# Audiovisual muscle therapy device

## Brief description

The aim of this device is to measure the muscle contraction of a person's muscle (e.g. biceps) in oder to give feedback to the person. Using adhesive electrodes the signal is measured and displayed on the device's screen. The user should try to meet the guideline also displayed with his actual muscle contraction as good as possible. Via headphones the device additionally plays music from an USB-Stick selected by the user. If the guideline does not match with the actual contraction, an overlayed error sound reminds the user to catch up.

## Attatching the electrodes

For properly measuring the muscle contraction, a total of three electrodes need to be attached. Two are used for the actual measuring process: Those should be placed directly above the muscle that shall be measured, closely together and be connected with the two black clips. The third electrode (red clip) helps the device to supress noise and error signals. Its placement is not very critial, somewhere around the measured muscle will do.
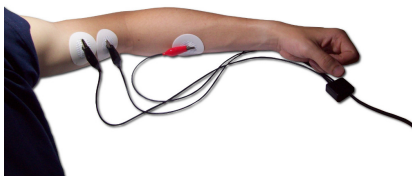


## Connectors and Controls

On the left, multiple connectors are located:



USB-Socket:
Preamplifier input:
Headphones jack:
Micro-USB (Power)
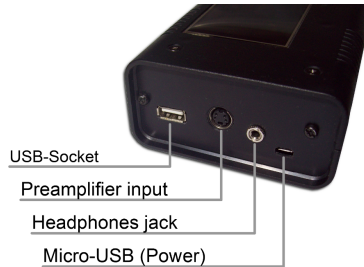
**USB-Socket:** A USB-Stick can be plugged in with the users favourite music for playing while the therapy session.

**Preamplifier input:** The electrode cabling with the preamplifier in line has to be connected here.

**Headphones jack:** The user can connect his headphones (or active loudspeakers) to listen to the music and the error sounds.

**Micro-USB:** The USB-powerpack is connected here to power the device.

On the other side, there is only the volume control for the headphones:



Headphone volume

Total setup:



## Powersupply and Charging

The device is powered via a USB-powerpack. An external USB Power-Supply (e.g. Micro-USB mobile phone charger) is needed to charge the powerpack. It is very important to only power the device via the powerpack or some accumulator, but never directly from the mains plug! That way, there is no way that the hazardous mains voltage can make its way (e.g. because of a powersupply failure, water etc.) to make its way through to the electrodes and injure the user.

**NEVER CONNECT THE DEVICE DIRECTLY TO A POWERSUPPLY WHILE THE ELECTRODES ARE ATTATCHED TO A PERSON'S BODY!**

## How to start a session

The device is started by connecting the powerpack to the Micro-USB-Connector. After a few tens of seconds, the device will have booted up and display the following screen:
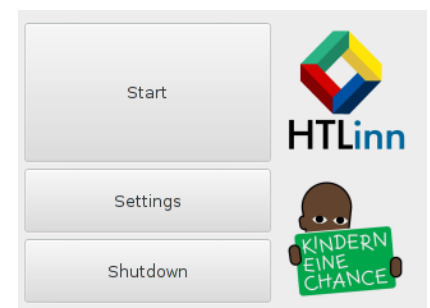


Before starting the training session some configuration can be made by clicking the Settings-button.
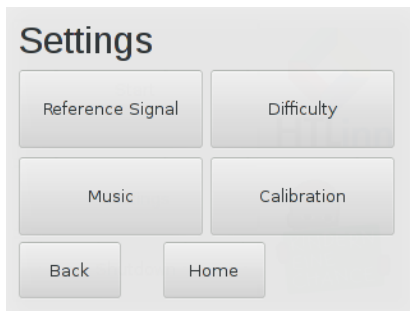
**Reference Signal:** By clicking on the Reference Signal-button another window appears:
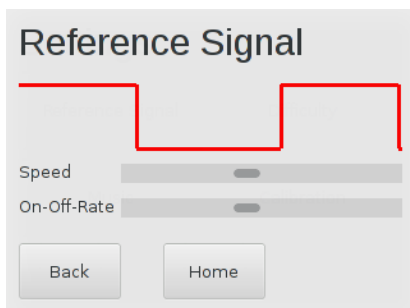


Here the signal which should be reproduced with the own muscle can be configured. Tab on the right or left side of the Speed-bar to define the frequency of the signal. Tab on the right or left side of the On-Off-Rate-bar to define the ratio between the time with contracted or relaxed muscle. A preview of the actual set reference signal is shown at the top of the window.

**Difficulty:** The Difficulty-bar can be used to set the muscle tension that is needed to reach the top line of the reference signal. If the slider is at the right side, a very high muscle tension is needed. If the slider is at the left side, it will be quite easy to follow the reference signal.

The Tolerance-bar is only needed if some music is played. If the slider is at the right side, the audio error signal will only get loud if the deviation is quite big. If the slider is left, already a very small deviation will cause a loud error signal added to the music.
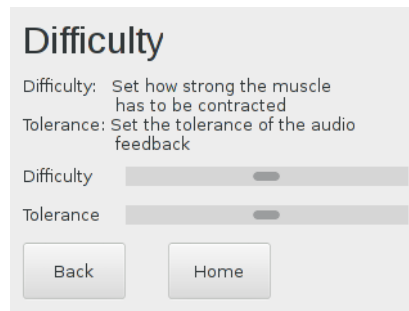
**Music:** The Music-dialog is needed to set the music that will be played during the training session. You can either choose from some internally saved music files or you plug in an USB flash drive. Select the wanted storage with the USB/Intern-button. Use the right and left arrows to switch through the available files. Folders are indicated by a blue font. Open a folder by clicking on the button named with the folder name. To go one level up to the top folder use the arrow at the top of the window. The music files at the USB drive have to end with .mp3 or .MP3. The dialog shows only mp3-files and folders. If you have found the correct song, click on the button named like the song to choose it as the song to play during the training sesssion.
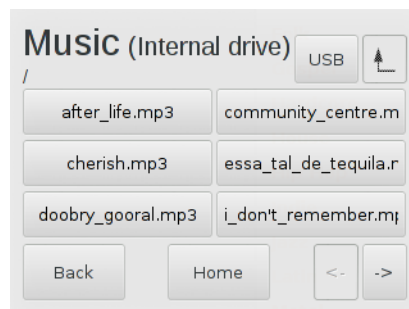


**Calibration:** The size of the measured signal depends on different factors like the state and position of the electrodes and the state of the skin (wetness). With the calibration dialog, the device can be calibrated to the actual situation.

At first the muscle of the patient should be relaxed. Click the Relaxed Muscle-button while the muscle is relaxed.
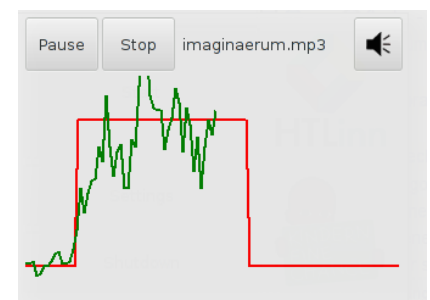
Then the muscle should be contracted as strong as possible and the button "Contracted Muscle" should be clicked. Now the device should be correctly calibrated.
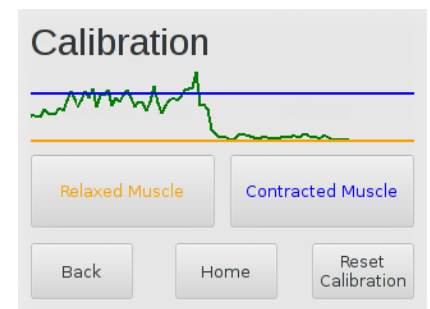


**Start:** By clicking the Home-button the main-window can be reached. Click Start to begin a training session.

The music will start playing and another window appears:



The red signal is the one that should be followed with the green signal which is the signal measured by the electrodes. Optionally the music can be muted with the loudspeaker-button at the top right side or you can pause the training with the Pause-button.

**Shutdown:** To turn the device off click the Shutdown-button at the main window. Confirm shutdown by clicking „Yes". The screen will get black. Wait a few seconds then you can remove the powerpack.

## Contact / Help

If you have further questions or any problems concerning this device please do not hesitate to contact us.

**E-Mail:**
Josef Heel:
    *j.heel@tele2.at*
Simon Kaufmann:
    *simon.kaufmann@aon.at*