



USER MANUAL

NIBPCHART 1.2.00

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1. INTRODUCTION

The Panlab Non-Invasive Blood Pressure (N.I.B.P) system provides an easy and reliable technique for measuring systemic blood pressure and cardiovascular parameters in rodents without any invasive catheterization.

The overall objective of the NIBPchart software is to provide a graphical way to measure blood pressure in an animal. This tool is a perfect complement to the Panlab's NIBP control units for ensuring data traceability and validation. The NIBPchart software will enable the user to:

- Collect and display signals from the cuff pressure and pulse provided by the NIBP Control Unit (LE-500x range).
- Establish values of systolic and diastolic pressure and mark those values on the signals.
- Generate an image file with the graphs of the acquired signals and marks.

2. INSTALLATION OVERVIEW

2.1. Requirements

NIBPCHART needs the following equipment:

- A fully compatible computer with at least:
 - 2 GHz Pentium® (Celeron processor excluded)
 - 2 Gb of RAM
 - 150 MB of free hard disk space
 - Graphics: 1024x768 pixels and 32-bit true color
- Connection interface
 - 1 free USB port
- Operating system supported:
 - Microsoft® Windows® 11 64 bits
 - Microsoft® Windows® 10 32/64 bits



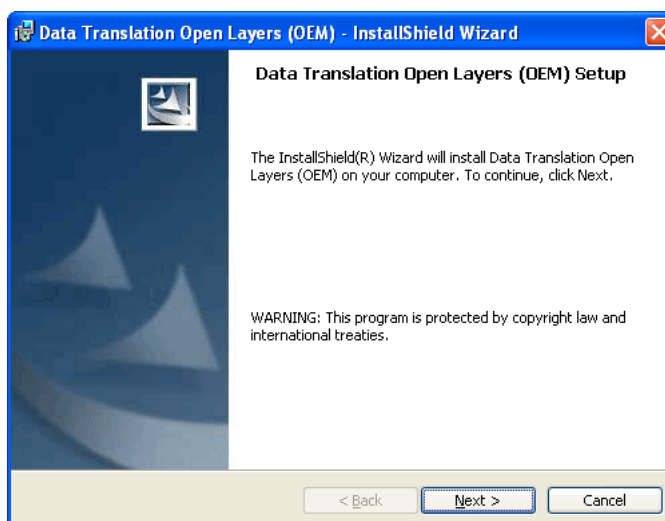
2.2. Installing the LE-500x USB unit drivers

Before installing the software, the USB drivers must be installed on the computer.

To do that, select the option **Install LE-500x USB unit drivers** within the installation window:



The DT-Open Layers installation wizard will be shown. When the Welcome screen appears, click [Next] and [Install] button to continue. Wait until the wizard asks you to press the [FINISH] button.



Once done, the LE-500x unit must be plugged in and follow the default steps of the "New hardware found" assistant.



If LE-500x unit were deliberately unplugged before installing the USB drivers, the assistant must be cancelled. If not, additional specific hardware uninstalling tasks must be done before installing USB drivers.



2.3. Installing the Software

NIBPchart software is delivered within a single USB flash drive. The USB flash drive contains the software installation tool, this User's Manual in PDF format and other components required to work in specific conditions.

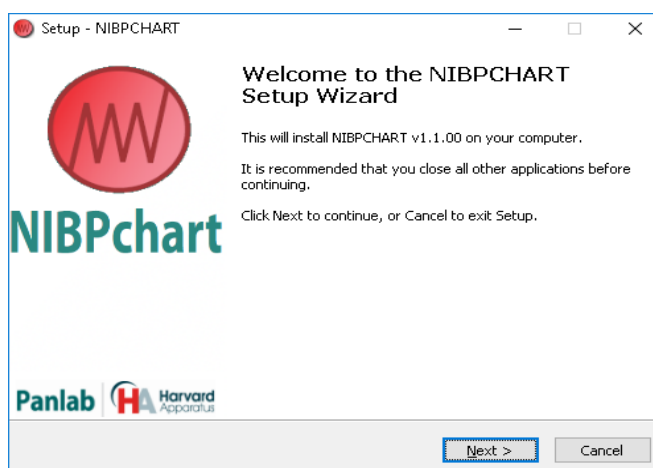
Due to security reasons of the Windows® operating system, a user with administrative rights is required to install the software and other components. Please contact your IT staff before installing the software.

Once you get the administrative rights to install the software, please follow these steps:

- Plug the USB flash drive in a free USB port of your computer and wait until Windows® installs it as a new removable drive.
- Access the new removable drive detected and execute the PANLAB.EXE file. A window will be shown, as below:



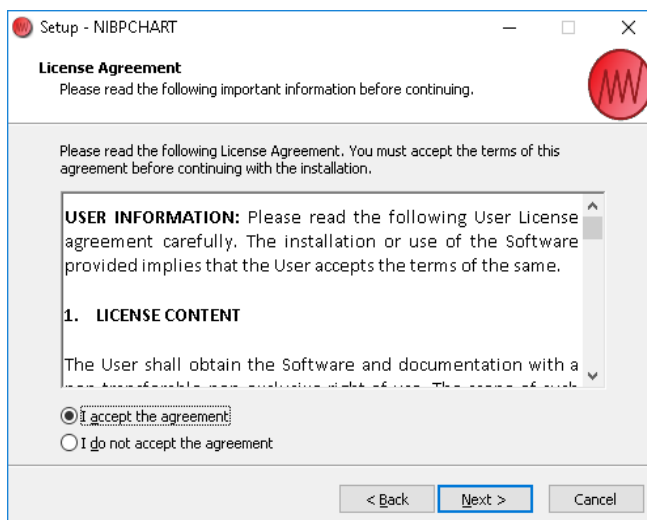
- Press the [Install NIBPchart v1.2.00] button to start the software installation.
- An installation wizard will appear. Press the [Next] button to start the software's installation.



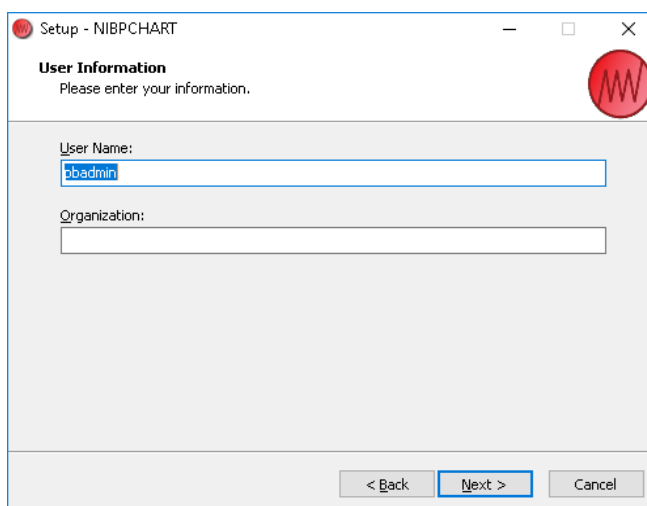
- Read carefully the License Agreement statement and select the "I accept the agreement" option to continue the installation of



NIBPChart. Then press the [Next] button to start the installation.

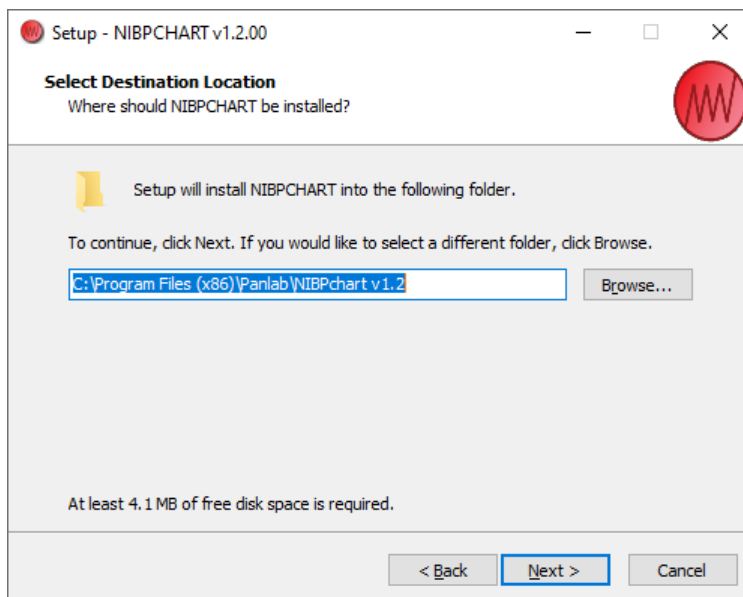


- In the next windows introduce the name of the user and the company in the correct field. After this, press [Next] button to continue.





- During the installation process, the software is installed in a new folder called [NIBPchart v1.2\] created under the Programs Files folder. If desired, the installation program allows you to choose another folder to locate the software. The location of the software is independent of the data folder, which is defined by the user using the corresponding options of the program.



- Press the buttons [Next] and [Install] following the Install Shield Wizard until reaching the [Finish] button.
- A new shortcut will appear on your desktop. Use it for executing the program later.



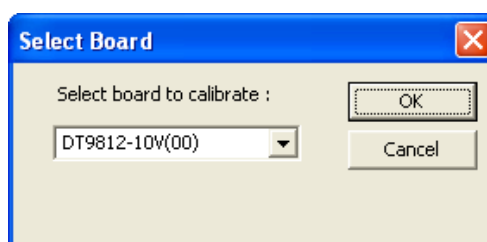


2.4. Calibrating the LE-500x USB unit

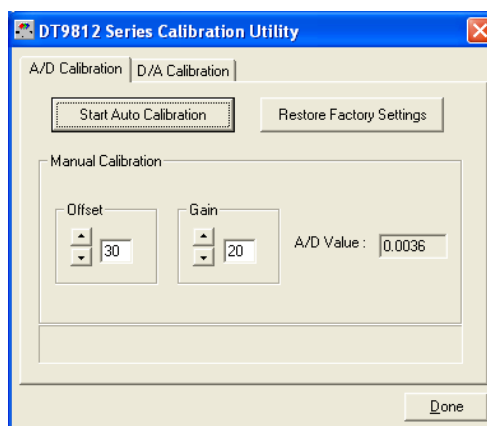
Before using NIBPchart for experimental purposes, the LE-500x USB unit and the software must be calibrated so that the right signal levels are acquired and thus valid pressure measurements are calculated.

To do that, please follow the next steps:

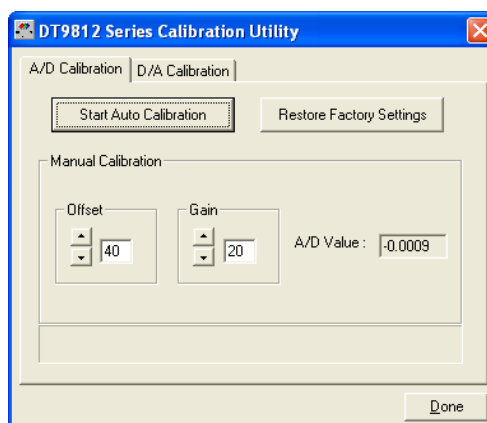
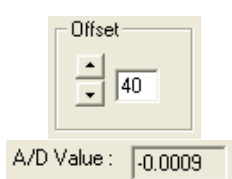
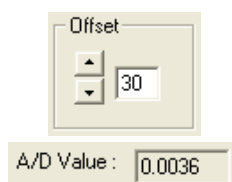
- Connect the LE-500x USB control unit to the computer.
- Close NIBPchart if it is currently running.
- Turn on the LE-500x USB control unit.
- Execute the "LE-500x USB calibration" tool located in the Start – Programs – Panlab – NIBPchart menu of the Windows®.



- Accept the first dialog pressing the **Ok** button.



- Adjust the **Offset** value until the **A/D Value** is in the range of ± 0.0020





3. EXECUTING NIBPchart

Open the NIBPchart software by double-clicking on the corresponding icon in the desktop. An initial clean screen will be opened.

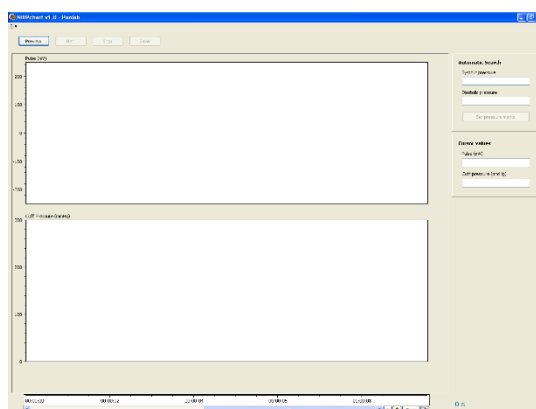
3.1. Application description

3.1.1. Application description

NIBPchart acquires data from the pulse and cuff analogical outputs of the Panlab's LE-500x Control Units through a connection based on USB communications.

3.1.2. Main Window

When NIBPchart is launched, the main window appears to provide a common way to perform all the available actions. It looks as shown below:



3.1.2.1. Control Buttons

The control buttons are placed at the top part of the window. They will be used to lead the trial development from the preview, data capture and subsequent analysis / inspection of the results and the report exportation.

3.1.2.2. Signal graphs

In the middle of the screen, the application shows the graphs that display the values obtained from the control unit. The first graph (Pulse) shows the value of the blood pulse (measured in millivolts). The pulse is the electrical conversion of blood pulsations detected by the transducer. The second one (Cuff pressure) shows the current value of the pressure applied in the cuff (measured in mmHg).



3.1.2.3. Time axis

At the bottom of the screen the time axis of the trial is shown with a horizontal scrollbar that allows the user to move along the time that the trial has taken. At the right side of the time axis, a chronometer visualizes the elapsed session time since the start of the data recording.

There are also several buttons that allow changing the view in which data is represented on the graphs:



5 : 1



- Zoom In the graphs, which reduces the time interval shown.
- Zoom Out the graphs, which increases the time interval shown.
- Set the zoom applied to graphs. By pressing the button, a list of all the scales available will be displayed.
- Enable / Disable auto-scroll. With the auto-scroll activated, the graphs and the time axis will always automatically move to the end, so the trial samples acquired can always be monitored.



3.2. Starting a trial

When the application is launched, it is ready to start a new trial. However if it is not within the data acquisition process (previewing or recording the signal), it will always be able to start a new trial using the menu option **File – New**.

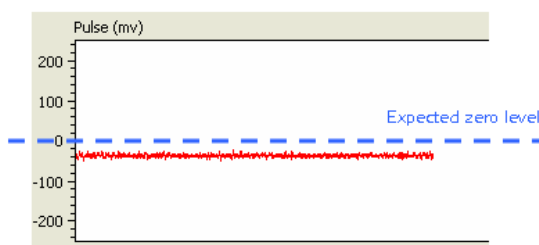
3.2.1. Preview

The preview stage should be used by the user to prepare the subject under trial, as the signals being captured at that time by the control unit can be used to ensure that (i) the measuring peripherals (cuff and transducer) are correctly located and (ii) that the subject is enough relaxed before starting the measurement.

Pressing the **Preview** button (or the F5 key) will make this stage to start.

During the preview stage, all the values acquired by the control unit are represented in the graphs but they are not stored by the application so that no further analysis or inspection could be done.

The preview stage can be also used to identify a possible offset in the zero level of the signal that can appear in some specific models of the PC.



Refer to chapter 2.4 to calibrate your LE-500x USB unit whether this offset appears in your system.

Anytime the experimenter can stop the preview process pressing the **Stop** button, carry out any action needed, and restart the preview process.

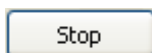
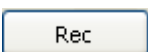
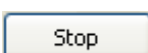
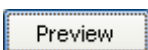
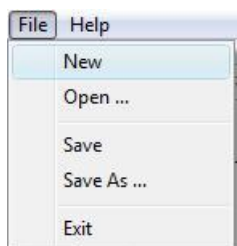
3.2.2. Trial recording

While the preview stage is being executed, the trial recording can start by pressing the **Rec** button (or the F9 key).

During the trial recording stage, all the values acquired by the control unit are represented in the graphs and also stored by the application for its further analysis and inspection.

At this point the user should interact with the LE-500x control unit to start the process of inflation / deflation of the cuff (START button on the front panel).

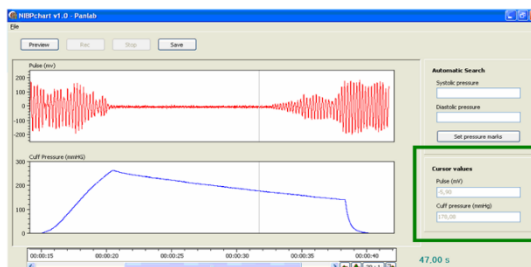
Whenever this process is completed -which can be easily determined by the LE-500x front panel-, the user should press the **Stop** button to go further to the inspection of the trial results.





3.2.3. Trial inspection

During the inspection stage the user can browse the recorded data, evaluate the results and set the values of systolic and diastolic blood pressures, either manually or automatically. When browsing with the cursor on any of the 3 graphs, a vertical line will appear on the cursor axis. This makes the task of inspection easier. Additionally, the value of the two measures (pulse and cuff pressure) at the point where we have located the mouse pointer will be displayed within the **Cursor values** area:



The user can browse for the graphical determination of the systolic and diastolic pressure values either manually or automatically and let a mark on the signal as memorandum.

3.2.3.1. Systolic & diastolic pressure manual determination

To set the pressure values manually, the user just have to place the cursor at the point of the cuff pressure signal corresponding to systolic and diastolic pressure (i.e. respectively, when the pulse signal reappears after arterial occlusion or when the pulse signal returns to its basal amplitude) and press the right mouse button. This action will drop down a menu that will allow the user to set the desired pressure mark (systolic or diastolic marks) Although multiple pressure measurements could have been done within the same trial, only two pressure marks (one for diastolic and one for systolic) will be provided at the same time. For trials with more than one pressure measurement, it is recommended to set the pressure marks and then export the image report for each measurement. Please refer to chapter 3.2.4 for more details.

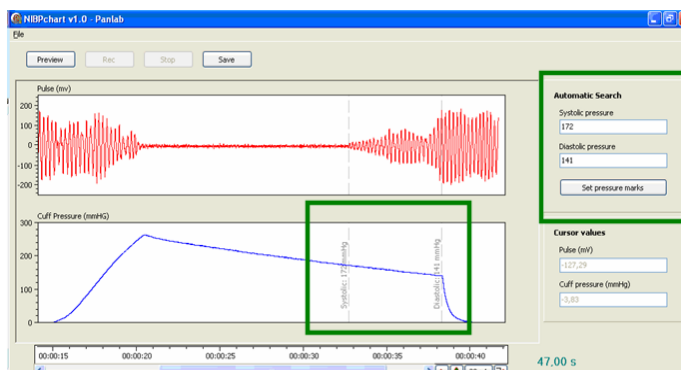
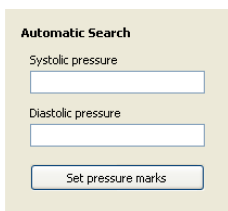
Set diastolic pressure
Set systolic pressure





3.2.3.2. Systolic & diastolic pressure automatic determination

To set the pressure values automatically, both the systolic and the diastolic pressures obtained by the LE-500x control unit should be entered into the **Automatic search** area. Pressing the **Set pressure marks** button will make the application to locate these values on the cuff signal recorded during the trial phase and to automatically let the corresponding mark.



The application specifies an absolute error margin of 0.1mmHg, and will execute a reversed search (starting from the last recorded sample).

If the application is unable to find the searched values, the user will be notified by a warning message.

Only the last pressure measurement will be considered by the automatic search tool.

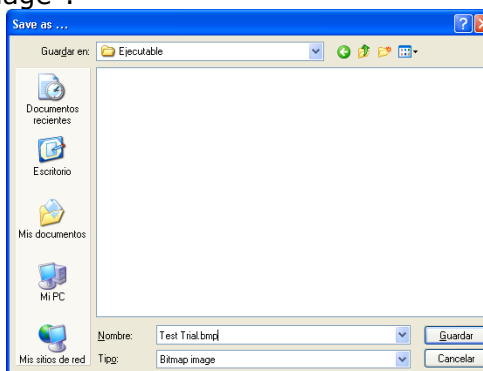
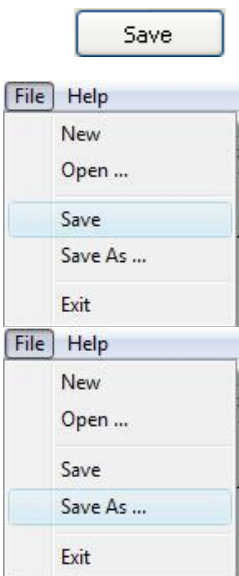


3.2.4. Image report exportation

Once the pressure marks are established, the user has the possibility to export the trial report to an image file in BMP format.

To do that, the user has to press the [Save] button or select the menu option [File – Save], unless the data was previously saved. Otherwise, the user can select the menu option [File – Save As...].

This option will open a window where the user can choose the folder to save the resulting export file, the name of the file and also the type of the file. To export an image report the type must be "Bitmap image":



Once the image report is exported, the application will remain at the inspection stage, so the user could decide to change the



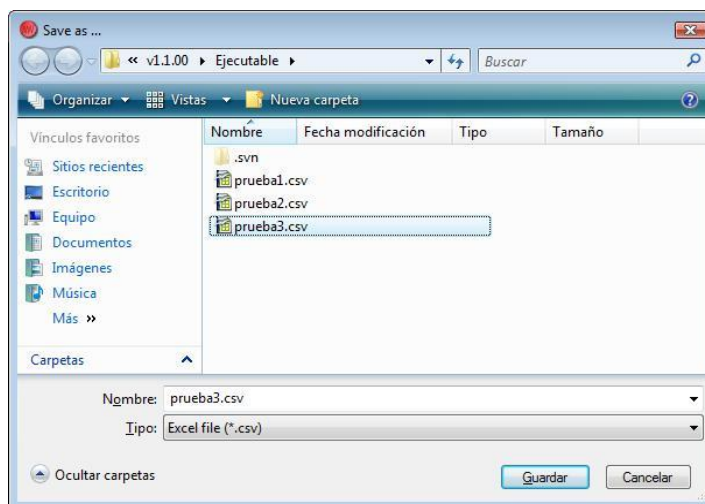
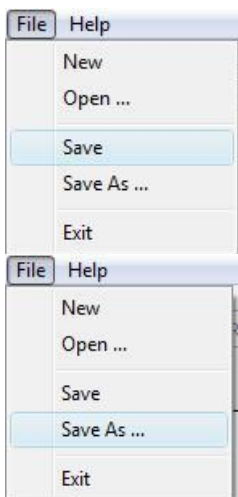
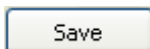
pressure marks, the view of the time axis, etc and to export the report again or to save the trial for later recovery and inspection.

3.2.5. Exporting data to Microsoft® Excel®

The user has the possibility to export the trial report to an comma separated values file (CSV file).

To do that, the user has to press the [Save] button or select the menu option [File – Save], unless the data was previously saved. Otherwise, the user can select the menu option [File – Save As...].

This option will open a window where the user can choose the folder to save the resulting export file, the name of the file and also the type of the file. To export a data report the type must be "Excel file (*.csv)":



Once the report is exported, the application will remain at the inspection stage, so the user could decide to change the pressure marks, the view of the time axis, etc and to export the report again or to save the trial for later recovery and inspection.



CSV is a widely used file format which stores the information in a human-readable way (plain text) and arranges the data in rows and columns separated by semicolons. CSV files can be easily imported in Microsoft® Excel® and other statistical software packages. Please refer to the user manual of your software package for more details.



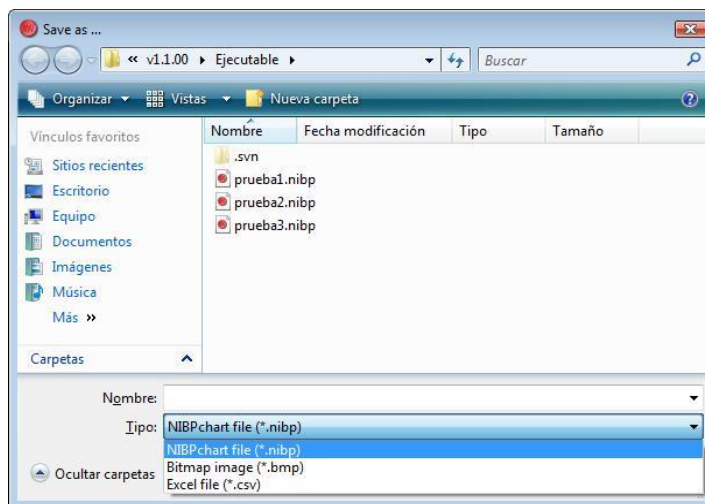
3.3. Saving a trial



Once the pressure marks are established, the user has the possibility to save the trial report to a NIBP trial file.

To do that, the user has to press the [Save] button or select the menu option [File – Save], unless the data was previously saved. Otherwise, the user can select the menu option [File – Save As...].

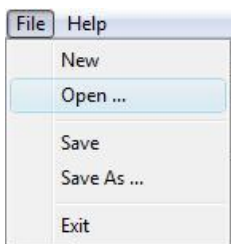
This option will open a window where the user can choose the folder to save the file, the name of the file and also the type of the file. To save the trial, the type must be "NIBPchart file":



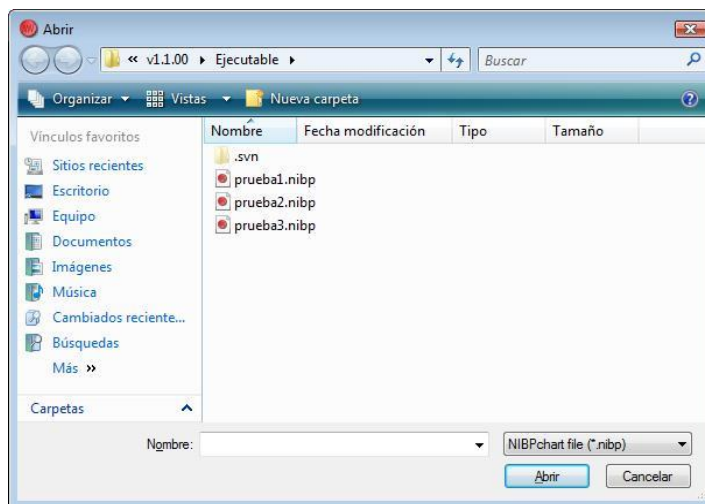
Once the trial is saved, the application will remain at the inspection stage, so the user could decide whether to change the pressure marks, the view of the time axis, etc and to export the report again.



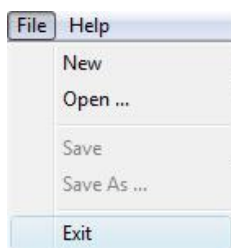
3.3.1. Recovering a trial



The user can recover a previously saved NIBP trial file. To do that, the user has to select the menu option [File – Open]. This option will open a window where the user can choose the folder and the type of file (“NIBPchart file”) to open a previously saved trial file:



Once the trial is loaded, the application will remain at the inspection stage, so the user could decide to change the pressure marks, the view of the time axis, etc and to export the report again or to save the trial for later recovery and inspection.



4. EXITING THE APPLICATION

The application can be closed through the menu [File – Exit], or via red cross of the main window. The application will always verify that there is no pending report to export and, in that case, the user will be warned to confirm that he wants to exit without saving the results.



5. CONTACT INFORMATION

We are available to help you with your questions and concerns. Should you hit a roadblock or need some additional training, please feel free to visit the HBIO Behavioral Support Center at <https://support.behavior.hbiosci.com> to find articles and helpful information in our knowledge base or submit a ticket. We are happy to help!

PANLAB

Carrer de l'Energia 112
08940 – Cornellà de Llobregat
Barcelona - SPAIN

Technical Support

Email: support@panlab.com