



# Efinity<sup>®</sup> Software Installation User Guide

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[www.efinixinc.com](http://www.efinixinc.com)



# Contents

<b>Overview.....</b>	<b>3</b>
<b>Hardware and Software Requirements.....</b>	<b>3</b>
<b>Third-Party Simulator Support.....</b>	<b>5</b>
<b>Installing the Efinity Software.....</b>	<b>6</b>
<b>Installing Patches.....</b>	<b>6</b>
<b>Efinity Quick Start.....</b>	<b>7</b>
<b>Appendix: Installing USB Drivers.....</b>	<b>8</b>
Installing the Linux USB Driver.....	8
Installing the Windows USB Driver.....	9
<b>Where to Learn More.....</b>	<b>9</b>
<b>Revision History.....</b>	<b>10</b>

# Overview

The Efinity® software provides a complete tool flow for designing with Efinix® products. This document describes how to install the software.

## Hardware and Software Requirements

### General Requirements

- Efinity full release: 64-bit, x86 instruction set architecture
- Windows Standalone Programmer.
  - Windows 10: 64-bit x86 instruction set architecture.
  - Windows 11: 64-bit x86 instruction set architecture.
- Computer with a 64-bit operating system.
  - A 64-bit Windows system is required for the Efinity standalone programmer.
  - A 64-bit Windows system is required for using the security tools in the Efinity standalone programmer.
- Your preferred text editor such as Notepad, gVim, Visual Studio
- Machine memory requirements (when running Efinity design compilations):

**Table 1: Machine Memory Requirements**

Product	Model	Memory
Trion	T4, T8, T13, T20, T35	8 GB
	T55, T85, T120	16 GB
Titanium	Ti35, Ti60	8 GB
	Ti90, Ti120, Ti180	16 GB
	Ti135, Ti200, Ti375	32 GB

### Windows Requirements

- Windows 10 or later, 64 bit operating system
- Microsoft Visual C++ 2019 x64 runtime library (or latest version) redistributable  
<https://docs.microsoft.com/en-us/cpp/windows/redistributing-visual-cpp-files?view=msvc-170>



**Note:** If you want to use the stand-alone Programmer, you also need to install the x86 and x64 libraries (for 64-bit systems).

- Zadig software to install USB drivers  
see [Installing the Windows USB Driver](#) on page 9
- Java 64-bit runtime environment; required for configuring the Sapphire RISC-V SoC and DMA Controller in the IP Manager; available from:
  - <https://www.java.com/en/download/manual.jsp> (Java 8)
  - <https://developers.redhat.com/products/openjdk/download> (OpenJDK 8 or 11)
  - <http://jdk.java.net/16/> (OpenJDK 16)





**Note:** You may also use other Java software platforms that are available in the market.



**Note:** The path <drive>:\Windows\System32 must exist in %PATH% if you have a customized environment variable.

## Linux Requirements

**Table 2: Linux Operating System**

Operating System	Note
Ubuntu v18.04 or later	You may need to install some graphics related libraries before running the Efinity tools. An example list of libraries (not comprehensive) could be: <b>apt install libxcb-xinerama0 libxcb-icccm4 libxcb-image0 libxcb-keysyms1 libxcb-render-util0</b>
Red Hat Enterprise v7.4 or later	<p>You may need to install some graphics related libraries before running the Efinity tools. An example list of libraries (not comprehensive) could be: <b>yum install libxkbcommon-x11 xcb-util-renderutil xcb-util-keysyms xcb-util-image xcb-util-wm xcb-util</b></p> <p> <b>Important:</b> If GUI is not working, set an environment variable, then launch the tool again using the following commands (applicable for all Linux operating systems):</p> <pre>source/path/to/efinity/&lt;version&gt;/bin/setup.sh export QT_DEBUG_PLUGINS=1 efinity</pre> <p>The Qt verbose command line output can provide clues about which system libraries are missing and need to be installed via apt/yum.</p> <p> <b>Note:</b> Red Hat Enterprise v9.0 has not yet been tested.</p>

- Linux X11 windowing system (for Efinity® GUI)
- Udev device manager for Efinix USB programming cable  
see [Installing the Linux USB Driver](#) on page 8

## Installing iVerilog

Icarus Verilog (iVerilog) is a free Verilog simulation tool you can use to compile and simulate Verilog HDL source code. The software is available as source code or as pre-compiled binaries.

### Windows installation:

To download the simulator: [bleyer.org/icarus](http://bleyer.org/icarus)



**Note:** The latest versions of iVerilog are bundled with the GTKWave software, so you only need to download 1 file to get both tools. Refer to the [bleyer.org/icarus](http://bleyer.org/icarus) website for more information.

To download the simulator source code: [github.com/steveicarus/iverilog](https://github.com/steveicarus/iverilog)

### Linux installation:

Refer to the Installation Guide for steps to obtain, compile and install Icarus Verilog:  
[steveicarus.github.io/iverilog/](https://steveicarus.github.io/iverilog/)



**Note:** Efinix recommends iVerilog version 11.0 or later.

## Installing GTKWave

GTKWave is an open-source tool that analyzes post-simulation dumpfiles and displays the results in a graphical interface. It includes a waveform viewer and RTL source code navigator. You can use GTKWave with the iVerilog simulator to analyze and debug your simulation model, or to view any VCD waveform.

### Windows installation:

You can read more at [gtkwave.sourceforge.net](http://gtkwave.sourceforge.net).



**Note:** If you have downloaded and installed the iverilog setup file (bundled with GTKWave), you do not need to install a separate standalone GTKWave.

To download and run the latest Windows version, follow these steps:

1. You can browse for the software files at [gtkwave - Browse Files at Sourceforge.net](http://gtkwave - Browse Files at Sourceforge.net). The Windows files are situated lower down the page.
2. Unzip the downloaded file.
3. *Optional:*

You may need to add the path to GTKWave (\$GTKWave\_folder\$\bin\) to your System Variables path for the software to launch correctly.

4. Run the program by executing **gtkwave.exe** in the <install dir>/bin directory.

### Linux installation:

Linux users can use the following commands:

```
sudo apt-get update
sudo apt-get install gtwave
```

## Third-Party Simulator Support

The Efinity tools do not include or explicitly integrate third-party simulators. However, Efinix has verified that the following simulators work with Efinity-generated Verilog HDL netlist files:

- Cadence Xcelium Logic Simulator
- Mentor Graphics QuestaSim Simulator
- Free Icarus Verilog (iVerilog) Simulator

To simulate an Efinity post-synthesis (or later compiler stage) Verilog HDL netlist, include the following library path as a resource in your third-party simulator:

```
<Efinity top-level path>/sim_models/verilog
```

# Installing the Efinity Software

## Windows installation:

Double-click the **efinity-*<version>*.msi** installer and follow the on-screen instructions.

### Optional:

Run the following script to install a shortcut in your Desktop directory:

```
> <installation directory>/bin/install_desktop.sh
```

## Linux installation:

Unzip or untar the Efinity package into your user directory:

```
> tar -xjvf efinity-<version>.tar.bz2
```

# Installing Patches

You download Efinity® patches separately from the software and then install them into your existing Efinity® installation directory.

## Windows

1. Download the patch from the Efinity® page in the Support Center.
2. Unzip the patch into any temporary directory by double-clicking the patch filename in the Windows Explorer and choosing **Extract all** or by using the command `unzip efinity-<version>-patch.zip` at a command prompt.
3. Setup the environment variables by typing these commands at a command prompt:

```
> <path to Efinity>\<version>\bin\setup.bat
```

4. Run the patch installer by typing these commands at a command prompt:

```
> cd efinity-<version>-patch
> run.bat
```



**Note:** The path `<drive>:\Windows\System32` must exist in %PATH% if you have a customized environment variable.

## Linux

1. Download the patch from the Efinity® page in the Support Center.
2. Open a terminal window.
3. Unzip the patch into any temporary directory:

```
> unzip efinity-<version>-patch.zip
```

4. Setup the environment variables:

```
> source /path/to/efinity/<version>/bin/setup.sh
```

5. Run the patch installer:

```
> cd efinity-<version>-patch
> ./run.sh
```

# Efinity Quick Start

To launch the Efinity graphical user interface (GUI), double-click the Efinity desktop icon.  
To launch and use the Efinity tool from the command line, refer to the following sections.



**Warning:** Do not use non-English characters in the Efinity project paths.

## Windows

Set up your environment and PATH:

```
bin\setup.bat
```

Launch the Efinity GUI from the command line:

```
bin\setup.bat --run
```

Run Efinity from the command line:

```
cd %EFINITY_HOME%\project\<project name> // Change to project directory
efx_run.bat <project name>.xml // Run Efinity
```

For command-line help:

```
efx_run.bat --help
```

## Linux

Set up your environment and PATH:

```
source bin/setup.sh
```

Launch the Efinity GUI from the command line:

```
efinity
```

Run Efinity from the command line:

```
cd $EFINITY_HOME/project/<project name> // Change to project directory
efx_run.py <project name>.xml // Run Efinity
```

For command-line help:

```
efx_run.py --help
```

# Appendix: Installing USB Drivers

To program Trion® and Titanium FPGAs using the Efinity® software and programming cables, you need to install drivers.

Efinix development boards have FTDI chips (FT232H, FT2232H, or FT4232H) to communicate with the USB port and other interfaces such as SPI, JTAG, or UART. Refer to the Efinix development kit user guide for details on installing drivers for the development board.



**Note:** If you are using more than one Efinix development board, you must manage drivers accordingly. Refer to [AN 050: Managing Windows Drivers](#) for more information.



**Notice:** The Trion T8 BGA81 Development Boards do not have FTDI chip for USB communication. Refer to the T8 BGA81 Development Kit User Guide for more information about installing its Windows USB driver.

For your own development board, Efinix suggests using the FTDI Chip FT2232H or FT4232H Mini Modules for JTAG programming Trion® and Titanium FPGAs. (You can use any JTAG cable for JTAG functions other than programming.)



**Note:** Efinix does not recommend the FTDI Chip C232HM-DDHSL-0 programming cable due to the possibility of the FPGA not being recognized or the potential for programming failures.

*Table 3: USB Programming Connections*

Board	Connect to Computer with
Efinix development boards	USB cable
Your own board	FTDI x232H programming kit. For example: <ul style="list-style-type: none"> <li>• FT2232H Mini Module</li> <li>• FT4232H Mini Module</li> </ul>



**Note:** The FTDI Chip Mini Module supports 3.3 V I/O voltage only. Refer to the [FTDI Chip website](#) for more information about the modules.

## Installing the Linux USB Driver

The following instructions explain how to install a USB driver for Linux operating systems.

1. Disconnect your board from your computer.
2. In a terminal, use these commands:

```
> sudo <installation directory>/bin/install_usb_driver.sh
> sudo udevadm control --reload-rules
```



**Note:** If your board was connected to your computer before you executed these commands, you need to disconnect and re-connect it.



## Installing the Windows USB Driver

On Windows, you use software from Zadig to install drivers. Download the Zadig software (version 2.7 or later) from [zadig.akeo.ie](http://zadig.akeo.ie). (You do not need to install it; simply run the downloaded executable.)



**Important:** For some Efinix development boards, Windows automatically installs drivers for some interfaces when you connect the board to your computer. You do not need to install another driver for these interfaces. Refer to the user guide for your development board for specific driver installation requirements.

To install the driver:

1. Connect the board to your computer with the appropriate cable and power it up.
2. Run the Zadig software.



**Note:** To ensure that the USB driver is persistent across user sessions, run the Zadig software as administrator.

3. Choose **Options > List All Devices**.
4. Repeat the following steps for each interface. The interface names end with *(Interface N)*, where *N* is the channel number.
  - Select **libusb-win32** in the **Driver** drop-down list.
  - Click **Replace Driver**.
5. Close the Zadig software.



**Note:** This section describes how to install the libusb-win32 driver for each interface separately. If you have previously installed a composite driver or installed using libusbK drivers, you do not need to update or reinstall the driver. They should continue to work correctly.

## Where to Learn More

The Efinity® software includes documentation as PDF user guides and on-line HTML help. This documentation is provided with the software. You can also access the latest versions of PDF documentation in the Support Center:

- [Efinity Software User Guide](#)
- [Efinity Synthesis User Guide](#)
- [Efinity Timing Closure User Guide](#)
- [Efinity Software Installation User Guide](#)
- [Efinity Trion Tutorial](#)
- [Efinity Debugger Tutorial](#)
- [Titanium Interfaces User Guide](#)
- [Trion Interfaces User Guide](#)
- [Efinity Interface Designer Python API](#)
- [Quantum® Trion Primitives User Guide](#)
- [Quantum® Titanium Primitives User Guide](#)

In addition to documentation, Efinix field application engineers have created a series of videos to help you learn about aspects of the software. You can view these videos in the Support Center.

# Revision History

**Table 4: Document Revision History**

Date	Version	Description
January 2024	3.1	Added note about Windows %PATH% variable when installing patches. (DOC-1687)
December 2023	3.0	Updated machine memory requirements. For Windows, a 64-bit operating system is required. 32-bit systems are not supported.
March 2023	2.9	Updated x86 architecture info under General topic of <b>Hardware and Software Requirements</b> on page 3. (DOC-1102) Added note for Java in Window requirement. Updated table Linux Operating System. Updated information for Installing iVerilog. Updated steps regarding browsing and downloading Windows file from Sourceforge.net in Installing GTKWave topic. (DOC-1122)
August 2022	2.8	Updated Efinity 2022.1 platform in <b>Hardware and Software Requirements</b> on page 3. Updated Installing USB Drivers topics.
June 2022	2.7	Pointed to new sourceforge location for GTKWave download. (DOC-797)
December 2021	2.6	Updated machine memory requirements (RAM).
October 2021	2.5	When using the stand-alone Programmer on 64-bit Windows, install both the x86 and x64 libraries. (DOC-576)
September 2021	2.4	JRE required for running the DMA Controller in the IP Manager. (DOC-549)
June 2021	2.3	Supported Ubuntu version is v18.04 or higher. v16.04 is end of life. (DOC-433) Added the Java runtime environment as a software requirement for configuring the Sapphire SoC in the IP Manager. Updated the Windows USB driver installation topic.
December 2020	2.2	Added the requirement to install the Microsoft Visual C++ 2015 x64 and x86 runtime libraries for the standalone Programmer.
November 2020	2.1	Updated instructions on installing USB drivers for Windows.
June 2020	2.0	Added instructions on how to install software patches. Windows 7, Red Hat v6, and CentOS v6 no longer supported. Provided new driver when installing USB drivers on Windows with Zadig software. Added FTDI Dual RS232 HS mini module in steps to install the USB driver.
December 2019	1.7	Updated Zadig USB driver information for Windows.
August 2019	1.6	Updated Quick Start command-line instructions.
January 2019	1.5	Added instructions on installing the USB driver for Windows.
October 2018	1.4	Added Python 3 to the software requirements list. For Windows, if you do not have a full version of Python, the .py extension may not be correctly associated with Python.

Date	Version	Description
June 2018	1.3	Removed Python requirement; as of this release, Python is included with the software. Added the requirement that Windows users install the Microsoft Visual C++ 2015 x64 runtime library.
April 2018	1.2	No changes.
November 2017	1.1	Removed references to OPM family. Removed instructions for setting external code editor (this version embeds a Code Editor).
May 2017	1.0	Initial release.