

How to Install NVIDIA Drivers on Debian

Introduction

NVIDIA [GPUs \(Graphics Processing Units\)](#) have various uses, including gaming, 3D rendering, cryptocurrency mining, [deep learning](#), and [machine learning](#). Keeping the drivers for these GPUs up to date ensures your system performs at peak efficiency.

In this tutorial, we will guide you through the NVIDIA driver installation process on Debian.



Prerequisites

- A system running Debian (the guide uses Debian 12 Bookworm).
- An [account with sudo privileges](#).
- Access to the terminal window.
- (Optional) Access to a [web browser](#).

Note: If you are working on an older machine, use the **nvidia-detect** tool to determine the appropriate driver version. Install it with `sudo apt nvidia-detect` and run `nvidia-detect` as a command to determine the appropriate driver version.

Install NVIDIA Drivers Via Debian Repository

The first method focuses on installing NVIDIA drivers from the Debian [repositories](#). NVIDIA recommends using this method for [Linux](#) systems due to improved interactions.

Follow the steps below to install the drivers via the Debian repository.

Step 1: Enable Non-Free Repositories

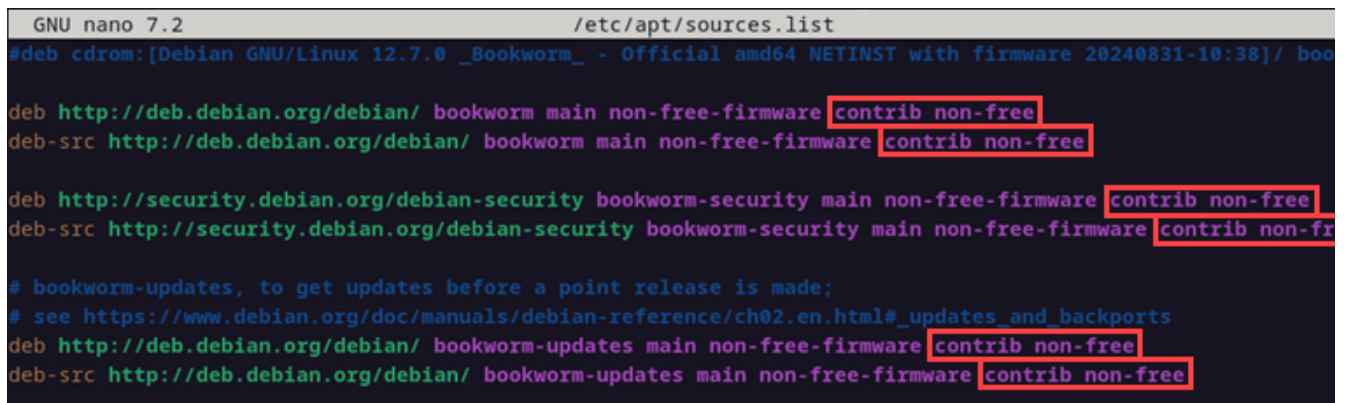
Adjust the [APT](#) sources list to include non-free repositories before installing. To enable them, do the following in the terminal:

1. Open the APT sources list [file](#) using a [text editor](#):

```
sudo nano /etc/apt/sources.list
```

2. Add the **contrib** and **non-free** repositories to the sources list links. For example:

```
deb http://deb.debian.org/debian/ bullseye main contrib non-free
```



```
GNU nano 7.2 /etc/apt/sources.list
#deb cdrom:[Debian GNU/Linux 12.7.0 _Bookworm_ - Official amd64 NETINST with firmware 20240831-10:38]/ boo
deb http://deb.debian.org/debian/ bookworm main non-free-firmware contrib non-free
deb-src http://deb.debian.org/debian/ bookworm main non-free-firmware contrib non-free
deb http://security.debian.org/debian-security bookworm-security main non-free-firmware contrib non-free
deb-src http://security.debian.org/debian-security bookworm-security main non-free-firmware contrib non-fr
# bookworm-updates, to get updates before a point release is made;
# see https://www.debian.org/doc/manuals/debian-reference/ch02.en.html#_updates_and_backports
deb http://deb.debian.org/debian/ bookworm-updates main non-free-firmware contrib non-free
deb-src http://deb.debian.org/debian/ bookworm-updates main non-free-firmware contrib non-free
```

Enabling the repositories gives access to [proprietary](#) drivers that are not [open source](#), including NVIDIA drivers.

3. Press **Ctrl+X**, **Y**, and **Enter** to save changes and exit the [configuration file](#).

4. Update the system repository index:

```
sudo apt update
```

The update ensures the newest data from the added repositories is available.

Step 2: Install NVIDIA Drivers

To install the driver, see the steps below:

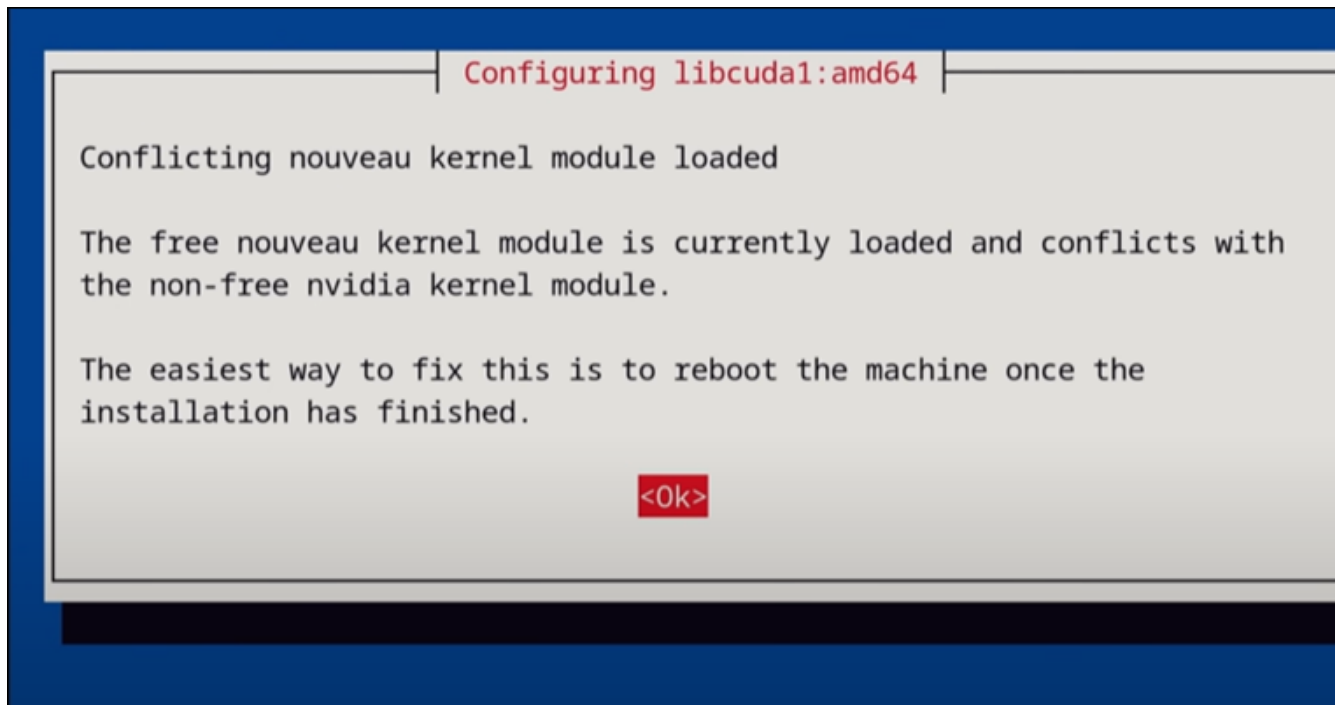
1. Run the following [apt command](#) to install the driver:

```
sudo apt install nvidia-driver
```

```
kb@phoenixNAP:~$ sudo apt install nvidia-driver
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu
  build-essential dkms dpkg-dev fakeroot firmware-nvidia-gsp g++
  g++-12 gcc gcc-12 glx-alternative-mesa glx-alternative-nvidia
  glx-diversions libalgorithm-diff-perl libalgorithm-diff-xs-perl
  libalgorithm-merge-perl libasan8 libbinutils libc-dev-bin
  libc-devtools libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0
  libctf0 libcuda1 libdpkg-perl libegl-nvidia0 libfakeroot
  libfile-fcntllock-perl libgcc-12-dev libgl1-nvidia-glvnd-glx
  libgles-nvidia1 libgles-nvidia2 libgles1 libglx-nvidia0
  libgprofng0 libitm1 liblsan0 libnsl-dev libnvcuvid1
  libnvidia-allocator1 libnvidia-cfg1 libnvidia-egl-gbm1
  libnvidia-egl-wayland1 libnvidia-eglcore libnvidia-encode1
```

The command also installs necessary [dependencies](#). Press **y** and **Enter** to confirm the installation.

2. If the system prompts that there is a conflicting driver, a restart after the installation resolves the issue.



Press **Enter** to confirm and continue the installation.

3. Once the installation completes, [reboot your system](#) with:

```
sudo reboot
```

The driver loads immediately after reboot.

Install NVIDIA Drivers Via Official nvidia.com Package

This method lets you manually download and install an NVIDIA driver package from the official [website](#).

Step 1: Download Drivers

To download the NVIDIA driver installer, do the following:

1. Navigate to the [Unix driver archive](#) in a web browser and find the appropriate driver version download link. The latest production version is compatible with all modern NVIDIA GPUs.

The screenshot shows the NVIDIA website's 'Drivers' section. At the top, there's a navigation bar with 'Shop', 'Drivers', and 'Support'. Below it, a 'Drivers' dropdown menu is open, showing 'All Drivers', 'GeForce Drivers', and 'Networking Drivers'. The main heading is 'Unix Driver Archive'. Underneath, there's a section titled 'RELEVANT LINKS' with a link 'What's a legacy driver?'. To the right, under the heading 'Linux x86_64/AMD64/EM64T', a list of driver versions is shown. A red arrow points to the 'Latest Production Branch Version: 550.127.05'.

RELEVANT LINKS
[What's a legacy driver?](#)

Linux x86_64/AMD64/EM64T
Latest Production Branch Version: [550.127.05](#)
Latest New Feature Branch Version: [560.35.03](#)
Latest Beta Version: [565.57.01](#)
Latest Legacy GPU version (470.xx series): [470.256.02](#)
Latest Legacy GPU version (470.xx series): [470.256.02](#)
Latest Legacy GPU version (390.xx series): [390.157](#)
Latest Legacy GPU version (340.xx series): [340.108](#)
Latest Legacy GPU version (304.xx series): [304.137](#)
Latest Legacy GPU Version (71.86.xx series): [71.86.15](#)
Latest Legacy GPU Version (96.43.xx series): [96.43.23](#)

Click the version number to access the downloads page.

2. Click the **Download** button and save the file.

The screenshot shows the NVIDIA website's 'Drivers' section for the 'Linux x64 (AMD64/EM64T) Display Driver 550.127.05 | Linux 64-bit'. The page has a navigation bar with 'Shop', 'Drivers', and 'Support'. Below it, a 'Drivers' dropdown menu is open, showing 'All Drivers', 'GeForce Drivers', and 'Networking Drivers'. The main heading is 'Linux x64 (AMD64/EM64T) Display Driver 550.127.05 | Linux 64-bit'. Below the heading, there's a breadcrumb trail: 'Drivers Home > Linux x64 (AMD64/EM64T) Display Driver'. A table lists the driver details: 'Driver Version: 550.127.05', 'Release Date: Tue Oct 22, 2024', 'Operating System: Linux 64-bit', 'Language: English (US)', and 'File Size: 307.14 MB'. To the right of the table, there's a disclaimer: 'By clicking the "Download" button, you are confirming that you have read and agree to be bound by the License For Customer Use of NVIDIA Software for use of the driver. The driver will begin downloading immediately after clicking on the "Download" button. NVIDIA recommends users update to the latest driver version.' A red arrow points to the 'Download' button. Below the table, there's a section titled 'Release Highlights' with a link to 'Supported Products' and 'Additional Information'. A 'Fixed a bug which could cause applications using GBM to crash when running with nvidia-drm.modeset=0.' is listed under 'Release Highlights'.

Linux x64 (AMD64/EM64T) Display Driver 550.127.05 | Linux 64-bit
Drivers Home > Linux x64 (AMD64/EM64T) Display Driver

Driver Version:	550.127.05
Release Date:	Tue Oct 22, 2024
Operating System:	Linux 64-bit
Language:	English (US)
File Size:	307.14 MB

By clicking the "Download" button, you are confirming that you have read and agree to be bound by the [License For Customer Use of NVIDIA Software](#) for use of the driver. The driver will begin downloading immediately after clicking on the "Download" button. NVIDIA recommends users update to the latest driver version.

Download

Release Highlights [Supported Products](#) [Additional Information](#)

> Fixed a bug which could cause applications using GBM to crash when running with nvidia-drm.modeset=0.

The file is in the `~/[username]/Downloads` [directory](#) of the currently logged-in user.

Step 2: Install Driver Prerequisites

Install the driver prerequisites. Run the following in the terminal:

```
sudo apt -y install linux-headers-$(uname -r) build-essential libglvnd-dev pkg-config
```

```
kb@phoenixNAP:~$ sudo apt -y install linux-headers-$(uname -r) build-essential
libglvnd-dev pkg-config
[sudo] password for kb:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu dpkg-dev
  fakeroot g++ g++-12 gcc gcc-12 libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan8
  libbinutils libc-dev-bin libc-devtools libc6-dev libcc1-0
  libcrypt-dev libctf-nobfd0 libctf0 libd/pkg-perl libegl-dev
  libfakeroot libfile-fcntllock-perl libgcc-12-dev libgl-dev
  libgles-dev libgles1 libglvnd-core-dev libglx-dev libgprofng0
```

The packages ensure that NVIDIA drivers compile successfully.

Step 3: Disable Default Drivers

Disable the default nouveau GPU driver:

1. Create and open a new configuration file using [nano](#):

```
sudo nano /etc/modprobe.d/blacklist-nouveau.conf
```

The configuration file is in the [kernel](#) module loading directory.

2. Add the following lines to the file:

```
blacklist nouveau
options nouveau modeset=0
```

```
GNU nano 7.2 /etc/modprobe.d/blacklist-nouveau.conf *
blacklist nouveau
options nouveau modeset=0
```

The file instructs the system to prevent the Nouveau kernel module from loading and disables the open-source driver.

3. Save the changes and exit. Press **Ctrl+X**, **Y**, and **Enter**.

4. Update the kernel **initramfs** with:

```
sudo update-initramfs -u
```

```
kb@phoenixNAP:~$ sudo update-initramfs -u
update-initramfs: Generating /boot/initrd.img-6.1.0-27-amd64
```

The rebuild takes several moments to complete. It ensures that essential drivers load and the root [filesystem](#) mounts early in the [boot](#) process. It ensures the changes apply after rebooting.

Step 4: Reboot to Multi-User Login

Since the default GPU drivers are now disabled, switching to a text-based interface lets you install NVIDIA drivers without using the [GUI](#).

1. Enable the text-based multi-user login prompt:

```
sudo systemctl set-default multi-user.target
```

```
kb@phoenixNAP:~$ sudo systemctl set-default multi-user.target
Created symlink /etc/systemd/system/default.target → /lib/systemd/system/multi-user.target.
```

The command creates a [symlink](#) and outputs the result.

2. Reboot the system with:

```
systemctl reboot
```

The system restarts into the terminal without a GUI.

Step 5: Install Nvidia Drivers

Once the system restarts, do the following:

1. Log in as *root*.

```
Debian GNU/Linux 12 phoenixNAP tty1

phoenixNAP login: root
Password:
Linux phoenixNAP 6.1.0-27-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.115-1 (2024-11-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

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permitted by applicable law.
root@phoenixNAP:~# _
```

2. Navigate to the directory where the driver file is downloaded:

```
cd /home/[username]/Downloads
```

3. Install the Nvidia drivers using the package you downloaded:

```
bash ./[driver file name]
```

For example:

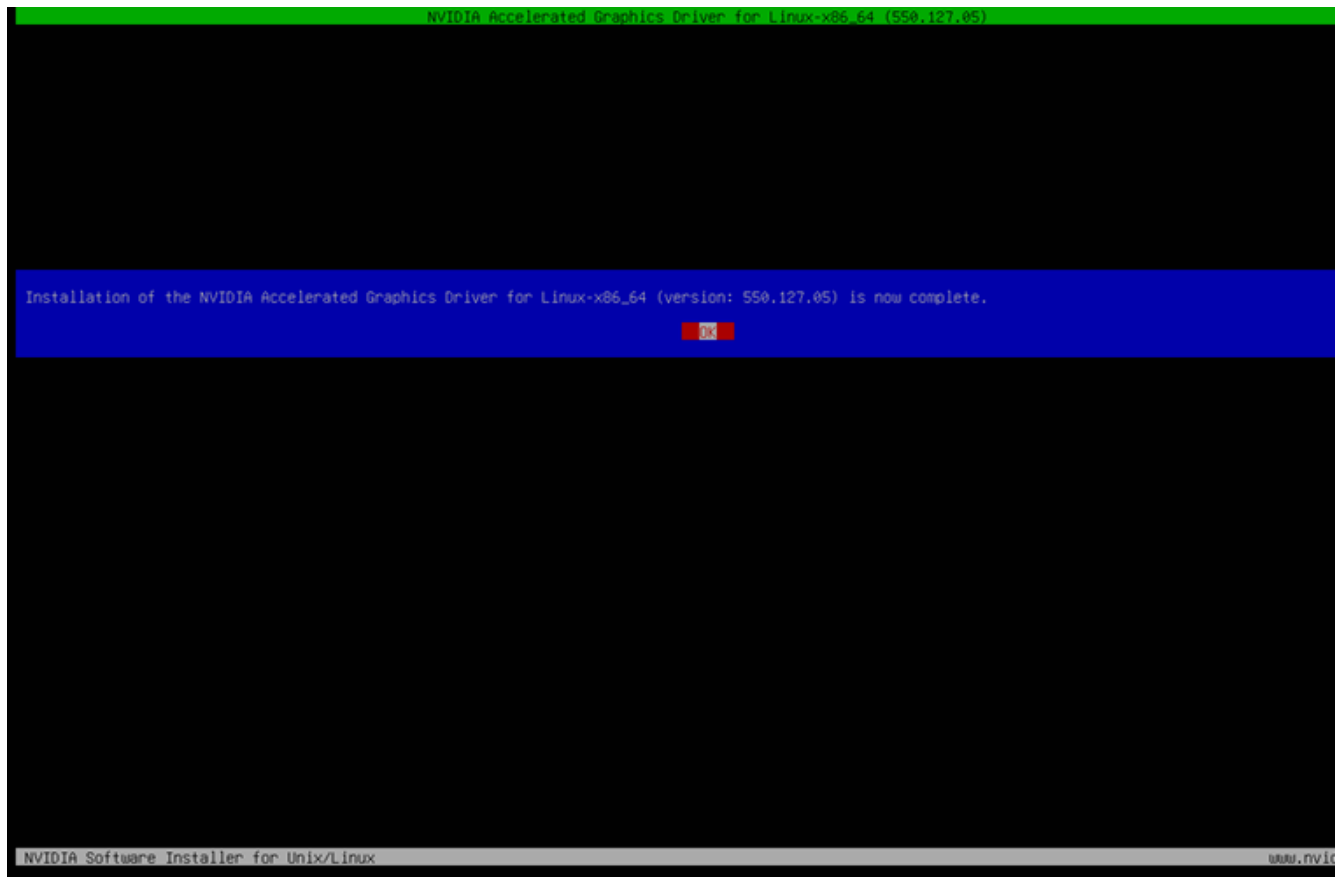
```
bash ./NVIDIA-Linux-x86_64-550.127.05.run
```

```
root@phoenixNAP:/home/kb/Downloads# bash ./NVIDIA-Linux-x86_64-550.127.05.run
Verifying archive integrity... OK
```

3. If prompted, choose the following options during the install process:

- *The CC version check failed:* **Ignore CC version check.**
- *Install NVIDIA's 32-bit compatibility libraries:* **Yes.**
- *Rebuild initramfs:* **Yes.**
- *An incomplete installation of libglvnd was found. Do you want to install a full copy of libglvnd? This will overwrite any existing libglvnd libraries:* **Install and overwrite existing filesort installation.**
- *Would you like to run the nvidia-xconfig utility to automatically update your X configuration file so that the NVIDIA X driver will be used when you restart X? Any pre-existing X configuration file will be backed up:* **Yes.**

4. Wait for the process to complete until it shows the installation was successful.



Press **Enter** to confirm and exit the installer. The prompt returns to the terminal.

Step 6: Enable GUI

Re-enable the GUI to complete the process and start up the new drivers:

1. Enable the GUI login prompt with:

```
systemctl set-default graphical.target
```

```
root@phoenixNAP:/home/kb/Downloads# systemctl set-default graphical.target
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /lib/systemd/system/graphic
```

2. Reboot your system to finish the installation:

```
reboot
```

The system starts up using the new driver.

Conclusion

This guide showed how to install the newest NVIDIA GPU drivers on Debian 12 using two different methods.

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Revision #2

Created 2025-01-06 21:57:15 UTC by willi

Updated 2025-05-13 17:08:04 UTC by willi