes.

1.5.2.5 Setting Environment Variables

If not set automatically through the installation program, the following environment variables will need to be set:

CARBON_ARCH

The CARBON_ARCH variable should be set for Windows:

```
CARBON_ARCH=Win
```

CARBON_HOME

The CARBON_HOME variable should be set to the location where you installed the software. For example:

```
CARBON_HOME=C:\Program Files\Carbon\Carbon Model Studio v8_0_0\
```

PATH

The PATH variable should include the following paths:

```
PATH=%CARBON_HOME%\bin;%CARBON_HOME%\Win\lib;%CARBON_HOME%\Win\lib\winx\shared
```

CARBOND_LICENSE_FILE

Prior to running Carbon Model Studio, or simulations using Carbon Models, you need to set the Carbon specific license environment variable, CARBOND_LICENSE_FILE. It should point to the location where the license file is located; either a license file or <socket>@<hostname>. For example:

```
CARBOND_LICENSE_FILE=7275@silicon;7276@silicon
```

1.5.3 Obtaining Accellera™ SystemC™

If you intend to use Accellera SystemC on a Windows platform, follow the instructions in the readme file SystemCInstall.txt, located in the userdoc directory of your CMS installation.

1.5.4 Completed Installation Directory Structure

Carbon Model Studio software is installed under a single directory structure as shown below. This file system must be visible to all systems that will be running Carbon software, or multiple installation areas must exist. Following is a high-level view of the installation tree.

To fully test the installation, run the example as described in [“Testing the Installation” on page 20](#).

Root	Subdirectory or File	Contents
\$CARBON_HOME/	bin/	Carbon executables
	examples/	Example designs
	fixate	Installation script (Linux only)
	include/	Carbon API header files
	installjammer/	Installer files
	lib/	Carbon libraries
	Linux64/	Third-party executables for Linux 64-bit platform (e.g., gcc), and appropriate Carbon libraries
	makefiles/	Carbon Makefiles
	README	Carbon README file
	userdoc/	All end-user documentation
	Win/	Third-party executables for cross development, and appropriate Carbon libraries

1.6 Testing the Installation

To test the installation, you can run a Verilog example:

1. Copy the example files into your local work directory:

```
cp -r $CARBON_HOME/examples/twocounter ./twocounter
```

2. Change to your work directory:

```
cd twocounter
```

3. Run the Makefile within the twocounter directory:

```
make
```

The results of the example will be output to the `twocounter.out` file:

```
0: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
100: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
200: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
300: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
400: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
500: clk1=1 reset1=1 clk2=1 reset2=1 out1=0 out2=0
. . .
```

If the example runs without error, then Carbon Model Studio software has been installed properly.

1.7 Accessing Carbon Documentation

The Carbon end-user documentation is available in Portable Document Format (PDF). If you do not have Adobe Reader installed on your system, you can download and install it free from the following site:

<https://get.adobe.com/reader/>

Note that if you transfer PDF files from one platform to another, you must use binary mode.

To access the documentation (from within the software kit):

1. Invoke your web browser and set the URL to the following:

file: `<$CARBON_HOME>/userdoc/index.html`

2. Select the link to the document you want to view or print.

Documentation is available from the Carbon Model Studio graphical interface by selecting **Help->CMS User Manual**.

Appendix A

Installing and Managing Carbon FlexNet License Files

Carbon products are licensed via the FlexNet license manager. To obtain a license you must have a license server available on your network. The license server can be downloaded from the Carbon support site (<https://portal.carbondesignsystems.com/websupport/support.aspx>). The license server is also included as a part of the Carbon Model Studio installation package.

License server packages are available for Linux and Windows. Download the version applicable to your installation.

For additional information on the FlexNet licensing, refer to the Flexera web site (www.flexera.com).

Note: The vendor daemon provided by Carbon is for use with FlexNet Version 11.13. If there is a version compatibility problem, an error is generated when you issue lmstat on the host machine.

A.1 FlexNet Software Location

After installing the Carbon software, the FlexNet programs and the Carbon FlexNet daemon are found in the following directories:

- Linux: `${CARBON_HOME}/Linux/bin/ES6`
- Windows: `%CARBON_HOME%\Win\bin\winx`

A.2 FlexNet Software Programs

The following FlexNet license programs are included once you complete the installation.

- lmgrd
- lmutil

A.2.1 lmgrd

The **lmgrd** program starts the FlexNet license daemon.

Linux: `lmgrd -c licenseFile [-l logFile]`

Windows: `lmgrd.exe -c licenseFile [-l logFile]`

A.2.2 lmutil

The **lmutil** program performs many functions depending on the option used.

The **lmhostid** option returns the FlexNet hostid.

`lmutil lmhostid`

Note: `lmhostid` returns a different ID than the Linux `hostid` command.

The **lmdown** option gracefully shuts down the FlexNet license daemon.

`lmutil lmdown -c licenseFile`

The **lmstat** option provides status information on the license server.

`lmutil lmstat -c licenseFile [-a]`

The **lmreread** option causes the license daemon to reread the license file and start any new vendor daemons.

`lmutil lmreread -c licenseFile`

In the above example, *licenseFile* is either a license file, or the location of the license server in the format `<socket>@<hostname>`, for example `7275@licserver`.

A.3 Setting Up the License File

The following modifications should be made to the Carbon-provided FlexNet license file:

- Change “this_host” on the SERVER line to the actual hostname, for example, for hostname *licserver*:

change from: `SERVER this_host 7274e893 7275`

to: `SERVER licserver 7274e893 7275`

- Linux: Add the path to the Carbon daemon object, *carbond* (see [“FlexNet Software Location”](#) on page 21 for the location of the Carbon daemon). For example:

change from: `VENDOR carbond`

to: `VENDOR carbond <path_to_${CARBON_HOME}>/Linux/bin/ES6/carbond`

- Windows: You cannot specify the path to the daemon; it must be in same directory as lmgrd.
- Optional: Change the socket number from 7275 on SERVER line if a different socket is to be used.

A.4 Starting and Managing the License Server on Linux

See [“FlexNet Software Location”](#) on page 21 to find the appropriate FlexNet programs.

To start the license server:

```
lmgrd -c licenseFile [-l logFile]
```

For example:

```
lmgrd -c carbon.lic -l carbonlic.log
```

To verify that the license started up correctly:

```
lmutil lmstat -c licenseFile -a
```

For example:

```
lmutil lmstat -c 7275@licserver -a  
lmutil lmstat -c carbon.lic -a
```

To gracefully stop the license server:

```
lmutil lmdown -c licenseFile -a
```

For example:

```
lmutil lmdown -c 7275@licserver -a  
lmutil lmdown -c carbon.lic -a
```

To update license information while the license server is running:

```
lmutil lmreread -c licenseFile
```

For example:

```
lmutil lmreread -c carbon.lic
```

A.5 Starting and Managing the License Server on Windows

The Carbon FlexNet Windows programs include LMTOOLS (lmtools.exe). LMTOOLS is a graphical user interface used to start and stop the license server, configure the license server, check the license server status, etc. LMTOOLS can be used to configure the license server to startup automatically when booting Windows.

To configure the license server using LMTOOLS:

1. Start LMTOOLS by launching the *lmtools.exe* program.
2. Select the **Services/License File** tab and then select **Configuration using Services** (“FLEXlmService1” should be highlighted).
3. Select the **Config Service** tab.
 - If not already specified, specify the *Service Name* (this normally should be “FLEXlmService1”).
 - Enter the full paths to the following items: 1) path to the *lmgrd.exe* file, 2) path to the license file, and 3) path to the debug log file (license server log file). You can use the *Browse* feature to identify the full path.
 - Check “Start Server at Power Up”.
 - Check “Use Services”.
 - Click **Save Services**.
4. Select the **Start/Stop/Reread** tab.
 - Verify that the correct service is highlighted (for example, “FLEXlmService1”).
 - Start the license server by clicking **Start Server**.
5. Select the **Server Status** tab. To verify that the license server is running, click on **Perform Status Enquiry** and then examine the log window under this button.

A.6 Setting Up Licensing on EL-5 License Servers

Flexera Software specifies that the license client (Carbon Model Studio) version must not be higher than the license server version. Carbon Model Studio is built using Flexera version 11.13, so you may need to update the *lmgrd*, *lmutil*, and *carbond* utilities to 11.13 versions.

The 11.13 versions of *lmgrd*, *lmutil*, and *carbond* are distributed with SoC Designer Plus. If you own a licensed version of SoC Designer Plus, refer to Appendix A of the *SoC Designer Plus Installation Guide* for instructions on updating these utilities. If you do not own SoC Designer Plus, contact Carbon Technical Support for instructions.