Quick start with Neurobit Optima(+) device

Preface

This document is intended to ease the first steps with the Neurobit Optima(+) equipment. It does not replace the instruction manual or associated documentation.

Neurobit equipment can be used with various software, modalities and sensor systems. Please familiarize yourself with the manuals/instructions of the software and sensors which you are going to use. As an example the use of the BioExplorer software (v. 1.7) for one channel EEG measurement is described in *italics* below. If you use other software, skip these parts and follow your software manual.

Software setup

If you have not installed a software application, do this first.

1. *Plug the BioExplorer license key into a USB port.*
2. *Download the latest BioExplorer installer (full version) from its manufacturer's website: http://www.cyberevolution.com/download.htm*

   HINT: The demo version may not implement Neurobit Optima(+).
3. *Run the installer and follow the instructions on the screen.*

Upgrade the Neurobit Driver used by your software application:

1. Download the latest driver version for your application from the webpage: https://www.neurobitsystems.com/download/Neurobit_Runtime-versions.htm
2. Unpack the downloaded archive to a suitable folder of your application (as specified on the above webpage), overwriting any existing files. The application should not be running during this step.
   HINTS:
   - Administrator rights may be required in your system to overwrite the older driver files.
   - If security software blocks the operation, an exception will need to be configured.

   For BioExplorer, the archive should be unpacked to the main application folder.
3. Restart your system.

Bluetooth installation

This section concerns Neurobit Optima* BLE and Neurobit Optima* BT models.

The BLE models require Bluetooth hardware v. 4.2 or newer and Windows 11, 10 or 8.1. The BT models can work with Bluetooth hardware 2.0 or higher, with Windows 11/10/8/7/Vista/XP systems.

If your computer is equipped with built-in Bluetooth hardware of the appropriate version, make sure, that it is enabled. (Some computers have a special button to switch Bluetooth and/or Wi-Fi on and off, or suitable icon on the task bar. If you have any doubts, consult your computer's manual.)

If you are not sure which Bluetooth version is supported by your computer, you can checki it using instructions by Microsoft.

If your computer does not have internal Bluetooth hardware, install a suitable Bluetooth USB adapter:

1. Connect the adapter to a USB port.
2. The system should detect the new hardware and automatically install the required drivers (already available in the system, no CD or download is required).

Neurobit Optima* USB setup

1. Install driver software for USB chip by FTDI. For Windows 7-11 download the file https://ftdichip.com/wp-content/uploads/2021/08/CDM212364_Setup.zip and extract the EXE file included there. (For Windows Vista or XP download the file https://www.ftdichip.com/Driver/CDM/CDM20824_Setup.exe instead.)

   Then click the EXE file with right mouse button and select "Run as administrator".
2. Connect the ISOL USB port of the device to the computer with a USB 2.0 cable with a micro B plug on one end and an A plug on the other end. The Link indicator should light red.
3. Briefly press the on/off button. The Power indicator should light green and the device should beep briefly.

   The computer should detect the device and install the driver necessary for its USB module.

   On successful installation, the device's Link control should continuously shine green, and there should be a correctly installed "USB Serial Converter" device in the system Device Manager, in the section "Universal serial bus controllers". In Windows 10 or 11 settings, on the Devices window, the device "Neurobit Optima*" should appear (without any comments).

Neurobit Optima* BLE or BT setup

1. Open the battery compartment at the bottom of the device, slightly pressing an arrow on the lid with your thumb and pulling it out. Insert 2 fresh AA batteries (alkaline or rechargeable Ni-MH), observing their polarity, as follows: insert a battery with the positive pole facing downward, push it to the metal contact in the enclosure. Next, squeeze in the negative pole end. Close the lid.
2. Briefly press the on/off button. The Power indicator should light green and the device should beep briefly.

   HINT: The device automatically shuts off after 10 min. in the idle state (without a data link to a computer). If this occurs during the next steps, simply turn the device back on.
3. Place the device in the vicinity of the computer.
4. Pair the Neurobit Optima(+) with your computer to enable Bluetooth communication.

   Note: Depending on the operating system version and configuration, authorization may be required during the above process.

   - Windows 10:

     a) In the Windows menu, select the Settings icon and click the Devices group.

     Alternatively, on the task bar, you can right-click the Bluetooth icon (if not hidden) and select "Show Bluetooth devices".

     b) Click or press the "Add device" button, then select "Bluetooth".

Any Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a few dozen seconds. Wait until "Neurobit" or "Neurobit Optima*" appears. Select that device.

c) In the PIN field, enter device pairing code: 000000 (6 zeros) for BLE model or 0000 (4 zeros) for BT model. Click or tap the Link button.

- Windows 7 or 8:

a) In the system "Control Panel", run the "Devices and Printers" module (visible in large or small icons view).

Alternatively, on the task bar, you can right-click the Bluetooth icon (if not hidden) and select "Show Bluetooth devices".

b) Tap or click the "Add device" button.

c) Any Bluetooth devices detected in the vicinity (and not paired yet) will be listed within a few dozen seconds. Wait until "Neurobit" or "Neurobit Optima*" appears. Select that device, then tap or click the Next button.

d) Enter the device pairing code: 000000 (6 zeros) for BLE model or 0000 (4 zeros) for BT model. Click or tap the Next button.

After a successful pairing, close the window.

IMPORTANT: Immediately after pairing of the device (and before you start any application interoperating with it), only the Power indicator of the device should be lit. If the Link indicator is also lit, the Bluetooth hardware driver in use is probably not fully compatible with Windows and will not work with Neurobit Optima(+). When it occurs for a computer with internal Bluetooth hardware:

a) Disable the internal Bluetooth according to the computer's user manual (e.g. with a special button on the keyboard).
b) Return to the "Bluetooth installation" section above and follow the procedure for a computer without internal Bluetooth hardware.

Preparation for measurements

1. Connect the selected sensor(s) to the unit. For simplicity of initial checking, one channel measurement is recommended.

   For typical one channel EEG measurement, please connect 3 electrodes to channel A in the following way:

   A+ input: head electrode (for example at the CZ site),
   A- input: electrode on the right earlobe (the A2 site) or behind right ear (M2),
   VG port: electrode on the left earlobe (the A1 site) or behind left ear (M1).

   Details of electrode application on the skin depend on a montage system in use and are described in a separate instruction.

2. Run your software and select interoperation with Neurobit Optima.

   In BioExplorer, select the BioExplorer/Devices option from the main menu, in the "Device Manager" window click the Add button, select your model of Neurobit Optima(+) from the list and click OK.

REMARK for BioExplorer ver. 1.7.0.680 or older:

In the Devices window, only a basic group of models (Neurobit Optima 2 or 4), with a number of versatile channels the same as in the owned device, is selected.

HINT: Only one Neurobit Optima(+) device should appear in the "Device Manager" window.

3. Configure the device for the planned measurement.

   In BioExplorer, click the "Optima Config Window" button (in the "Device Properties" window). The device settings window will appear (it may take a few seconds, if the unit is off).

   REMARK for BioExplorer ver. 1.7.0.680 or older:

   On the General tab, in the "Device model" field, select the model of your device.

   There is a tab for each measurement channel. Enable and configure the channels which you plan to use in the nearest session.

   For one channel EEG, simply check "Channel enable" on the "Chan A" tab (the other fields are already set for EEG measurement, by default).

   HINT: Channels which will not be used (i.e. will not be connected to signal sources) in a given session should have their "Channel enable" fields unchecked.

4. Test electrode-skin impedances and the continuity of the input connections:
   a) Select the Test tab in the device settings window.
   b) Click the Test button.

      The Link and Signal indicators on the device front panel should begin to shine, and impedances will be shown with bar graphs and digital values on the Test tab. If everything is working correctly, all of the indicators and bars should be green (or eventually yellow). If there is any red, the connections and/or electrode applications should be corrected.

   c) When you get correct and stable test results, click the Stop button, then the Close button.

Measurement session

1. Load an example design (configuration) of data processing and presentation in your software.

   In BioExplorer, select the Design/Open command from the main menu, select a design file, e.g. Examples\AlphaMIDI.bxd, and click the Open button.

2. Start a session.

   In BioExplorer, click the Play button below the main menu (or select the Session/Play command from the menu). Raw measured and/or processed signals should now appear in the BioExplorer Instruments window(s). Some audio and/or visible feedback may also be available – depending on the loaded design.

Additional resources

Sets of example designs of data processing and presentation for several software applications can be found in the Designs folder on CD supplied with the equipment.

> *For BioExplorer software, the archive Designs\BioExplorer\Neurobit_designs_for_BioExplorer.zip should be unpacked (e.g. to the Designs subdirectory in the user's document folder created by this software), preserving the structure of the folders stored in the archive. When a selected design (e.g. Neurobit\Optima4\EMG.bxd) is opened in the application (Design/Load in the main menu), a short design description can be shown (via the Design/Notes menu option).*

Suitable settings of device channels are loaded along with a design for the BioEra Pro and BrainBay software.

> *The design files for BioExplorer (ver. 1.7) do not include device settings. For this reason, the delivered designs are accompanied by corresponding device configuration files (e.g. Neurobit\Optima4\EMG.nbc). Instead of manual channel configuration, it is possible to load a suitable configuration file with the Load button in the device settings window (BioExplorer/Devices/selected device/Properties/"Optima Config Window").*

Additional hints for BioExplorer users

1. *If necessary, **additional resources for BioExplorer** (electronic tutorial, training designs, biofeedback games) can be purchased online on the websites: https://brain-trainer.com/product/brain-trainer-design-subscription/, https://brain-trainer.com/shop/products/games/*

   These products are delivered electronically.

2. *Only one Neurobit Optima(+) device should appear in the "Device Manager" window.*
3. *If you have added a Neurobit Optima(+) in the "Device Manager", but the Link control of the unit is blinking green and measurements do not start, check if you have enabled at least one measurement channel in the device settings window.*
4. *A flashing green Link control on a Neurobit Optima(+) unit may also result from the selection of an incorrect device model (e.g. 4-channel instead of 2-channel one or vice versa) in the "Device manager".*
5. *When there are some enabled measurement channels, which are not (correctly) connected to signal sources, the device may signal errors with the Signal indicator and beeps. Thus, all unused channels should be disabled in the device settings window.*
6. *BioExplorer does not configure the device channels based on the design of signal processing. Thus, when you open a design using a different number of channels or different modalities than were used most recently, the device settings should be adjusted manually.*
7. *In order to facilitate frequent adjustments of the device configuration, you can save the selected settings with the Save button in the device settings window, and then restore them with the Load button, as needed.*
8. *BioExplorer keeps the device on and measuring even when a session is stopped in the application. In order to save batteries, you can simply turn the device off when not in use.*