The use of BioExplorer 1.7 with Neurobit devices
Quick start

Setup

The setup of Neurobit Optima(+) equipment with software is described in a separate document. If you want to setup BioExplorer for equipment installed earlier, follow the instructions below:

1. Plug the BioExplorer license key into a USB port.

2. Download the latest BioExplorer installer (full version) from the 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.

4. Download the latest Neurobit Driver version for your application from the webpage:
    http://www.neurobitsystems.com/download/Neurobit_Runtime-versions.htm

5. Unpack the downloaded archive to the installation folder of your application, 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.

6. Restart your system.

Preparation for the first session

1. If you use a Neurobit Lite unit, place it within range of the infrared adapter (optimally about 30 cm), with the black cap of the battery compartment facing it.

2. Apply the selected sensors (we recommend you test with one EEG signal initially) and turn on the unit.

3. Launch the BioExplorer application.

4. Select the BioExplorer/Devices option from the main menu. In the "Device Manager" window, click the Add button, select your Neurobit device 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, are selected.

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

5. For the Neurobit Optima(+) device, 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).

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

There is a tab for each measurement channel. Enable and configure the channels that you plan to use in the nearest session. At the beginning, we suggest you enable channel A, and keep the other settings in their default states.

For Neurobit Optima(+), you can now test the impedances of the electrode-skin contacts or sensor circuits on the Test tab.

When finished, close the device settings window, as well as the "Device Properties" and "Device Manager" windows.

HINT: The device configuration will be restored when the application is next started. If necessary, you can modify the settings (or test the impedances for Neurobit Optima(+)), by selecting the BioExplorer/Devices option again, highlighting the device in the "Device Manager" window and clicking the Properties button.

6. The word "Connected" should appear on the status bar of the BioExplorer (under the menu and icon bars). Measurements will start in the device. A transmission progress bar will appear on the Neurobit Lite screen, or the Link and Signal lights will light on the Neurobit Optima(+) unit.

   If BioExplorer does not correctly connect to the device, check the "Known issues" section near the end of this document.

Session with an example design

1. Using the Design/Open option, load one of the ready-to-use designs of data processing and presentation, for example Designs\Examples\AlphaMIDI.bxd. In this example design, the feedback signal is the level of alpha brainwaves, traditionally associated with relaxation.

2. To start a session, click the Play icon (under the main menu of the application; it is equivalent to the Session/Play menu option).

   Moving graphs should appear in the Instruments1 window. The feedback signal is presented with sounds and a bar graph on the screen (more alpha waves, the longer the bar). Apart from that, the raw EEG signal is showed, as well as the course of the alpha waves in time and the frequency spectrum of the EEG signal (the vertical axis of the spectrum diagram corresponds to the amplitude of the individual wave components of the EEG, with frequencies given on the horizontal axis; alpha brainwaves have frequencies in the range of 8 to 12 Hz).

3. If necessary, you can change the processing or presentation blocks settings, e.g.:
   - the scale of the raw EEG diagram (select the Objects/Oscilloscope1 option from the application menu, then change the Sensitivity value on the CH1 card of the window that appears), or
   - the range of the sound pitch corresponding to the level of alpha waves (select the Objects/MIDI1 option, then change the "Notes/Input range" parameter).

Another example of data processing and presentation is design Designs\Examples\FlashPacMan.bxd, which includes a simple Flash game controlled via EEG.

With practice, you can modify the example designs included in the package (e.g. you can choose another frequency band of the trained brainwaves) or build your own designs. The software also enables signal recording to disc, replaying of recorded sessions, the creation of reports, and many other features.

Using video files for biofeedback

1. In the Design menu of the application, select Open and choose the example design for video files: MultiThresholdVideo.bxd.

2. Right-click on the Instrument2 window (or the VideoPlayer1 element in the signal diagram window), and select Properties. On the Playlist tab, click the Add button and select a video file to play. Click OK in Properties window.

3. Click the Play button to start a session.

    By default, the video is played whenever signal amplitudes in three EEG bands meet a criterion. With different connections of VideoPlayer element inputs, the brightness and other parameters can also be controlled by feedback signal.

If there is a problem with a specific video file format, please test if it can be played in Windows Media Player. If not, an additional plug-in for WMP may be required.

DVD biofeedback

DVD preparation

Correct DVD control depends on the proper interoperation of a few software components from different manufacturers, especially:

- Microsoft Windows operating system,
- DVD decoder (often not included in the system, but purchased separately),
- BioExplorer application using the DVD interface of the operating system.

Compatibility problems quite often occur here.

1. First of all, ensure that you can play a DVD in Windows Media Player (a Microsoft application included in the system). Run the application (e.g. from your system Start menu). On the Play menu, select the "DVD, VCD or CD Audio" option and select DVD drive. The DVD should start playing.

    However, if you see a message saying that WMP cannot play the DVD because no compatible DVD decoder is installed, you have a few options:

    a) The free DScaler decoder, compatible with BioExplorer, is available on the webpage
    http://www.free-codecs.com/dscaler_mpeg_filters_download.htm

    b) Some decoders compatible with WMP are listed on the webpage
    https://support.microsoft.com/en-us/help/17948/plug-ins-and-add-ons-for-windows-media-player
    They can be bought over the Internet and downloaded.

    c) Alternatively, you can purchase a DVD software package which includes a decoder for WMP, for example WinDVD or PowerDVD.

2. On the main menu of BioExplorer, select BioExplorer, then Preferences. On the "DVD settings" tab, select navigator, video decoder and audio decoder. (If there are a few video decoders in your system, you can choose the one you prefer. If it does not work properly, install and select the DScaler decoder mentioned above.)

3. Initially, it may be convenient to test DVD playing with example session data from disc. In the Session menu of the BioExplorer application, select the Playback option and choose the Examples\CESample.bxs session file. Answer "No" to the question "Open Session's Design?".

   (After a successful initial test of DVD playing, you can switch to physical measurements with the Session/Capture option and then Session/Play.)

DVD session

1. In the Design menu, select Open and choose the DVD.bxd example design.

2. Place a DVD in the drive. After a while, select the Session/Play option on the BioExplorer menu (it will start signal processing). Then click the Start button and the Control button on the DVD window of BioExplorer (at the bottom).

3. The DVD should be playing now, with image size and brightness controlled via the feedback signal. With other connections of the DVD Player's inputs, the volume can also be controlled or the movie can be stopped, when the signal is under a given threshold.

If there are problems with the DVD, further information can be found in BioExplorer help, in the "Design Object Reference"/"WM DVD Player" and "DVD Player" chapters.

Known issues

1. BioExplorer it is not adapted to simultaneous support of several Neurobit Optima(+) devices. Only one such device should appear in the "Device Manager" window.

2. If you have added a Neurobit Optima(+) in the "Device Manager", but the Link control of the unit blinks and measurements do not start, check if you have enabled at least one measurement channel in the device settings window.

3. Flashing Link control on a Neurobit Optima(+) unit may also result from selection of an incorrect device model (e.g. 4-channel instead of 2-channel one or vice versa) in the "Device manager".

4. BioExplorer does not configure Neurobit Optima(+) channels based on the design of the signal processing. Thus, when you load a design using a different number of channels or different modalities than recently, the device settings should be adjusted manually.

5. In order to ease frequent adjustments of Neurobit Optima(+) 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. These features are available from v. 3.2.3 of the Neurobit Driver.

   A ready to use device configuration file (*.nbc) is included for each design in the package of example BioExplorer designs by Neurobit Systems.

6. BioExplorer keeps a device on and measuring even when the session is stopped in the application. In order to save batteries you can simply turn off the device when not in use.

7. In some circumstances, BioExplorer fails to initiate measurement mode in the <u>Neurobit Lite</u> unit. Among other things, this effect occurs when the unit is turned off while BioExplorer is launched or when the device is added in the "Device Manager" of the application. If the unit is turned on later, physical measurements don't start (even if you click the Play button in the BioExplorer window). There is no bar indicator of data transmission on the unit's screen (options of the device's menu are displayed there instead).

    If the device is connected with BioExplorer (the word "Connected" is displayed on the status bar of the application) and the device isn't in measurement mode for any reason, please simply turn off the device and turn on it again. (Alternatively, you can disconnect the device logically in the "Device Manager" with the square to the left of the device name and logically reconnect it.)

    Now the device should enter measurement mode. The transmission progress bar should appear and run on the device's screen. Assuming a valid design is loaded into BioExplorer (e.g from the Designs/Examples directory), graphs updated in real time should appear in an instrument window of the application. (You may then need to setup the sensitivity or other parameters of the design objects, e.g. "Spectrum Analyzer", to make these graphs easily visible.)

8. Some of antivirus/protection software may block transmission between the Neurobit unit and BioExplorer. The word "Connected" is displayed on the BioExplorer status bar but the device is not in measurement mode (the menu is still displayed on its screen) and no signal is processed in the application. In such a case, you can temporarily deactivate the protection software to test if it resolves the issue. If so, you can activate protection again, but configure a so-called exception for BioExplorer and/or the infrared driver to avoid the block. Details of the operation are specific to the protection application and should be available in its help.

9. If you tested an old version of BioEra (another piece of biofeedback software) with a <u>Neurobit Lite</u> device and installed the IrComm2k driver required by that application, you must uninstall IrComm2k to enable connection with BioExplorer. (Newer versions of the BioEra application do not use the IrComm2k driver.)

10. If you use a <u>Neurobit Lite</u> device, please remember that computer-based session is initiated from the computer side, and not with the Start! command from the device's menu. (For stand-alone training, initiated with Start! in the device, no data is transmitted to your computer.)

Further information and resources

1. BioExplorer electronic tutorial:
   http://www.itallis.com/shop/index.php?main_page=product_info&cPath=13&products_id=26

2. Example designs by Neurobit Systems, delivered on CD with the device.

3. Training designs and biofeedback games:
   http://www.itallis.com,
   https://brain-trainer.com/product/brain-trainer-design-subscription/

4. Extensions for BioExplorer: https://www.silencevision.com/

5. BioExplorer help menu.

6. Technical support of the software manufacturer, CyberEvolution, Inc.:
   http://www.cyberevolution.com/support.htm