Digital Photogrammetric System

PHOTOMOD

Version 8.1

USER MANUAL

Linux preconfiguration and PHOTOMOD installation (Astra Linux 1.8)

RACURS

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1. General information

The current document describes the *PHOTOMOD* distribution that was developed for the interaction with the *Astra Linux 1.8* operating system.

A hallmark of *Linux* operating system is that performance features of its distributions may differ significantly from each other.

Accordingly, for the different *Linux* distributions (and for the appropriate *PHOTOMOD* distributions too), the certain operations may not be required (or they may be performed in different ways, depending on the particular distribution).

This manual is intended for a qualified system manager who has full knowledge of current *Linux* distributions installed on particular workstations.

Configuring a *Linux* distribution and further *PHOTOMOD* installation requires administrator privileges.

Preliminary configurations of the operating system, user accounts, and parameters of the file system are strongly recommended to be performed *before* installing *PHOTOMOD*.

Before configuring the operating system, make sure that secure remote connection to your computer via the SSH protocol is available.

Remote connection allows you to fix errors that may occur when installing third-party software (for example, video card drivers required for working in stereo mode; see Section 2.3) without having to reinstall the operating system.

As a rule, advanced customization of operating system parameters concerns issues of the following functional capabilities:

- Installing *PHOTOMOD*;
- Using a hardware key;
- Network mode;
- Stereo mode;
- Distributed processing mode;
- Increasing the system performance through graphic processing unit (GPU) resources.

After making changes to the operating system parameters, the restart of the operating system is strongly recommended. It is necessary to take into account that restarting the operating system may require remounting the connected devices (see Section 2.2.1).

Detailed information about the features of the *Astra Linux 1.8* operating system can be found in the appropriate User Manual.

2. Linux pre-configuration

2.1. Preparing for work

2.1.1. Connecting repositories

The need to pre-connect the required repositories depends on the features of the *Linux* distribution used.

The distribution you are using must be able to install and update packages using the standard package installer, the **apt** command-line tool.

In case of *Astra Linux 1.8*, to ensure correct operation of *PHOTOMOD*, it is *necessary* to connect the following repositories:

- Main repository (`main`);
- Extended repository (`extended`).

Connection of repositories is described in detail, for example, in “Astra Linux Special Edition x.8 Internet repositories” in the *Astra Linux* User Manual.

2.2. Network mode provisioning

2.2.1. Mounting a file system

For data management, it’s necessary to consider the feature of *Linux* that hard drive partitions, USB drives, network drives, and other data carriers connected to the workstations are to be *mounted*.

Mounting a file system is a system process to prepare a disk partition for the operating system. As the case may be, this operation can be performed either manually or automatically.

Data stored on a *connected* but not *mounted* device will not be accessible.

Re-mounting of a connected device may be required, for example, after an operating system reset.

Mounting shared SMB resources

When organizing joint networks between *Windows* and *Linux* systems, the latter provide the ability to mount shared SMB resources directly to the file system.

The *cifs-utils* package is used for this.

If such storages are used to place processed data, then, to ensure correct *PHOTOMOD* operation, the following additional parameters must be used when mounting them:

- `actimeo=0`
- `closetimeo=0`

2.3. Video adapter setup

To work in stereo mode, the workstation must be equipped with a stereoscopic displays and a specialized video card.

Fig. 1. StereoMirror monitor

Preparation for work in stereo mode involves installing and configuring video card drivers for a StereoMirror monitor.

The need to perform these actions is due to the fact that most *Linux* distributions involve the use of *Nouveau* drivers for *NVidia* video cards, which are not suitable for the stereo processing and increasing the system performance through graphic processing unit resources.

In general, this process includes the following steps:

1. Checking what model of the *NVidia* video card is installed on the workstation;
2. Searching, loading, and installing video card drivers;

   The methods for installing drivers may vary significantly depending on the *Linux* distribution used.

3. Creating the restriction rule for the *Nouveau* drivers usage;
4. Restarting the system;
5. Checking what display protocol is used by the Linux distribution (*Wayland* or *Xorg*).

   The *Wayland* display protocol does not provide for fine-tuning *NVidia* video card drivers; see Item **6** below.

6. [optional] Switch to the *Xorg* (*X11*) display protocol, and restart the system if necessary.

   The methods for switching between graphical interface display protocols may vary depending on the *Linux* distribution used.

7. Monitor setup;
8. Setting up video card drivers, optionally, manual editing and saving the */etc/X11/xorg.conf* file
9. Restarting the system.

2.3.1. Checking the video card model

If there is no information about the particular model of the *NVidia* video card installed on the workstation, it is recommended to use the *nvidia-detect* package (first make sure that the *nvidia-detect* package is installed and running on this workstation).

To display information about the *NVidia* video card installed on the workstation in the console, run the following command from the console:

```
nvidia-detect
```

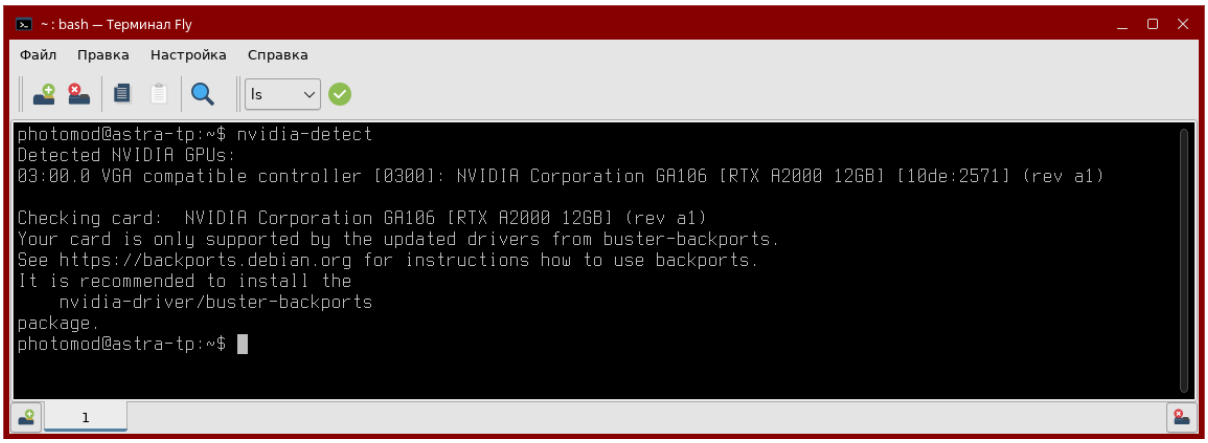

Fig. 2. The Terminal window, displaying NVidia video card info using the nvidia-detect package

2.3.2. Loading and installing video card drivers

To perform search for the available *NVidia* drivers, run the following command from the console:

```
apt search nvidia
```

To install *NVidia* drivers, run the following command from the console:

```
apt install <driver_name>
```

Wait until the operation is complete. Restart the workstation after driver installation.

Installation of *NVidia* drivers for *Astra Linux 1.8* is described in detail in “Nvidia Video Card Drivers for Astra Linux on x86-64 Platform” of the *Astra Linux* operating system User Manual.

2.3.3. Creating the restriction rule for the “Nouveau” drivers usage

To create the restriction rule for the *Nouveau* drivers usage, add to the */etc/modprobe.d/blacklist.conf* file the following strings:

```
blacklist nouveau

options nouveau modeset=0
```

Restart the workstation.

2.3.4. Checking a user interface display protocol

The *Wayland* graphical interface display protocol does not provide for fine-tuning *NVidia* video card drivers. Accordingly, before installing and configuring drivers, ensure that the system uses the *Xorg* (*X11*) user interface display protocol.

For this, you first need to know the identifier (id) of the current user session. To do this, run the command from the console:

```
loginctl list-sessions
```

The **Terminal** (console) window displays information about all current sessions. The session ID is displayed at the beginning of the line (entry) about a particular session.

Knowing the identifier of the current session, the user has the ability to obtain detailed information about it (including information about the display protocol).

To display information about the user interface display protocol, run the command from the console:

```
loginctl show-session <session_id> -p Type
```

For example:

```
loginctl show-session 3 -p Type
```

The **Terminal** (console) window displays information about the protocol, for example:

`Type=x11` or `Type=wayland`

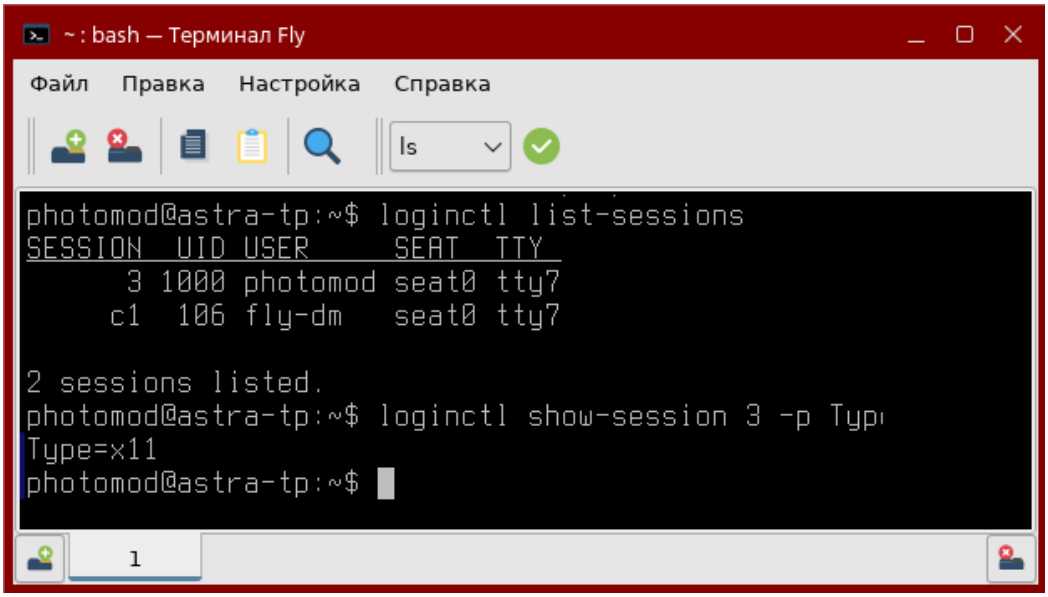

Fig. 3. The Terminal window. The top part shows information about two active sessions. Below is the requested information about a particular session

If necessary, switch to the *Xorg* (*X11*) display protocol and restart the system.

The methods for switching between graphical interface display protocols may vary depending on the *Linux* distribution used.

2.3.5. Monitor setup

To preconfigure monitor operation parameters, perform the following:

1. **Right-click** the desktop. The context menu opens:

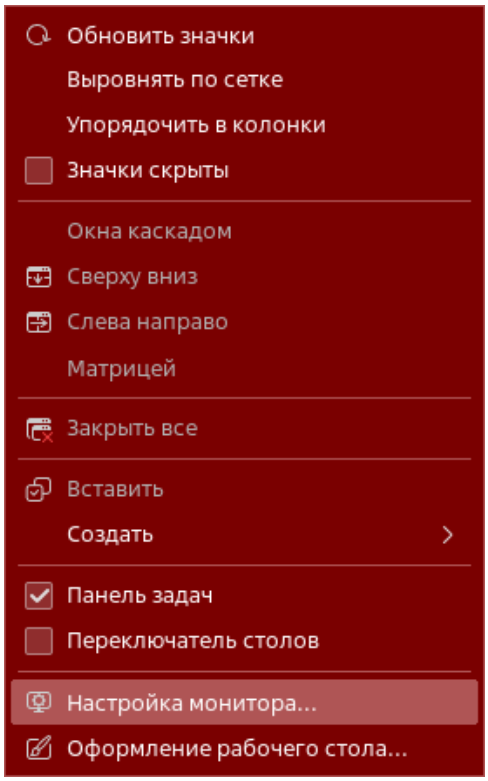

Fig. 4. The context menu

2. Choose **Monitor Setup**. The **Monitor Setup** window opens:

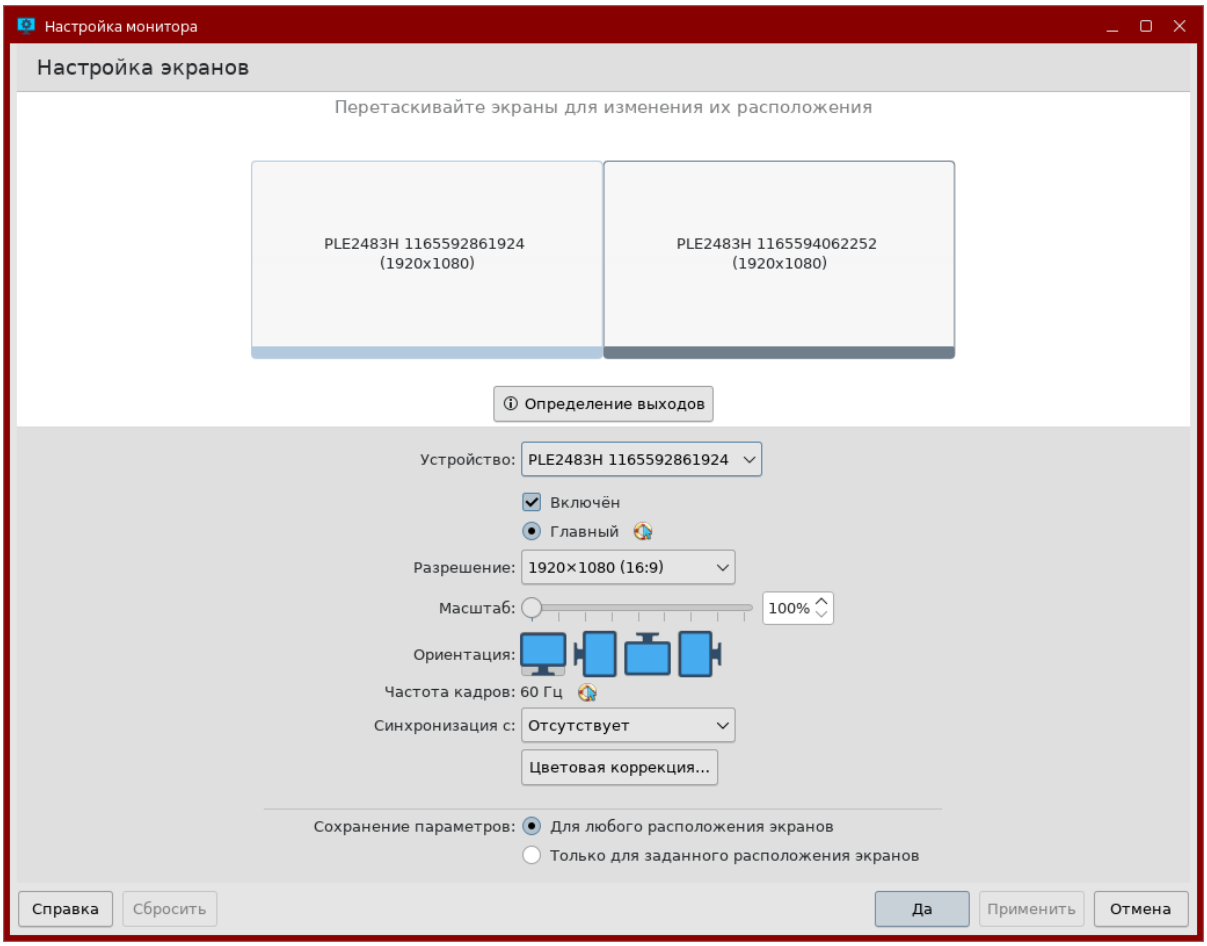

Fig. 5. The Monitor Setup window

3. In **Display Settings**, **left-click** to select one of the icons representing a display. While holding down the **left mouse button** and moving the mouse cursor, completely align the selected icon with the adjacent one (or use the **Sync With** drop-down list).

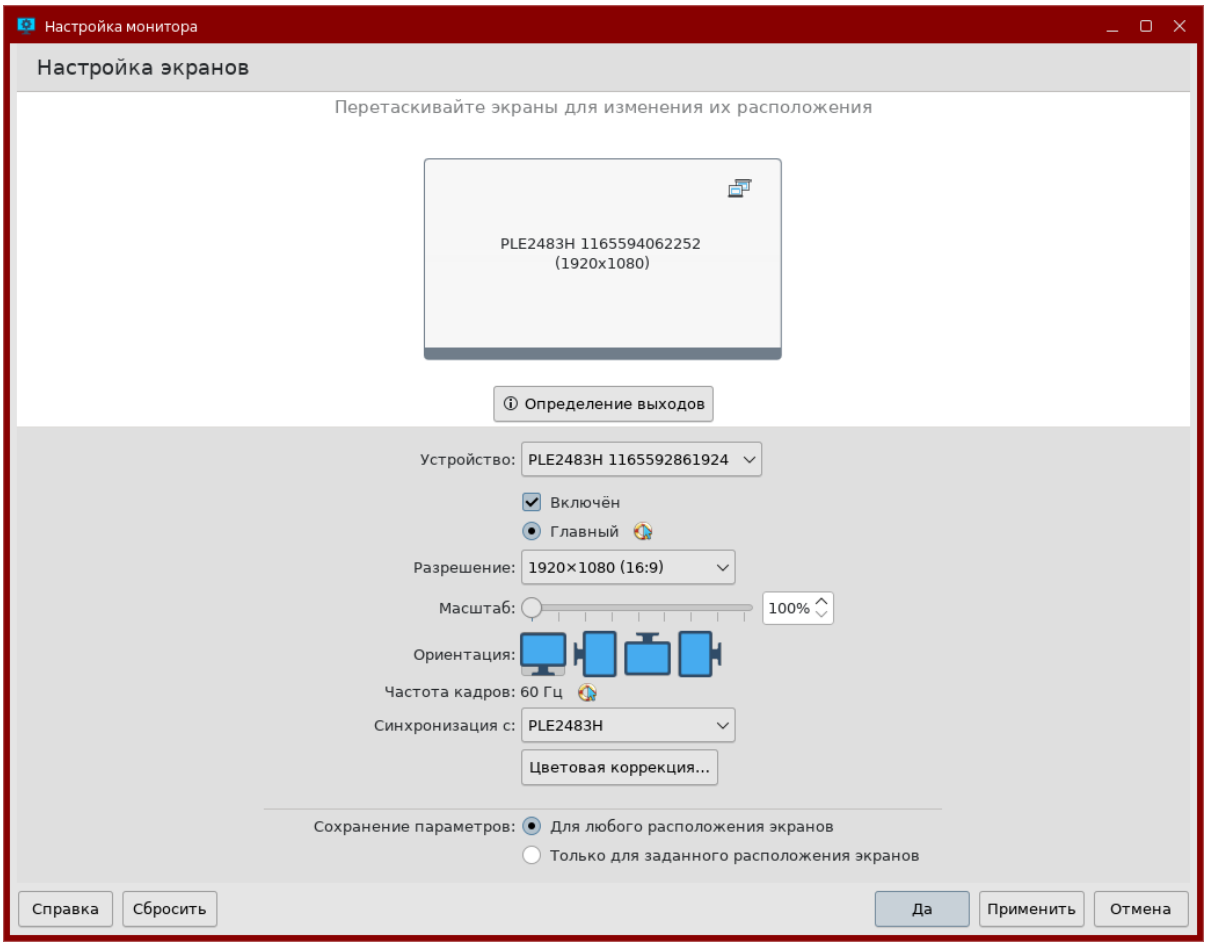

Fig. 6. The Monitor Setup window

4. Click **Apply** and close the **Monitor Setup** window after saving the settings.

2.3.6. Configuring a video card driver for a StereoMirror monitor

To configure *NVidia* video card drivers for a StereoMirror monitor, perform the following:

1. Choose **Start › System › NVIDIA X Server Settings**. The **NVIDIA Settings** window opens. Open the **X Server Display Configuration** tab:

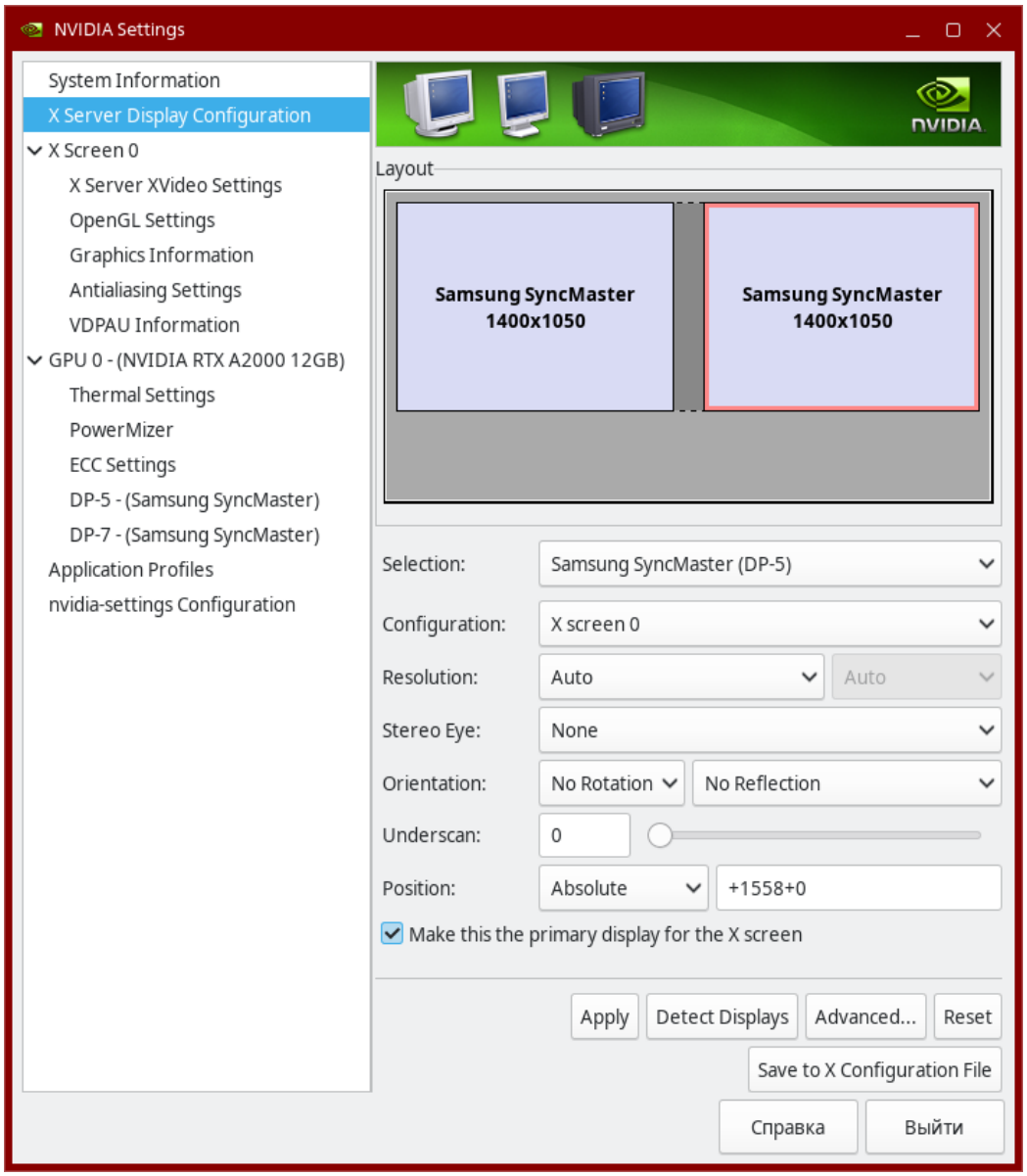

Fig. 7. The NVIDIA Settings window

2. [optional] If necessary, in the **Layout** section, **left-click** to select one of the icons representing the display. Hold down the **left mouse button** and move the mouse cursor until the selected icon is completely aligned with the adjacent one (see Section 2.3.5).

   Click **Apply**.

   Skip this step if display icons have already been aligned.

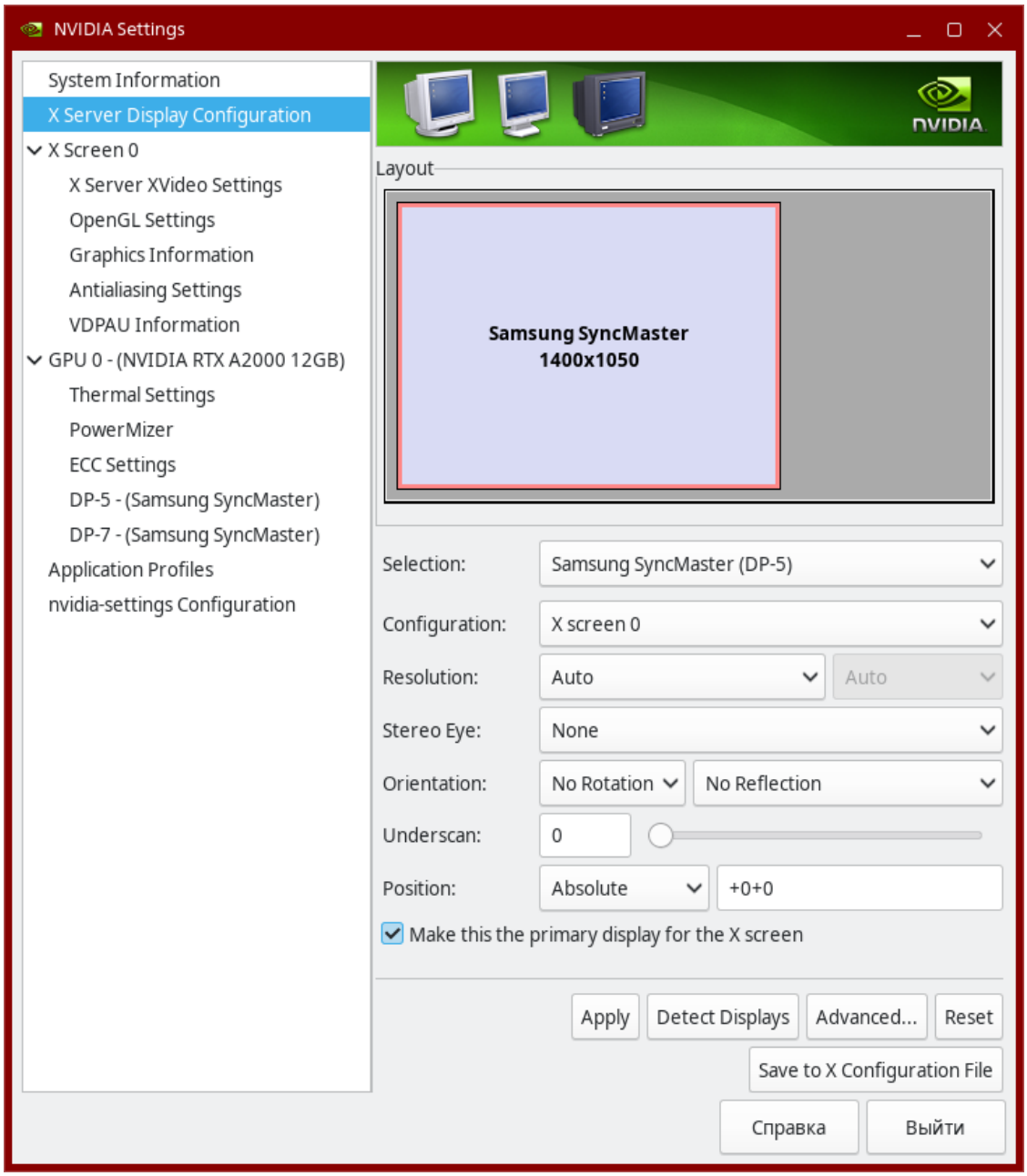

Fig. 8. The NVIDIA Settings window

3. In the **Selection** drop-down list, choose **X screen 0**. In the **Stereo Mode** drop-down list that appears, choose **Passive One-Eye-per-Display**.

   Click **Apply**.

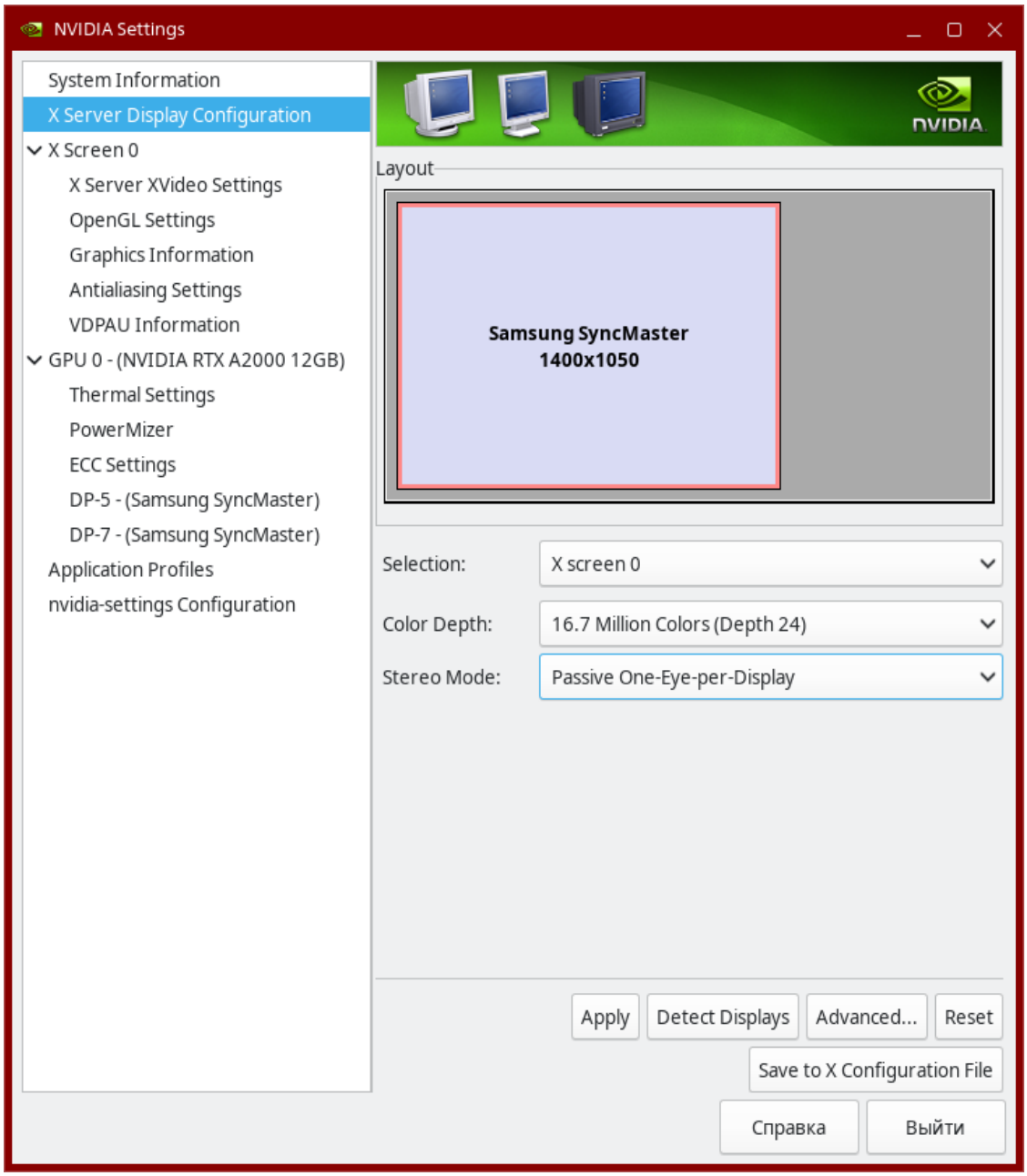

Fig. 9. The NVIDIA Settings window

4. [optional] In the **Cannot Apply** window, click **Apply what is possible**.

Changes made to the settings will only be applied after saving the */etc/X11/xorg.conf* file and restarting the system.

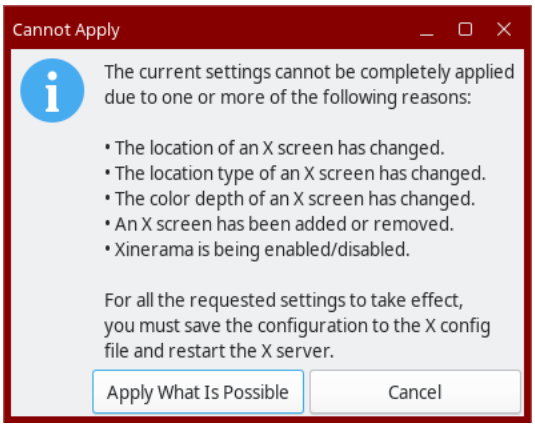

Fig. 10. The Cannot Apply window

5. Click **Save to X Configuration File**. The **Save X Configuration** window opens:

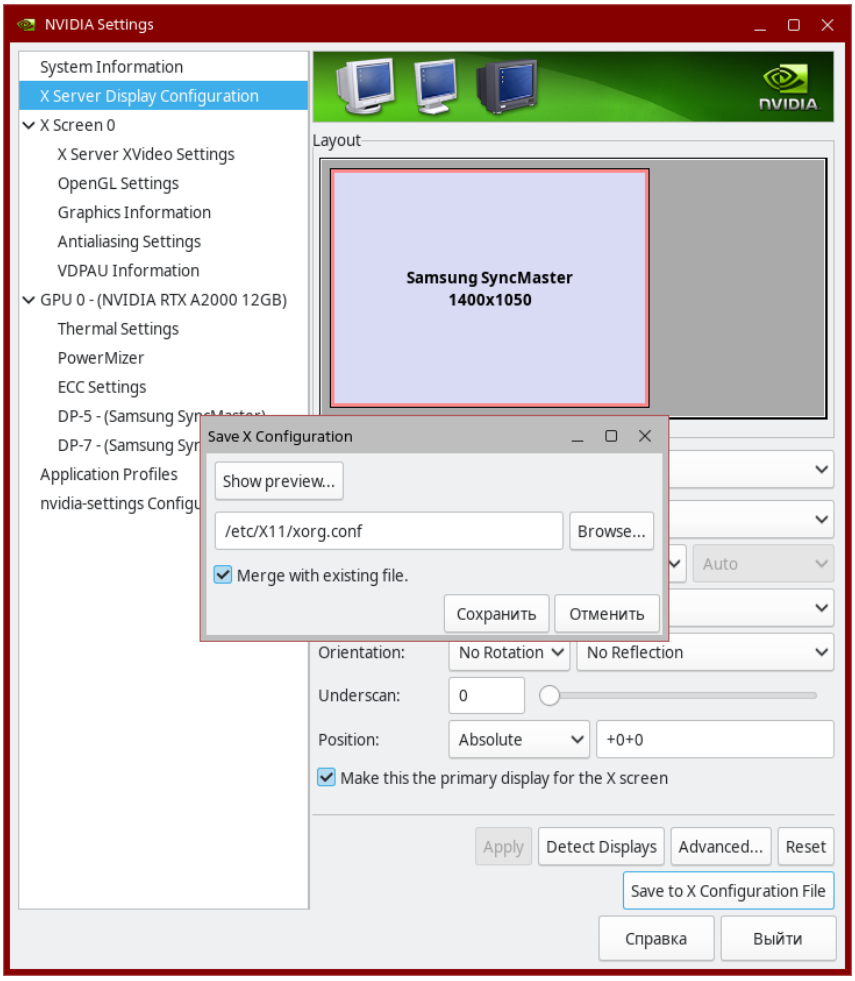

Fig. 11. The Save X Configuration window

6. In the **Save X Configuration** window, click **Show preview...**. If necessary, “stretch” the transformed window to correctly display the text of the saved file */etc/X11/xorg.conf*.

   Move to the end of the displayed text using the appropriate slider or **mouse wheel**. Make sure that the file contains the following final lines:

   ```
   Section "Extensions"

   Option "Composite" "Disable"

   EndSection
   ```

   If necessary, include these lines manually.

   

   In some cases, disabled **Composite** extension in *Debian-based Linux* distributions may case somewhat incorrect operation of *GNOME 3*-based desktop environments (e.g. such as *Cinnamon*). This may include additional graphical window effects such as shadows, transparency, rounded corners, etc.

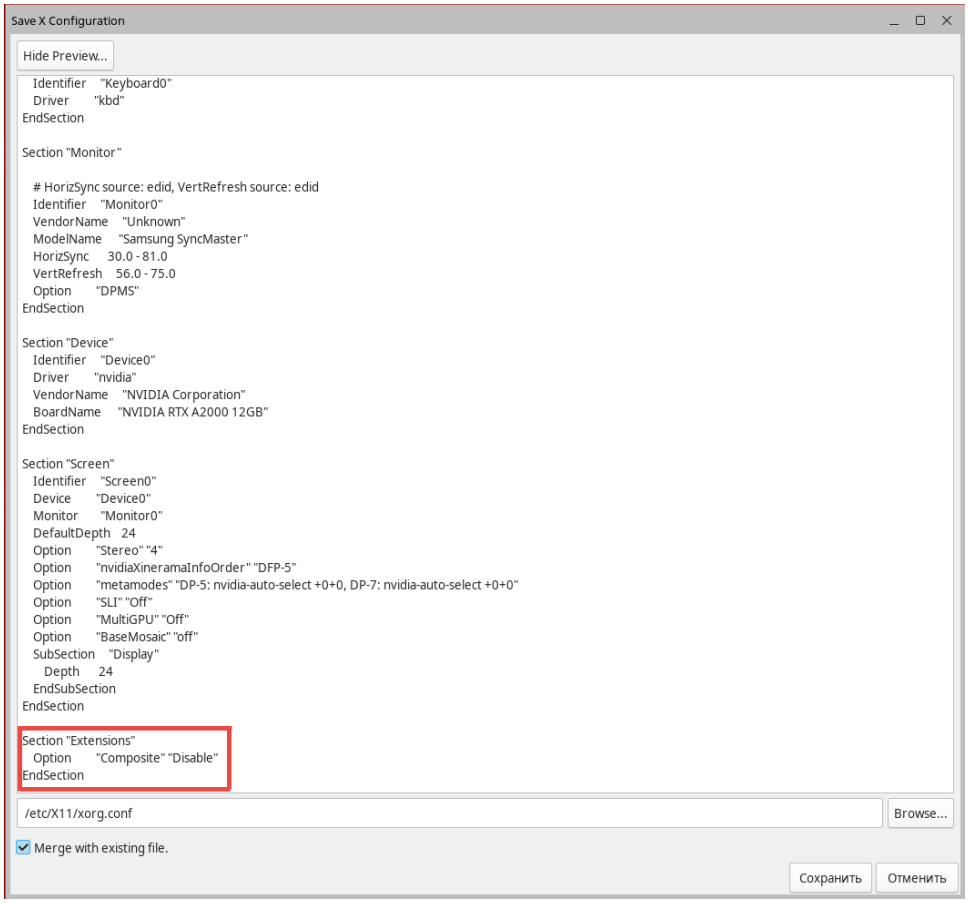

Fig. 12. The Save X Configuration window

7. Save file. This may require confirmation of administrator privileges.

Fig. 13. The Authentication required window

Depending on the *Linux* distribution you are using, the ability to save the */etc/X11/xorg.conf* file directly from the **NVIDIA Settings** window may be limited. This situation is discussed in detail in a special subsection below.

8. Restart the workstation;

9. After restarting the workstation, open the **NVIDIA Settings** window again choosing **Start › System › NVIDIA X Server Settings**. Open the **X Screen 0** tab. Make sure you see the stereo effect in the dark gray box displayed at the bottom of the window (when viewing through the “mirror” on a mirror stereo monitor).

   The top left of the box should display a red **LEFT** caption, and the top right of the field should display a blue **RIGHT** caption.

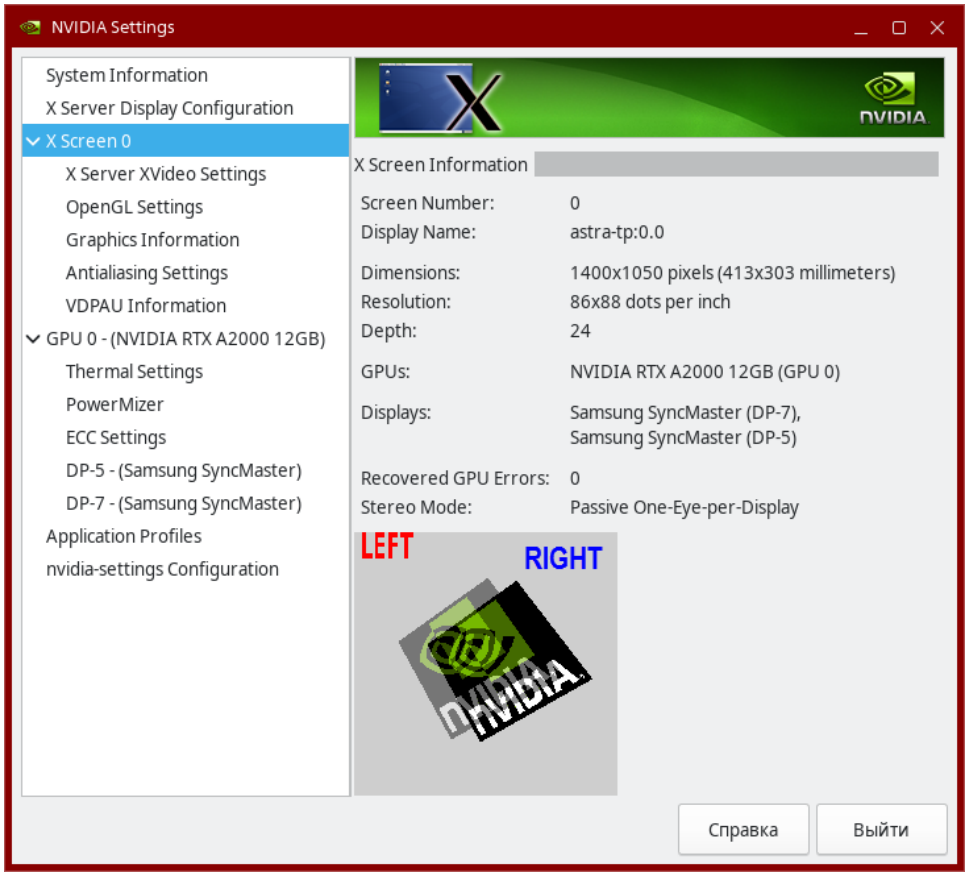

Fig. 14. The NVIDIA Settings window

Manual saving the “/etc/X11/xorg.conf” file

Depending on the *Linux* distribution you are using, saving the */etc/X11/xorg.conf* file directly in the **NVIDIA Settings** window may be limited. In this case, after configuring all the required settings described above, in the extended version of the **Save X Configuration** window, select the whole text of the *xorg.conf* file to be saved.

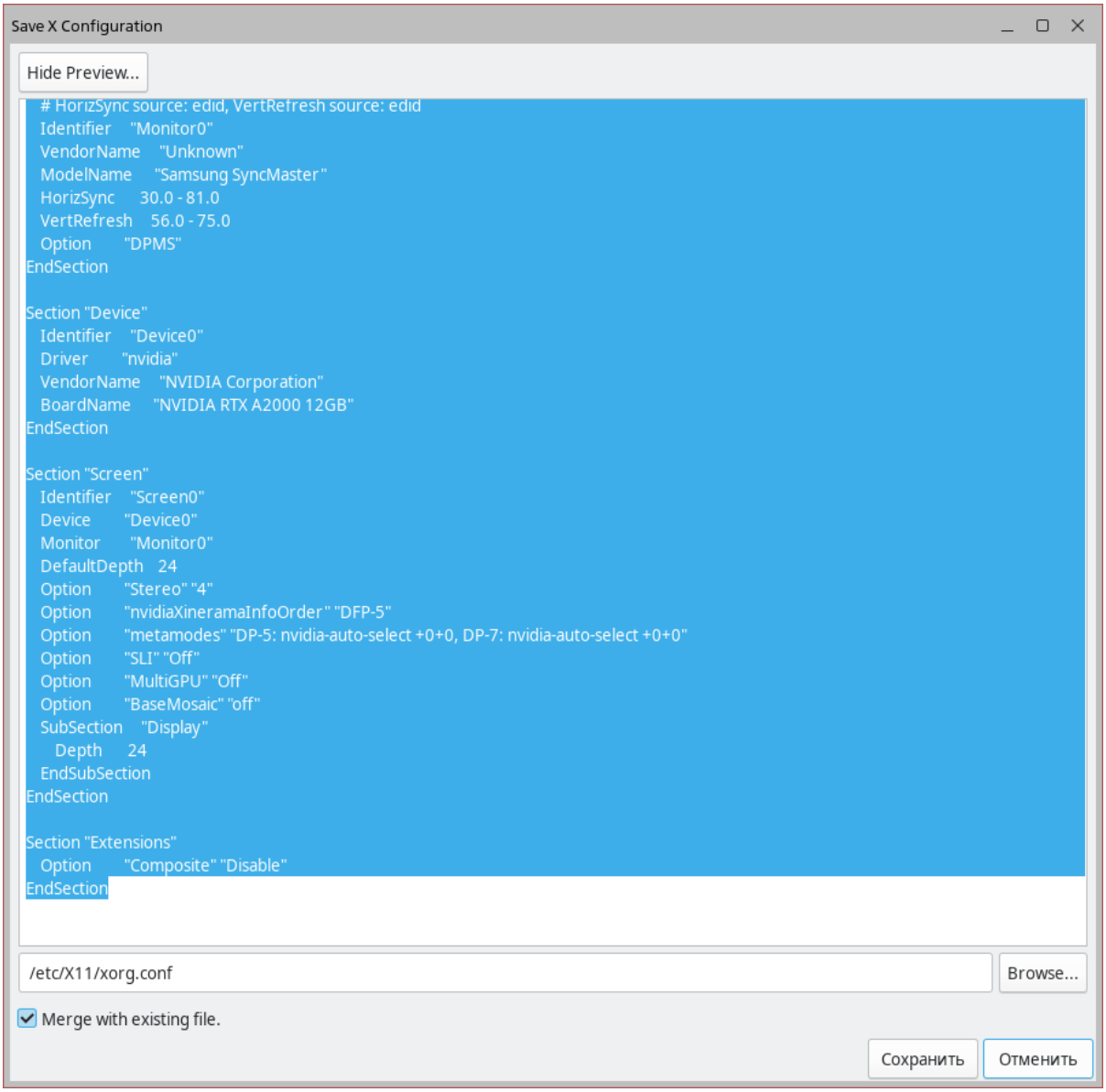

Fig. 15. The Save X Configuration window

Create an empty text file, copy the selected text into it and save this file in a folder accessible within the current session. Rename this file to *xorg.conf*. Move this file to the */etc/X11/* folder using administrator privileges. Restart the workstation.

3. System installation

3.1. Distribution kit

License software distribute in a branded box. The company name is place on the front. On the reverse side are placed address, technical support service phone and e-mail, web-site of company.

The system distribution kit includes:

- CD-ROM containing the system setup files, hardware lock key drivers, `PhConsts50.dll` file and the documentation files in PDF format;
- ’System installation Manual;
- Hardware lock key (see the “Protection of the system” chapter in “General information” User Manual).

3.2. Security hardlock key drivers installation

The last version of security key drivers could be downloaded here.

To do this, perform the following:

1. Launch a **Terminal** window;
2. In **Terminal** window move to the folder containing security key drivers installation file;

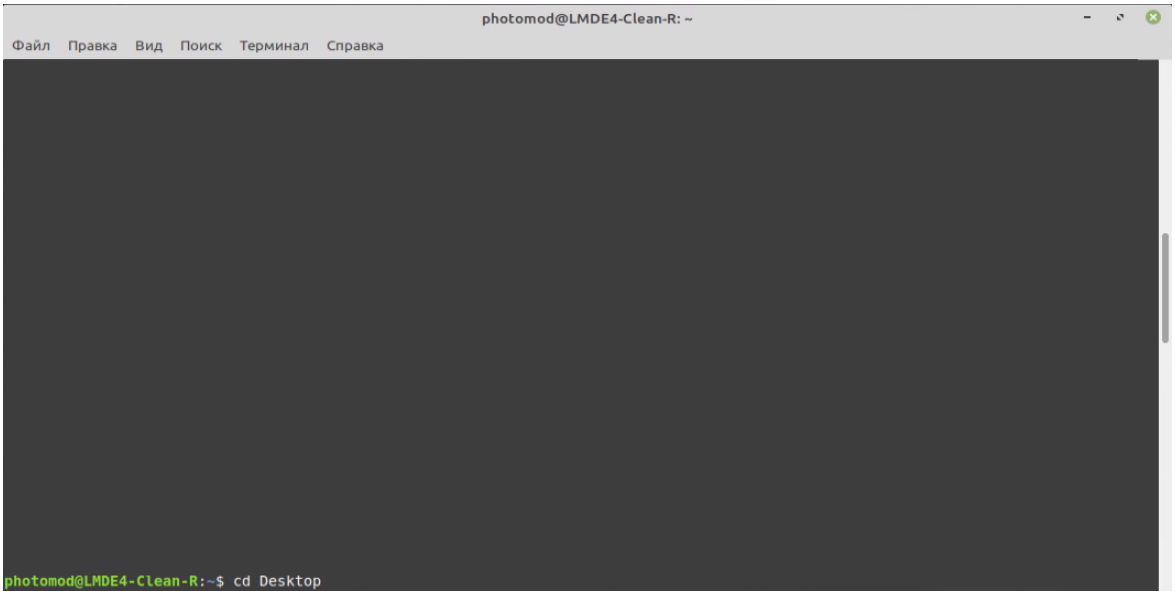

Fig. 16. The Terminal window

3. Type the installation command in the **Terminal** prompt, for example:

   ```
   sudo apt install ./aksusbd_9.15-1_amd64.deb
   ```

   Press **Enter** to execute it.

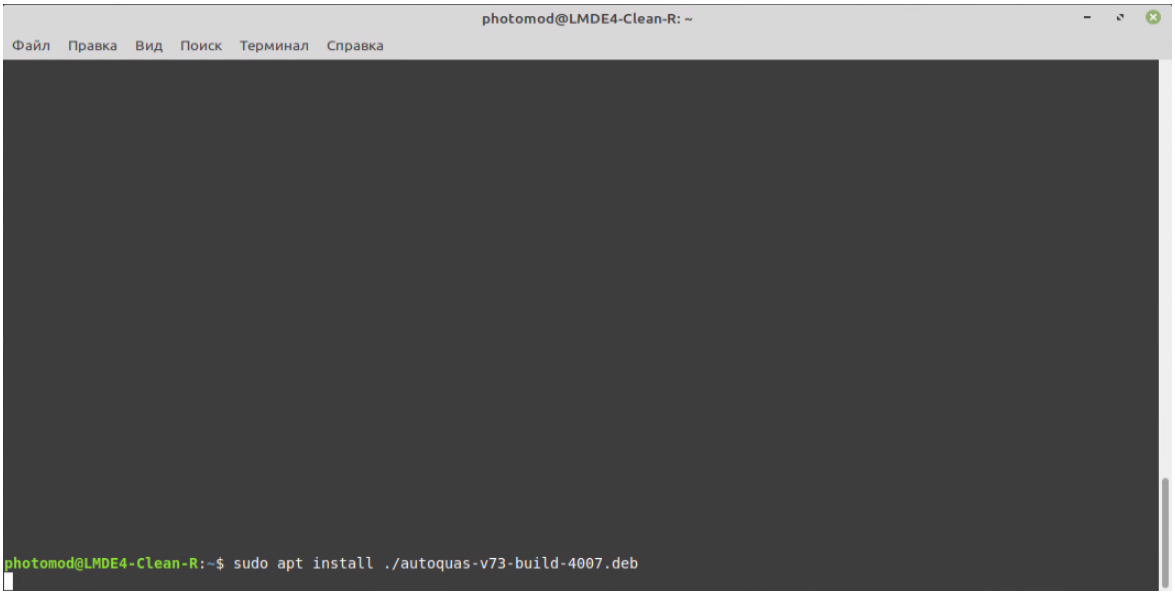

Fig. 17. The Terminal window

4. [optional] Confirm your action by entering your account password:

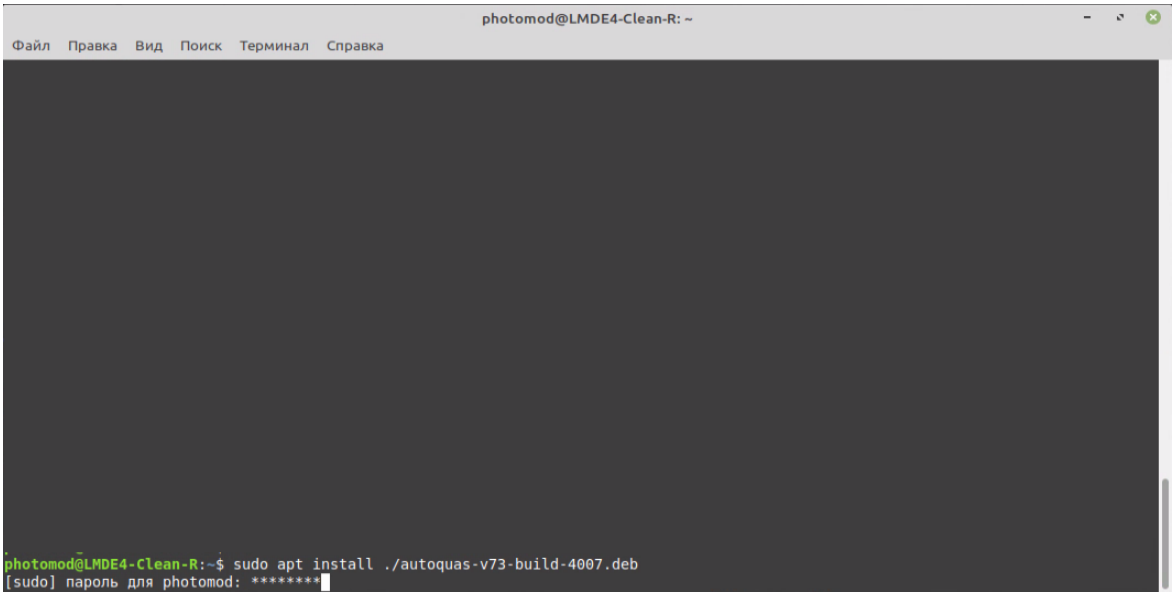

Fig. 18. The Terminal window

5. Wait until operation is completed.

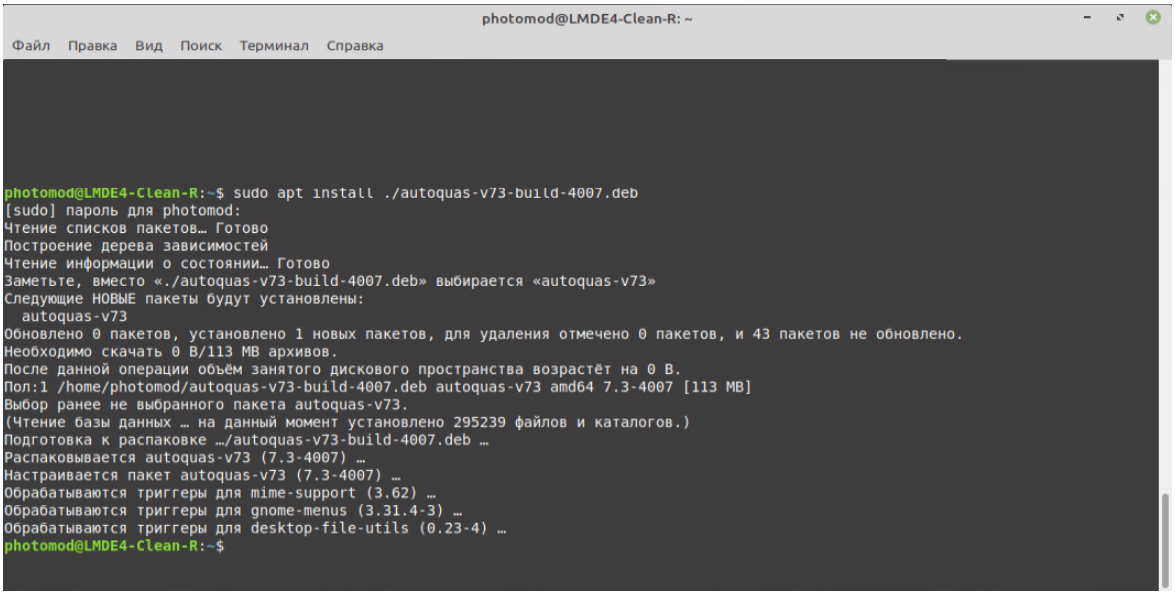

Fig. 19. The Terminal window

3.3. PHOTOMOD installation

Prior to the system installation it is desirable to insert *Sentinel HL* security key into the USB-socket of the workstation (see the “Protection of the system$QUOTE$"chapter in “General information” User Manual).

Administrator privileges are required to install *PHOTOMOD*.

The *PHOTOMOD* program requires 64 bit operating system.

To search the pre-installed *Racurs* software, run `apt search photomod` from the console.

To install *PHOTOMOD* perform the following:

1. [optional] Close all modules of the *PHOTOMOD* system, installed before (if exist);
2. Launch a **Terminal** window;
3. In **Terminal** window move to the folder containing *PHOTOMOD* installation file (`net-vNN-build-CCCC.deb`, where **N** is the version number, **CCCC** is the build number);

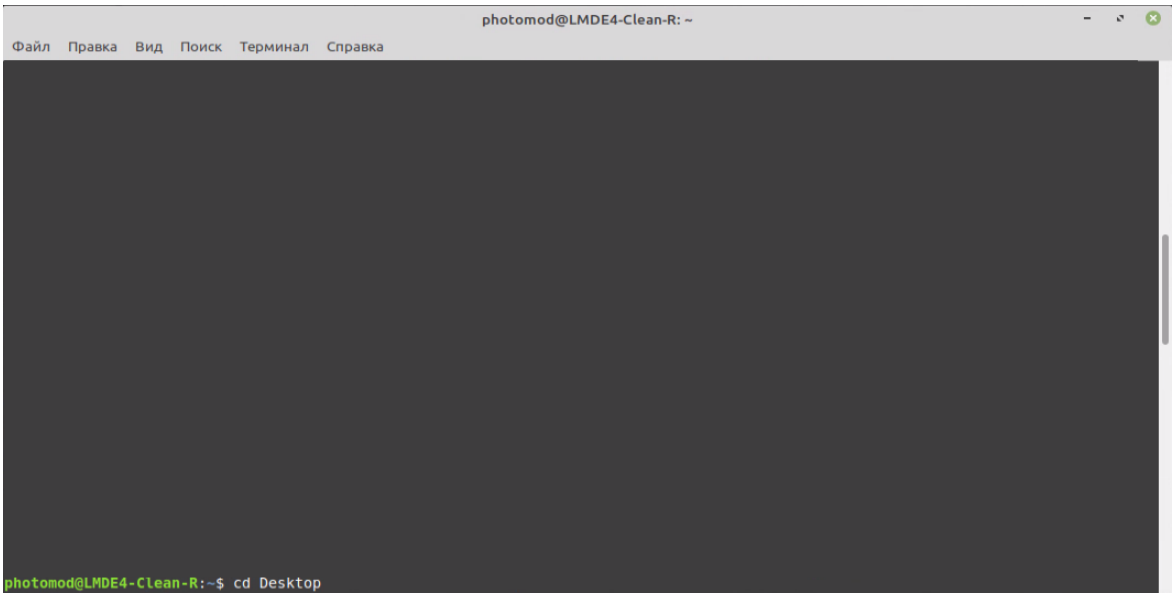

Fig. 20. The Terminal window

4. Type the following command in the **Terminal** prompt:

   `sudo apt install ./net-vNN-build-CCCC.deb`

   where **N** is the version number, **CCCC** is the build number. For example:

   `sudo apt install ./net-v80-build-4007.deb`

   Press **Enter** to execute it.

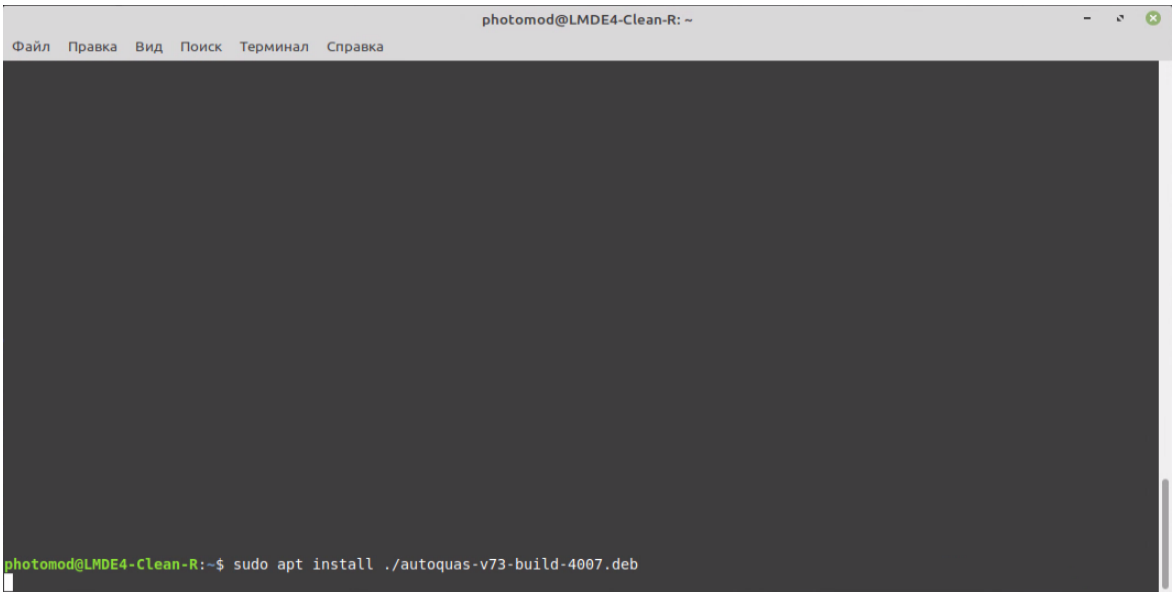

Fig. 21. The Terminal window

5. [optional] Confirm your action by entering your account password:

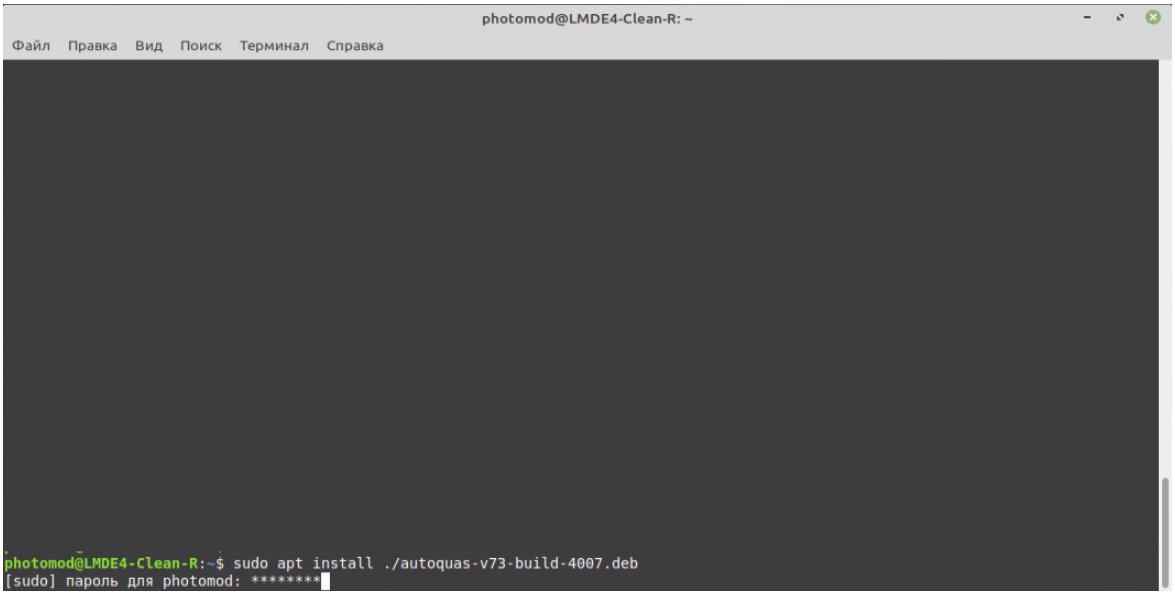

Fig. 22. The Terminal window

6. Wait until operation is completed;

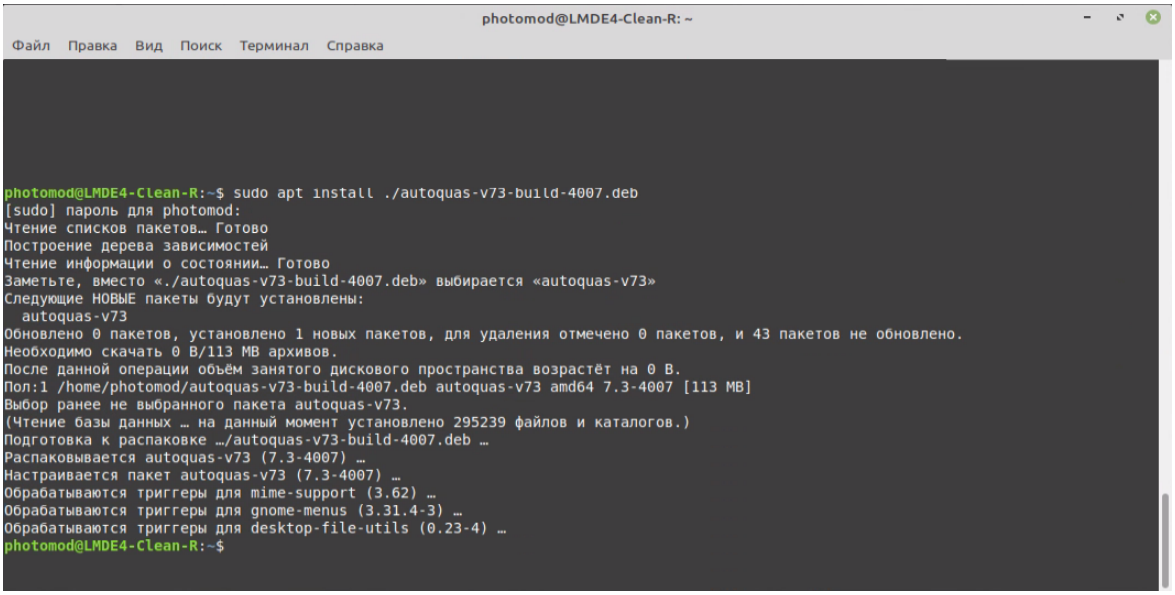

Fig. 23. The Terminal window

By default *PHOTOMOD* is installed in */opt/photomod-NN/bin* folder, where **N** is the version number.

3.4. Copying the security key file

Also, after the *PHOTOMOD* installation, the `PhConsts50.dll` must be copied to the system folder (*/opt/photomod-NN/bin* by default). This file is necessary to correct work of the system and it is a file of hard lock key from *Sentinel HL* (see the “Protection of the system” chapter in “General information” User Manual).

4. System deinstallation

To search the pre-installed *Racurs* software, run `apt search photomod` from the console.

To remove the system from computer, perform the following:

1. Close all modules of the system;
2. Choose **Start › Science › PHOTOMOD 8.0 Uninstall**;
3. Confirm your action by entering your account password:

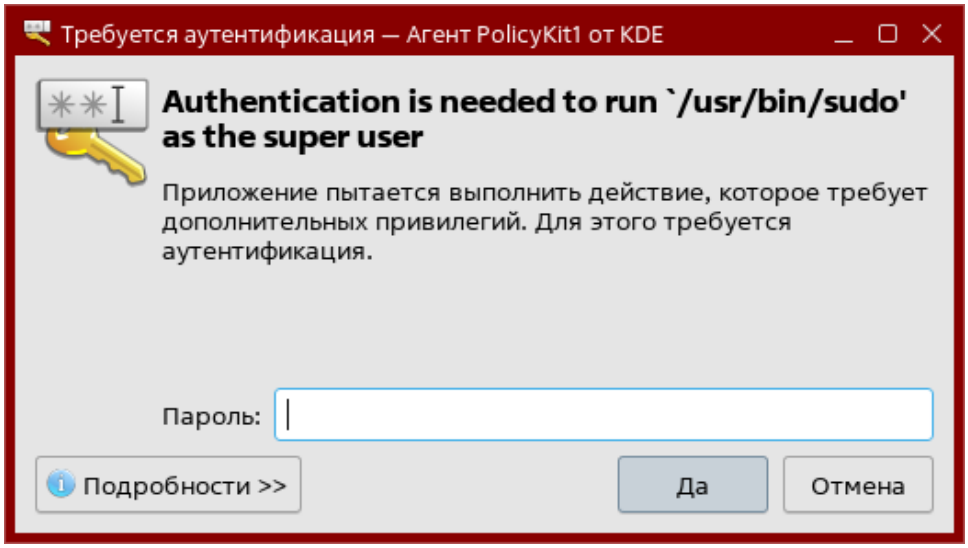

Fig. 24. The confirmation window

The **Start › Science › PHOTOMOD 8.0 Uninstall** command is strongly recommended for system uninstallation. If you uninstall the system using the appropriate commands entered in the **Terminal** window, it is strongly recommended to restart the workstation after completing the operation.

The *PHOTOMOD8.VAR* folder is not removed during uninstallation.