User Manual

# Neuron-Spectum.NET
## (for veterinary purposes)

Software

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5, Voronin str., Ivanovo, 153032, Russia
P.O. Box 10, Ivanovo, 153000, Russia
Phone: +7 (4932) 24-04-34; +7 (4932) 95-99-99  Fax: +7 (4932) 24-04-35
E-mail: info@neurosoft.com  Internet: www.neurosoft.com

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# Introduction

The Neuron-Spectrum.NET software is intended to perform EEG acquisition and analyze the recorded EEG.

The software can restore automatically the connection with the device after the accidental disconnection and continue the recording. Also, the software provides the function of automatic saving of exam during the recording with the specified time interval which is useful for the recording of long-term EEG exams to prevent data loss in case of emergency power down of the computer and other failures. The convenient montages manager gives the possibility to create any variant of electrode placement with 10-20 or 10-10 system using up to 256 derivations.

The software supports several users, at that the settings of one user do not impact the settings of other users. The software provides the customizable graphical interface which can be changed from the simple one (several main big buttons on the toolbar) up to the complicated one which gives the full access to all the software functions. Besides, graphic user interface option is integrated to contol the software using touchscreen display. The software settings are very simple and convenient; they are divided into acquisition settings and analysis settings. The use of acquisition styles and analysis styles allows switching quickly between different software settings. It is possible to use the acquisition wizard and the analysis wizard which allow performing EEG acquisition, analysis and generation of reports in the automatic mode. The exams can be stored both in database (local or network) and the separate files (archive). The possibility of the exam export to optical media in different formats is implemented.

The software allows performing the quick navigation over the recorded EEG, exporting the exams to EDF+ format, printing of the selected EEG fragments and all the record.

The software provides the flexible capabilites for the reports generation. Each user can generate any exam reports using his/her own report templates. The report template defines the exam information to be added and its sequence. Together with text interpretation it may include any analysis results (tables, 2D or 3D maps, graps and hystograms). The exam reports can be stored in RTF, PDF or Microsoft Word format.

# 1. General Information about Software Operation

The Neuron-Spectrum.NET runs on the Windows operating system that is why the principle of operation with it does not differ from any other applications functioning in the mentioned operating system. Before the digital EEG and EP system connection to computer and starting to use the software, it is necessary to install it to the computer. To start the operation with the software, one should run it.

## 1.1. System Requirements

The Neuron-Spectrum.NET software is developed for the use under control of Windows 8.1 and higher. Consequently, the base requirements to the computer hardware correspond to the requirements of the above-mentioned systems. Besides, the computer should have at least one USB connector for the device attachment. For the comfortable operation with the Neuron-Spectrum.NET it is required to have additional computer resources. For example, to analyze EEG in the real-time mode during the acquisition, the additional computational resources can be required and for the more detailed EEG review it is better to use the monitor with not less than 19 inches size.

The recommended system requirements:

- Processor: Intel Core i5 with 2 GHz clock rate and higher.
- Main memory: 4 GB and higher.
- Monitor: 24 inches and higher, resolution 1280×1024 pixels and higher.
- Free space on a disk: 1.8 GB to install the software and 50 GB and higher to store the exams.
- USB port to attach the device.

**Neurosoft** Company provides the possibility to purchase any digital EEG and EP system of **Neuron-Spectrum** series together with the computer. In this case, the computer is completely ready to operate with the device, and all the required software is installed. If you plan to use the digital EEG and EP system of **Neuron-Spectrum** series with other computer, you should first install the Neuron-Spectrum.NET software on it. The distributive is supplied on electronic storage device (USB flash drive, CD, etc.). Besides, during all the device operation life you can download the last versions of the required software from Neurosoft site free of charge.

## 1.2. Software Setup

To install the Neuron-Spectrum.NET software, use the electronic storage device with the software distributive. Run the distributive. If after several seconds the setup is not run automatically, start *Autorun.exe* file from the electronic media. In the appeared di-

alog box (Fig. 1.1) choose **Neuron-Spectrum.NET.** After that, the dialog box offering to choose the software interface language will appear on the screen (Fig. 1.2).

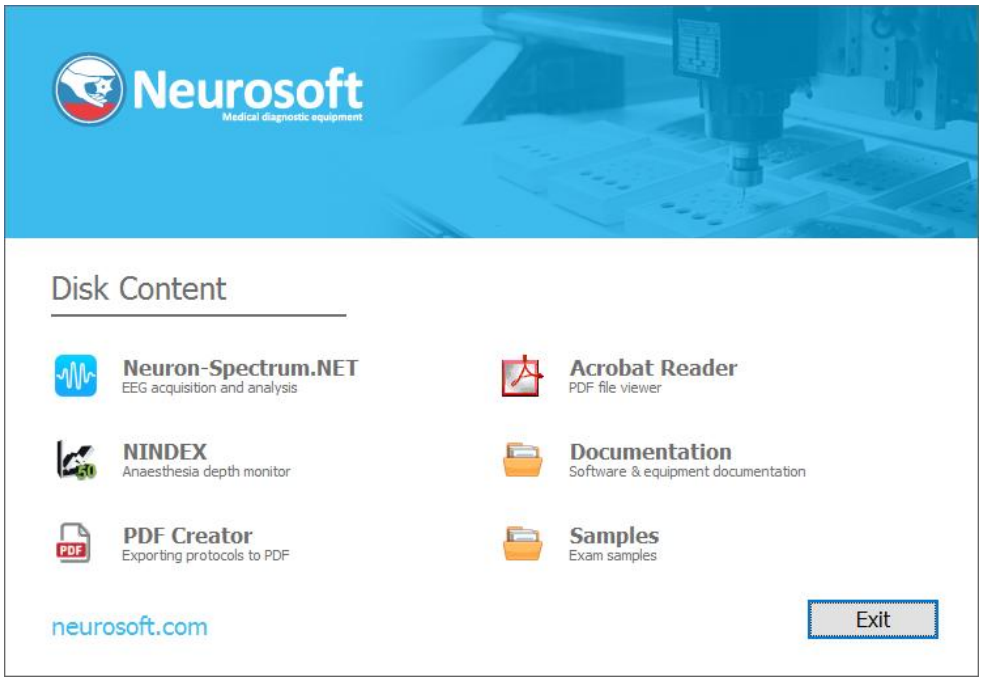


Fig. 1.1. Software setup.

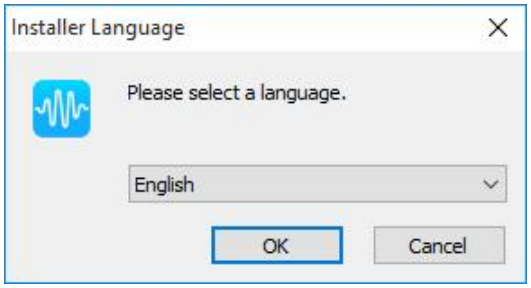


Fig. 1.2. Selection of software language.

After software interface language is selected, press “OK” button to continue the setup or “Cancel” button to deny it. If you continue the setup, the following dialog box will appear on the screen (Fig. 1.3).

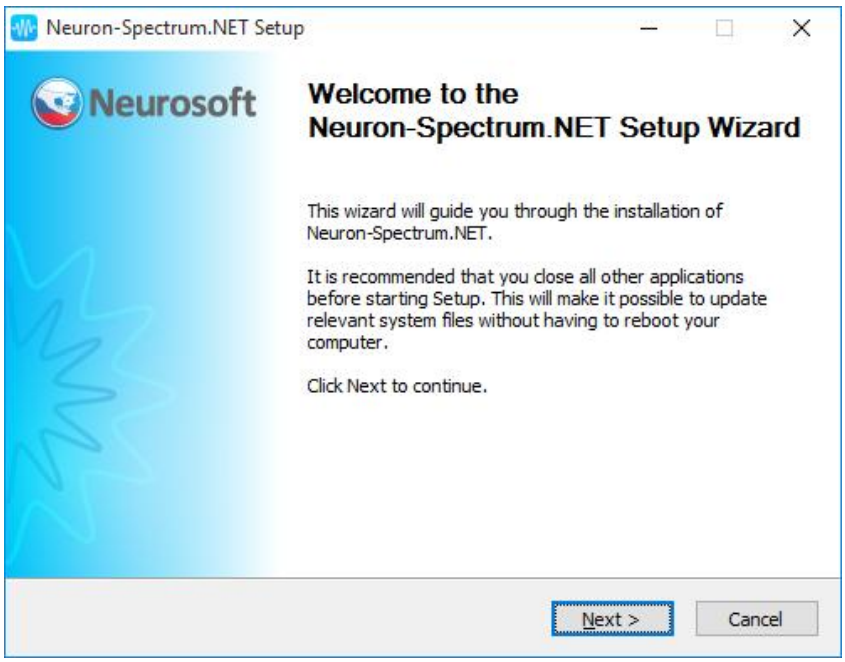


Fig. 1.3. Welcome of setup software.

To continue the software setup, press “Next >” button. The “License Agreement” dialog box will appear at the screen (Fig. 1.4).

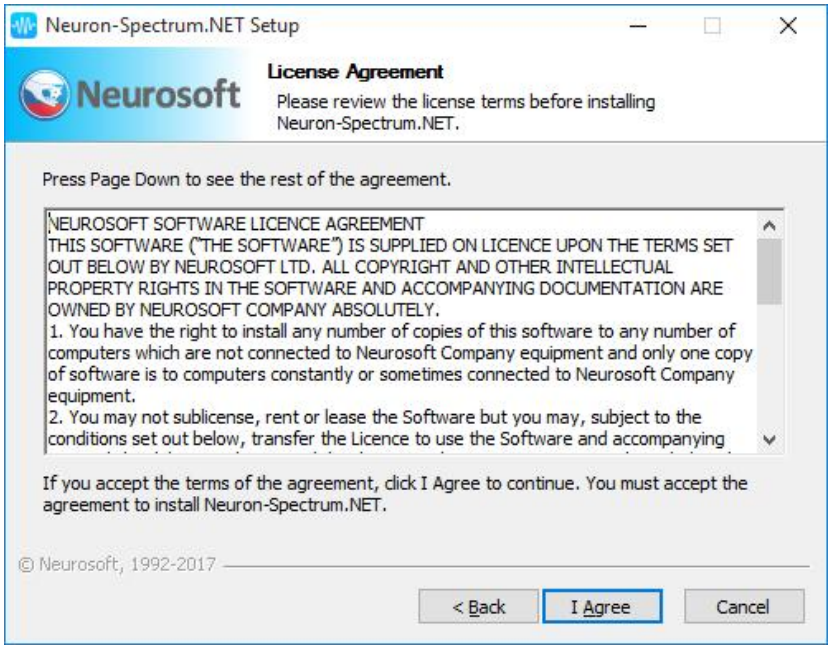


Fig. 1.4. “License Agreement” dialog box.

To continue the software installation, press “Next>” button. If 64-bit operating system is integrated, the dialog box offering to select the software version will appear at the screen (Fig. 1.5). By default it is offered to install 64-bit software version. However if you plan long-term EEG acquisition with video recording, it is recommended to use

32-bit software version as it ensures wider range of codecs for quality video compression.

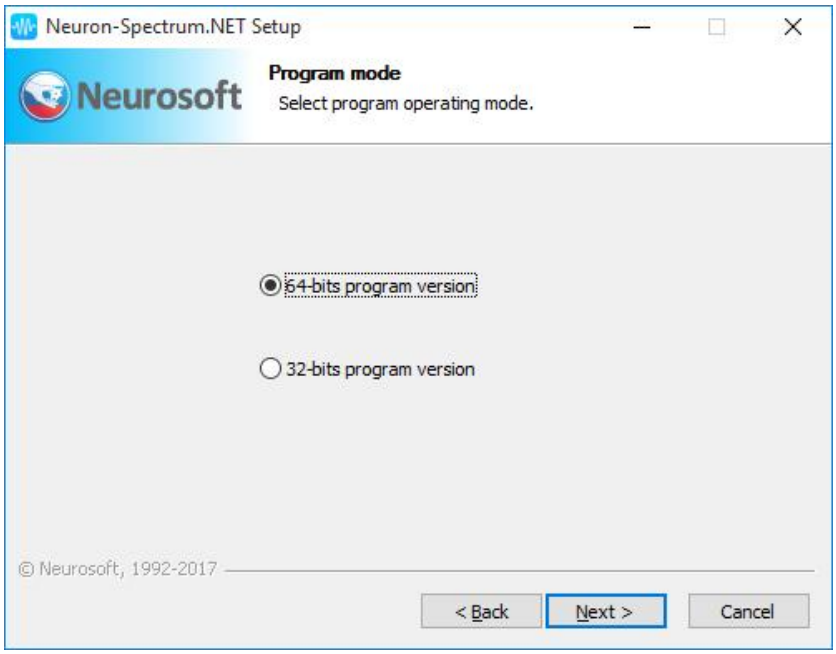


Fig. 1.5. Request to select processor capacity.

To continue the software setup, press “Next >” button. The dialog box offering to choose the place of the software installation will appear on the screen (Fig. 1.6). By default the software will be installed to *C:\Program Files\Neurosoft\Neuron-Spectrum.NETomega*. To change the directory of the software setup, press “Browse…” button and select the folder for the software setup.

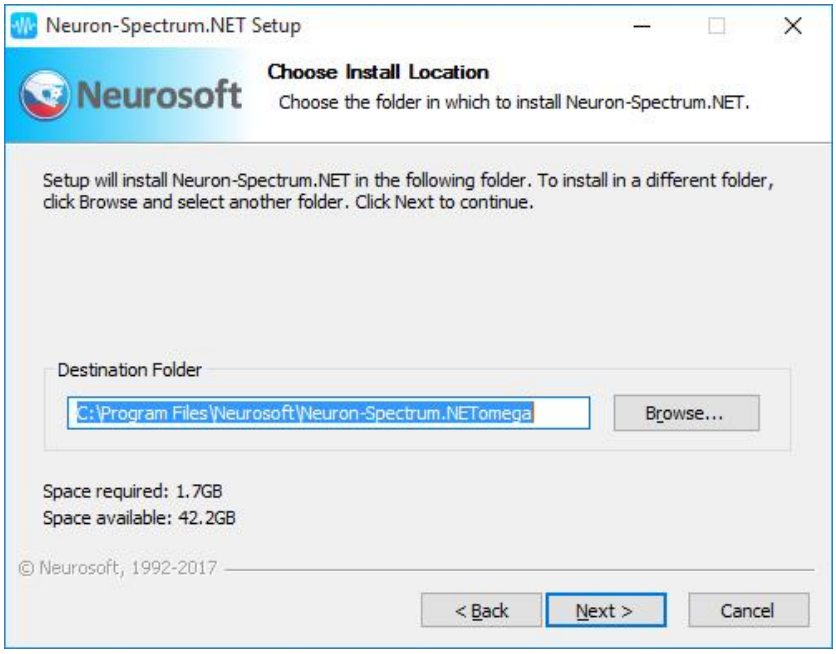


Fig. 1.6. Request to choose the place of the software setup.

To continue the software setup, press “Next >” button. To return to the previous setup step, press “< Back” button. In the appeared dialog box (Fig. 1.7) press “Install” button to finish the software setup.

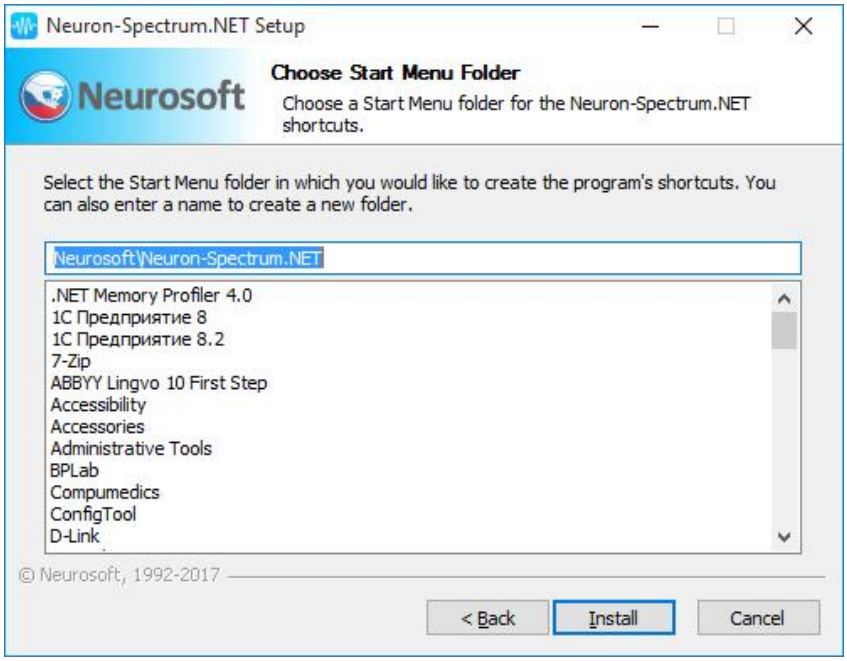


Fig. 1.7. Software installation.

In the next dialog box (Fig. 1.8) wait for the setup ending and press “Next >” button to finish the software setup (Fig. 1.9).

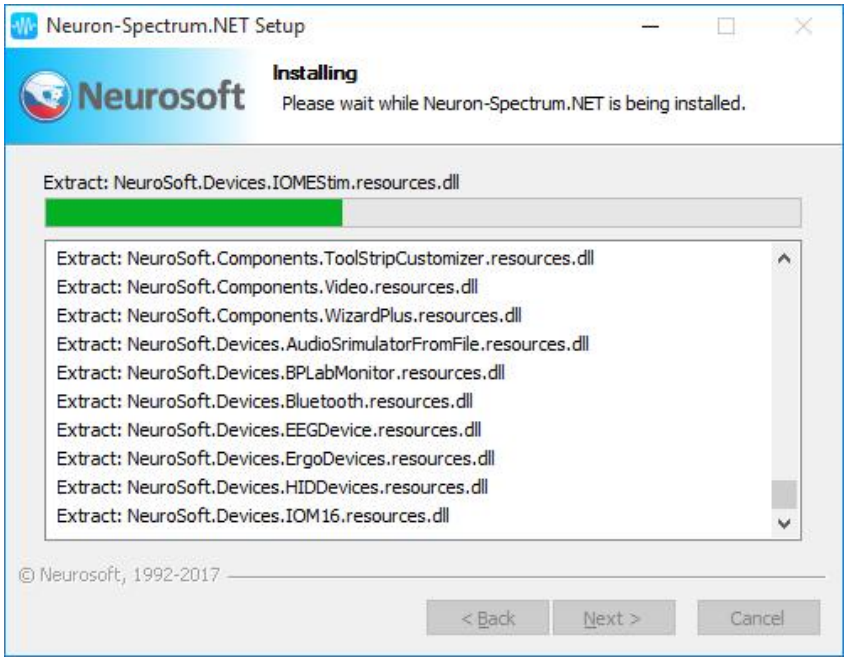


Fig. 1.8. Process of software setup.

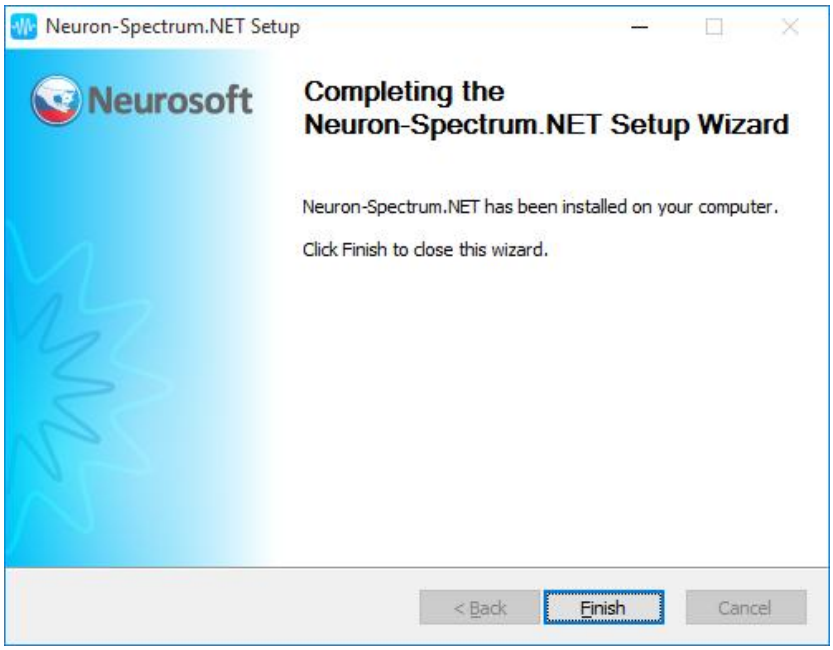


Fig. 1.9. Finishing of software setup.

If you install the Neuron-Spectrum.NET software on your computer for the first time, the software wizard will install automatically Microsoft DirectX of 9.0c version to your computer. At that, the Microsoft DirectX setup window (Fig. 1.10) will appear on the screen. To install Microsoft DirectX, follow the instructions of the software wizard.


Fig. 1.10. Setup of Microsoft DirectX of 9.0c version.

If you purchase the digital **Neurosoft** EEG and EP system of **Neuron-Spectrum** series, you get the right to update periodically the software allowing operating with the above-mentioned digital EEG and EP system free of charge. To install the new version of the Neuron-Spectrum.NET software, perform all the steps listed in this section (see section 1.2 “Software Setup”). At the first run of the updated version, the software will ask the way of user settings updating (Fig. 1.11).

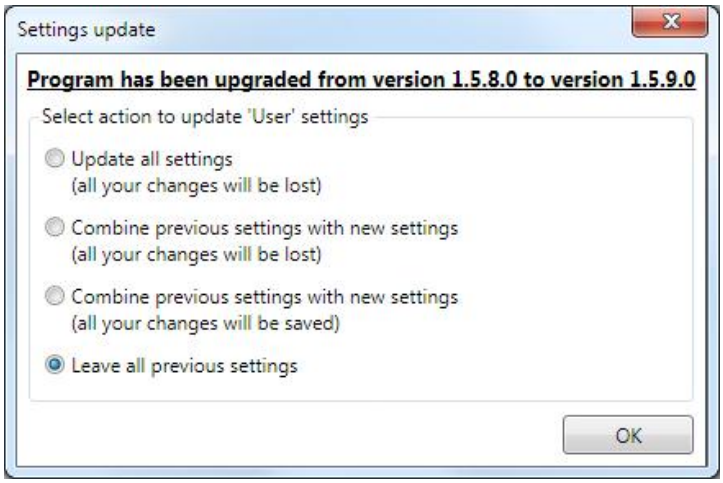


Fig. 1.11. Updating of software settings.

You can choose one of the following ways to update software settings:

- **Update all settings.** All the program settings will be updated. At such type of renew all the montages, markers, functional tests, acquisition and analysis templates, desktops created by a user will be lost. The software will look like the one just installed with the default set of montages, markers, tests, etc. All additional settings made by a user (new montages, markers, tests, etc.) will be lost. Such type of updating is required only at a pinch.

- **Combine previous settings with new settings (all your changes will be lost).** At such type of updating the user settings will be replaced by the default settings of the new software version.

- **Combine previous settings with new settings (all your changes will be saved).** At such type of update all the settings will remain the same but the new settings with default values available in the new software version will be added to them. This way of settings updating is the most preferable.

- **Leave all previous settings**. All user settings will remain the same. However, in this case the new settings available in the new software version will be inaccessible what is why this way of updating is not advisable.

## 1.3. Software Run

To run the Neuron-Spectrum.NET, it is necessary to install it first on the computer (see section 1.2 “Software Setup”). If the software is installed, it is required to fulfill one of the following operations to run it:

- Double-click the software shortcut  on the desktop with the left mouse button.

- Select the software in the **Start** menu of the operating system: **Start\All programs\Neurosoft\Neuron-Spectrum.NET\Neuron-Spectrum.NET**.

- Run *C:\Program Files\Neurosoft\Neuron Spectrum.NETomega\NeuroSoft.EEG.WPF.exe.*

# 1.4. Main Software Window

After the software run a user identification window will appear on the screen (Fig. 1.12). The Neuron-Spectrum.NET software supports the operation of several users. If you started the software for the first time, enter your name. In case it is done not for the first time, choose your name from the combo-box. If you do not want others to work with the software under your name, enter the password. In this case, the software will require the password each time at each next run. If you do not plan to organize the multi-user mode of operation with the software, you can check “Do not show this window” checkbox in the bottom part of the window. In this case, the identification window will not appear at the next software runs. To finish the identification, press “OK” button. If you press “Cancel” button, the software run will be cancelled.


Fig. 1.12. User identification of the software.

On identification process completion, the main software window will appear on the screen (Fig. 1.13).

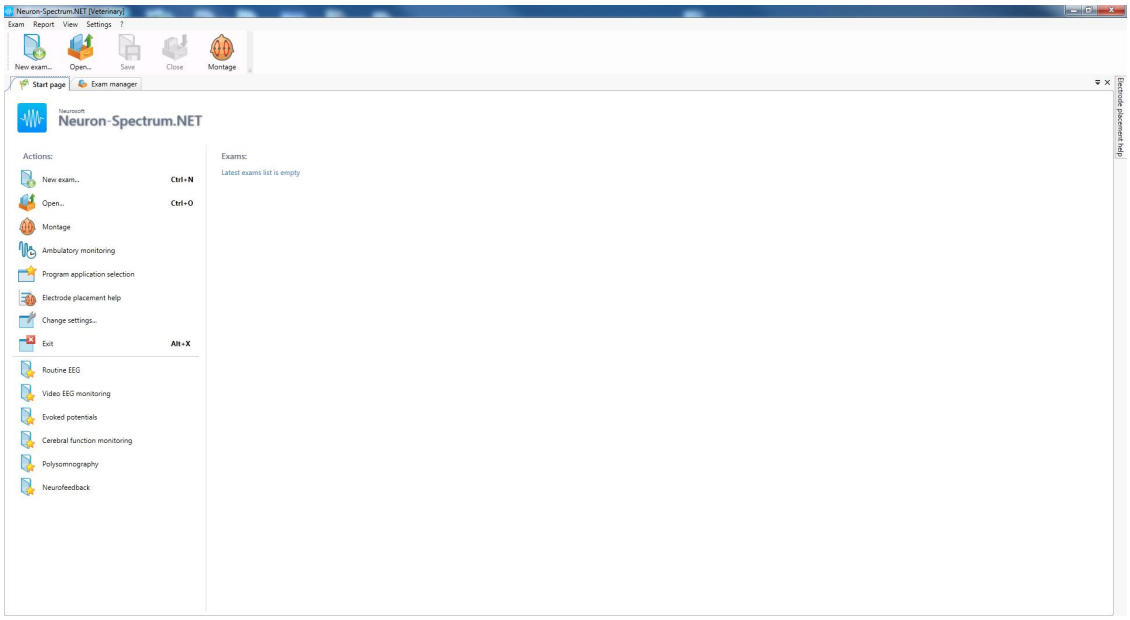


Fig. 1.13. The main window of **Neuron-Spectrum.NET** software.

The main software window has a traditional structure for Windows applications. The top part of the window contains its title and window control buttons. Just after the title, the panel of the software main menu can be seen. Using the menu commands, you can create new exams, open the existing ones, control EEG acquisition, perform the analysis, generate exam reports, and change the settings. Using the menu, a user can get the access to all the software functions. The most frequently used software functions can be placed on the toolbar buttons. The main toolbar is located under the menu bar of the software. The Neuron-Spectrum.NET has several toolbars for the acquisition, analysis, exam generation, etc. Each toolbar can be located in any part of the software window according to user's preferences. A user can also adjust both the visibility of toolbars and the visibility, the size and the view of toolbar buttons.

The remained part of the window is occupied by the software work space. EEG review and analysis windows, exam report managers can be located here. By default the start page is opened when the software is run (**View|Start page** menu items). The most often used commands are located in the left part of start page and the list of latest exams opened with the software is shown in the right part.

## 1.5. Software Exit

On software operation completion, it should be closed. To do this, it is necessary to execute one of the following operations:

- Press  button in the top right corner of the main software window.
- Use **Exam|Exit** menu command.
- Use **[Alt+X]** hotkey combination.
- Use  button on the start page.

# 2. EEG Exam

The example of the typical EEG exam recording using the Neuron-Spectrum.NET software is descibed in this chapter. This software should be installed on your computer beforehand (see section 1.2 Software Setup) and digital EEG and EP system should be connected to computer USB port.

1. Run the the Neuron-Spectrum.NET software on your computer.
2. After the software start, the user identification window (Fig. 2.1) will appear on the screen. Enter user name and press “OK” button.


Fig. 2.1. Identification of software user.

3. In the main software window (Fig. 2.2) press the New Exam button on the toolbar or use **Exam|New…** menu command. Also to create the new exam, you can use **[Ctrl+N]** key combination or the corresponding button at start page.

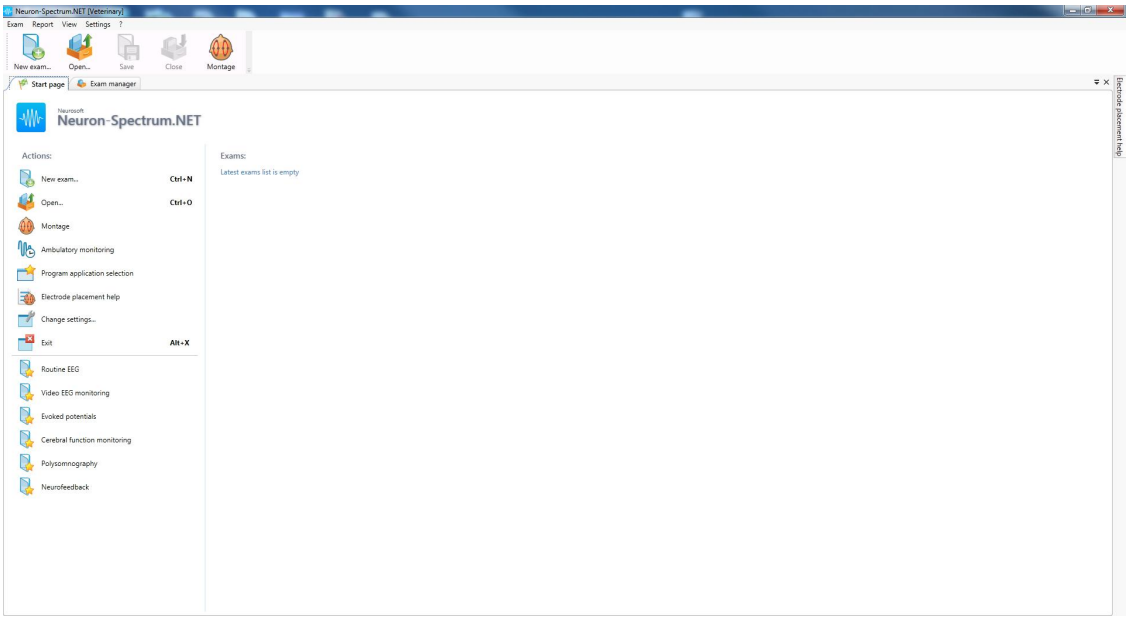


Fig. 2.2. Main window of Neuron-Spectrum.NET software.

4. In the appeared dialog box enter a patient's data (Fig. 2.3) and press "OK" button. On the **Acquisition** tab you can choose the required "Current acquisition style" from the corresponding combo-box.

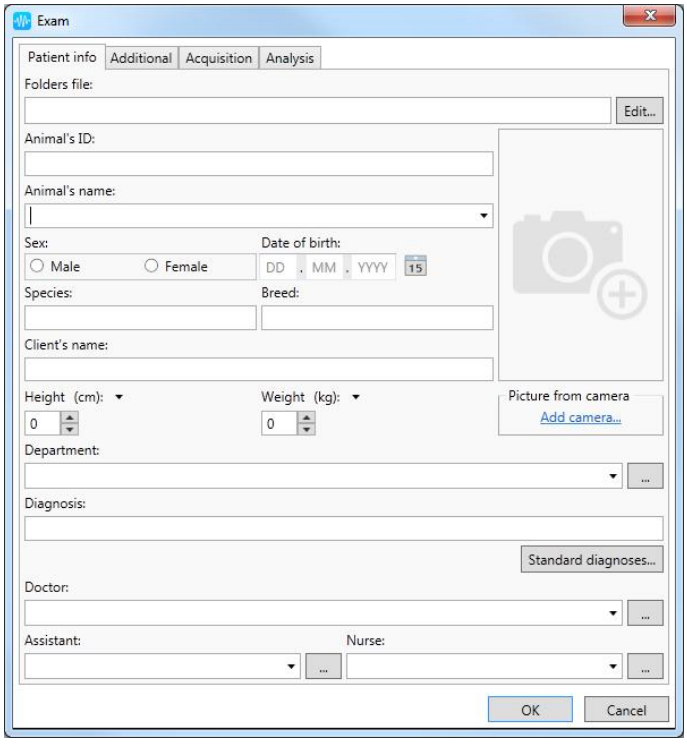


Fig. 2.3. Entering patient's data.

5. After the acquisition parameters are downloaded (Fig. 2.4), press “Impedance” button on the toolbar.

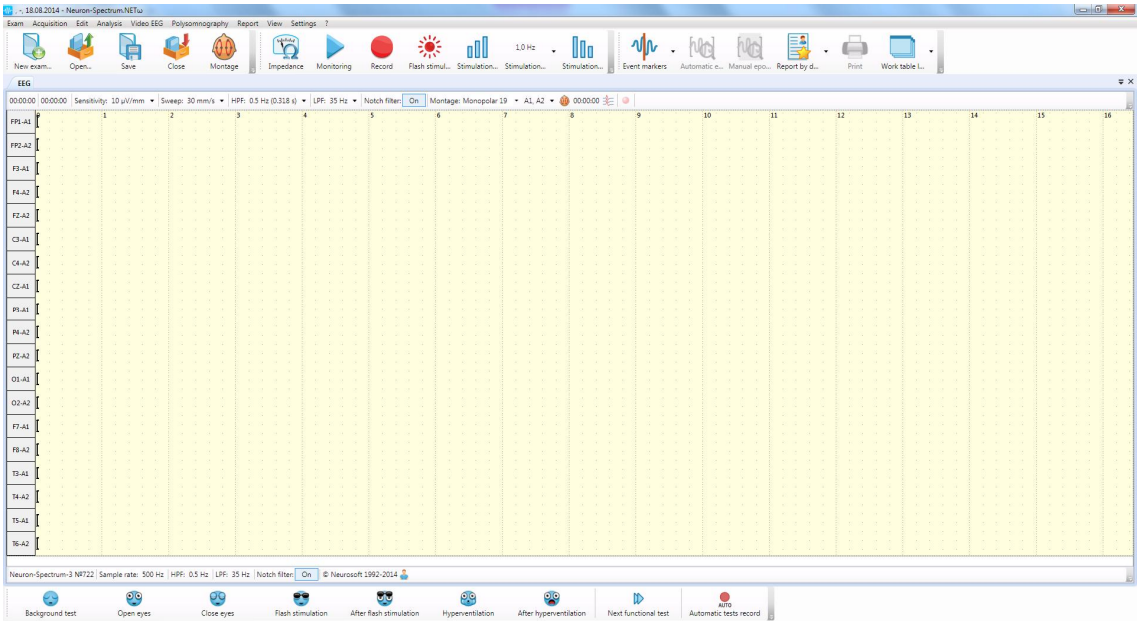

Fig. 2.4. The acquisition window after new exam creation.

After that, the dialog box with the results of electrode impedance measurement (Fig. 2.5) will appear on the screen. You can place the electrodes on an animal with simultaneous control of electrode placement quality.

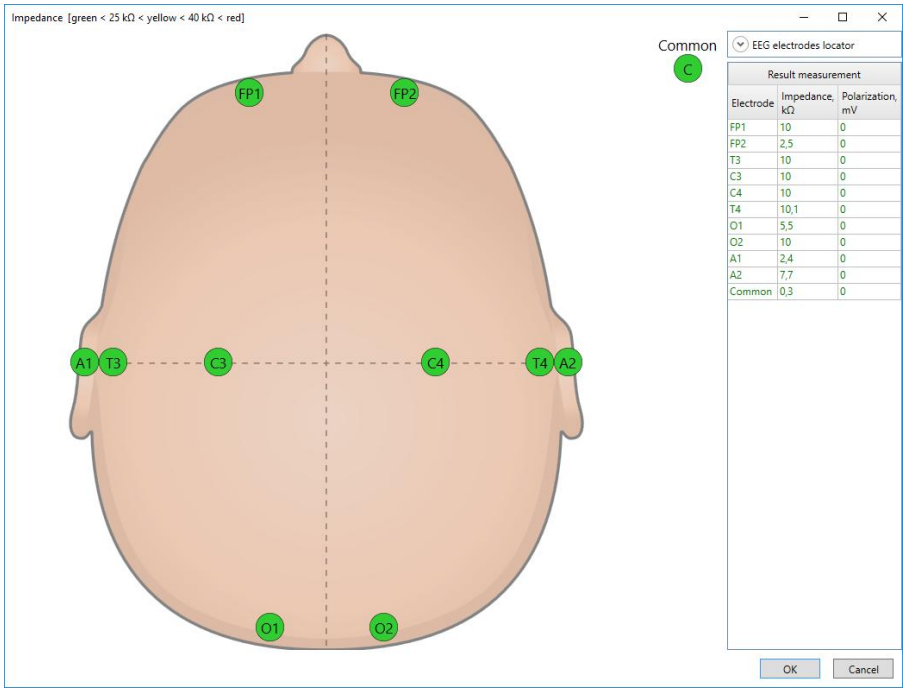


Fig. 2.5. The impedance measurement.

6. On electrode placement completion, press “Monitoring” button on the toolbar to check EEG signal. Calm down an animal; make sure in the stability of monitoring signal and press “Record” button on the toolbar. From this moment EEG acquisition is started, the functional test “Background test” is run automatically.

7. To arrange the event markers during EEG acquisition, you can use “Event markers” button with drop-down list located on the toolbar.

8. To finish EEG acquisition, press “Stop” button on the toolbar. The navigation over the recording can be done with the use of the arrow buttons, mouse scroll or navigator located under EEG traces. To review the analysis results during the recording or after it you can open the required analysis windows using **Analysis** menu item.

9. To prepare the automatic report, press “Report” button on the toolbar or choose “Report by default template” using the combo-box of this button. After that the automatic report will be generated.

10. If the printer is connected to your computer, you can print the exam report using “Print” button on the toolbar. Also you can print EEG traces using main menu commands.

11. To save the exam, press “Save” button on the toolbar.

12. To close the exam, press “Close” button on the toolbar.