

DIRAC LIVE 2.0

USER MANUAL SUPPLEMENT

APPLIES TO DIRAC LIVE 2.0 ENABLED MINIDSP PRODUCTS ONLY

STEREO VERSION

SUPPORTED PLATFORMS

DDRC-22

DDRC-24

SHD SERIES

SUPPORTED OS



macOS Mojave

Revision history

Revision	Description	Date
2.0 alpha3	Beta tester preview for Dirac Live 2.0, DDRC-24	23 January 2019
0.3	Preliminary standalone Dirac Live 2.0 manual	10 August 2019
0.4	Revised	16 August 2019
0.5	Added a step for Mac OS users in section 1.1.2	28 August 2019
0.6	Improved installation section	2 September 2019
0.7	Additional trouble-shooting/installation info	30 November 2019

IMPORTANT INFORMATION

Please read the following information before use. In case of any questions, please contact miniDSP via the support portal at minidsp.desk.com.

System Requirements

To configure the miniDSP audio processor, you will require a Windows PC or Apple Mac OS X computer with the following minimum specification:

Windows

- **Microsoft® Windows® 10**, latest version with all updates
- At least a dual core i3, i5, or i7 processor
- At least 2 GB RAM (4 Gb preferred)
- Two free USB 2.0 ports
- Internet connection

macOS

- **macOS 10.14 Mojave**, latest version with all updates
- At least a dual core i3, i5, or i7 processor
- At least 2 GB RAM (4 Gb preferred)
- Two free USB 2.0 ports
- Internet connection

Disclaimer/Warning

miniDSP cannot be held responsible for any damage that may result from the improper use of this product or incorrect configuration of its settings. As with any other product, we recommend that you carefully read this manual and other technical notes to ensure that you fully understand how to operate this product. The miniDSP audio processor is a powerful tool, and misuse or misconfiguration, such as incorrectly set gains or excessive boost, can produce signals that may damage your audio system.

As a general guideline, you should perform the initial configuration of the miniDSP audio processor before enabling audio through any connected output device or amplification. Doing so will help ensure that the software is correctly configured.

Finally, note that the miniDSP audio processor is a very flexible device, and many of the questions we receive at the tech support department are already answered in this user manual and in the online [application notes](#) on the miniDSP.com website. So please take the time to carefully read this user manual and the online technical support. Thanks for your understanding!

Warranty Terms

miniDSP Ltd warrants this product to be free from defects in materials and workmanship for a period of one year from the invoice date. Our warranty does not cover failure of the product due to incorrect connection or installation, improper or undocumented use, unauthorized servicing, modification or alteration of the unit in any way, or any usage outside of that recommended in this manual. If in doubt, contact miniDSP prior to use.

FCC Class B Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Warning: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice: Shielded interface cable must be used in order to comply with emission limits.

Notice: Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

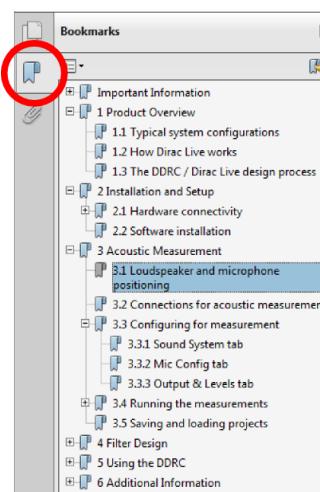
CE Mark Statement

The miniDSP processor has passed the test performed according to European Standard EN 55022 Class B.

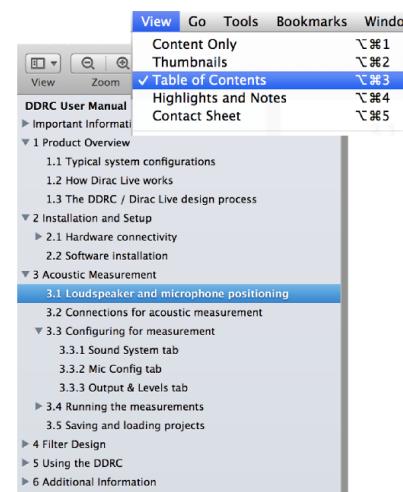
A note on this manual

This User Manual is designed for reading in both print and on the computer. If printing the manual, please print double-sided. The embedded page size is 8 1/2" x 11". Printing on A4 paper will result in a slightly reduced size.

For reading on the computer, we have included hyperlinked cross-references throughout the manual. In addition, a table of contents is embedded in the PDF file. Use the View menu (Preview on Mac) or the bookmarks sidebar (Adobe reader on Mac and Windows) to view this table of contents.



Adobe Reader on Windows



Preview on Mac

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1 OVERVIEW

This manual is a supplement to the main user manual for the **stereo** miniDSP Dirac Live processors. It will use “miniDSP processor” to refer to any of the following miniDSP processors:

- [DDRC-22](#)
- [DDRC-24](#)
- [SHD Series](#)



This software runs on Windows 10 or macOS 10.14 (Mojave) only

1.1 DIRAC LIVE 1 OR DIRAC LIVE 2?

The original Dirac Live software that ran on your PC or Mac to set up Dirac Live on miniDSP platforms like the DDRC-22, DDRC-24 and SHD Series was called **Dirac Live Calibration Tool**, or DLCT. This is now referred to by Dirac Research as “DLCT 1.x” ([FAQ](#)). The software suite and algorithm as a whole is also referred to sometimes as “Dirac Live 1” to distinguish it from “Dirac Live 2.”

The new version of Dirac Live that is explained in this manual was announced by Dirac Research as “Dirac Live 2.0”. This is a complete new architecture and codebase, so the “2.0” designation works in the general sense of “a second major version of something” ([Wiktionary](#)) rather than being just a code version number. While Dirac Research now refer to it as “New Dirac Live,” the “Dirac Live 2” designation seems to have stuck in common use. The software program that you run on your Mac or PC is now referred to simply as **Dirac Live**.

DLCT 1.x will continue to be supported by miniDSP as long as we can, because the new Dirac Live only runs on the most recent macOS and Windows operating systems. You can run Dirac Live 2 if your computer has:

- Windows 10, or
- macOS Mojave (10.14)

If you have an older operating system on your computer, you will need to continue using DLCT 1.x. In that case, please refer to the main user manual of your miniDSP processor for instructions.

1.2 IF YOU ARE UPGRADING FROM DIRAC LIVE 1

If you are upgrading from your Dirac Live 1 installation and are already familiar with the installation steps, you can follow this abbreviated guide.

If you are installing for the first time, please follow the instructions in Section 2.

1.2.1 What's different?

1. You must download software from [live.dirac.com](#) as well as from [miniDSP.com](#).
2. You can run only on Windows 10 and macOS Mojave.
3. You must start Dirac Live from within the miniDSP plugin.

4. The user interface is completely redesigned. See the rest of this manual.
5. You will need to create and log in to a Dirac Live account to use the software effectively.
6. You can use any *calibrated* microphone (although we support only the UMIK-1).
7. More measurement points can be used (up to 17).
8. Phase is analyzed in speaker pairs to improve imaging.

1.2.2 Install Dirac Live 2

Download Dirac Live 2 at this link:

- <https://live.dirac.com/download>

After downloading it, unzip and install it.

1.2.3 Install miniDSP software and update your processor

Download the miniDSP software package from the User Downloads section of the miniDSP.com website. **Make sure you download the software specifically marked as being for Dirac Live 2.0.** Unzip the download, and:

1. Install the new plugin,
2. a) If you are running Windows, have not previously installed the miniDSP UAC driver, and are using a processor that supports USB streaming including the following, install it.
 - a. DDRC-24
 - b. SHD and SHD Studio
- b) If you are running Mac OS, go to "System Preferences" -> "Sharing" and turn on "File Sharing" for the device discovery in Dirac Live to work. You can turn it off afterwards when you are not using Dirac Live
3. Update the firmware on your processor. This ensures that your processor starts with a "clean slate."
4. Use the plugin to connect to the processor and select **Refresh DSP Program** from the **Restore** menu.

1.2.4 Running Dirac Live

The procedure for running Dirac Live is different for Dirac Live 2:

1. Start the miniDSP plugin.
2. Click the **Start Dirac Live Software** button near the top right of the screen.
3. Dirac Live will start. If the plugin was connected, it will now disconnect.
4. You can continue to use Dirac Live while the plugin is running (and not connected).
5. If you want to reconnect the plugin to the miniDSP processor, be sure to quit Dirac Live before pressing the **Connect** button in the plugin.



You **must** follow the above procedure. If you just start Dirac Live without using the plugin as described above, Dirac Live will not be able to detect the miniDSP processor.

2 SOFTWARE INSTALLATION AND CONFIGURATION – WINDOWS 10

miniDSP processors are configured by software running on a PC or Mac. There are two sets of software to download and install, from live.dirac.com and from [miniDSP.com](https://www.minidsp.com).



The software described in this section runs on Windows 10 only. Other versions of Windows are not supported.

2.1 DOWNLOAD AND INSTALL DIRAC LIVE

Download the software for Windows 10 from <https://live.dirac.com/download/>.

Double-click on the downloaded installer to run it. It will have a name like **DiracLive v2.2.3 Setup Windows.exe**. We recommend that you accept the default installation settings. Do not run the Dirac Live software yet.

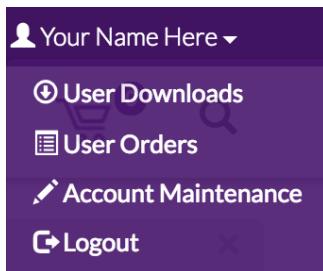
2.2 DOWNLOAD THE MINIDSP SOFTWARE

If you purchased your processor directly from miniDSP, your software will be available from the [User Downloads](#) section of the miniDSP website when your order ships. To access the download, you will need to be logged into the website with the account you created when purchasing.

If you purchased your processor from a miniDSP dealer, you will receive a coupon together with the product. Redeem this coupon at the link below:

- <https://www.minidsp.com/support/redeem-coupon>

The User Downloads link is visible from the dropdown menu at the top right of the website page:



Navigate to the folder listed below and download the Dirac Live 2.0 version of the software:

- DDRC-22: Dirac Series -> DDRC-22 software -> [DDRC-22 software for Dirac 2.0](#)
- DDRC-24: Dirac Series -> DDRC-24 software -> [DDRC-24 software for Dirac 2.0](#)
- SHD Series: SHD series -> [SHD software for Dirac 2.0](#)

Download the file and unzip it (right-click and select “Extract All...”). The unzipped download has a name like **DDRC_24_108_Dirac2_drv_4_67**.

2.3 INSTALL THE MINIDSP SOFTWARE

Possible Windows installation issues

The miniDSP software requires that a number of other frameworks be installed for it to work. These packages should be installed automatically, but you can manually install them if you receive an error message that required software is missing.

- [Microsoft .NET framework](#) (version 3.5 or later)
- Latest version of [Adobe Air](#)
- Microsoft Visual C++ 2010 Redistributable Package: for [x86](#) (32-bit operating system) or [x64](#) (64-bit operating system).

Plugin installation

1. Navigate to the **Plugins** folder of the software download and then to the **Windows** folder.
2. Double-click on the plugin installer to run it. It will be named **DDRC_22.exe**, **DDRC_24.exe**, or **SHD.exe**. We recommend that you accept the default installation settings.

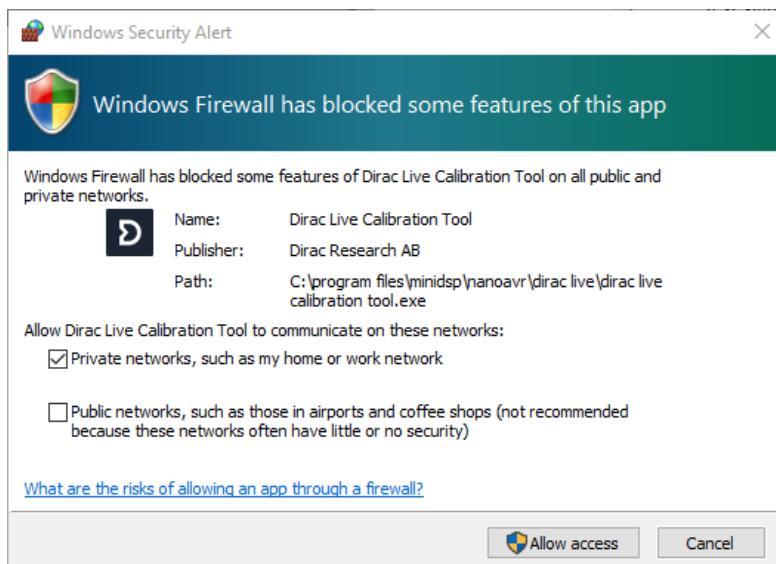
UAC driver installation (DDRC-24 and SHD Series only)

1. Connect the processor to the computer using the supplied USB cable, and power it on.
2. Navigate to the **WinDrivers** folder of the software download and double-click on the appropriate installer:
 - **miniDSP_UAC2_v2.29.3_ForWinXP_Vista.exe** for Windows XP and Vista
 - **miniDSP_UAC2_v4.47.0_ForWin7_8_10.exe** for Windows 7, 8, and 10

(The version number embedded in the filename may be different.)

We recommend accepting the default installation location. Once the driver installation completes, click the **Finish** button.

Note: the first time you run Dirac Live, you may see a Windows Firewall warning as shown below. If so, ensure that “Private networks...” is checked and “Public networks...” is not checked. Then click on “Allow access.”



3 SOFTWARE INSTALLATION AND CONFIGURATION – MACOS 10.14 MOJAVE

The miniDSP Dirac Live processors are configured by software running on a PC or Mac. There are two sets of software to download and install, from live.dirac.com and from [miniDSP.com](https://www.minidsp.com).

This section describes download and installation for MacOS 10.14 Mojave.



**This software described in this section runs on macOS 10.14 (Mojave) only.
Other versions of MacOS are not currently supported.**

3.1 DOWNLOAD AND INSTALL DIRAC LIVE

Download the software for macOS Mojave from <https://live.dirac.com/download/>.

Double-click on the downloaded file to unzip it. Then double-click on the unzipped installer file to run it. It will have a name like **DiracLive v2.2.3 Setup Darwin.app**. We recommend that you accept the default installation settings. Do not run the Dirac Live software yet.

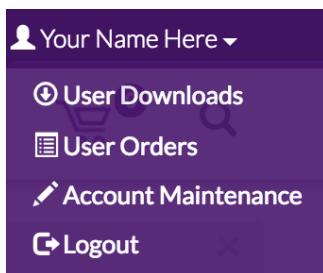
3.2 DOWNLOAD THE MINIDSP SOFTWARE

If you purchased your processor directly from miniDSP, your software will be available from the [User Downloads](#) section of the miniDSP website when your order ships. To access the download, you will need to be logged into the website with the account you created when purchasing.

If you purchased your processor from a miniDSP dealer, you will receive a coupon together with the product. Redeem this coupon at the link below:

- <https://www.minidsp.com/support/redeem-coupon>

The User Downloads link is visible from the dropdown menu at the top right of the website page:



Navigate to the folder listed below and download the Dirac Live 2.0 version of the software:

- DDRC-22: Dirac Series -> DDRC-22 software -> [DDRC-22 software for Dirac 2.0](#)
- DDRC-24: Dirac Series -> DDRC-24 software -> [DDRC-24 software for Dirac 2.0](#)
- SHD Series: SHD series -> [SHD software for Dirac 2.0](#)

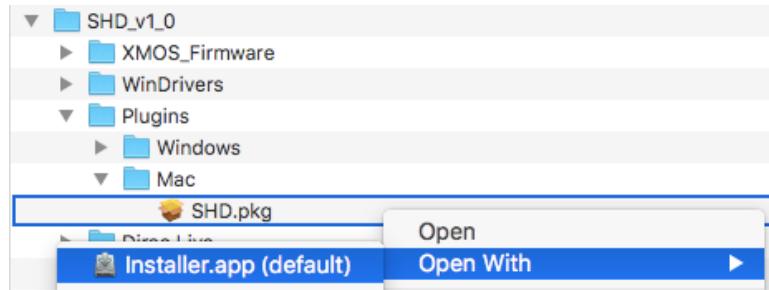
Download the file and unzip it (double-click on it). The unzipped download has a name like **DDRC_24_108_Dirac2_drv_4_67**.

3.3 INSTALL THE MINIDSP SOFTWARE

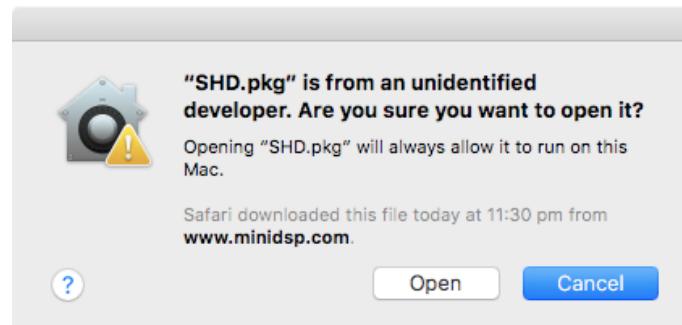
Possible Mac installation issues

If double-clicking on the installer brings up a message that the installer cannot run, use this alternate method:

1. Right-click on the installer (or click while holding the Control key).
2. Move the mouse over the “Open With” item and then click on “Installer (default).”



3. The following window will appear. Click on “Open.”



Plugin installation

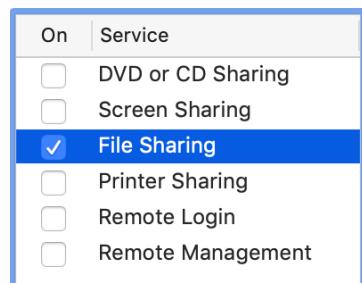
1. Navigate to the **Plugins** folder of the software download and then to the **Mac** folder.
2. The installer program will be named **DDRC_22.pkg**, **DDRC-24.pkg**, or **SHD.pkg**. To run it, double-click on it, or right-click and open as described above. We recommend that you accept the default installation settings.
3. To run the plugin, locate it in the Applications -> miniDSP folder and double-click on it. To make it easier to run in future, right-click on its dock icon and select Options -> Keep in Dock.

File sharing for device discovery

To enable device discovery, open System Preferences and then go to Sharing. Enable File Sharing as shown at right.

Notes:

- a) This step is not always necessary, and may depend on your Mac's configuration or home network setup.
- b) You can turn File Sharing off again after you have completed your calibrations.



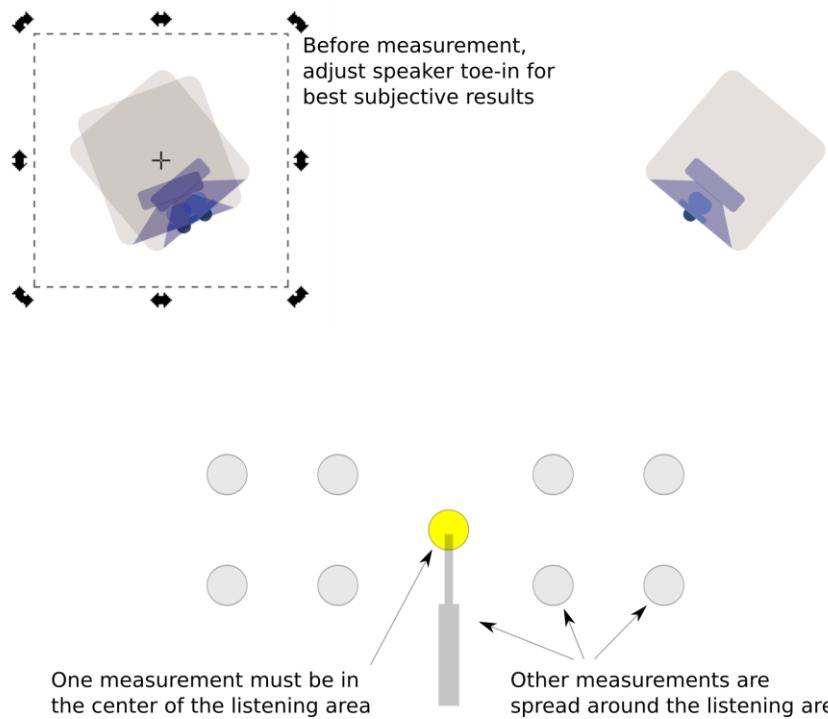
4 ACOUSTIC MEASUREMENT FOR DIRAC LIVE

Dirac Live uses between 9 and 17 measurements made in your listening room to calculate correction filters for the left and right channels. The measurements are made using the miniDSP processor, your computer and a miniDSP UMIK-1 measurement microphone.

4.1 LOUDSPEAKER AND MICROPHONE POSITIONING

Prior to performing acoustic measurements, optimize your loudspeaker and listening positions. Start with the recommendations of the manufacturer of your loudspeakers. Loudspeakers designed for home hifi use typically perform best away from the walls, whereas speakers designed for studio use may be designed for use closer to walls or other surfaces. With Dirac Live®, you have more freedom with loudspeaker placement, but the best result will still be achieved if optimal loudspeaker placement is used together with Dirac Live®.

You should also experiment with toe-in – many loudspeakers benefit from pointing directly at the listening position or even slightly in front. The listening position should be away from the rear wall, as placing the listening chair or sofa right against the wall will result in increased early reflections and changes in timbre.

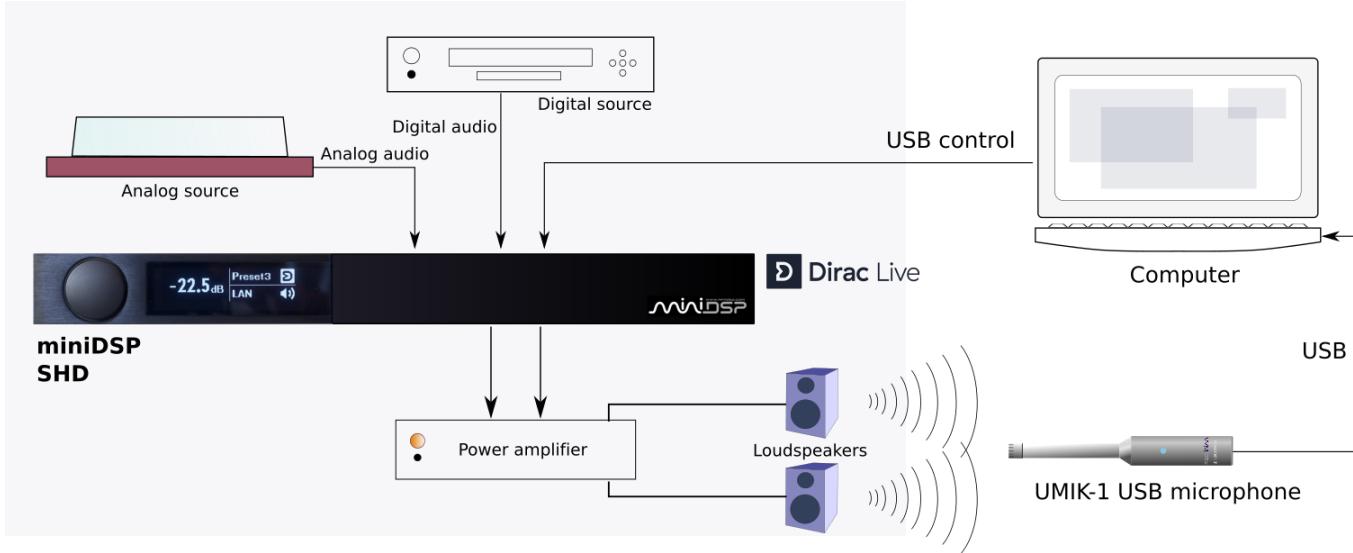


A total of 9, 13 or 17 measurements is recommended, with the microphone located in different positions in the room and pointed between the two speakers. One of the measurements must be taken at the **exact center** of the listening area, so that Dirac Live can set the levels and delays of each speaker. While this will usually place the microphone an equal distance from both speakers, Dirac Live® will adjust in cases where it is not. Additional measurements are taken at other positions around the listening area and at different heights from the floor.

4.2 CONNECTIONS FOR ACOUSTIC MEASUREMENT

The figure below shows a typical connection diagram for performing acoustic measurement. No changes to existing audio connections are needed. Simply:

1. Connect the supplied USB (type A to mini type B) cable from the processor to a USB port on the computer.
2. Connect the supplied USB (type A to mini type B) cable from the UMIK-1 to a USB port on the computer.



Place the UMIK-1 microphone into the microphone stand and point it between the speakers. Position the computer and cabling so that there is enough freedom of movement to move the microphone into the needed measurement positions.

Note that all measurement positions should have acoustic “line of sight” i.e. the direct signal from the speaker to the microphone should not be obstructed by furniture. You may need to alter your measurement positions if this is not the case.

4.3 CHECK YOUR CONFIGURATION/PRESET

Some miniDSP processors provide additional DSP functionality in addition to Dirac Live, in particular the ability to set up processing such as parametric EQ, crossovers, and delay on the output channels. This section applies to those processors only.

It is important that you have the correct configuration selected before running measurements for calibration. This is because the Dirac Live test signal passes through a mixer matrix and the processing on the output channels.

For example, suppose you have set up configuration 2 with routing and output channels for a subwoofer crossover. Before starting Dirac Live (**Start Dirac Live Software** button), select configuration 2 from within the plugin or with the remote control.

4.4 WINDOWS 10 USERS – BEFORE YOU PROCEED

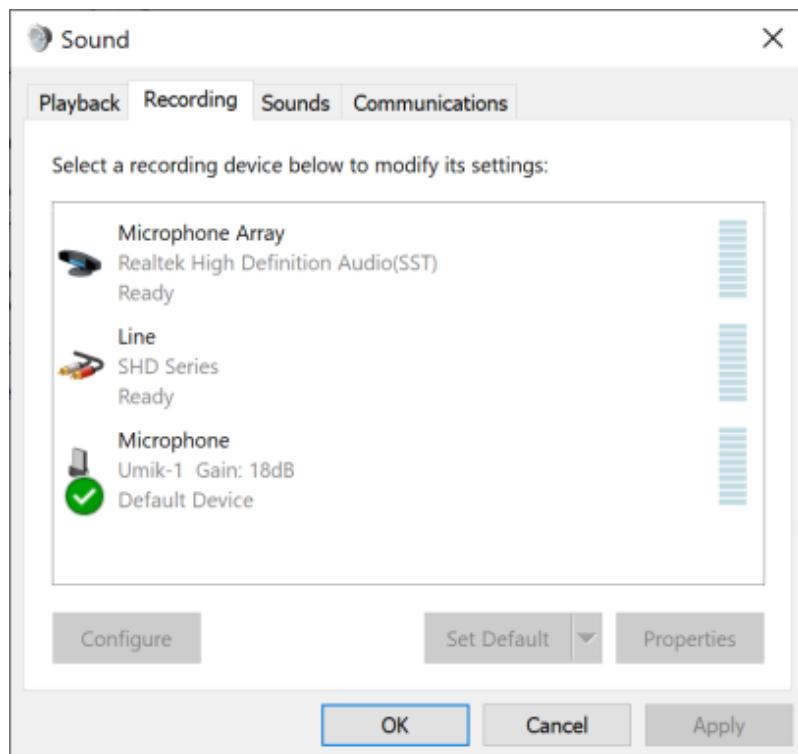
Double-check the following items. Doing so can prevent some common issues that arise. Do this **before** starting the Dirac Live application.

UMIK-1 plugged in

If you haven't plugged in your UMIK-1 yet, plug it in now.

UMIK-1 is set as the default recording device

Open the Windows Control Panel, and select the Sound pane then the Recording tab. Check that the UMIK-1 is set as the default recording device. If it is not, then click on it and then on the Set Default button.



Dirac Live has access to microphones

Open the Windows 10 Settings and select Security, then Privacy then Microphone. Check that “Allow apps to access your microphone” is turned on.

Allow apps to access your microphone

If you allow access, you can choose which apps can access your microphone by using the settings on this page. Denying access blocks apps from accessing your microphone.



Scroll down and check that “Allow desktop apps to access your microphone” is also turned on, and that DiracLive.exe is listed with the applications that are allowed to access the microphone:

Allow desktop apps to access your microphone

Some apps and Windows features need to access your microphone to work as intended. Turning off this setting here might limit what desktop apps and Windows can do.



Some desktop apps might not appear in the following list or are not affected by this setting. [Find out why](#)



REW room acoustics and audio analysis software

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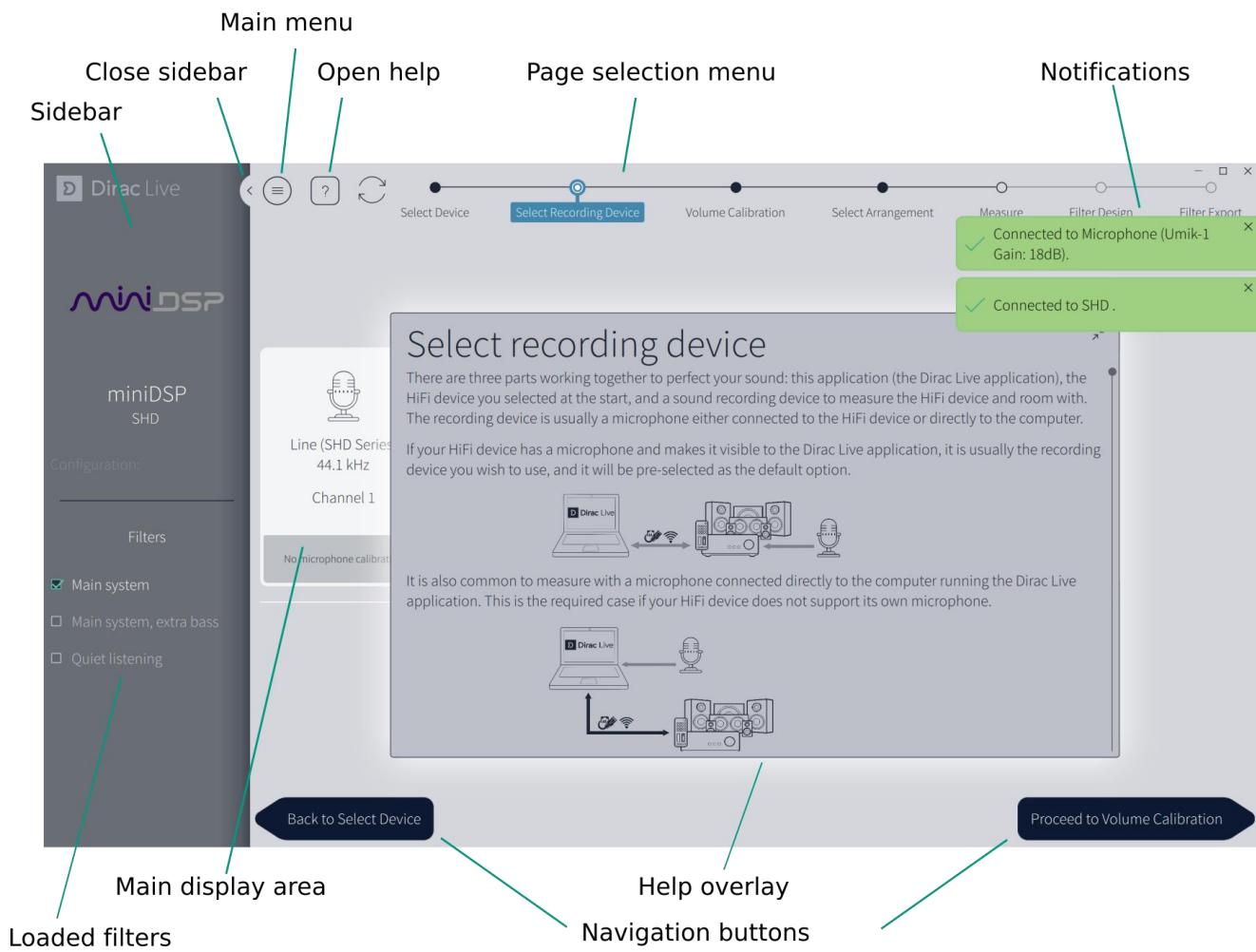


DiracLive.exe

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4.5 GENERAL FEATURES OF THE DIRAC LIVE UI

The general features of the Dirac Live user interface are illustrated in this screenshot.



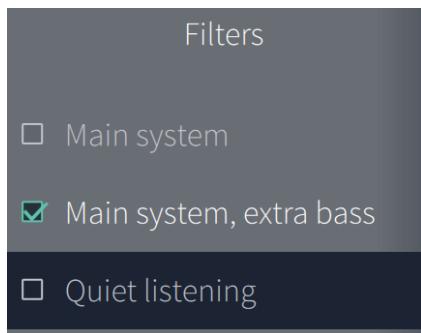
4.5.1 Sidebar

The sidebar shows the currently selected device. The lower portion lists loaded filters. The sidebar can be closed with this icon:



4.5.2 Loaded filters

After correction filters have been loaded into the miniDSP processor (see page 42), the list of loaded filters appears here. Enabling a filter will turn on that filter, and also change the preset configuration to the matching slot. For example, filter “Main system, extra bass” is enabled in the screenshot below; since this filter was loaded into slot 2, the back-end processing for slot 2 is also enabled.



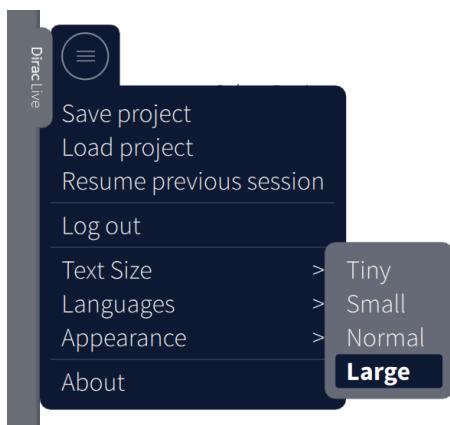
4.5.3 Page selection menu

Once the output device has been selected, the main page menu appears. This menu indicates which page you are currently viewing. In addition, you can navigate directly to a page by clicking on its name in the menu.



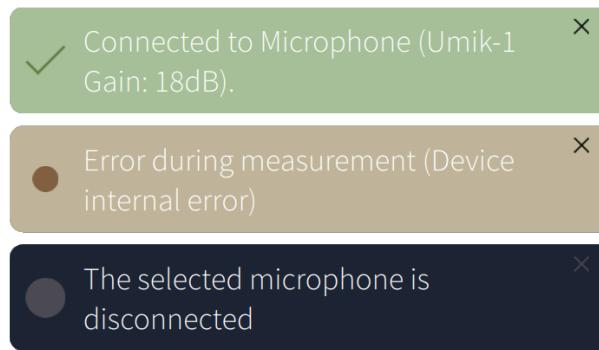
4.5.4 Main menu

The “hamburger” icon towards the top left drops down a menu with a small number of useful items:



4.5.5 Notifications

When events happen, a notification appears to the top right of the page. Normal notifications are in green, with warnings and errors in black and orange:



To close a notification, click on the “X” at its top right.

4.5.6 Help overlay

The help overlay appears on each page the first time you open it. You can scroll to read all of it. Note that the recommendations in the Help overlay are generic to Dirac Live – that is, they do not necessarily apply to the specific device that you are using. For example, it may say “If your HiFi device has a microphone...” – this does not apply to the miniDSP processor.

To close the overlay, click on the icon at its top right (partially obscured in the example screenshot):



To open the help overlay again, click on the question mark icon:



4.5.7 Main display area

The Main display area contains the key information of each page.

4.5.8 Navigation buttons

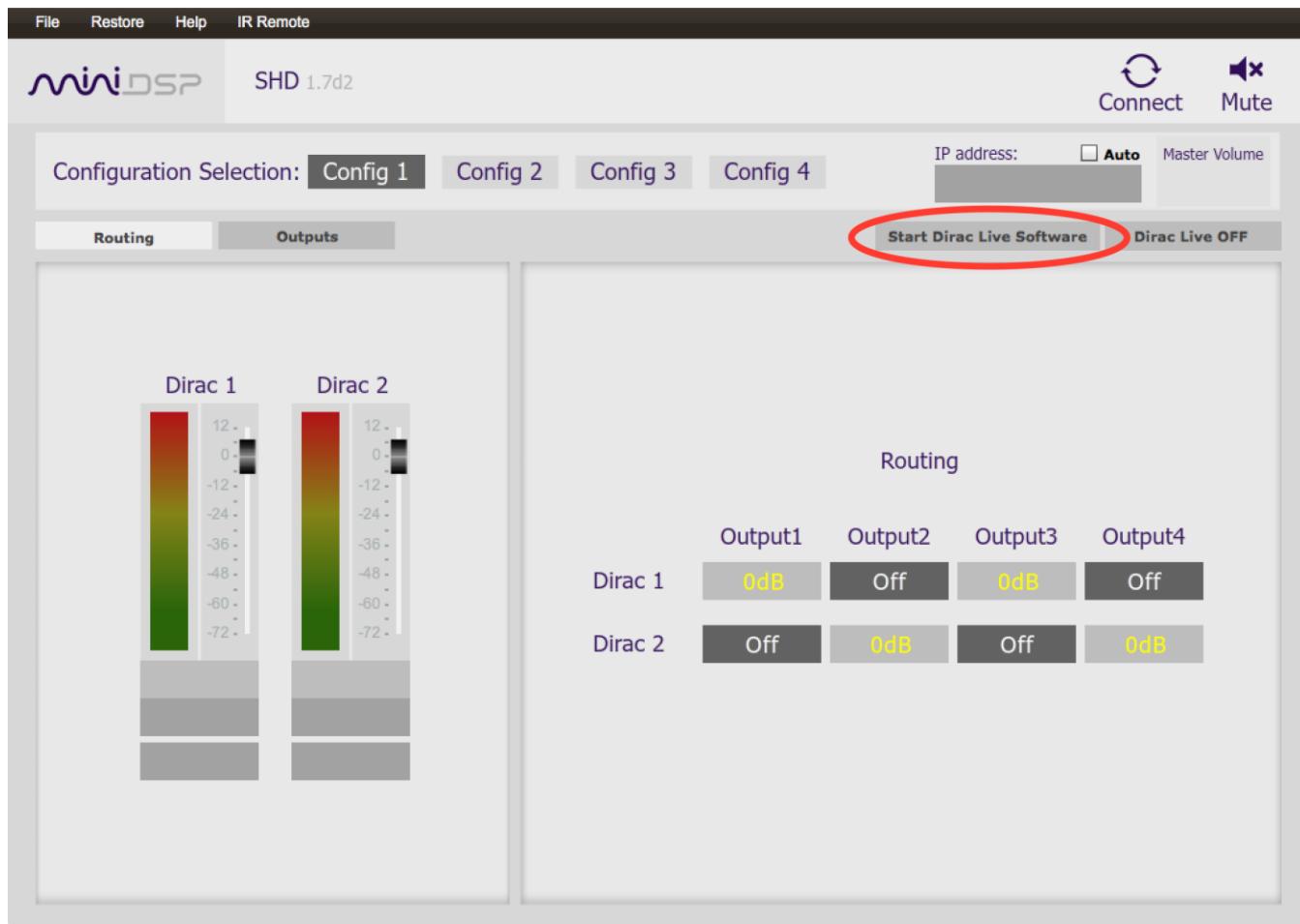
The navigation buttons to the lower left and lower right of the main display area change to the next and previous page, using the order in which a complete calibration is normally performed.

Back to Select Device

Proceed to Volume Calibration

4.6 STARTING DIRAC LIVE

To start Dirac Live, you **must** run the miniDSP processor plugin first. Then click on the **Start Dirac Live Software** button:



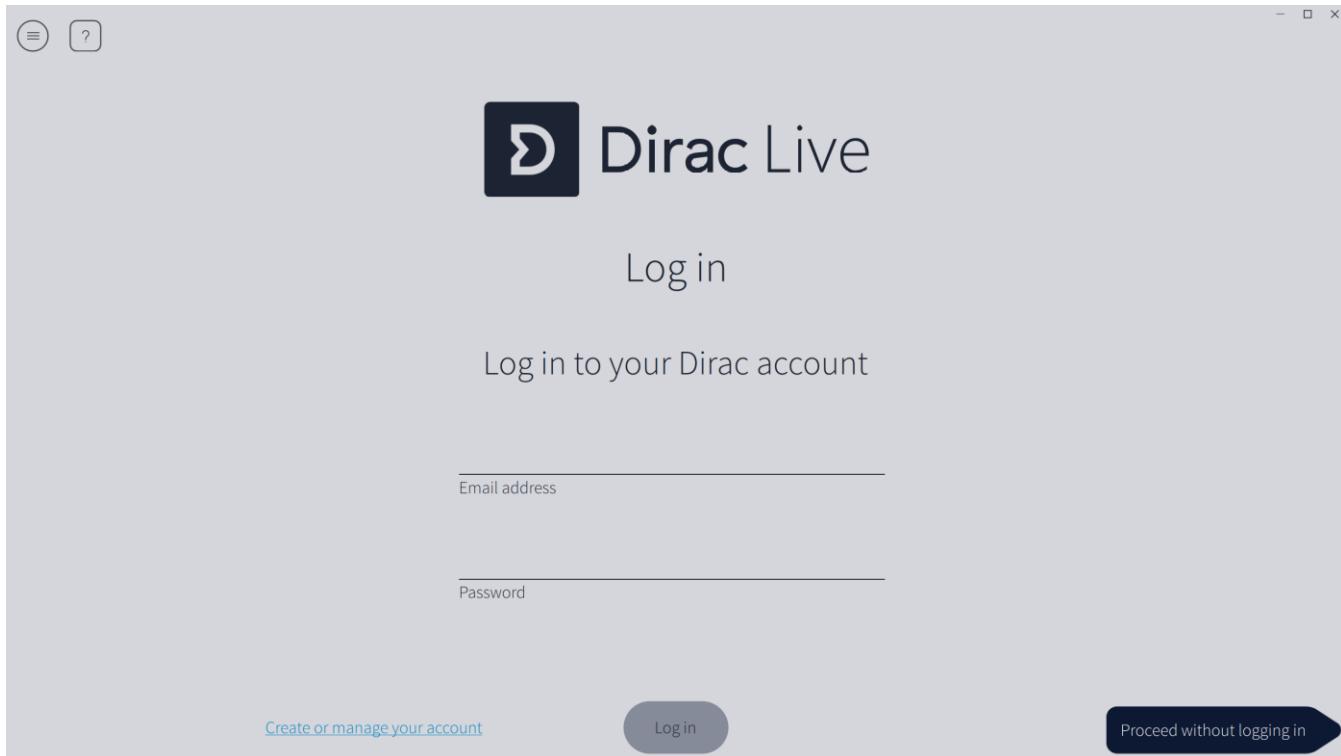
Dirac Live will start. If you had previously clicked **Connect** in the plugin, then the plugin will now disconnect from the miniDSP processor. If you wish to later connect the plugin again, you **must** quit Dirac Live first.



You **must** start Dirac Live from the miniDSP plugin. If you just start Dirac Live without using the plugin as described above, Dirac Live will not be able to detect the miniDSP processor.

4.7 DIRAC ACCOUNT LOGIN OR CREATION

Dirac Live works better when you are logged into your Dirac account. The first time you start Dirac Live, the option to log in or create an account appears.



You can log in here if you have a Dirac account. If you do not have an account, you can create one by clicking on “Create or manage your account.” This will direct you to <https://live.dirac.com> where you can create an account.

If you wish, you can click “Proceed without logging in” to perform a calibration. You can return to this page later and create an account by selecting Login from the hamburger menu.

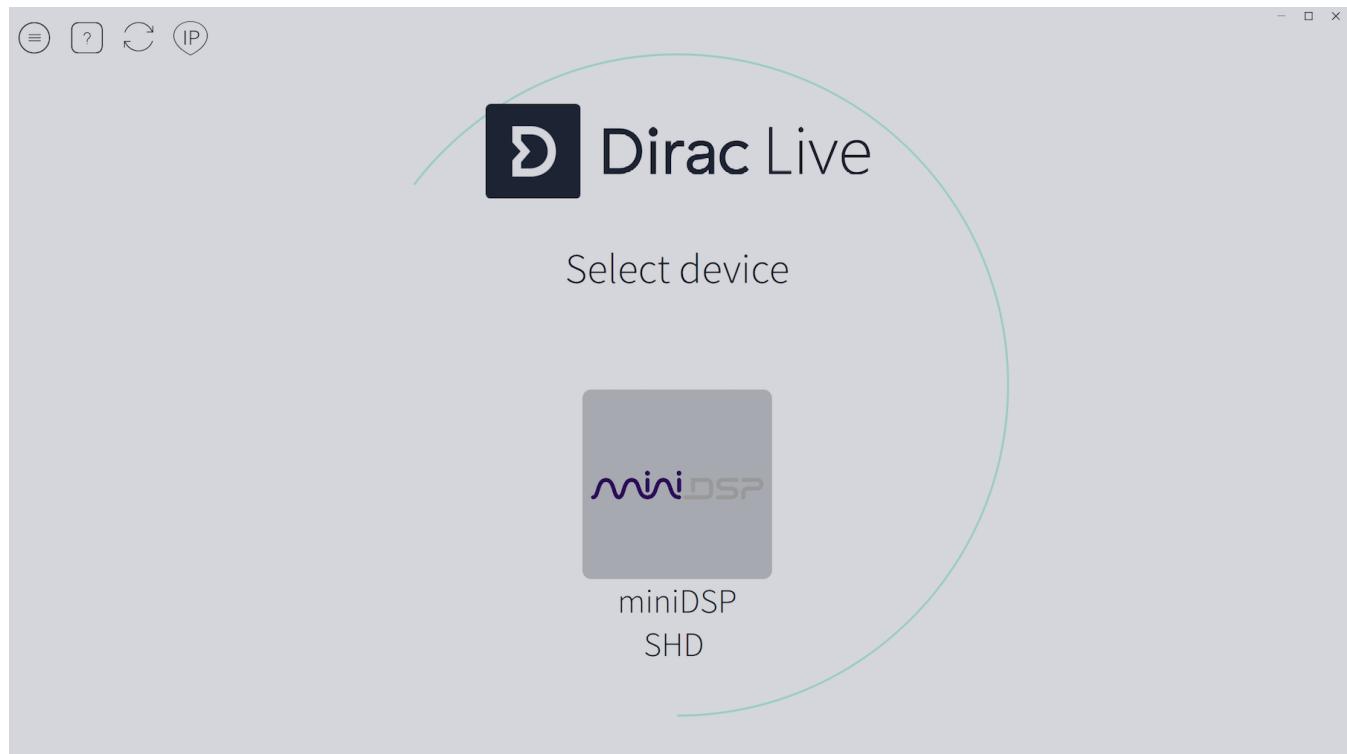
The following functions are enabled only when logged into a Dirac account:

- Load a previously saved project. You can only load an existing project if you are logged into a Dirac account. If you don't log in, you will be able to save your measurements as a project, but you will not be able to open them again.
- Other optional or paid-for features. miniDSP always provides the “full” version of Dirac Live with its products, so you do not need to log in to use the full version of Dirac Live if you have a miniDSP product.

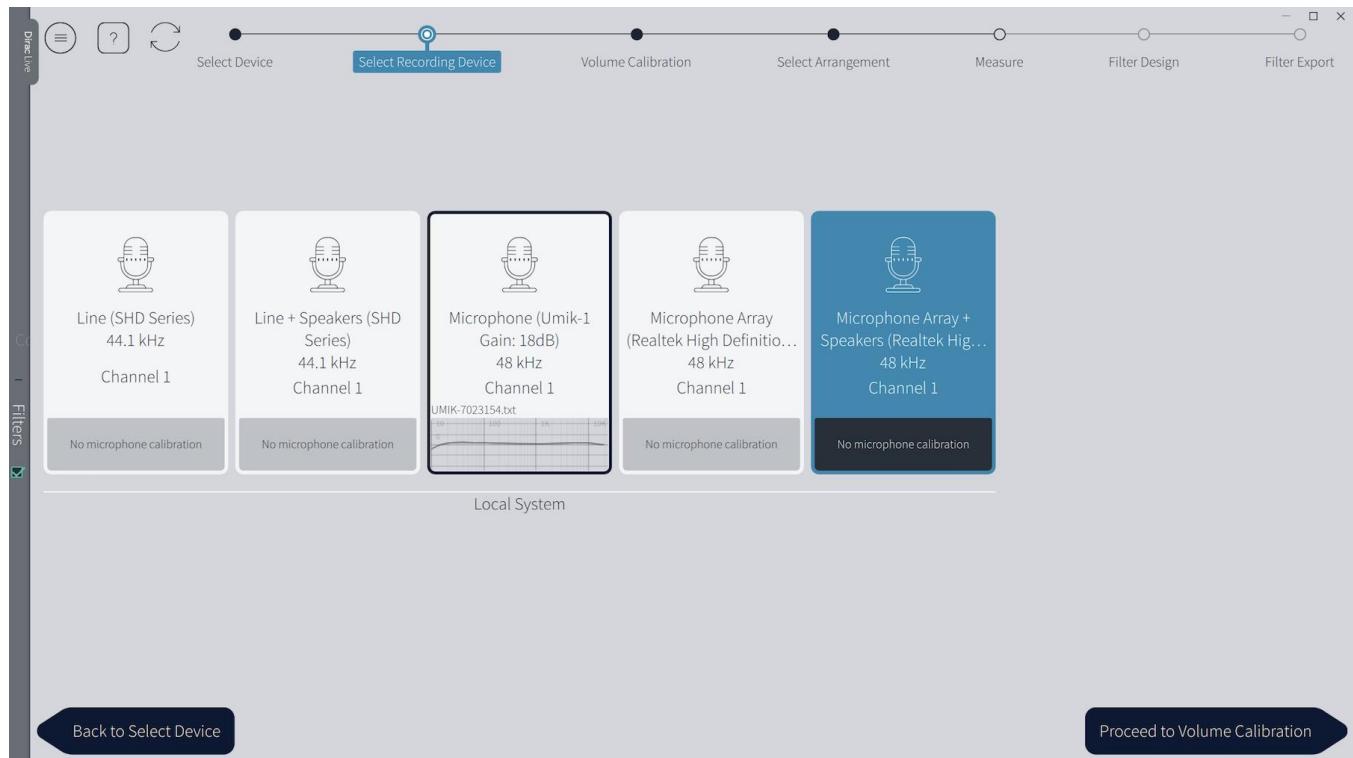
4.8 CONFIGURING FOR MEASUREMENT

4.8.1 Select Device

The only device visible here will be the miniDSP processor. If necessary, close the help overlay that obscures the device icon. Click on the device icon to select it and proceed to the next page.



4.8.2 Select Recording Device



Use this page to select the UMIK-1 and load its calibration file:

1. Click on the UMIK-1 icon (labeled “Microphone (Umik-1 Gain: 18 dB”) to select it.
2. At the bottom of the grey rectangle, click on “No microphone calibration.” Locate your UMIK-1 calibration file in the file system and select it. The display will change to show the microphone’s serial number.
3. Click on **Proceed to Volume Calibration**.

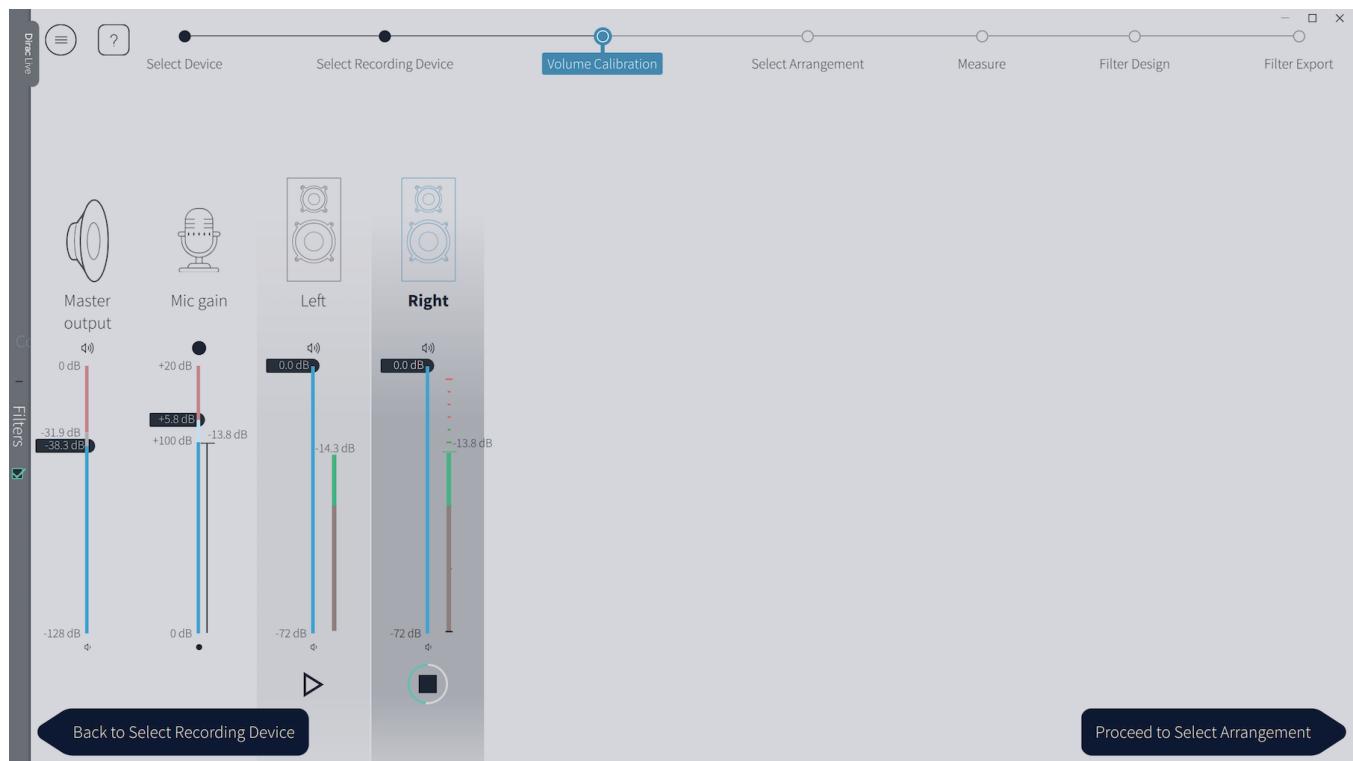
Note: Each UMIK-1 measurement microphone is individually calibrated to ensure accuracy. To download the unique calibration file for your microphone, go to the [UMIK-1 page](#) and enter your microphone's serial number. It is in the form xxx-yyyy and labelled on the microphone.

Two calibration files are downloaded. The regular or “on axis” calibration file will be saved to the computer with a name that is the same as the serial number e.g. “7001870.txt”. This is the one that you should usually use with the miniDSP processor, with the microphone pointed between the speakers.

The second calibration file has “_90deg” in the name e.g. “7001870_90deg.txt.” This corrects the frequency response when the microphone is oriented at 90 degrees to the sound source. You should use this calibration file with the miniDSP processor only if you are pointing the microphone at the ceiling.

Once you have verified that this tab is correct, click the **Proceed to Volume Calibration** button.

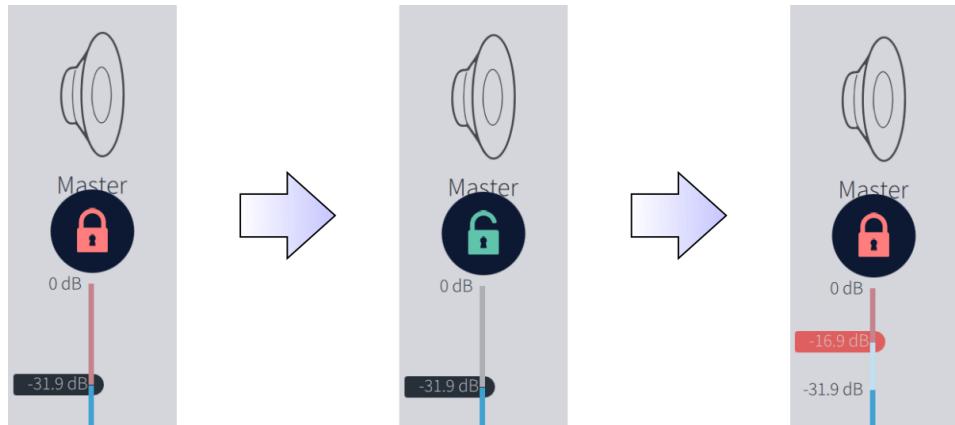
4.8.3 Volume Calibration



Use this page to set the output level and microphone recording level. The microphone should be positioned in the center of the listening area and pointed between the speakers. For best calibration results, ensure that the environment is reasonably quiet. Low frequency noise in particular can disrupt the calibration.

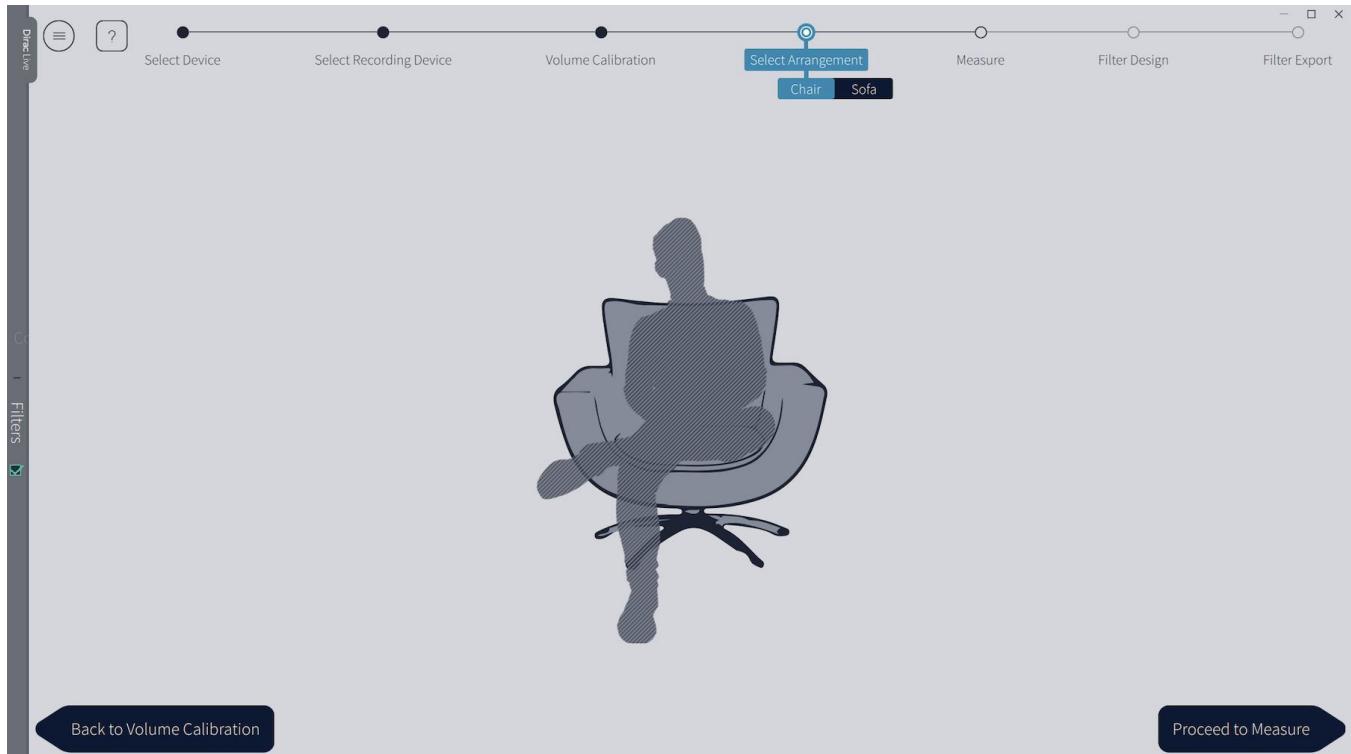
1. Check that the **Master output** slider is set low.
2. Click on the triangular button for the left channel and gradually increase the **Master output** slider (see note on next page). You should hear pink noise playing from the left speaker. Continue to increase volume until it is at a moderate level, such that your voice would have to be raised to converse with someone sitting next to you.
3. Increase the **Mic gain** slider so that the level meter is in the green zone, as shown in the screenshot above.
4. Click on the triangular button for the right channel and confirm that the level is also in the green zone. If necessary, adjust **Mic gain** so that both channels are in the green.

Note: as a safety feature, Output volume is limited to -31.9 dB. If you try to raise it higher, a lock icon will appear. To raise it higher, click the lock. It will “unlock” and then you can raise the slider further. The lock icon will automatically lock again after a few seconds.



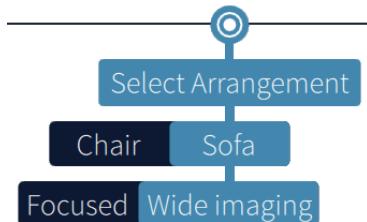
Once you have set the input and output levels, click the **Proceed to Select Arrangement** button.

4.9 SELECTION OF SEATING ARRANGEMENT



The **Select Arrangement** page selects the type of seating arrangement to calibrate for. Each arrangement has a different set of measurement positions, in order to optimize the response around that area.

The menu bar expands to show the selection choices:

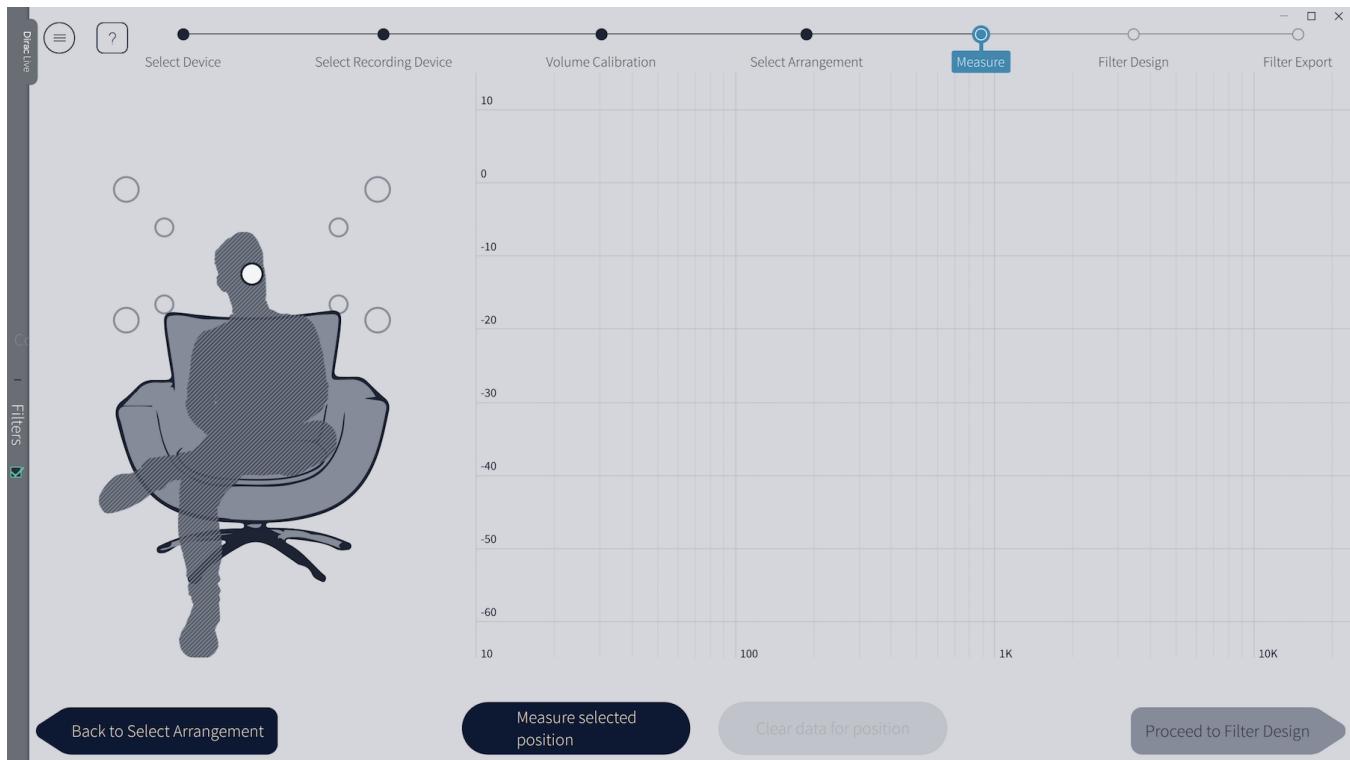


Use the menu to select the arrangement that is most appropriate for your listening area. Each seating arrangement has a different set of measurement positions; this is indicated on the **Measure** page.

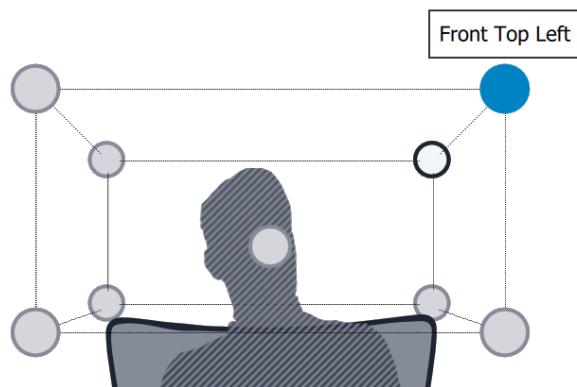
Note that there are no hard and fast rules on which arrangement to use, so feel free to experiment by calibrating for more than one arrangement and comparing the results by auditioning. Up to four different sets of correction filters can be loaded into the miniDSP processor.

4.10 RUNNING THE MEASUREMENTS

Measurements are performed on the **Measure** page.



The visual at the left shows the set of measurement positions. The position that will be measured is shown in white. To display the name of a position, hover the mouse over it – the position will be highlighted in blue and its name displayed.



While the visual guide indicates a suitable set of microphone positions, these can be varied to suit individual circumstances. It is, however, imperative that the measurement named “Main Position” is taken in the center of the listening area, as this measurement is used to set the levels and delays of each channel. The other eight measurements should be well spread out over the entire listening area so that Dirac Live can acquire a good set

of measurements that capture the acoustic behavior of the room. Placing all measurement positions too close to each other may result in “over-correction” that will sound dry and dull.

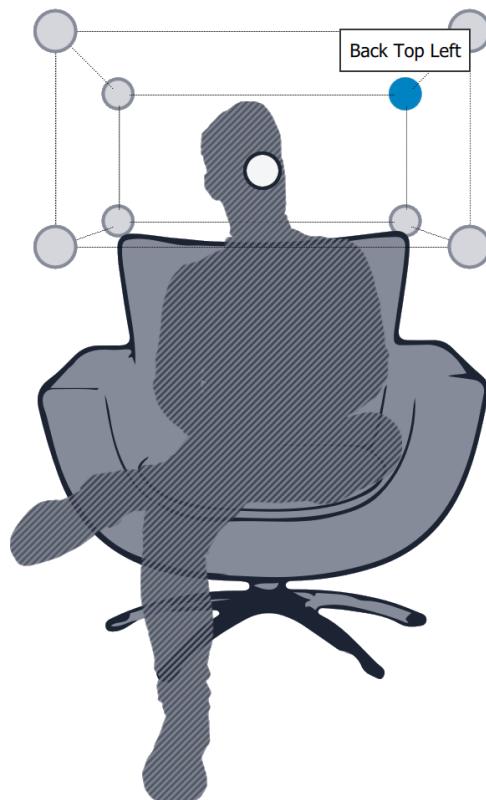
For example, if using the **Chair** arrangement, spread the microphone positions over a circle with a diameter of at least a meter (three feet) and vary the microphone height from the central position by at least 30 cm (one foot) up and down. If using one of the **Sofa** arrangements, spread the measurement positions over the full width of the sofa and vary the height up and down by at least 30 cm (one foot).

A different set of measurement positions other than those indicated by the visual guide and the above guidelines can be used if necessary. For example, if the displayed measurement position doesn't provide acoustic “line of sight” from the speaker to the microphone, then adjust the measurement position so that it does. The important thing is to ensure that they are spread out over the whole listening area and that the microphone is moved a sufficient distance vertically as well as horizontally.

In some cases, such as when the listening area is very close to the loudspeakers or the loudspeakers have a very narrow dispersion pattern, the size and in particular the height of the measurement area can be reduced, to avoid discrepancies caused by varying output response from the speakers themselves.

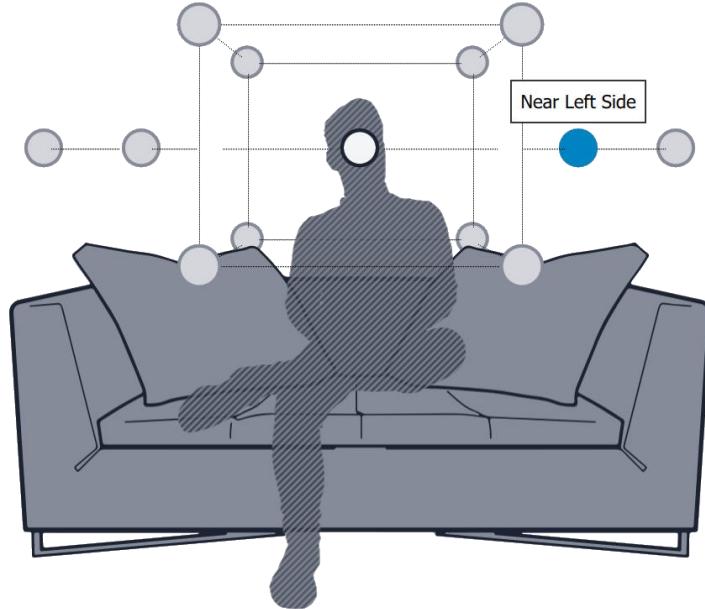
4.10.1 Chair

This arrangement is best for a single listener. There are nine measurement positions:



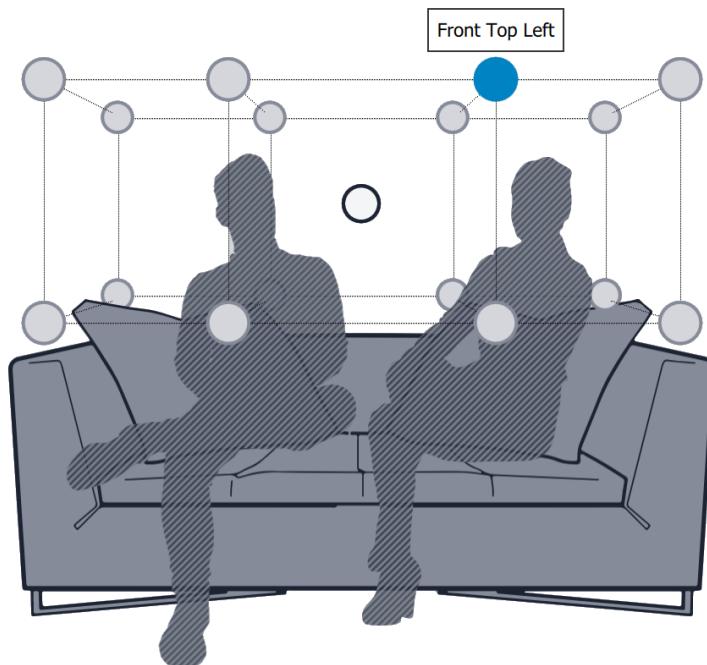
4.10.2 Sofa – Focused

This arrangement is optimized for a single listener but also caters for additional listeners. There are thirteen measurement positions: the same nine as the Chair arrangement, plus an additional four positions extending out to the left and right:



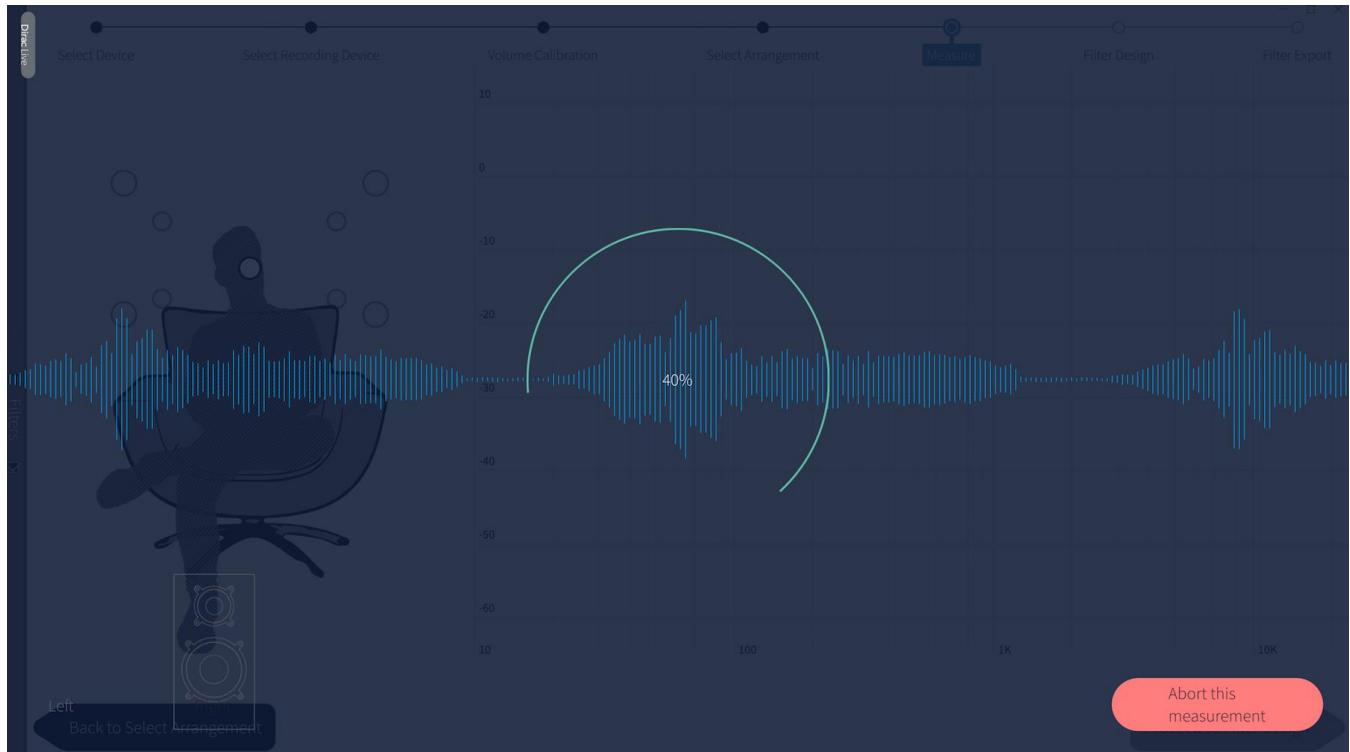
4.10.3 Sofa – Wide Imaging

This arrangement is optimized for multiple listeners. There are seventeen measurement positions: the same nine as the Chair arrangement, plus an additional eight positions that extend the listening area out to the left and right:



4.10.4 Executing measurements

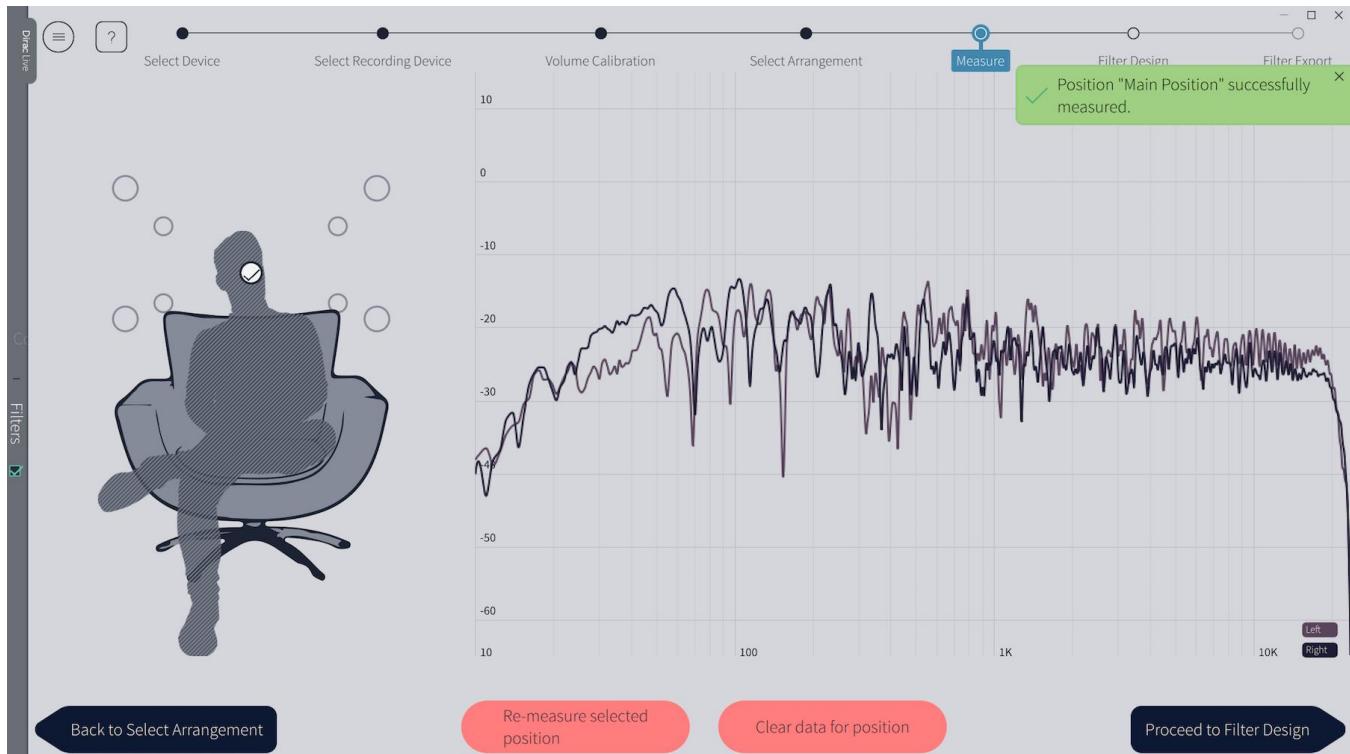
With the microphone in place in the position indicated with the white circle, click on the **Measure selected position** button. The miniDSP processor will generate a test signal, audible as a frequency sweep through the left speaker, then the right, and then the left again.



While the measurement proceeds, the time-domain graph of the captured audio signal is overlaid on the page. This graph is related to the magnitude response but is not the same display. Its purpose is to verify that the recorded signal level is in a suitable range.

Note that measurements should be performed under good conditions. While the measurement technique used by Dirac Live is quite robust, low-frequency noise (traffic, machinery, aircraft, storms) in particular can adversely affect measurement accuracy. A high level of ambient noise can degrade signal to noise ratio and prevent the algorithm from analyzing the test sweep signal properly. Minimize the effect of any external noise, ensure that measurement signal levels are adequate, and/or choose a suitable time for performing measurements.

At the completion of a successful measurement, the frequency response graph will update with the measurement just taken.



If the program indicates that the measurement was not successful, you will need to take corrective action. The most common errors are related to signal level:

- The measurement signal is too low to ensure a clean capture.
- The measurement signal is too high and the audio signal has exceeded the maximum level (clipping). This is shown in red on the signal graph overlay.

In either of the above cases, go back to the **Volume Calibration** tab and adjust **Master output** or **Mic gain**. Then re-run the measurement. (You do not need to redo the measurements you have already successfully completed.)

If the measurement is successful, a check mark will be shown on the visual guide. Click on another measurement position, move the microphone, then measure again. Repeat until all positions have a successful measurement:



4.10.5 Viewing and redoing measurements

Click on any completed measurement position to select it and display its measured response.

After selecting a completed measurement, the two buttons at the bottom of the screen can be used to re-take the measurement, or just to delete it:

Re-measure selected position

Clear data for position

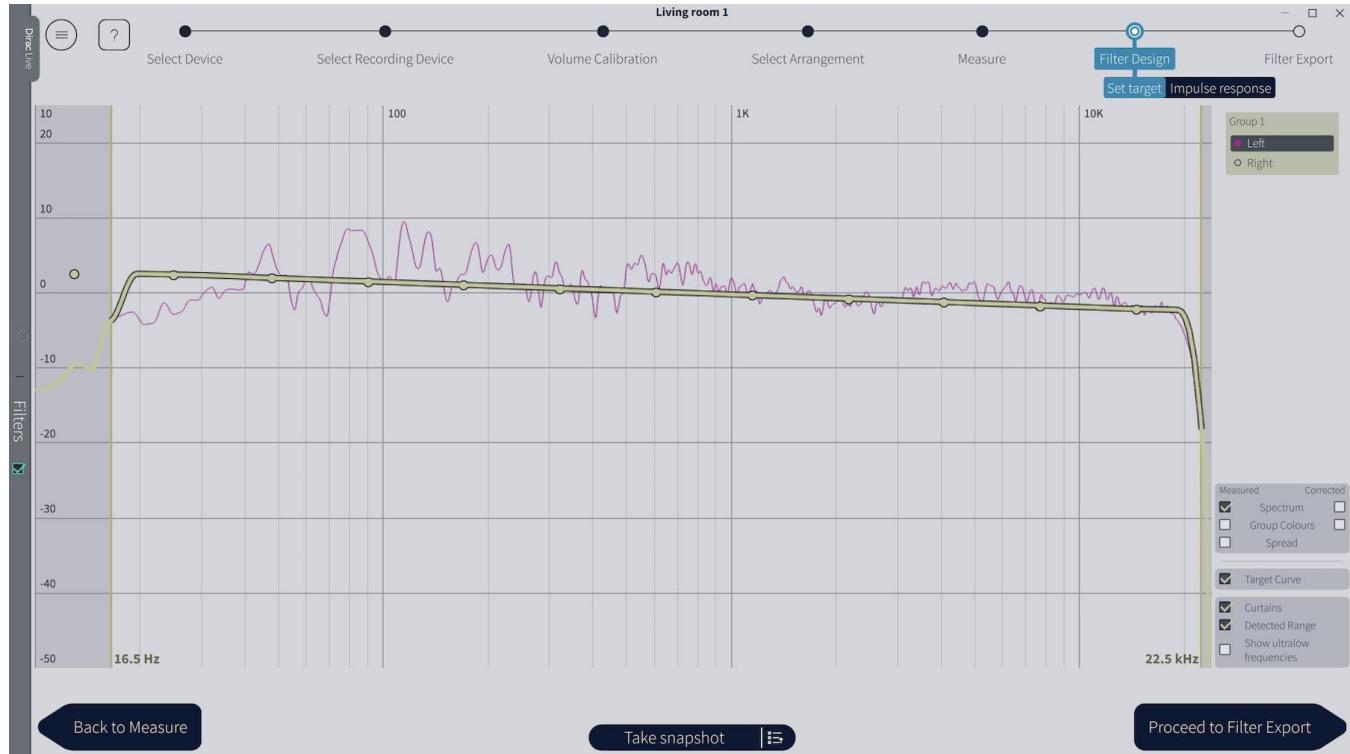
Once you have completed all measurements, click on the **Proceed to Filter Design** button.

5 DIRAC LIVE FILTER DESIGN AND DOWNLOAD

Once the full set of measurements has successfully been taken, **Dirac Live Calibration Tool** has the acoustical information it needs about your loudspeakers and listening room to create the correction filters.

5.1 WORKING WITH GRAPHS

The **Filter Design** page shows, by default, the average measured response of the left channel (mauve line) and the target curve (yellow/black line):

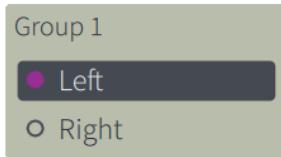


The graph can be zoomed in – and out again – by using the mouse wheel, or zooming gestures with a touchscreen. To move a zoomed graph, left-click and drag, or use the grab and move gesture with a touchscreen. To zoom out to 100%, right-click and select “Reset Zoom”.

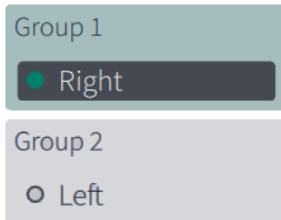


5.1.1 Channel selection and groups

By default, there is one group for both channels. This means that one target curve will apply to both left and right channels. Click on “Left” or “Right” to display the response graphs for that channel.



To separate the channels into two groups, click on “Left” or “Right” and drag it out of the darker box. Then there will be two groups, each with its own target curve:



5.1.2 Display controls



Spectrum

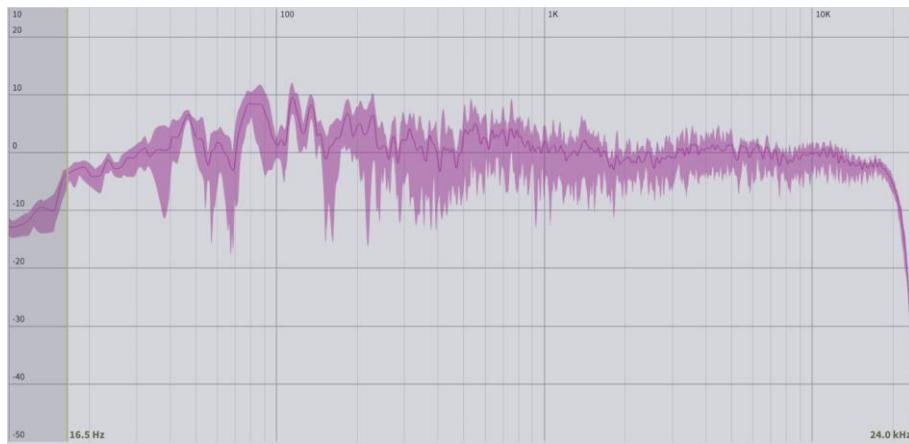
Displays the average of all magnitude responses. If the “Measured” checkbox on the left is on, the average of the uncorrected measurements is displayed. If the “Corrected” checkbox on the right is on, the average of the response after correction is displayed.

Group colors

If checked, the graph colors are the same for all channels in a group. This can be individually selected for the measured and corrected responses.

Spread

If selected, the range of measured responses is shown as a lighter highlight on the graph. For example:



Target curve

Turns on the display of the target curve.

Curtains

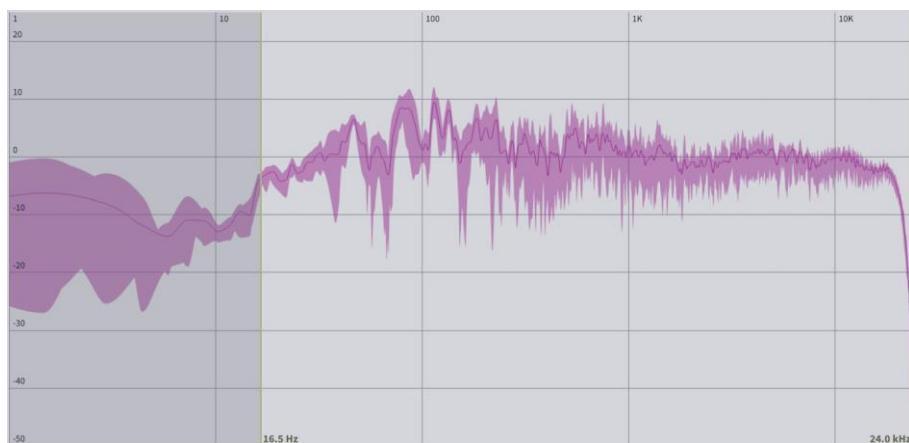
Turns on the display of the “curtains” to the left and right of the graph that set the range of magnitude response correction.

Detected Range

Turns on two cursors that indicate the frequency range within which Dirac Live has determined the speaker(s) to have reasonable output. Note that at low frequencies, environmental noise can cause this estimate to be incorrect.

Ultralow frequencies

Extends the frequency display down to 1 Hz. Note: the UMIK-1 is calibrated only down to 10 Hz, so use great caution in interpreting the graphs at these ultralow frequencies. In addition, these ultra-low frequencies are **very** susceptible to noise pickup (which you cannot hear).



5.2 DESIGNING THE TARGET CURVE

The *target curve* is the desired in-room frequency response with the miniDSP processor performing digital room correction. When you first go to the **Filter Design** page, Dirac Live automatically works out a typical target curve, but you have full control over this target curve and can alter it as you wish.

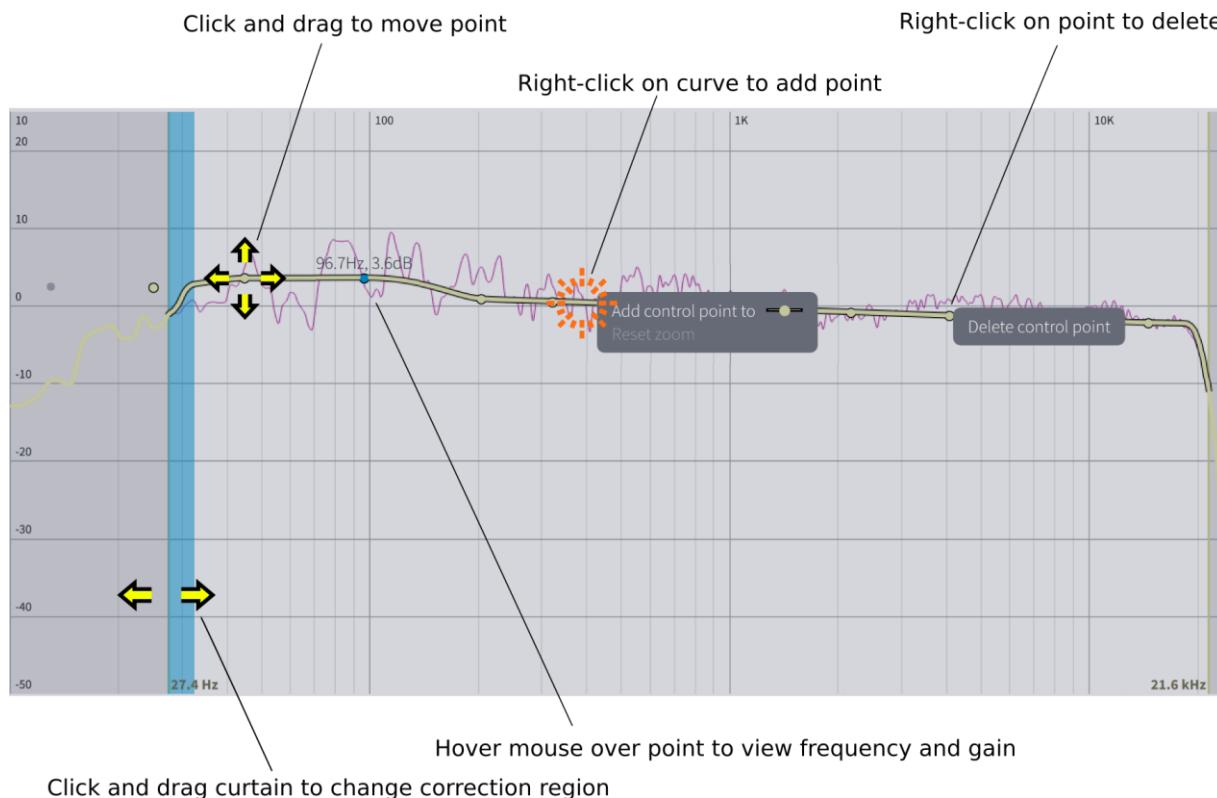
5.2.1 Editing the target curve

You can edit the target curve to set any desired magnitude response. This is done with the use of *control points*, shown as dots on the target curve:

- Click and drag a control point to move it.
- Right-click on the target curve to add a control point.
- Right-click on a control point to delete it.

The regions to the left and right of the response graphs that are shaded in a darker grey are excluded from magnitude correction. You can adjust the range of correction for your system and environment by dragging the “curtains” to either side of the graph. For example, low-frequency noise (traffic, machinery) may be present in some environments, so it is best to adjust the frequency range to exclude these frequencies from the correction. Or, you may be happy with the in-room response at higher frequencies, so you can set the frequency region to limit correction to the modal region (up to 300 Hz, in a typical room).

The same target curve is used for all channels in a group. So, if the left and right channels are in the same group (the default), both channels have the same target curve. To apply a different target curve to each channel, put them in separate groups as described on page 34.

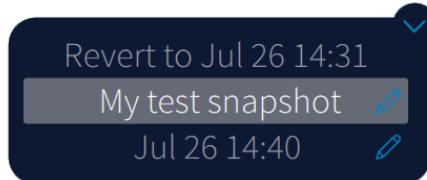


5.2.2 Snapshots

You can save the current set of groups, target curves and curtain frequencies by clicking on the **Take snapshot** button:



Snapshots will by default be named as the current time. They can be renamed for easier selection later on. Click on the right side of the button and then on the pencil-shaped icon. Enter the name and press the Return key:



To select a saved snapshot, click on the right side of the button and then click on the desired snapshot.



Selecting a saved snapshot will overwrite the current target curves and curtain frequencies. Take another snapshot first if you want to save them.



It is not currently possible to delete a snapshot.

5.2.3 Reset to default

To reset a target curve to the default, drop down the menu from the hamburger icon and select **Set default target curve**, then select the group to reset:



5.2.4 Saving and loading individual target curves

Target curves can be saved and loaded individually for use at a later time or in other projects. To save a target curve, drop down the menu from the hamburger icon and select **Save target curve**, then select the group:



To load a target curve, drop down the menu from the hamburger icon and select **Load target curve**, then select the group:



5.2.5 Guidelines for target curve design

Care should be taken to create a target curve that works well with your speakers and room, as well as suiting your personal preferences. Small changes to the target curve can have significant effects on the tonal quality of the system, so it is important that you experiment with different target curves to find the optimum.

If you initially don't achieve a satisfactory result, please ensure that you have spread your measurements over a sufficiently large area and with sufficient variation in height. The following guidelines will help you understand how to adjust your target curve.

Low-frequency extension and boost

All loudspeakers have a natural low-frequency roll off. Setting the target curve to boost the region below the speaker's natural roll off frequency *may* result in overdriving the speakers, especially with smaller home loudspeakers and depending on your listening habits. A system with capable subwoofers integrated into it, however, will support much more low-frequency output.

The auto-target estimates the low-frequency roll-off and curve, and in some cases may include some amount of boost if it estimates that the speakers are capable of handling it. You should determine by *listening* whether this estimate is suitable for your speakers and adjust the target curve accordingly.

High-frequency “tilt”

The target curve is the desired measured response of loudspeakers *in a room*, in contrast to measurements made of a loudspeaker during its design under anechoic (measured in free space) conditions. While high-quality loudspeakers are usually designed for a flat on-axis anechoic response, these same speakers when placed into a listening room will tend to have a downward-sloping or “tilting” response at high frequencies, due to the effects of limited dispersion at high frequencies and greater acoustic absorption.

A completely flat in-room response is therefore usually not desirable and will tend to sound thin or bright. Start with a target curve that follows the natural behavior of your speakers in your room, and then

experiment with greater or lesser degrees of tilt in the treble region to obtain the most natural timbral balance.

Low-frequency adjustment

A completely flat response at low frequencies, with complete elimination of peaks due to room modes, may sound light in the bass. Often, a slight increase in the target curve below 100 Hz will give a more balanced sound, yet without introducing audible irregularities in bass response.

Magnitude response dips

In some cases, it may be helpful to adjust the target curve to follow dips in the magnitude response. This can occur where, for example, the listening area is very close to the speakers and the measurements exhibit a dip caused by the vertical response of the speakers themselves. In such a case, adjusting the magnitude response to follow the dip will avoid making the speakers sound worse elsewhere in the room. (You may also wish to try a different set of measurement positions.)

Ungrouping channels

In almost all cases, the left and right channels should be in the same group for target curve adjustment, to ensure that both speakers produce the same response across the listening area. In certain unusual circumstances, such as where the magnitude response dip discussed in the previous point shows up in only one speaker, you can try ungrouping the left and right channels and making separate adjustments.

5.3 THE IMPULSE RESPONSE GRAPH

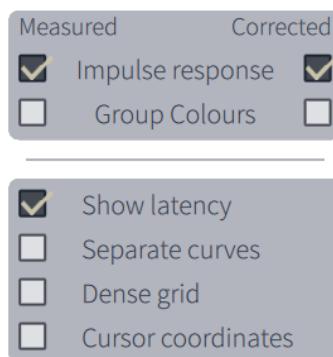
The Filter Design menu can be used to display the impulse response:



This is an example impulse response display. This graph has “Show latency” and “Separate curves” checked, so the original impulse response is at the top and the corrected impulse response is below.



There are several controls at the right of the graph:



Impulse response

Displays the impulse response corresponding to the average of all magnitude responses. If the “Measured” checkbox on the left is on, the impulse response corresponding to the measurements is displayed. If the “Corrected” checkbox on the right is on, the impulse response corresponding to the corrected response is displayed.

Group colors

If checked, the graph colors are the same for all channels in a group. This can be individually selected for the measured and corrected responses.

Show latency

Shows the impulse responses including actual delay through the miniDSP processor. (On by default.)

Separate curves

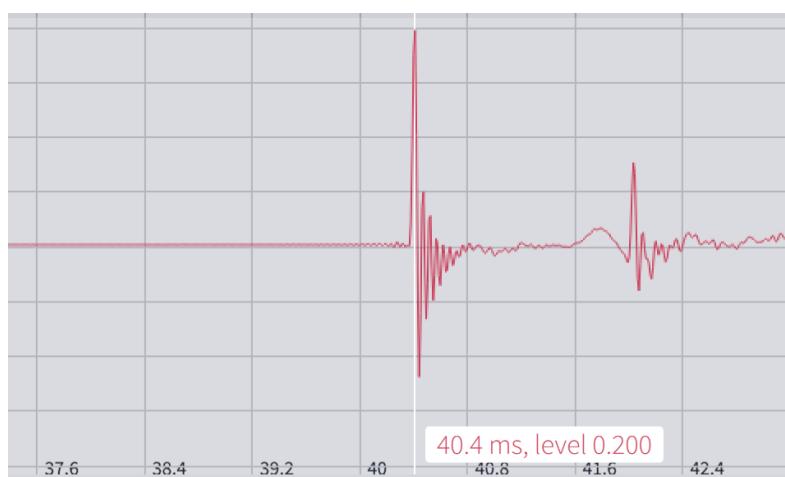
Shows the measured and corrected responses on separate graph axes.

Dense grid

Turns on additional grid lines on the graph.

Cursors coordinates

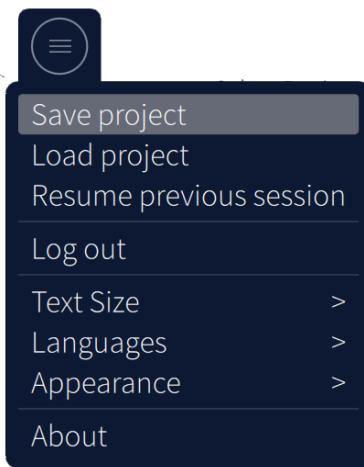
Turns on a display of a vertical cursor line where the mouse is, and the time delay and impulse response value at the cursor position.



5.4 SAVING AND LOADING PROJECTS

To save the project, click on the hamburger icon and select **Save project**.

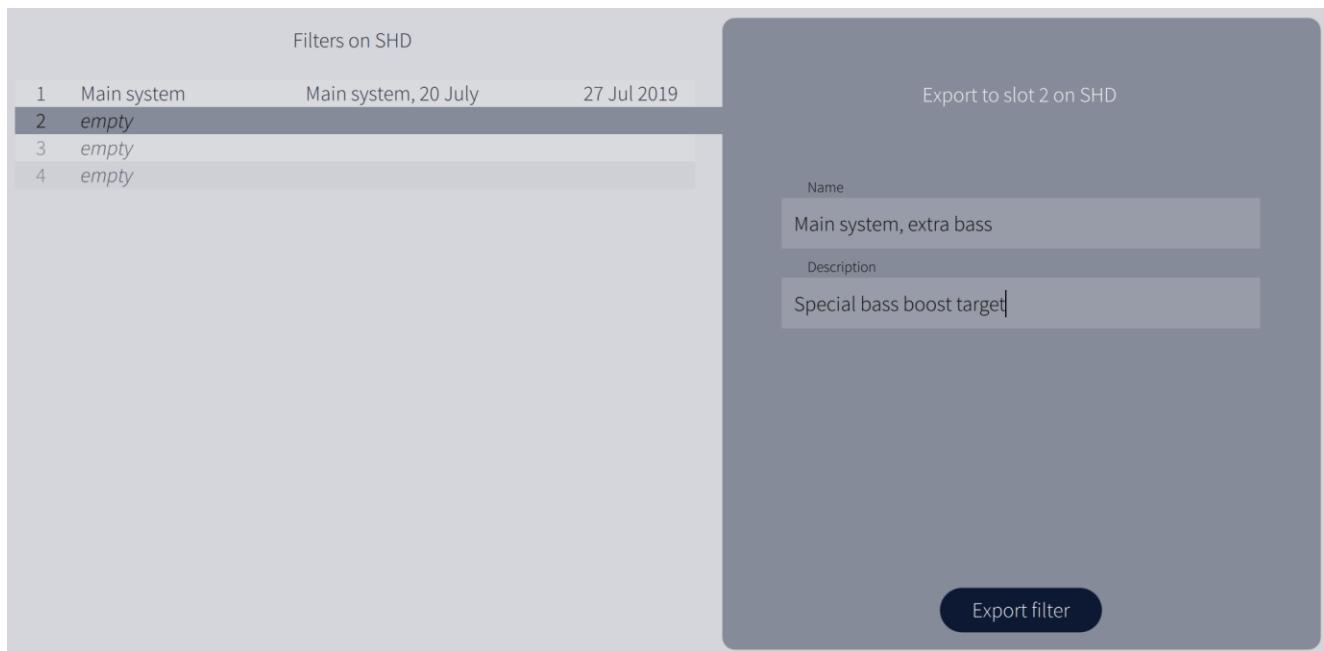
To load the project, click on the hamburger icon and select **Load project**.



If you save the project and you are not logged into your Dirac account, you may not be able to load that project ever again. Be sure to log into your Dirac account before saving the project.

5.5 FILTER EXPORT

The **Filter Export** page initially shows four empty “slots” for filter sets (a filter set is one filter for the left channel and one filter for the right channel). To load a filter into a slot, click on the slot name. At the right, enter the name and description and click **Export filter**:



	Filters on SHD	
1	Main system	Main system, 20 July
2	empty	27 Jul 2019
3	empty	
4	empty	

Export to slot 2 on SHD

Name
Main system, extra bass

Description
Special bass boost target

Export filter

A circular progress indicator will go around in circles. When filter export is complete, the UI will return to the Measure page so you can adjust the target curve to create a different set of filters. Return to the **Filter Export** page to view the list of loaded filters:

Filters on SHD			
1	Main system	Main system, 20 July	27 Jul 2019
2	Main system, extra ...	Special bass boost target	27 Jul 2019
3	Quiet listening	Target set for quiet listening	27 Jul 2019
4	empty		

To overwrite a filter slot, select a slot with a loaded filter and click on **Replace existing filter**.

Replace existing filter

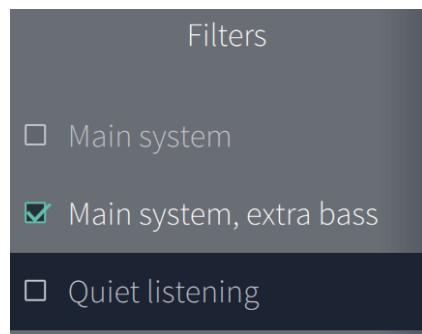


Be sure to load the filters into the same slot as the preset selected when running the Dirac Live calibration measurements.



It is not currently possible to clear a filter slot. If for some reason you really need to do so, you will need to reflash your device firmware. See the user manual for your specific device.

To audition different filters while still running Dirac Live, use the filter selection checkboxes in the sidebar to choose the filter set to listen to:



Note that selecting a filter here will also select the matching configuration preset in the miniDSP processor's back-end processing.