cadence®

Allegro® X Platform System Requirements

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Contents

Allegro X Platform System Requirements

This document contains the recommended system requirements for Cadence® OrCAD® X and Allegro X products in release 23.1.

Important

Refer to the *README* file in the *OrCAD X/Allegro X 23.1 (SPB231)* tabs of the Cadence® Downloads page for current and detailed requirements information listing the hardware and software requirements across products and compatibility information for different software.

Microsoft Windows System Requirements

This section describes the system requirements for Microsoft® Windows® operating systems.

Because Cadence® OrCAD® X and Allegro X products are integrated directly with Windows, hardware and peripherals supported by Windows are also supported by these Cadence products. A list of hardware and peripherals officially supported by Windows can be obtained from the Microsoft web page.

These products require updating certain Microsoft libraries in the Windows directory. You must install the Cadence software either using the desktop mode or client install.

Note: After you install release 23.1, you must use the release 23.1 version of the *switchversion* program to change releases. The installer places this program at the top of the Cadence hierarchy in the Windows *Start* menu.

Operating System	Windows 11 Professional and Enterprise; Windows 10 (64-bit) Professional and Enterprise, including Dark Theme mode; Windows Server 2016 (All Service Packs); Windows Server 2019; Windows Server 2022. **Note:** Cadence Allegro X and OrCAD products do not support Windows 10 Starter and Home Basic. In addition, Windows Server support does not include support for Windows Remote Desktop. Windows RT and Tablets/ Phones, including Windows 10 Phone, are not supported. **Note:** 64-bit Windows require 64-bit Flex software dongle drivers if using dongle-based licensing.
Recommended Hardware	Intel® Core™ i7 4.30 GHz or AMD Ryzen™ 7 4.30 GHz with at least 4 cores 16 GB RAM 50 GB free disk space (SSD drive is recommended) 1920 x 1200 display resolution with true color with at least 32bit color. A dedicated graphics card supporting OpenGL, minimum 2GB with additional support for DX11 for 3D Canvas Dual monitors (For physical design)

	Broadband Internet connection for some service
	Ethernet port/card for network communications and security hostID
	Three-button Microsoft-compatible mouse
Supported MATLAB Version (For the PSpice-MATLAB interface)	R2020A-64Bit R2020B-64Bit R2021A-64Bit

Using Spaces in File and Directory Names

Support for spaces in file and directory names applies only to Windows. Spaces in file or directory names are not supported on Linux platforms. Leading and trailing spaces in directory components are not supported.

Spaces in directory names are supported in the following areas:

- Program installation location (`C:\Program Files`)
- Default user home directory (`C:\Document and Settings\<user>`). If you set the `HOME` environment variable, you override the default.
- Default temporary directory (`C:\Document and Settings\<user>`). If you set the `TEMP` or `TMP` environment variable, you override the default.
- Your desktop directory (`C:\Document and Settings\<user>\Desktop`)
- Project location
- Library locations

Spaces in filenames are not supported when a filename is stored in the design. For example, symbols and padstack names are stored in the Allegro X database where a space is not legal. Ancillary space support is based upon each installed application. Allegro X® PCB Editor supports spaces in filenames for non-design files, such as, reports and text files.

Linux System Requirements

This section describes the system requirements for Linux.

Operating System	RHEL 8.4 (64-bit); RHEL 7.9 (64-bit); RHEL 7.4 (64-bit); SLES 11 SP4 (64-bit); SLES 12 SP3 (64-bit)
Hardware	Intel® Core™ i7 4.30 GHz or AMD Ryzen™ 7 4.30 GHz with at least 4 cores 8 GB or greater system memory 12 GB swap space 10 GB (or greater) available disk space TrueColor (65000 colors) required For information about graphics cards, see Graphics Requirements for Physical Design Products on page 13.
Window Manager	Gnome

Note: If you are running physical design/layout (back-end) tools, you must source

`<cdsroot>/tools/bin/allegro_cshrc (tcsh/csh)`

or

`<cdsroot>/tools/bin/allegro_profile (sh/bash)`

or integrate the equivalent Linux settings into your own environment files. It is not sufficient just to add installed tools to the `PATH` variable.

Supported Platforms for License Server

Cadence® License Server 22.01, HotFix 002 is based on FLEXnet v11.19.1.1 supports the following platforms:

Windows	Linux	Ubuntu
Windows 10	Linux RHEL 7.4	Ubuntu 14.04
Windows 11	Linux RHEL 8	
Windows Server 2016[1]	Linux SLES 12	
Windows Server 2019	Linux SLES 15	
	CentOS 7.4	

1. Windows Server 2016 is no longer supported by FlexNet. Any support requiring FlexNet involvement must be reproduced in another Windows flavor listed in this table to be addressed by FlexNet.

Note: All supported platforms are 64-bit.

You can download and install the latest License Server from the *Lic+Config_Utils* category of the Cadence Downloads page.

License Server Network Connection

To achieve good performance and to avoid problems from dropped licenses, all Cadence® software require a fast and reliable network connection to the license servers with low latency.

- The recommended network latency to the license server should be no higher than `30ms`.
- Ideally, the license server latency should be close to `1ms`

Requirements for Allegro X Pulse

To run Allegro X® Pulse client, your system must have the following minimum configuration:

- Cores: Four or more
- RAM: A minimum of 8 GB with 4 GB swap space. The recommended RAM is 16 GB.

Note: Allegro X System Capture uses Allegro X Pulse for design data management by default. Allegro X PCB Editor or other applications also require the same configuration to use Allegro X Pulse for data management.

Allegro X Pulse Server Requirements						
Server Type	**CPU**		**RAM**		**Available Storage**	
	Recommended	Minimum	Recommended	Minimum	Recommended	Minimum
Pulse Primary Server	>= 16 Cores	>= 16 Cores	32GB	32B	100GB	20GB
Pulse Data Node Server	>= 4 Cores	>= 4 Cores	8GB	8GB	20GB	5GB
Pulse Test Server	>= 16 Cores	>= 8 Cores	32GB	16GB	100GB	20GB
EDM Production Server	>= 4 Cores	>= 4 Cores	8GB	8GB	20GB	5GB
EDM Test Server	>= 4 Cores	>= 4 Cores	8GB	8GB	20Gb	5GB
Operating System for Servers						
Recommended	■ Linux for high reliability					
Supported	■ Windows Server					
All primary and data nodes must be in the same configuration. For example, if the primary server is in the EDM Production mode, the data nodes must also be in the EDM Production mode.						

PTC Windchill Version for Publish For Manufacutring (PFM)

Publish for Manufacturing (PFM) is qualified with PTC Windchill version 11.0 M030-CPS17 REST 1.7 installed on Windows with SAML2 – PingFederate.

Note: Refer to PTC documents for PTC Windchill installation requirements.

PTC Windchill Version for Dassault 3D Experience (3DX) Version

Publish for Manufacturing (PFM) is qualified with Dassault 3DX version R2022x-FD04 installed on Linux RHEL 7.8.

Note: Refer to Dassault 3DX documents for Dassault 3DX installation requirements.

Operating System Exceptions for Allegro X Pulse Features

Allegro EDM Flow Manager is not supported on the following operating systems:

- SLES
- Windows 2016 Server
- Win 2019 Server

Improving Performance on UNIX Systems

You may be able to greatly enhance your graphics performance on certain machines if you run both X and Cadence® products on the same machine.

To run X and Cadence products on the same machine, set the display variable to its local mode by specifying `setenv DISPLAY :0` at the command prompt. This lets the X protocol use shared memory instead of the expensive TCP/IP transport.

Non-Native X Emulators

Cadence tools only support the XServer provided by the Linux vendors. Non-native X solutions, such as Hummingbird, Exceed, and so on are not supported. VNC to non-native X solutions is also not supported.

Virtual Environment Support

Cadence® OrCAD® X and Allegro X release has several products that require access to high performance graphic hardware. These applications rely on direct access, via drivers, to the capabilities of high-end graphics cards to display, render, and manipulate images on the screen. Products exist in both the Virtualization and Remote desktop areas that may or may not emulate these hardware functions. If these products emulate these graphical hardware functions, performance of the Cadence software is likely to be poor. If these products do not emulate the APIs (Application Programming Interfaces) of the graphics hardware, the software will not function.

The Cadence advanced graphics programs list OpenGL as a requirement. To achieve the best performance and quality, you must download the latest graphics adapters provided by the hardware vendor of the card. The following list of the programs require access to accelerated graphics adapters to operate:

- Allegro X PCB Editor

- Allegro X Advanced Package Designer
- SigXplorer
- Allegro X Free and Plus viewers

These products offer the ability to disable advanced graphics. This can be done temporarily by using the `-noopengl` command line argument or permanently by specifying `set disable_opengl` in the local Allegro `env` file. Running Allegro X products after deactivating OpenGL will deactivate certain advanced product functionality, such as 3D view modes and transparency.

Even if these products are installed in these environments, the performance is poor and advanced capabilities, such as 3D viewing may not work. Use of the graphical applications in these environments is not recommended and is subject to the following restrictions and caveats:

- The products are not supported in a virtual or remote desktop environment.
- Performance may be at unacceptable level. Any functionality based on advanced graphics hardware may not work.
- Cadence will attempt to address issues reported in this environment but they must be reproduced on a supported workstation running in a non-virtual or non-remote desktop environment.

Finally, certain remote conferencing products such as Microsoft NetMeeting do not properly display these applications. You should migrate to a remote meeting product that supports these applications, such as Microsoft Live Meeting, or run the Cadence software with advanced graphics option deactivated.

File Server Support

The installed products support loading the software on centralized file servers. The operating system used by a file server does not have to appear on the platform support matrix as long as the system is just used as a file server. For example, a file server running Windows 2005 is supported. If the file server is used for other purposes such as a license server, this function will need to meet the platform requirements.

The following network file system protocols are supported:

- Linux: NFS and local files systems (ext versions and NTFS). For local systems, FAT or other Linux file systems are not recommended. Mounting CIFS file systems on Linux is not supported.

- Windows: SMB/CIFS. While open source Samba software provides SMB/CIFS, Samba itself is not supported due to its variations. Although Samba shares are used without problem in many enterprises, you need to duplicate tool problems in a supported environment.

Graphics Requirements for Physical Design Products

Most physical design products, including PCB Editor, APD, and SI, but excluding Allegro® X PCB Router or SigXplorer, offer enhanced graphics via OpenGL. Schematic editors or front-end applications do not require OpenGL.

To use OpenGL as a graphics drawing option, your system must meet the following requirements:

- A modern computer purchased recently.
- A dedicated graphics card (motherboard-based) with hardware OpenGL support or an Intel 945 class graphics card. A recommended 2GB dedicated (not shared) video RAM and a 128-bit bus interface.Cadence recommends that the card be workstation certified. A high-end motherboard based graphics solution delivers acceptable performance for most designs. This is one area where paying a little more for quality improves productivity.
- A minimum of 1 GB system memory.
- Installation of the latest graphics patches from the graphics card vendor.

Important

As with most graphics support, you must ensure that the appropriate drivers are installed and properly configured on your system. If you use older versions, you may see glitches with the display of objects, poor performance, and other problems. Ensure that video cards for Linux have Linux drivers available.

Remote graphics are not supported. Examples include:

- Windows terminal services such as Citrix
- VNC based programs
- Remote X programs (for example: Hummingbird)
- Thin client solutions

  Remote X clients need support for OpenGL.

All tools require at least 65000 colors. The 256- color mode (also known as 8-plane mode in the X window world) is not supported. Linux Xservers must be configured to use the TrueColor model.

OpenGL is enabled by default. You can deactivate it using the environment variable `disable_opengl` in the OpenGL category of the User Preferences Editor dialog box.

GPU Acceleration Rendering

Note: Support for GPU-accelerated graphics rendering is available in Allegro X PCB Editor with the *Allegro X PCB Venture* and *Allegro X Enterprise PCB Designer Suite* licenses and in *Allegro X Advanced Package Designer* with the *SiP Layout* option.

GPU support provides faster response time during panning and zooming and while toggling layers on or off, as well as improving the graphics rendering quality. GPU support is enabled by default and available on the Windows and Linux platforms.

Note: To disable GPU support, set the user preference variable, `disable_gpu`.

Any NVIDIA GPU that is CUDA-compatible and running an up-to-date driver is supported, which include the GPUs corresponding to Pascal, Volta, Turing, and Ampere architectures. Although any NVIDIA GPU that is CUDA-compatible and running an up to date driver is supported, RTX A6000 class GPUs are recommended for best performance. Refer to the NVIDIA website for more details.

Planning Hardware Purchases for Physical Design Products

The Cadence® OrCAD® X and Allegro X product family includes products for schematic capture and library design. These applications place higher demands on disk access and do not require the fastest CPU available. However, most Allegro X physical design or back-end products are CPU and memory-bound— especially true of the following back-end products: Allegro X PCB Editor, PCB Router, APD, and PCB SI. Therefore, Cadence recommends a faster CPU for these products.

Allegro X products use both integer and floating point, so select a configuration that provides ample processing power in both areas. When choosing a machine, purchase one with the highest CPU rating. As vendors are de-emphasizing their CPU clocking, use the chip-naming convention of the vendor. Alternatively, use a performance benchmark measurement. For example, the SPEC site (`http://www.spec.org`) lists the hardware results from multiple vendors.

If two systems have comparable ratings, purchase the system with the larger Level 2 cache, even if its ratings are slightly lower. Buying a top-end CPU usually also brings a system with the latest motherboard, bus architecture, and RAM hardware.

In the Windows environment, if the machine is recommended for gamers, it meets the needs of high-end physical implementation design. The exception to this rule is that for Allegro X products, you do not need dedicated sound cards. A dedicated graphics card is recommended over a motherboard-based graphics card because motherboard cards share memory and bus access with the CPU.

Buy enough memory so you are not paging during your work. One gigabyte is a good starting point for average PCB designs but you may need to raise the total if you plan on auto-routing, signal integrity work, or multi-board simulation. A rule of thumb is to take a recently completed board, and your memory requirement would be:

```
Memory requirements = 1000 MB + (Design_Size_on_disk * 10)
```

then round up to the next half gigabyte.

Example: If you have a 50 MB board, you need 2 GB of memory.

If you plan on using centralized Cadence® software, design, or library storage, a 100 Mbs network connection is recommended.

Some of the products make use of multi-processors; at least four processors are recommended. This can be either separate cores, multi-cores, or hyperthreading.

- On Windows, the second chip can remove the performance penalty that is imposed by Virus checkers, inventory management, IP Protection, and other overhead software that can be found installed on modern Windows systems. In this area, the Intel HT technology can help with Windows *overhead* processing.
- On UNIX systems, graphics programs achieve a better performance due to the nature of the X-windows architecture. The additional CPUs also let you run background processes, such as auto-routers and simulators.

In the Intel CPU world, Intel, Xeons, and AMD chips are good choices.

If you are considering a laptop computer, look at the workstation replacement laptops, even though they are heavier and have less battery life than more conventional laptops.

Finally, when purchasing a new system, assess your future needs and not just your current requirements.

Additional Recommendations for Allegro X Advanced Package Designer Products

The Cadence 3D Design Viewer requires an OpenGL-compliant video card (128 MB recommended minimum video memory).

IC-Package co-design capability is available only on the Linux platforms. Similarly, as this capability works with the Innovus-based IC floor-planning technology, you should plan that systems running this capability have sufficient disk and memory space for the Innovus-based and Allegro portions of the applications, as well as sufficient disk space for the IC portions of the system designs.

Most back-end programs such as Allegro X PCB Editor, Allegro X Advanced Package Designer, SigXplorer and SI but not SPECCTRA, offer the OpenGL drawing capability. Front-end programs, such as OrCAD® X Capture, do not require OpenGL capability.

To use OpenGL as a graphics display option, your system needs to meet the following requirements:

- A modern computer purchased recently.
- A dedicated graphics card is recommended for the OpenGL based products.

  In smaller form factor hardware such as notebooks, many motherboard based graphic controllers now deliver good to excellent performance for most designs. For the best performance, a dedicated graphics card is still recommended.
- Apply the latest graphics patches from the graphics card vendor or PC supplier.

Note: On Linux, all products require at least true color (65000 colors). 256 color mode (also know as 8 plane mode in the X window world) is not supported. Linux Xservers must be configured to use the TrueColor model.

Frequently Asked Questions

This document contains the frequently asked questions (FAQ) about system requirements and performance. To view the answer to any question, click the question from the following list:

What will happen if disk minimums are not met?

Answer: The Cadence installer compares the disk space requirements of the products you choose and the available disk space on the target partition and does not install if free space requirements are not met. Use custom installation to select the required products instead of installing the entire product set to complete installation with less disk space requirement.

The minimum requirements include both installation and some user working space.

Can you specify a true memory hard limit where Allegro X applications will not run?

Answer: No, this is not possible as there are many factors involved. We have a calculator in this document that helps in estimating memory requirements based on the design size and the tool functionality you plan on using but 8GB (64bit OS) will satisfy almost all the users.

Can you be more specific on memory requirements?

Answer: For physical design the rule of thumb is to take the disk size of a completed board and triple it to learn your basic memory requirements. Then you give the OS its due (say 2MB) and that is your basic memory requirement. If you run SI simulations you need a lot more memory.

Given how economical memory is today, I would just use 8 GB on Windows 10 and allocate Virtual memory at least twice the physical. If the system is memory rich, the OS can use additional memory to give the system a smoother overall feel by keeping running programs in memory and caching frequently accessed files.

Will adding more memory improve Allegro performance?

Answer: No, Allegro X programs do not look at the amount physical memory to adjust performance. If Allegro X programs are not paging then adding addition memory will not improve performance. The programs assume that the OS can satisfy memory requests. The OS manages a program's memory requirements through virtual memory. When the OS can no longer satisfy a memory request, a low memory warning is flagged and the tool exits. Failure of Cadence products is not typically due to lack of memory.

What other things may impact performance?

Answer: Slow performance can be due to the following factors:

- rogue programs – use a process manager and sort by CPU time to ensure no unwanted programs are consuming CPU cycles.
- On Windows, a mis-configured virus checker.
- Presence of IP protection software. These programs can cause delays in accessing files. Due to the number of files accessed by Cadence schematic tools, the delays can be especially noticeable with these tools.
- With schematic editors, if accessing designs or libraries over the network WAN/LAN latency or congestion may be an issue. Also check if the file server is overloaded.
- For physical tools, design setup may be an issue so run Performance Advisor found under the Database Check command.

Will multiple core/CPUs improve Allegro X application performance?

Answer: Almost everyone can benefit from having two processing units. This can be obtained through multi-core, multi-CPU or HyperThreading configurations. For physical design (brd or mcm), four processing units is recommended but for dense designs or complex constraint rules more than four units will improve performance. For DRC, high-end SI Analysis tools and GRE, eight or more processing units is recommended.

Why is my Graphics Performance slow?

Answer: Check your system meets the minimum graphics requirements. A dedicated graphics card is always the best as motherboard based solutions frequently share memory with the slower CPU RAM. In addition, verify that your graphics driver software is up to date.

What do I do if I experience menu glitches when using the nonopengl option?

Answer: If you experience menu glitches with PCB Editor, Advanced Package Designer (APD), or SigXplorer when running `-nonopengl` command line option:

1. Check if `SaveUnders` and `backingstore` options are off, which is the default for many Linux systems. To check, run the following command: `xdpyinfo | grep back`.
2. Change the default settings by running the configure program: `xorg -configure`.

You need root access.

3. Edit the Devices section of /etc/X11/xorg.conf and set `backingstore` and `SaveUnders` to `true` and `on` respectively. Use the following command to edit xorg.conf

   ```
   sudo vi /etc/X11/org
   ```

   Following is a sample of the changes for `backingstore` and `SaveUnders`:

   ```
   Section “Device”
   Identifier “Videocard0”
   Driver “nvidia”
   #added to fix menu glitches
   Option “backingstore” “true”
   Option “SaveUnders” “on”
   EndSection
   ```

4. Reboot the system as root (`sudo reboot`).

Some menus display with shifts when I use multiple monitors. What should I do?

Answer: Multiple monitors are supported, and two monitors are recommended for the physical design tools, Allegro X PCB Editor and Advanced Package Designer. However, if you have multiple monitors with different resolution or settings, you might see menu shifts or pop-up menus on right-click appearing in a different monitor.

To avoid menu shift:

- Make one of the high-resolution monitors the primary display. For example, avoid setting the laptop screen as the primary display.
- Do not move the application from one display to another with differing resolutions/font scaling settings.
- Start the application on the monitor it is intended to be used