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Unit Overview

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Additional information

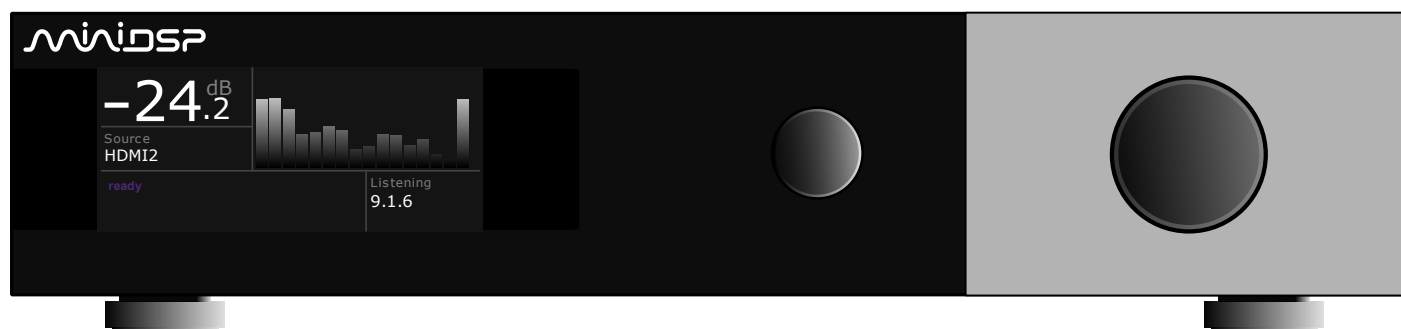
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miniDSP Tide16



Product Overview

The miniDSP Tide16 is miniDSP's flagship home theater processor. It incorporates the following immersive audio technologies:

- Dolby Atmos[®] decoding and playback
- DTS:X[®] decoding and playback

The miniDSP Tide16 also includes Dirac Live[®], the world's premier room correction solution. These advanced technologies, combined with superb audiophile specifications and miniDSP's renowned audio processing capabilities, deliver an unprecedented level of performance and flexibility for home theater and audiophile applications.

Up to 16 channels of audio can be decoded from the HDMI source, depending on speaker configuration. Three HDMI inputs are provided, together with eARC (enhanced Audio Return Channel) for audio sources connected to an eARC-enabled TV. Dirac Live with optional Bass Correction (DLBC), a flexible matrix mixer, and a suite of miniDSP's powerful audio processing capabilities on all sixteen output channels round out this modern audio powerhouse. Applications such as multiple subwoofers (unlimited in number, within the limitation of available output channels) and active speaker systems are now easily within reach.

We haven't forgotten our roots in stereo audio. A wide range of stereo inputs are provided, including USB, Bluetooth™ (including LDAC™ and APTX HD™), analog on RCA and XLR, and four S/PDIF digital inputs (coax and optical). Audiophile-grade analog circuitry and converters ensure that stereo audio performance is not compromised despite the powerful home theater processing capabilities, making it the perfect solution for combined stereo/home theater systems.

Note

DISCLAIMER/WARNING

miniDSP cannot be held responsible for any damage that may result from the improper use or incorrect configuration of this product. Please read this manual carefully to ensure that you fully understand how to operate and use this product, as incorrect use or use beyond the parameters and ways recommended in this manual have the potential to cause damage to your audio system.

Please also note that many of the questions we receive at the technical 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 documentation. And if an issue arises with your unit, please read through the Troubleshooting section first. Thank you 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.

Typical applications

The miniDSP Tide16 is the perfect solution to a wide range of home theater and integrated stereo/home theater system configurations. In addition to decoding immersive audio formats, its powerful onboard processing and flexible routing support a wide range of applications including active speaker systems and independent control of multiple subwoofers. World-class analog I/O specifications ensure that all configurations perform at a very high level regardless of analog or digital input.

Info

The configuration used must of course fit within the available sixteen output channels.

Immersive home theater

Figure 1 shows the miniDSP Tide16 in an immersive home theater application. HDMI audio is provided by sources connected directly to the Tide16 as well as from the TV and its connected sources over HDMI eARC (enhanced Audio Return Channel).

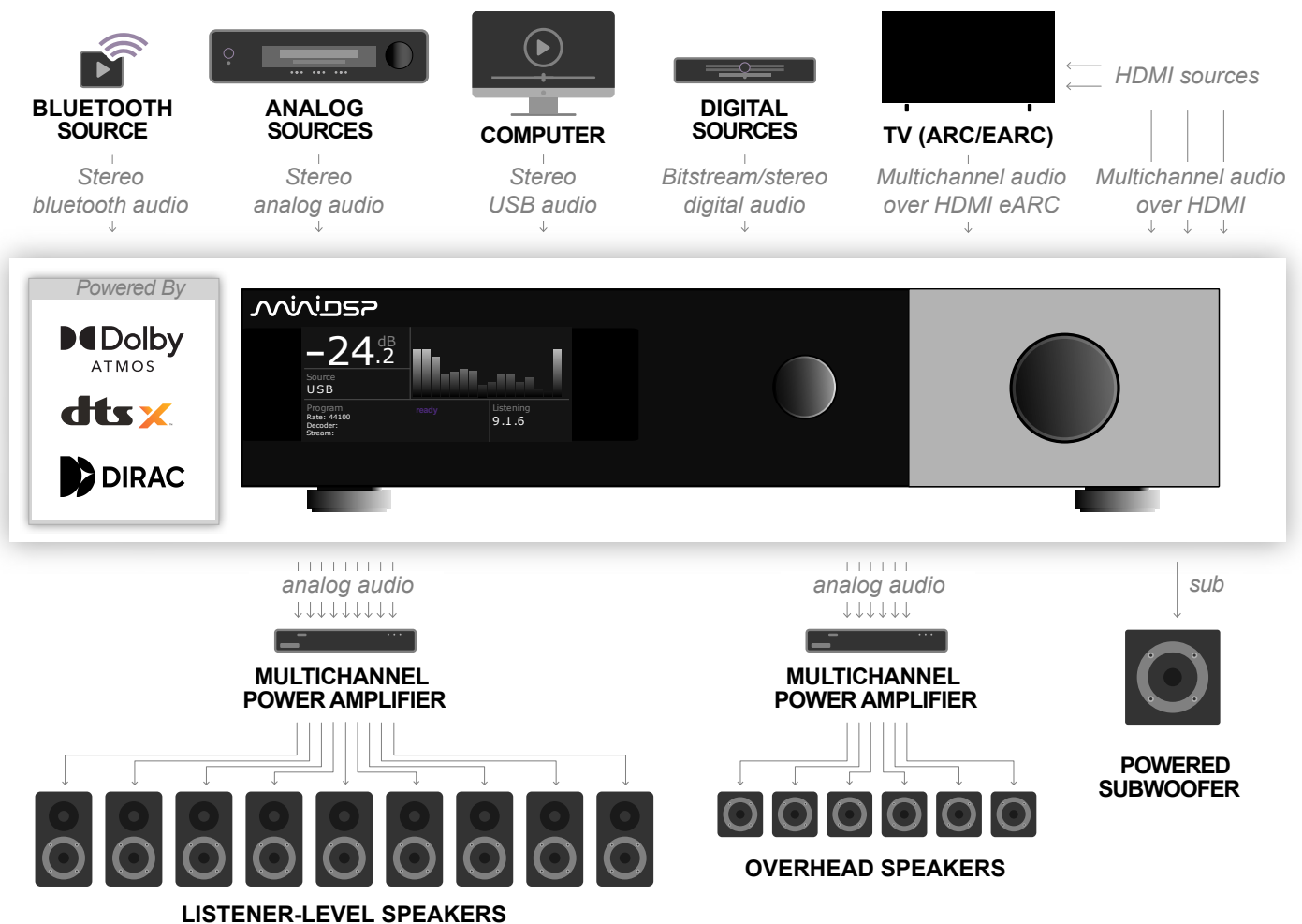


Figure 1. Example immersive home theater system configuration with the miniDSP Tide16 and Dirac Live room correction

Multiple subwoofers

Up to four subwoofers are supported, subject to available output channels. For example, configurations with three subwoofers can use up to 13 speaker channels, such as 9.3.4 or 7.3.6. With four subwoofers, a configuration such as 7.4.4 is easily supported.

There are two ways to integrated and optimize multiple subwoofers:

- The optional Dirac Live Bass Control (DLBC) integrates seamlessly with Dirac Live Room Correction to manage multiple subwoofers and room correction together, to optimize the response across the listening area.
- Alternatively, more advanced users can use miniDSP's speaker processing capabilities to manually optimize the subwoofers and integrate with the speakers. For detailed information on this approach, see our app note [Tuning multiple subwoofers with miniDSP \(https://www.minidsp.com/applications/subwoofer-tuning/tuning-multiple-subs\)](https://www.minidsp.com/applications/subwoofer-tuning/tuning-multiple-subs) and the additional app notes linked here.

Active speakers

With 16 output channels, many systems have "spare" outputs that can be used to create active speakers. Within the context of a home theater system, creating active speakers for the front and center channels can result in increased output and clarity.

The Tide16 can also be used for stereo-only systems. Configurations that don't "fit" within the constraints of our 8-channel processors – 5-way speakers, 4-way speakers plus subwoofers, for example – are handled by the Tide16 with ease.

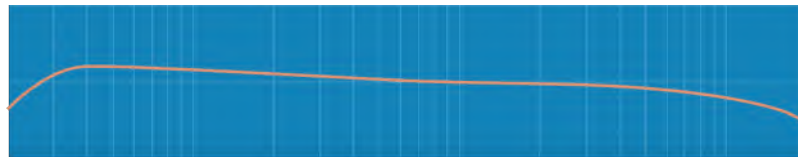
Info

Configuring an active speaker is an activity for more advanced users. It's necessary to know or learn how to use an acoustic measurement program such as Room EQ Wizard and to configure the crossover and parametric EQ filters using the miniDSP software interface. We provide guidance on the topic in the library of application notes on our website.

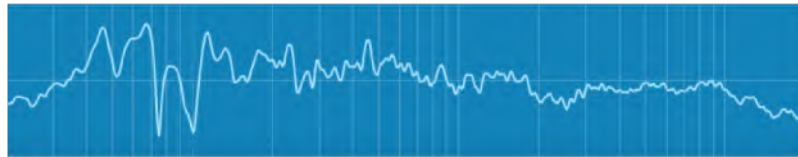
Dirac Live room correction

The miniDSP Tide16 executes multichannel Dirac Live® digital room correction, from [Dirac Research \(https://www.dirac.com/\)](https://www.dirac.com/). Dirac Live's mixed-phase filtering technology will improve the imaging of your system, minimize the effects of room modes and resonances, and improve dynamics and clarity.

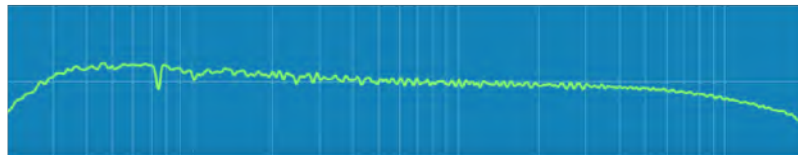
To accomplish this, the **Dirac Live** software steps you through the procedure for taking measurements around your listening area. It employs a sophisticated analysis algorithm to make the optimal correction across the *whole* listening area, not just at a single point. You have full control over the target frequency response. Measurements are taken with the miniDSP UMIK-1 or UMIK-2 calibrated acoustic measurement microphone.



Target magnitude response

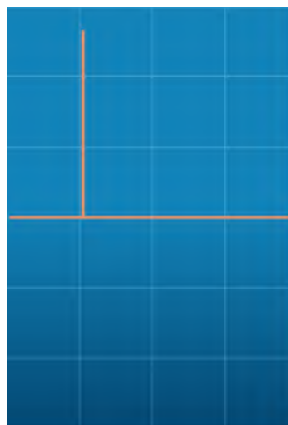


Uncorrected magnitude response



Corrected magnitude response

In addition to correcting magnitude response, Dirac Live® corrects the system's *impulse response*, which reflects how the system responds to a sharp transient such as a drumbeat. Reflections, diffraction, resonances, misaligned drivers, and so on, all combine to smear out the transient. Impulse response correction is a critical factor for accurate sound-staging, clarity and bass reproduction.



Ideal impulse response



Uncorrected impulse response



Corrected impulse response

The miniDSP Tide16 also support Dirac Live Bass Control (DLBC). This is an optional upgrade purchase. DLBC provides seamless integration of the subwoofer or subwoofers with the speakers. In addition, if more than one subwoofer is used, DLBC uses an advanced algorithm to fine-tune the subwoofers so that they work together to provide the best response across the whole listening area.

Specifications

The full specifications are available in the datasheet at the following link:

- [miniDSP Tide16 datasheet \(https://www.minidsp.com/images/documents/Product%20Brief%20-%20miniDSP%20Tide16.pdf\)](https://www.minidsp.com/images/documents/Product%20Brief%20-%20miniDSP%20Tide16.pdf)

Licenses and trademarks

- Dolby, Dolby Atmos, and the double-D symbol are registered trademarks of Dolby Laboratories Licensing Corporation.
- For DTS patents, see <http://patents.dts.com>. Manufactured under license from DTS, Inc. or DTS Licensing Limited. DTS, DTS:X Pro, DTS:X, and the DTS:X logo are registered trademarks or trademarks of DTS, Inc. in the United States and other countries. © 2021 DTS, Inc. ALL RIGHTS RESERVED.
- DIRAC LIVE is a registered trademark of Dirac Research AB.
- ASIO is a trademark and software of Steinberg Media Technologies GmbH.
- Bluetooth is a registered trademark of the Bluetooth SIG, Inc.
- LDAC is a registered trademark of Sony Group Corporation.
- aptX is a registered trademark of Qualcomm Technologies International, Ltd.

Unit Overview

Unit Overview

This section describes the physical unit, including the rear panel, the front panel and how to operate it, and remote control.

Pages in this section

- [Physical placement and precautions](#)
- [Rear panel](#)
- [Power and control](#)
- [Front panel](#)
- [Remote control](#)

Physical placement and precautions

Unpacking the unit

Carefully unpack the Tide16. In the package, you will find:

1. The Tide16 unit
2. One pair of rack ears with fastening screws
3. One Wifi antenna
4. One Bluetooth antenna
5. One infrared remote control and two AAA batteries
6. Power cord for your country
7. One infrared receiver
8. One UMIK-1 with USB cable and basic stand*

(*) The UMIK-1 is included by default when ordering a miniDSP Tide16. If you deselected it when ordering, you will not receive one.

Assembly

There are only some small items to attend to before placing the miniDSP Tide16 in its intended location:

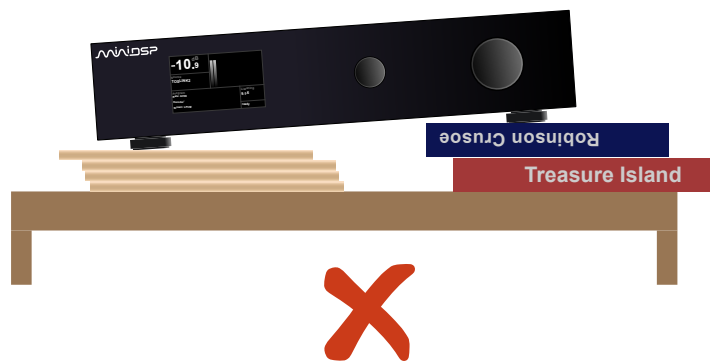
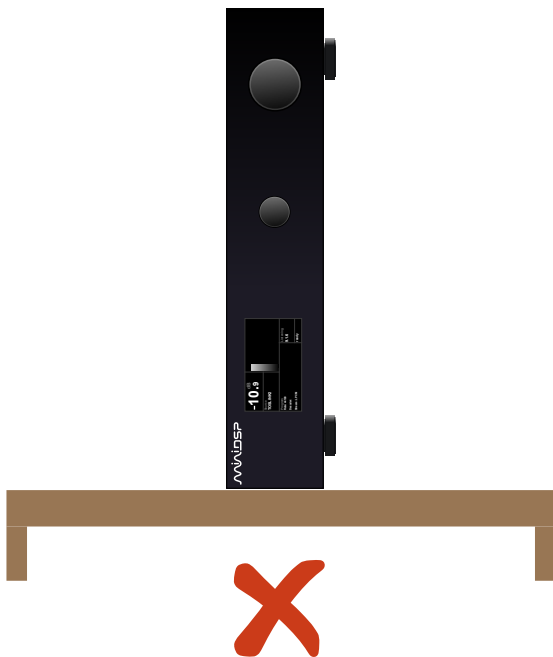
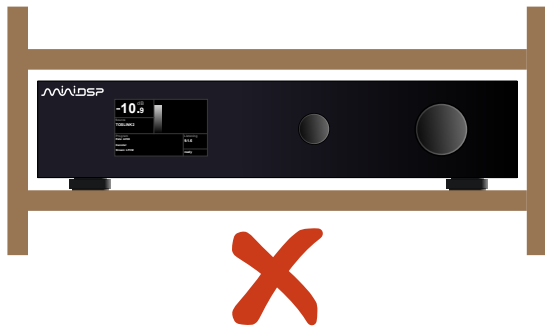
1. Screw the two provided antennas onto the sockets labeled **WIFI** and **BT** on the rear panel. Tighten firmly by hand only. Be careful not to use excessive force.
2. Clip open the panel on the back of the infrared remote and insert the two provided AAA batteries. Click the panel back into place.
3. (Optional) If you are mounting in a rack, screw the rack mounting ears onto each side. There are four countersunk screws on each side. Tighten the screws firmly but be careful not to use excessive force.

If you will be positioning the Tide16 out of line of sight, the provided infrared receiver can be connected after putting the Tide16 in its intended location.

Placement

Place the Tide16 on a flat level surface. Leave a few centimeters – ideally, 5 cm (2 inches) – of space between the chassis and other solid surfaces.

While the Tide16 does not contain power amplification, it does still produce a small amount of heat. Ideally, avoid stacking other components on top of it. Do not stack books or papers on top of it. If placing it in a cabinet or cupboard, ensure that there is some natural ventilation, such as openings at the back, sides or top of the cabinet.

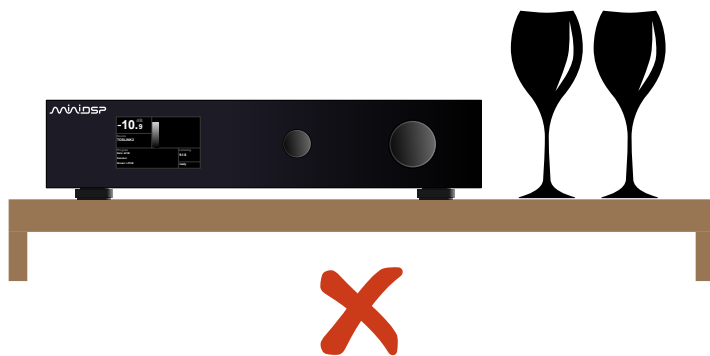


Tip

We recommend that you ensure that you have good access to and visibility of the rear panel. There are a lot of connections to be made to the Tide16, and this will help avoid mistakes.

Precautions

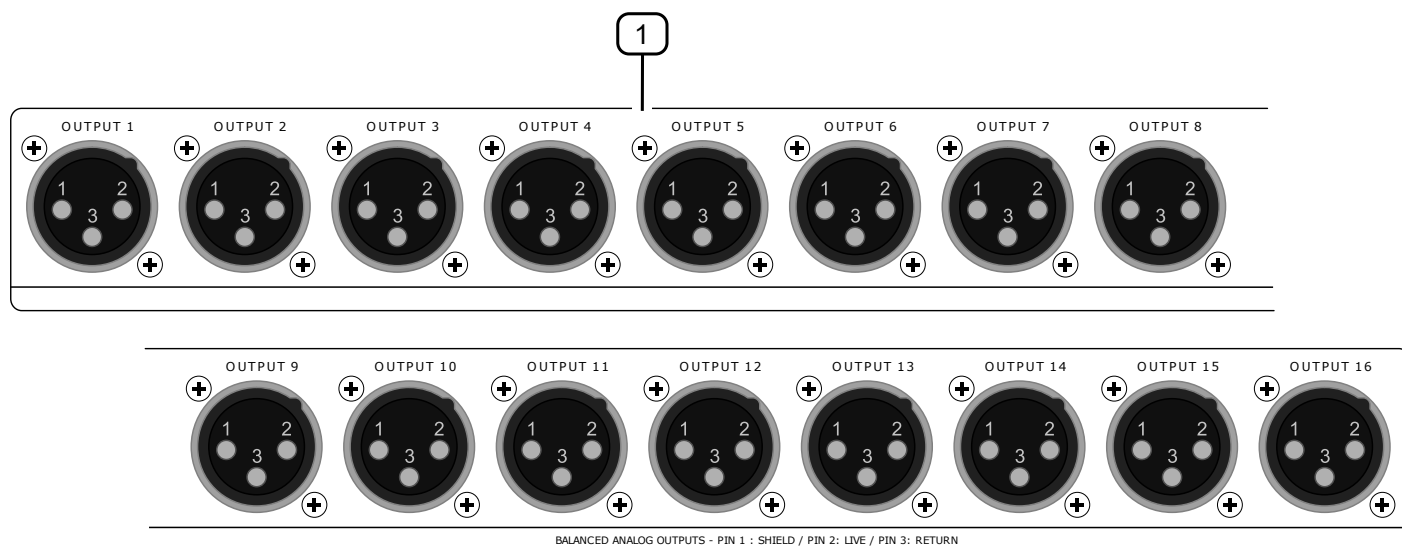
The Tide16 is sensitive electrical equipment and should never be placed where it could be exposed to water or other liquids.



The rear panel of the AOC C27G2U monitor features a variety of connectivity options:

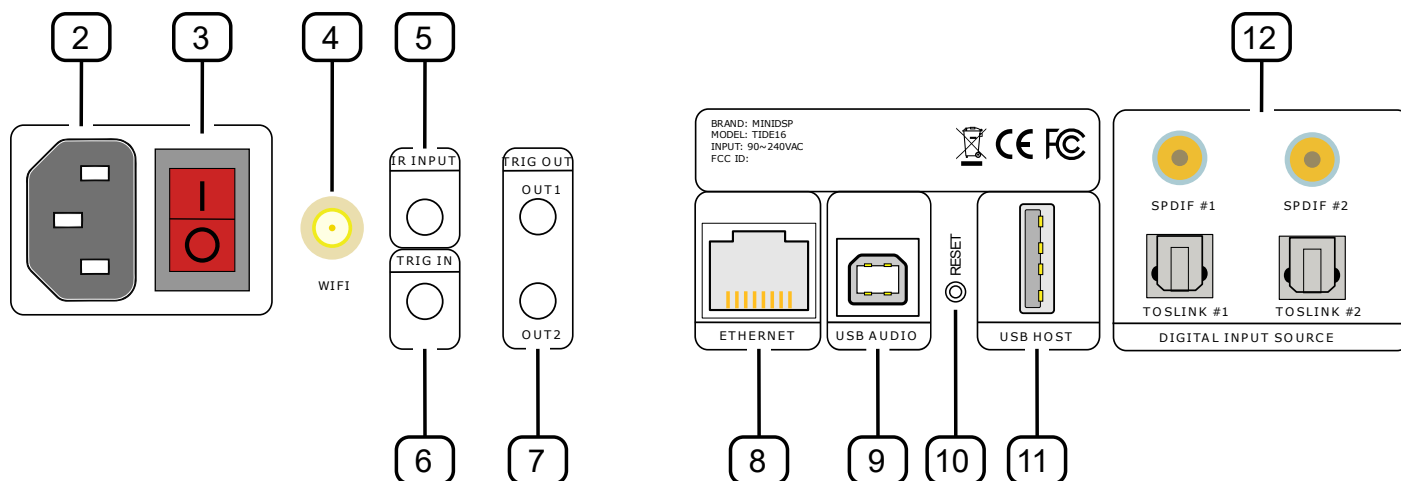
- 16 Balanced Analog Outputs:** Labeled OUTPUT 1 through OUTPUT 16, each with a 3-pin D-sub connector. A note below indicates: "BALANCED ANALOG OUTPUTS - PIN 1: SHIELD / PIN 2: LINE / PIN 3: RETURN".
- Input/Output Ports:**
 - WIFI:** A yellow antenna port.
 - IN PORTS:** Includes a red DisplayPort (DP) and a black DVI-D (DIGITAL IN).
 - USB:** Includes a USB-A port for a USB HUB and a USB-B port for a USB HOST.
 - SPDIF:** Two optical audio ports labeled SPDIF #1 and SPDIF #2, with Toslink and S/PDIF labels.
 - HDMI:** Three HDMI 2.0 (HDMI 2.0 / 4K / HDCP 2.2) ports labeled HDMI IN #1, HDMI IN #2, and HDMI IN #3.
 - HDMI OUT:** A single HDMI port labeled OUTPUT / AUDIO / ARC.
- Other Features:** A reset button, a CE mark, and a "DIGITAL INPUT SOURCE" label.

Section A: Analog outputs



1. **Analog outputs.** Connect power amplifiers here using balanced XLR connections. The maximum output is 4 Vrms.

Section B: Power, control, and digital inputs

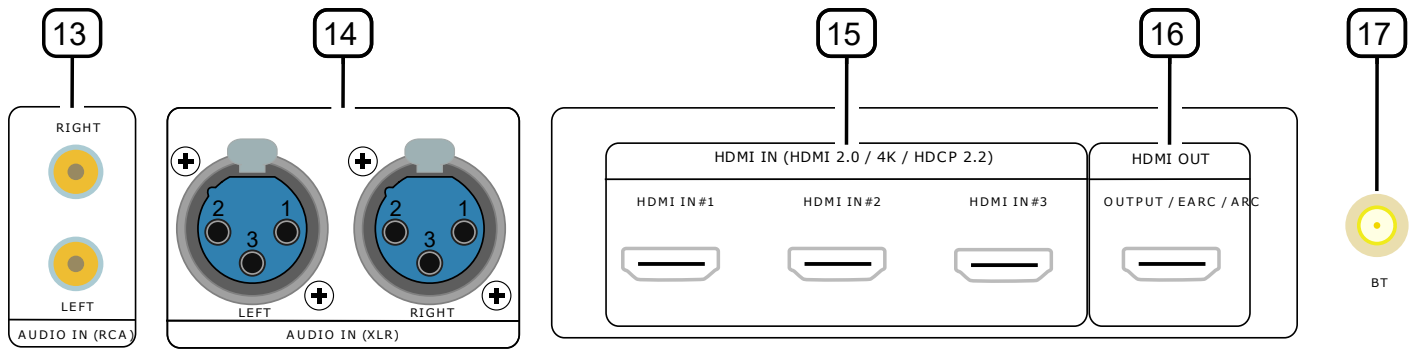


2. **Power inlet.** Connect a standard IEC C13 cable here. The mains supply voltage can be in the range 95 to 240 VAC, 50 to 60 Hz.
3. **Power switch.** Turns power to the Tide16 on and off.
4. **Wi-Fi antenna.** Screw on the supplied Wi-Fi antenna here.
5. **IR Input.** If needed, connect the supplied IR receiver here.
6. **Trigger input.** If needed, connect the trigger output on another piece of equipment to this trigger input.
7. **Trigger outputs.** If needed, connect these output to a trigger input on other equipment to turn it on and off. See also [Trigger output timing](#).
8. **Ethernet port** for device control.
9. **USB port** for stereo audio streaming. Connect to an available USB port on your computer.
10. **Reset button.** For use in specific circumstances only. See the *Trouble-shooting and Support* section.
11. **USB host port** for USB music stick.
12. **Digital inputs.** The four digital inputs accept stereo PCM or encoded bitstream audio (Dolby Digital/DTS) over optical or coax (RCA). The four digital inputs can be individually selected with the front panel encoder or the remote control.

Info

Note that immersive formats such as Atmos and DTS:x are not supported on the coax/optical digital inputs, as they require higher bandwidth. Use the HDMI inputs and/or HDMI eARC for high-bandwidth immersive formats.

Section C: Analog inputs and HDMI I/O



13. **Analog inputs (RCA).** Connect an analog source here using unbalanced RCA connections.

14. **Analog inputs (XLR).** Connect an analog source here using balanced XLR connections.

15. **HDMI Inputs.** Connect up to three HDMI sources here. Resolutions up to 4k at frame rates of 24, 25, 30, 50 and 60 Hz are supported.

16. **HDMI Output/ARC/eARC.** Connect to a TV or other HDMI display. If the TV supports HDMI eARC or ARC (enhanced Audio Return Channel), this connection serves as a fourth HDMI input for audio.

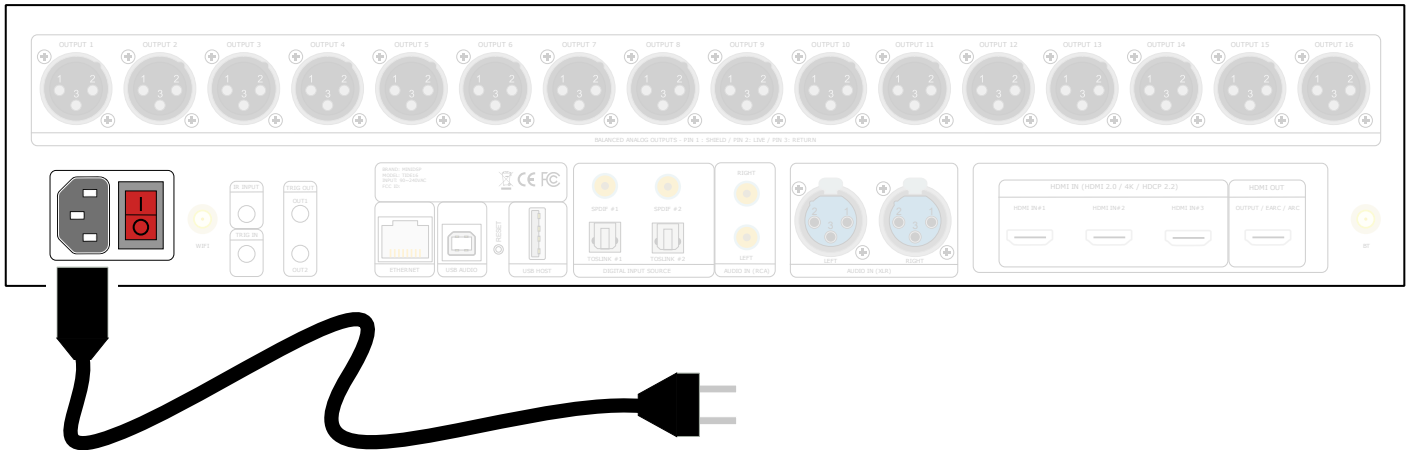
17. **Bluetooth antenna.** Screw on the supplied Bluetooth antenna here.

Power and control

This page describes how to connect the miniDSP Tide16 to power, and the connections needed to configure it using Device Console and Dirac Live.

Power

Fit the supplied IEC cable to the rear panel and plug the AC mains plug into the power outlet.



If initially setting up the Tide16, power can be turned on now to verify and test operation with the front panel and remote control. However, be sure to turn power off again before making any connections to the rear panel.

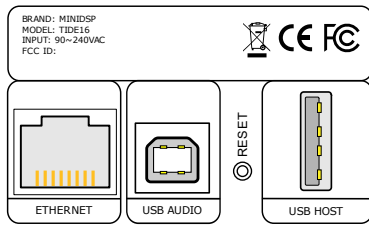
Generally, when being powered on and off with the rear panel switch, the following turn-on/turn-off sequence is recommended:

- **On:** Power on line-level equipment, including the Tide16, then turn on power amplification.
- **Off:** Turn power amplification off, then power off line-level equipment, including the Tide16.

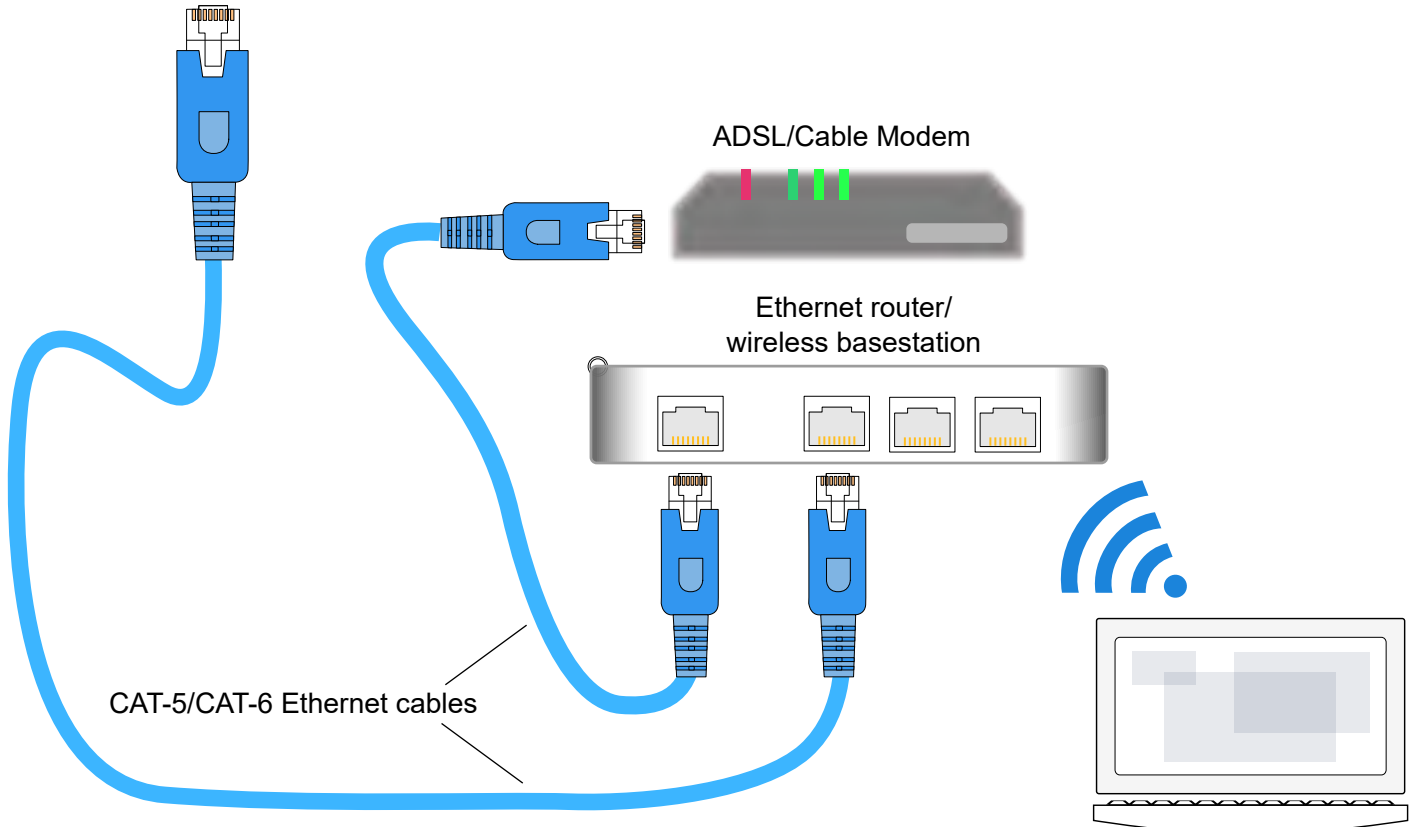
When not in use, the Tide16 can be placed into standby mode with the remote control or front panel.

Configuration over the network

To configure the Tide16, a network connection is required. Connect an Ethernet cable from your home network router to the Ethernet port on the rear panel. This is a typical example:



Tide16 rear panel

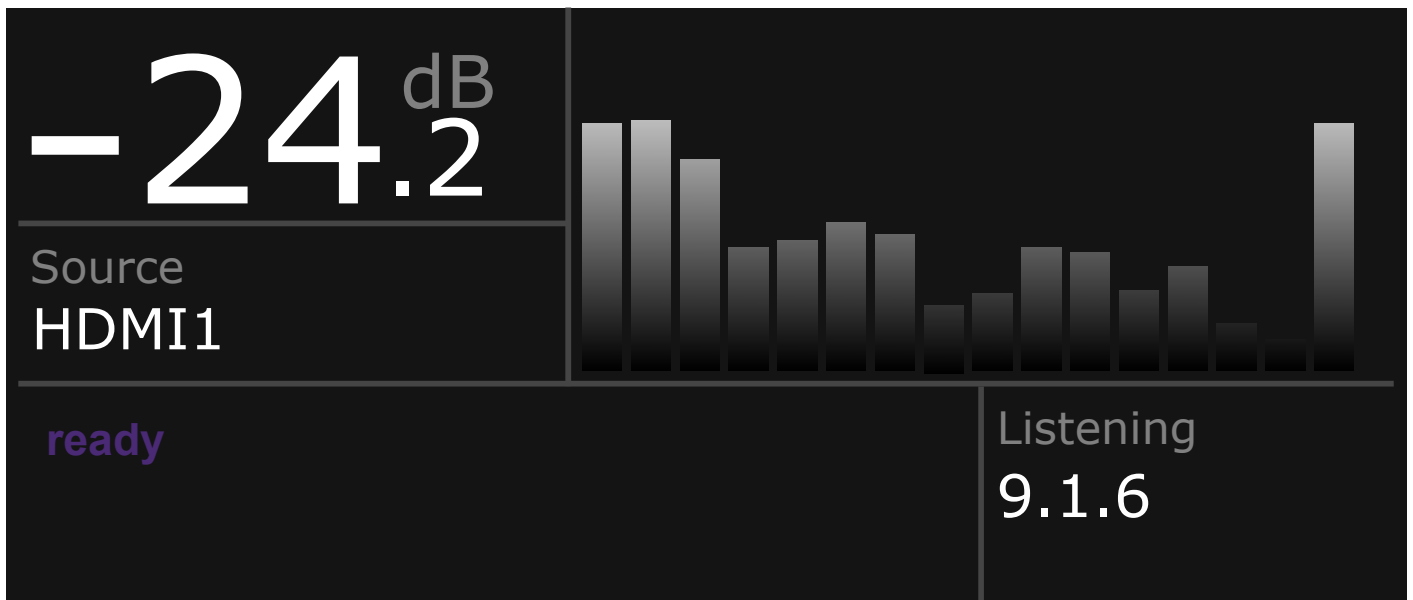


A short Ethernet cable is provided with the unit. If a longer cable is required, these are readily available from computer stores and online. The recommended maximum length of Ethernet cables is 100 meters (330 feet). Note that your router must be set to allow dynamic IP addresses i.e. DHCP. Most routers will have this function enabled by default.

Front panel



The front panel of the miniDSP Tide16 houses a 1920x800 (effective) OLED display and two rotary encoders. The encoder on the right controls volume, while the encoder toward the middle of the panel is used to select the input source.



Volume

To change the volume, rotate the rightmost encoder. The volume changes in 0.2 dB steps. Minimum volume is -127.5 dB and maximum volume is 0.0 dB.

Audio source

To change the audio source, rotate the middle encoder. The source name changes to yellow to indicate a pending change. When the desired source is displayed, press the encoder to confirm the selection.

Level meters

The level meters show the output levels on all channels in real time.

Status

The status field shows *ready* during normal use.

IP address

Press the encoder to display the IP address of the Tide16. Press it again to close the message box.

Control Software

Control Software

This section describes the user interface that is used to configure the miniDSP Tide16.

Pages in this section

- [Connecting to the UI](#)
- [The Main page](#)
- [The Speakers page](#)
- [The Decoding page](#)
- [The Dirac page](#)
- [The Settings page](#)

Connecting to the UI

To open the Tide16 web interface, click on one of the following:

- <http://minidsp-tide:5050> (<http://minidsp-tide:5050>)
- <http://minidsp-tide.local:5050/> (<http://minidsp-tide.local:5050>)

Depending on your network setup, one may work while the other will not. If neither works, you will need to connect to the web interface by IP address. You can find the IP address by pressing the middle encoder button on the front panel. The display will show the software version number and the IP address:

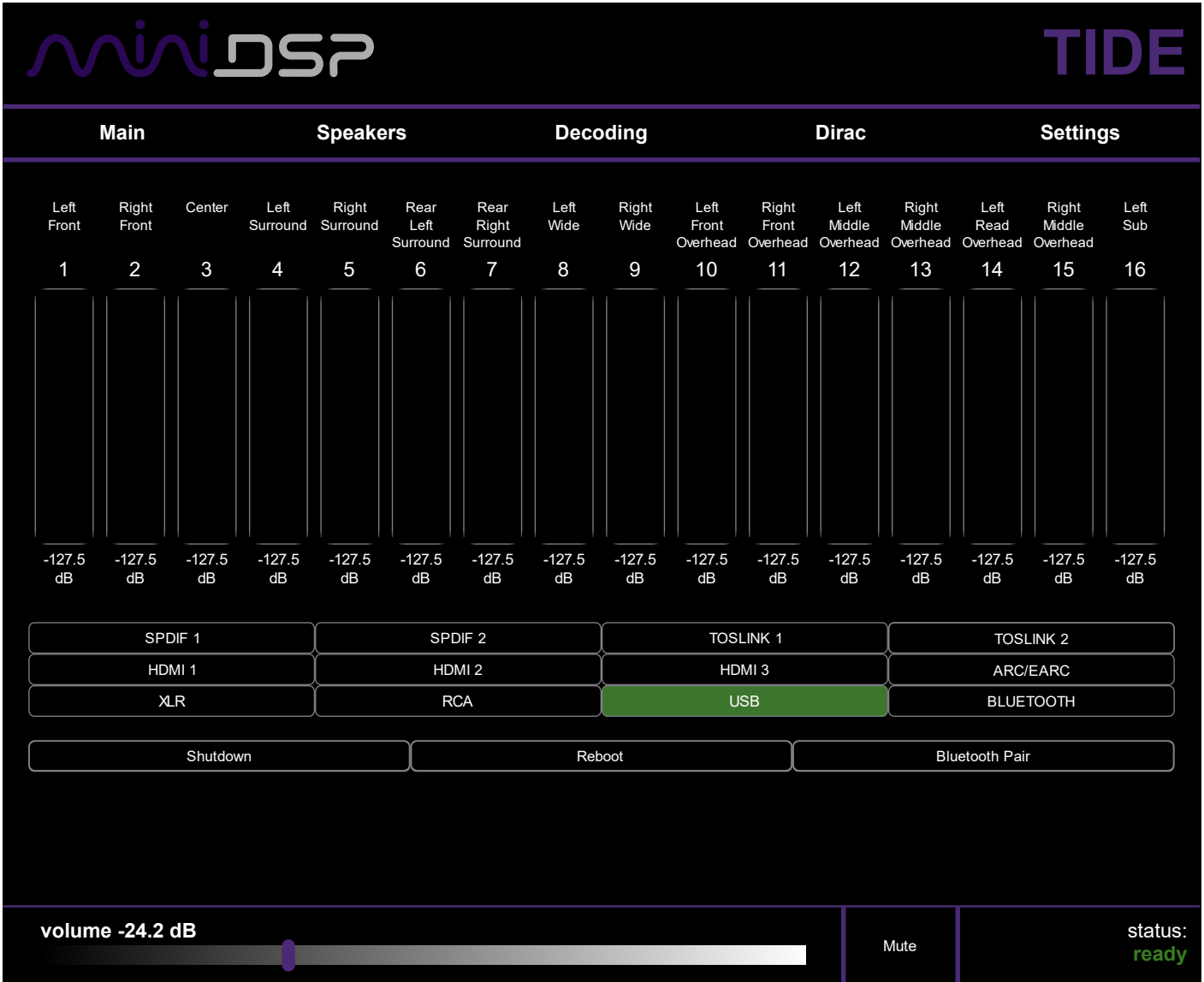


Once you have the IP address, use it in the address above, for example:

- <http://192.168.1.42:5050/> (<http://192.168.1.42:5050>)

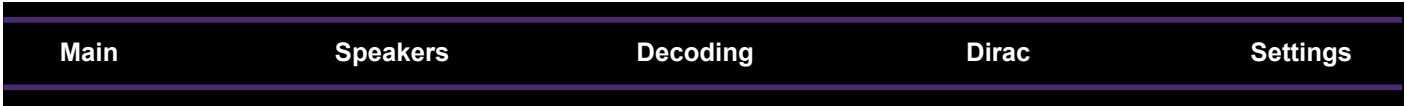
(Click the encoder button again to close the IP address display.)

The Main page



This page presents of overview of audio playback in the miniDSP Tide16.

Page selection menu



This menu is present on all pages. Click to select the page to display.

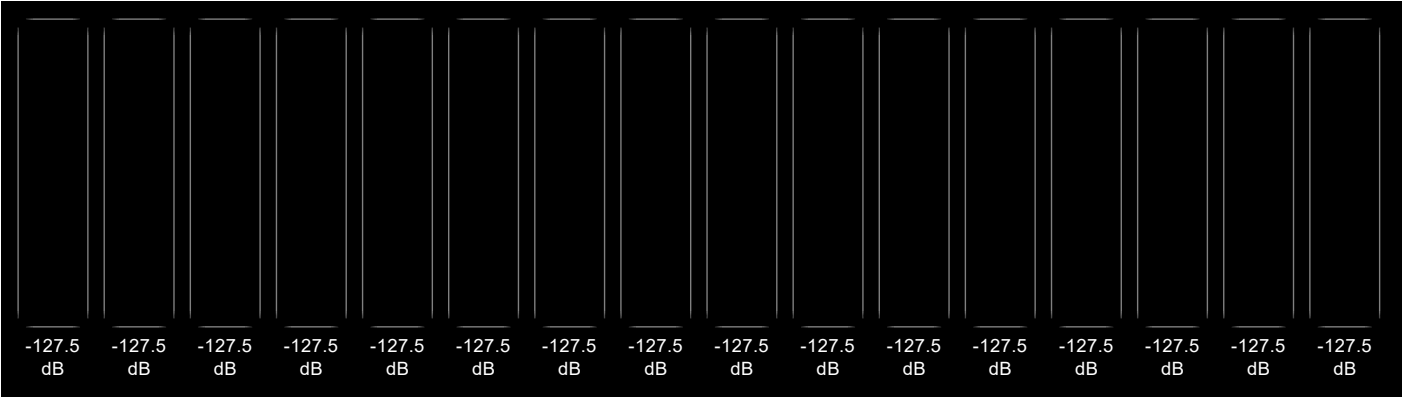
Speaker/channel identification

Left Front	Right Front	Center	Left Surround	Right Surround	Rear Left Surround	Rear Right Surround	Left Wide	Right Wide	Left Front Overhead	Right Front Overhead	Left Middle Overhead	Right Middle Overhead	Left Rear Overhead	Right Middle Overhead	Left Sub
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

The top row of labels indicates the assigned speaker output channel, while the bottom row indicates the corresponding channel number.

The labels will change when speaker configuration is changed on the **Speakers** page.

Realtime level meters



These meters display the current signal level on the *output* channels, both as a graphical bar and numerically below the graphical bar.

Note that, since the meters display the output levels, they are affected by the volume control. Therefore, at low listening levels, there may be little or no indication of signal on the graphical bars.

Input selection

SPDIF 1	SPDIF 2	TOSLINK 1	TOSLINK 2
HDMI 1	HDMI 2	HDMI 3	ARC/EARC
XLR	RCA	USB	BLUETOOTH

Select an input by clicking on the labeled button. The currently selected input is highlighted in green.

System control

Shutdown	Reboot	Bluetooth Pair
----------	--------	----------------

Shutdown

Perform an orderly shutdown of the Tide16 CPU and turn the unit off.

Reboot

Reboot the Tide16.

Bluetooth Pair

Enter Bluetooth pairing mode.

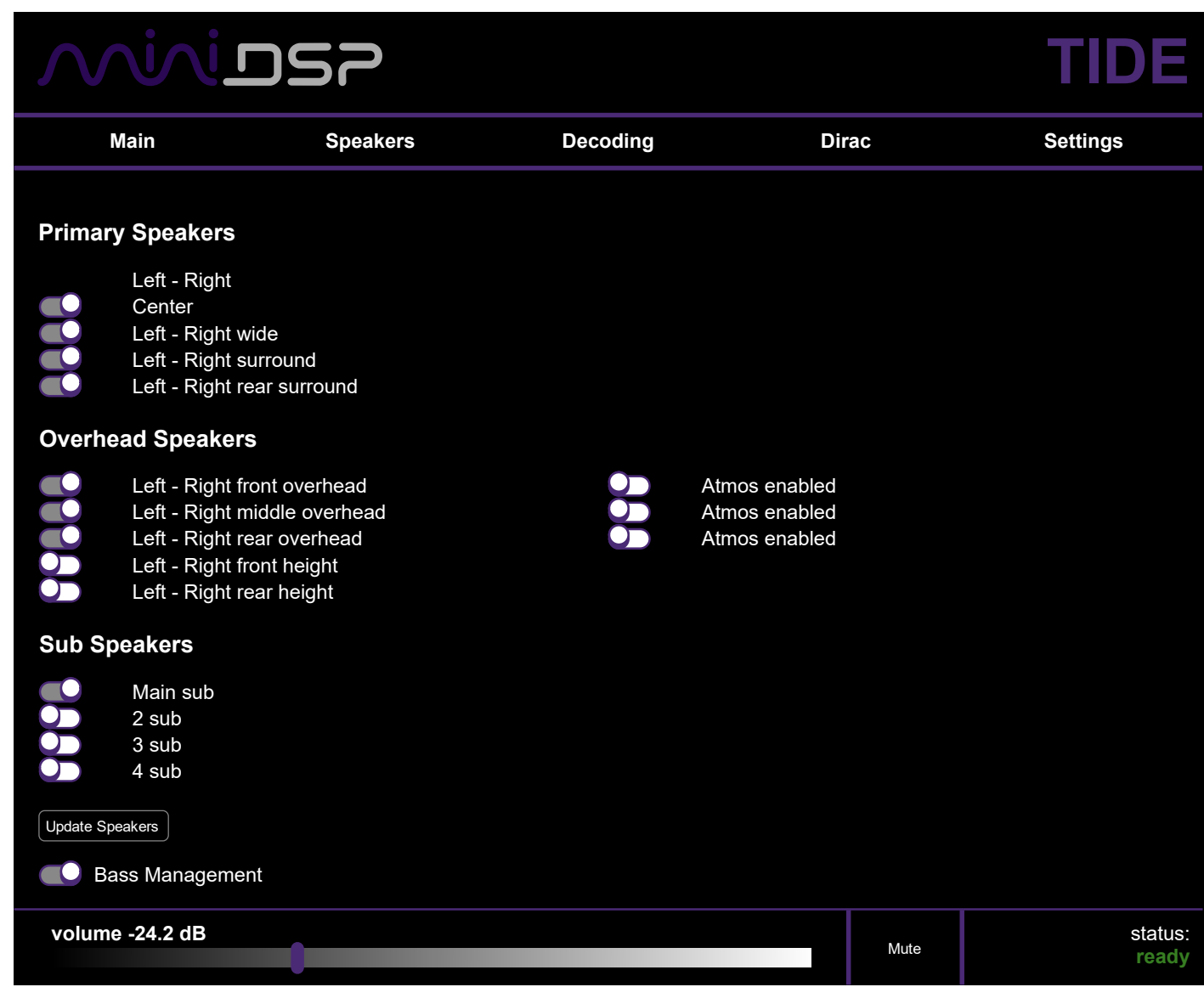
Volume, mute and status



This section is present on all pages.

- The volume control slider on the left side is the main volume control.
- In the middle is the Mute button; click to mute (or unmute) the unit. This displays red when the unit is muted.
- The status indicator on the right is "ready" in normal operation.

The Speakers page



The Speakers page of the Web UI

This page is used to select the speaker configuration. This is set up during initial configuration to match the physical layout of your system, and is not usually changed after that.

To set up the speaker configuration, use the sliders to enable the actual speakers in the system. After setting up the speakers, click on the **Update Speakers** button.



Then view the **Main** page to see the mapping of speakers to output channels.

Primary Speakers

Set up the primary speakers here.

Primary Speakers

Left - Right

Center

Left - Right wide

Left - Right surround

Left - Right rear surround

The front left and right speakers are always enabled. Enable the other speakers according to your system. See the page [Primary Speakers](#) for the recommended sets of speakers.

Overhead Speakers

Set up the overhead speakers here.

Overhead Speakers

Left - Right front overhead

Left - Right middle overhead

Left - Right rear overhead

Left - Right front height

Left - Right rear height

Atmos enabled

Atmos enabled

Atmos enabled

Enable overhead speakers in pairs, according to your system. See the page [Overhead Speakers](#) for the recommended combinations of speakers.

Sub Speakers

Set up the subwoofers here.

Sub Speakers



- Main sub
- 2 sub
- 3 sub
- 4 sub

Enable from one to four subwoofers here. See the page [Subwoofers](#) for more information.

Bass Management

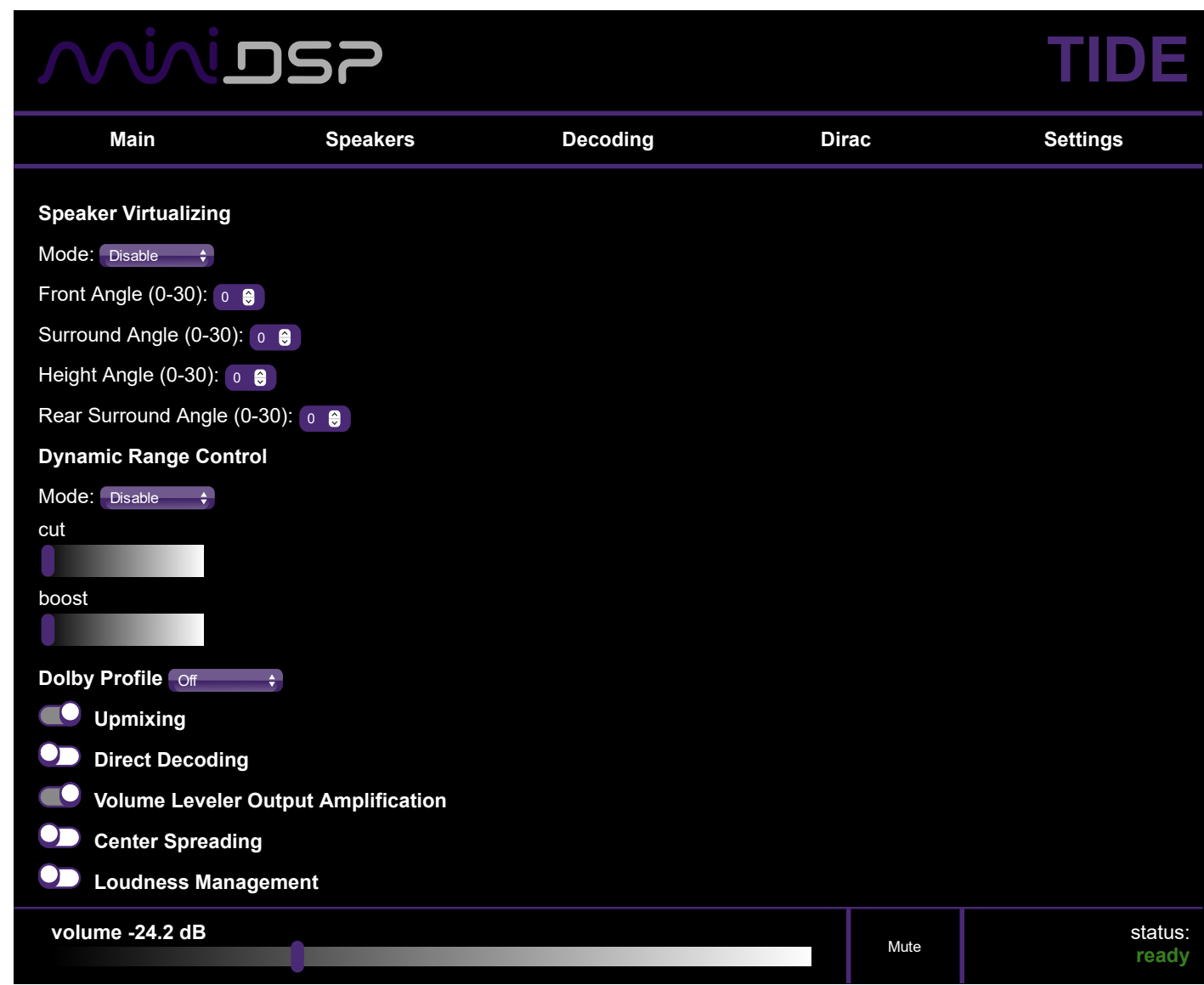
Enable bass management here. If enabled, low bass content from the speaker channels will be redirected to the subwoofer or subwoofers.



Bass Management

The Decoding page

The Decoding page sets the parameters of the audio decoder.



Speaker Virtualizing

There are three settings:

Off

The decoding proceeds as normal using the available speakers.

Speakers

Enables speaker virtualization to improve immersion if there are no height or surround speakers.

Headphone

Enables speaker virtualization for headphones.

The parameters to the virtualization algorithm set the angle of a speaker pair from the central listening plane, relative to the listening position. Each parameters has a value from zero to 30 degrees. Setting the parameter to zero (the default) disables virtualization for that speaker pair:

- **Front Angle:** Angle between central listening plane and left/right front speakers.
- **Surround Angle:** Angle between central listening plane and side-firing left/right surround speakers.
- **Height Angle:** Angle between central listening plane and up-firing left/right Dolby Atmos enabled speakers.
- **Rear Surround Angle:** Angle between central listening plane and rear-firing left/right surround speakers.

Dynamic Range Control

This setting sets the dynamic range control mode for the Dolby Digital Plus, Dolby TrueHD and Dolby MAT decoders.

mode

Sets the dynamic range control mode, and can be one of *enable*, *disable*, *auto*, *heavy*, *portable_8*, *portable_11* or *portable_14*.

cut

This is the dynamic range compression cut scale factor, from 0 to 100.

boost

This is the dynamic range compression boost scale factor, from 0 to 100.

Dolby Profile

Select one of the Dolby Profiles, or *Off* if none is desired: *Movie*, *Music*, *Night*, *Dynamic*, *Voice*, *Game*, *Personalize*, *Custom A*, *Custom B*, *Custom C* or *Custom D*.

Upmixing

Enable/disable the Dolby Surround Decoder for upmixing channel-based audio to the specified speaker layout.

Direct Decoding

The audio on the soundtrack is sent to the output channels without being modified (except for bass management if enabled).

Volume Leveler Output Amplification

Enable the Volume Leveler output amplification. If disabled, the Volume Leveler output target level is -31.0 dBFS. If enabled, the Volume Leveler output target level is set to -20.0 dBFS.

Center Spreading

Enable center spreading of the surround decoder. This prevents highly correlated source material, such as music, from "collapsing" into the center speaker and maintains the desired stereo spread.

Loudness Management

Enable the Dynamic Range Control for Dolby TrueHD / Dolby MAT decoder.

The Dirac page

miniDSP

TIDE

Main

Speakers

Decoding

Dirac

Settings

Dirac

volume -24.2 dB

Mute

status:

ready

This page is used to enable Dirac Live room correction.

The Settings page

TBC

Speaker Placement

Speaker placement overview

For the best Atmos audio experience, the speakers must be set up according to the Dolby Atmos guidelines. This ensures that the Atmos renderer (the software/hardware that converts the Atmos audio in the soundtrack to the actual speakers that you have) can create the most effective and immersive soundstage.

The speaker layout is specified in the form *p.s.o*:

- *p* is the number of primary speakers. The Tide16 supports 2, 3, 4, 5, 7 or 9 such speakers.
- *s* is the number of subwoofers. It can range from 0 through to 4.
- *o* is the number of overhead speakers. It can range from 0 through to 6. Overhead speakers are always added in pairs.

Pages in this section

- [Primary speakers](#)
- [Overhead speakers](#)
- [Subwoofers](#)

References

- [Dolby Atmos Speaker Setup Guides](https://www.dolby.com/about/support/guide/speaker-setup-guides/) (<https://www.dolby.com/about/support/guide/speaker-setup-guides/>)
- [Dolby Atmos Home Theater Installation Guidelines](https://www.dolby.com/siteassets/technologies/dolby-atmos/atmos-installation-guidelines-121318_r3.1.pdf) (https://www.dolby.com/siteassets/technologies/dolby-atmos/atmos-installation-guidelines-121318_r3.1.pdf) (PDF)

Primary speakers

The primary speakers are similar to earlier generations of home theater speakers. They are situated approximately at the ear level of the seated listeners. The standard height for this is 1.2 meters (4 feet), but this will of course depend on your specific situation.

Primary speakers are also known as *ear-level* or *listener-level* speakers.

There can be from 2 up to 9 primary speakers. (Odd numbers include a center channel speaker, while even numbers do not.)

Info

The primary speakers are sometimes referred to as "bed" speakers. This is incorrect: in Dolby Atmos, the bed channels are those that each have a distinct audio track assigned to them. The set of bed channels can be one of 2.0, 3.0, 5.0, 5.1, 7.0, 7.1, 7.0.2, or 7.1.2. In contrast, audio *objects* are not assigned to a specific speaker channel, but to a (changing) location in space.

The set of bed channels is set in the recording and can not be changed by the user. During playback, the Atmos renderer uses the audio from the bed channels and the audio objects to generate the audio signals to send to the actual speakers that you have. For more information, see the Dolby article [What's the difference between beds and objects \(https://professionalsupport.dolby.com/s/article/What-s-the-difference-between-beds-and-objects?language=en_US\)](https://professionalsupport.dolby.com/s/article/What-s-the-difference-between-beds-and-objects?language=en_US) ?

The correct layout of the primary speakers is important to ensure that the Atmos renderer produces the most realistic, immersive soundstage. Each section below summarizes Dolby's guidelines for placement.

Speaker height

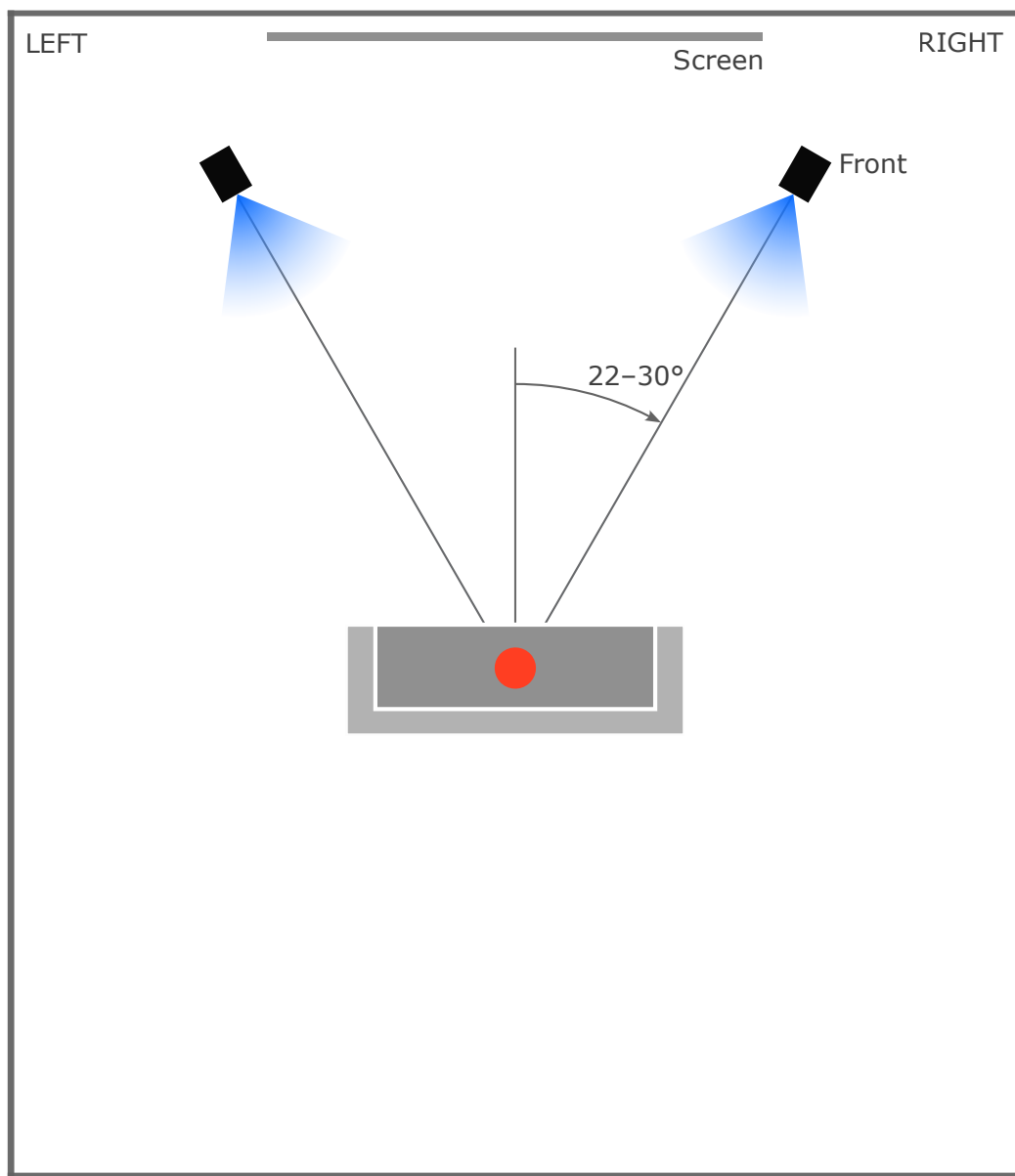
In all cases, the speaker's tweeter should be located at approximately ear height. This applies to surround speakers also: if they can not be at the same height as the front speakers, Dolby recommends that they be no more than 1.25 times that height.

In practice, it may not be possible to mount the center speaker at listener height, in which case it should be placed as close as possible to that height.

All speakers should be positioned to point towards the listening area, and have clear "line of sight" to all listeners.

2 speakers

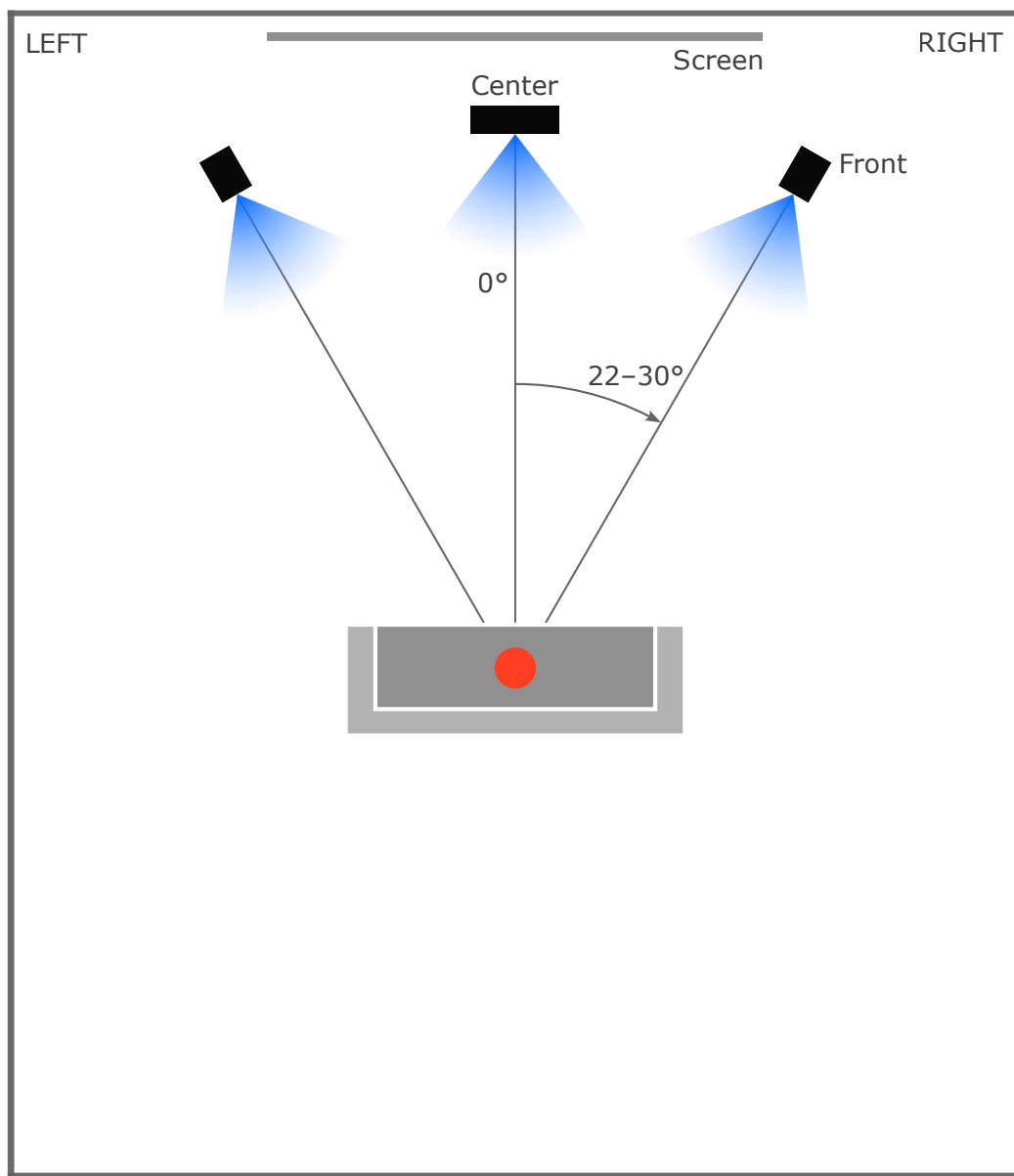
With two speakers only, the front left and front speakers are located at an angle between 22 and 30 degrees from the centerline.



2-speaker layout

3 speakers

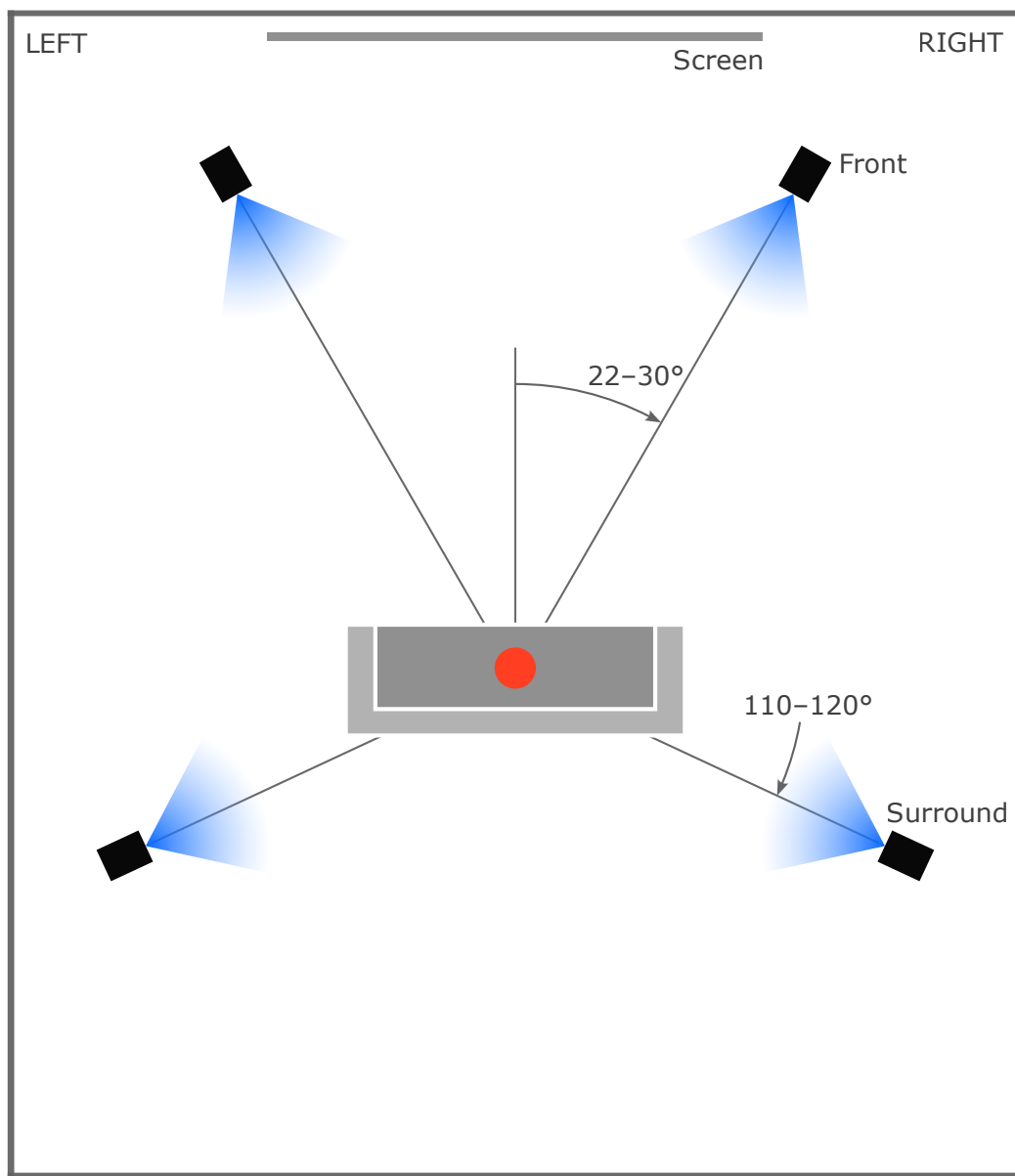
A 3-speaker layout adds a center channel. This speaker must be situated directly on the centerline.



3-speaker layout

4 speakers

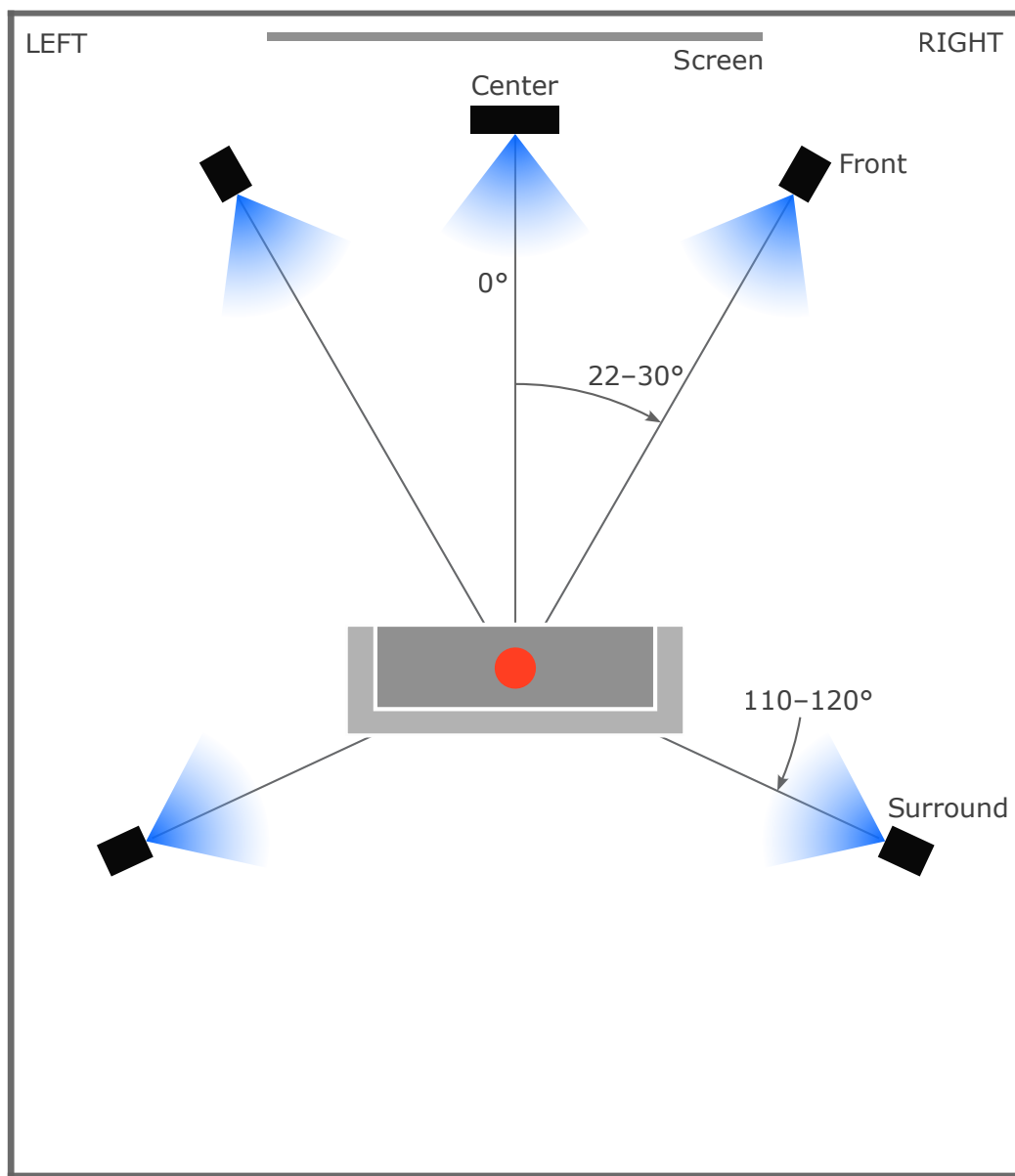
A 4-speaker layout adds two surround speakers to the 2-speaker layout. The surround speakers should be located at an angle of 110 to 120 degrees from the centerline.



4-speaker layout

5 speakers

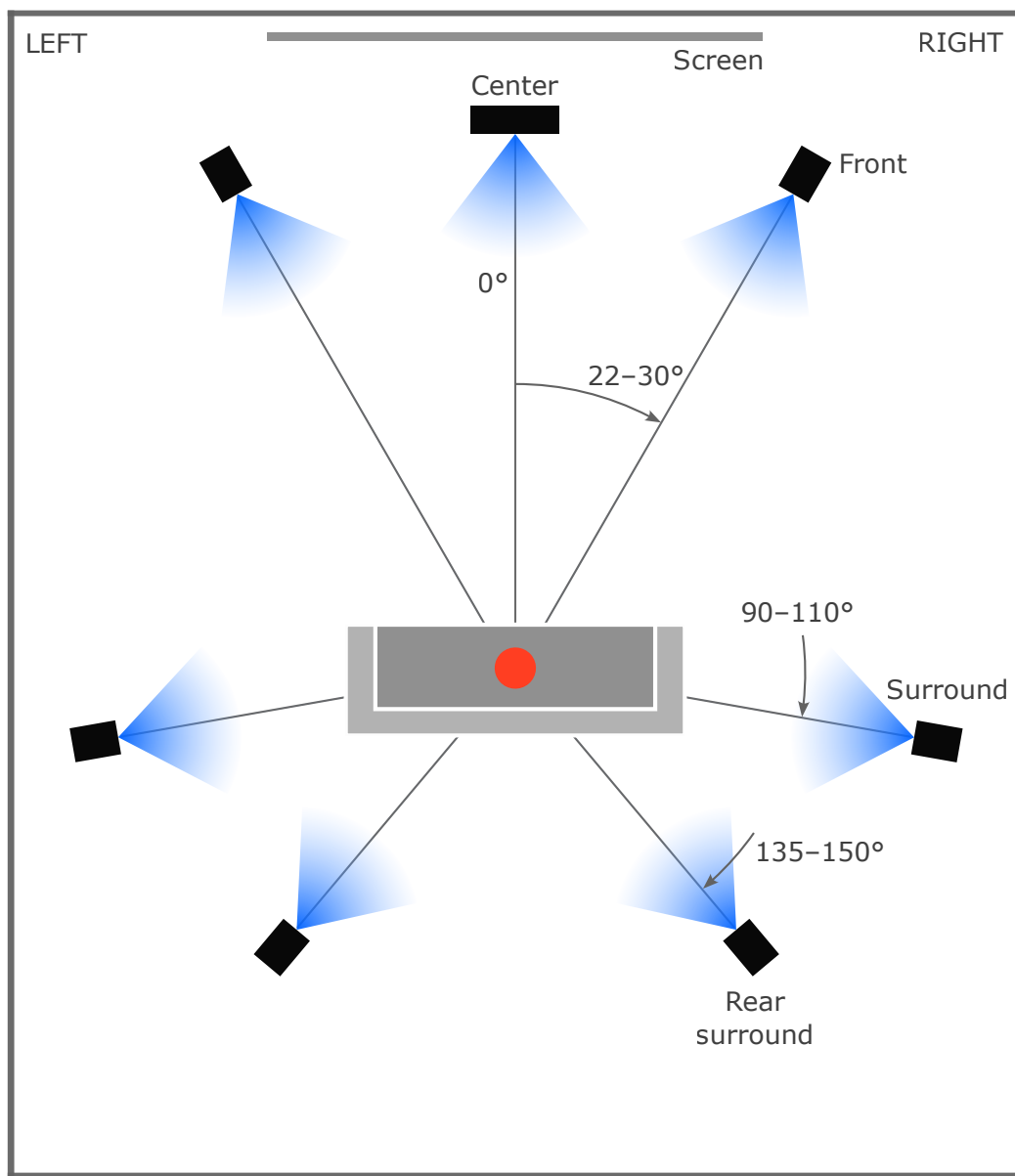
A 5-speaker layout adds two surround speakers to the 3-speaker layout. The surround speakers should be located at an angle of 110 to 120 degrees from the centerline.



5-speaker layout

7 speakers

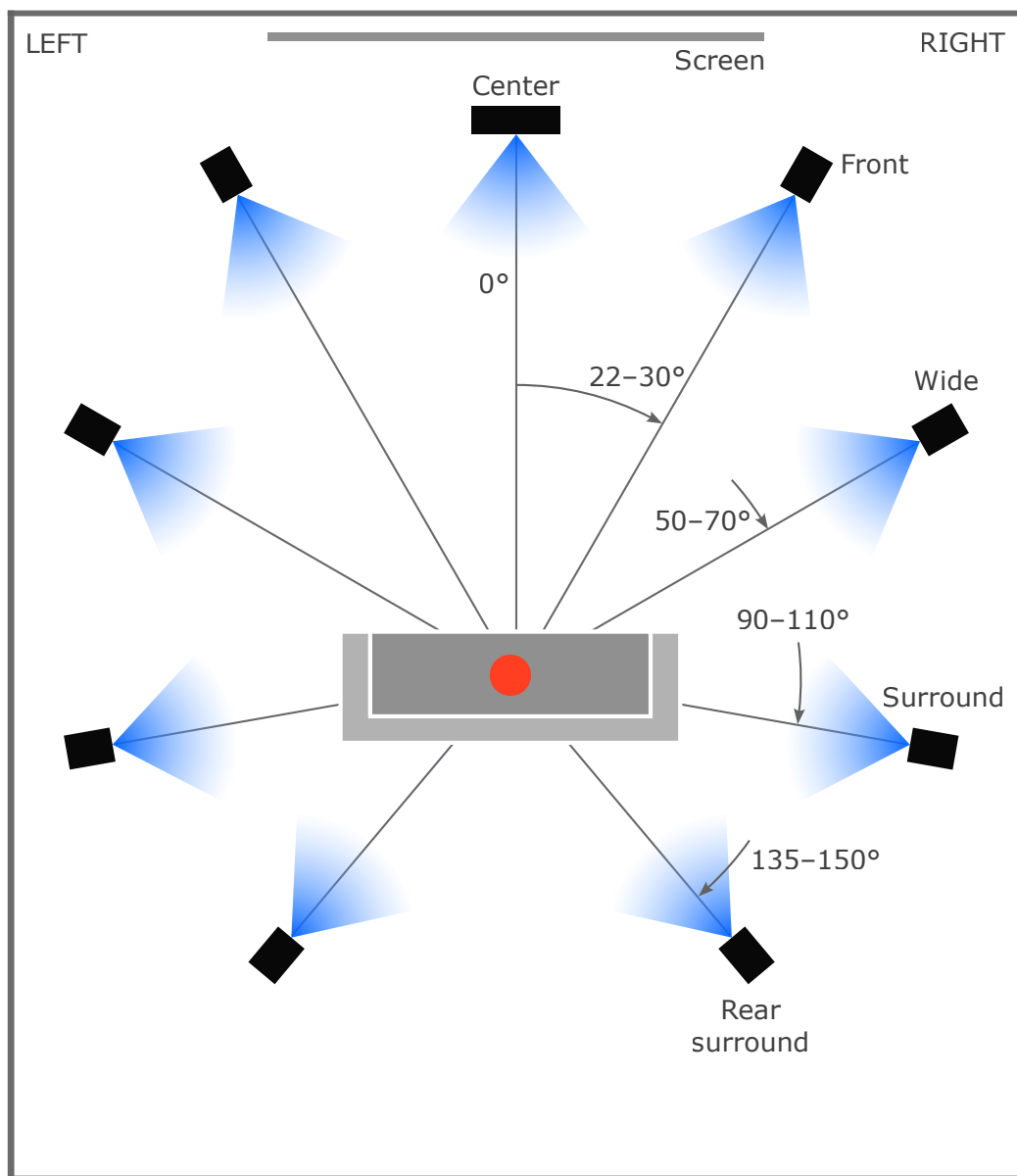
A 7-speaker layout adds a pair of rear surround speakers to the 5-speaker layout. The side surround speakers should be located at an angle of 90 to 110 degrees from the centerline and the rear surrounds at an angle of 135 to 150 degrees from the centerline.



7-speaker layout

9 speakers

A 9-speaker layout adds two front wide speakers to the 7-speaker layout. These speakers should be located at an angle of 50 to 70 degrees from the centerline.



9-speaker layout

Overhead speakers

Overhead speakers provide the height (vertical) dimension to the soundstage, creating sounds that are above the listener's head. They are installed in pairs only, to the left and right of the listening area.

This page provide the recommended layouts for overhead speakers and their combination with different sets of primary speakers.

Info

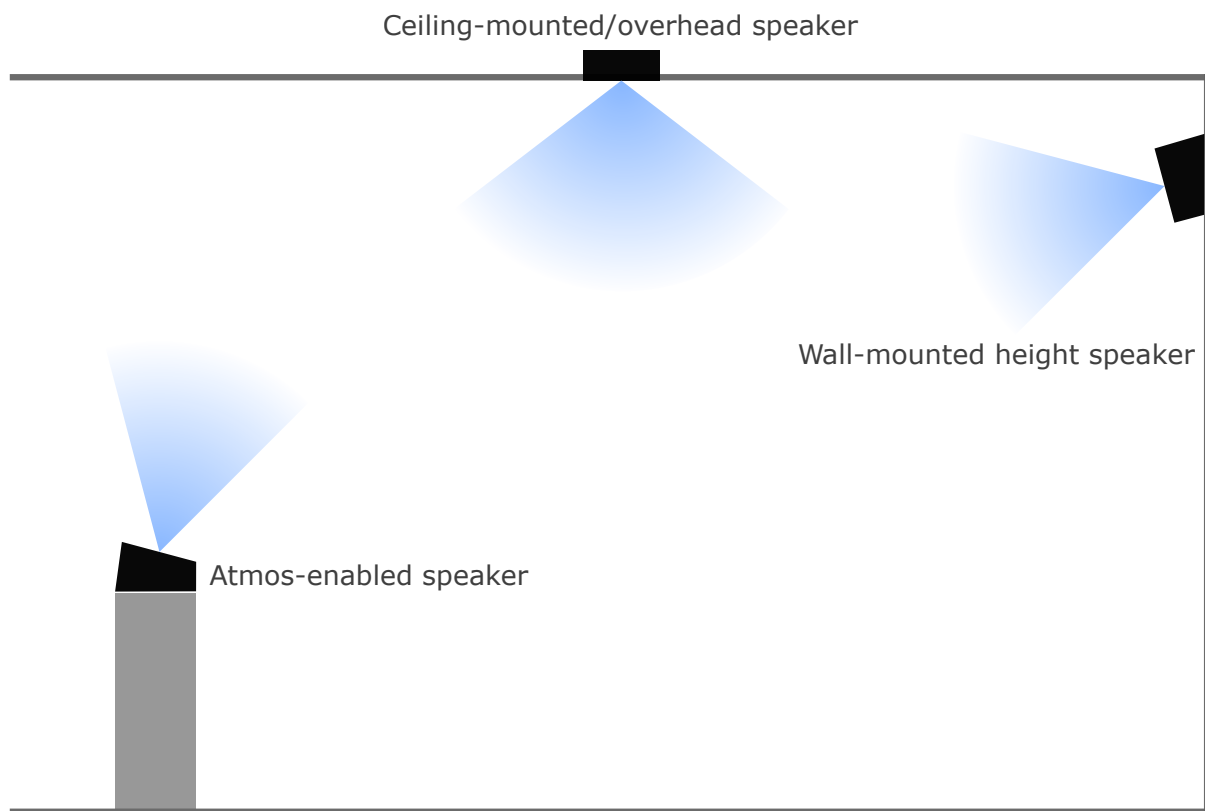
If there are no overhead speakers, the last digit is usually left off the speaker designation, leaving the conventional surround-sound designations such as 5.1, 7.1 and so on. In that case, Dolby Atmos can synthesize a virtual height dimension using only the primary speakers. However, for the most immersive experience, install one or more pairs of overhead speakers.

Types of overhead speaker

There are three types of overhead speaker:

- Ceiling-mounted speakers. These are typically known simply as "overhead" speakers, and can also be referred to as the "top" speakers.
- Atmos-enabled speakers. These speakers are situated at or slightly higher than the listener's ear level and point at the ceiling. Vertical soundstage is created by reflecting sound from the ceiling. They can be integrated into conventional front or surround speakers, or implemented as an add-on module that sits on top of a conventional speaker.
- Wall-mounted height speakers. These speakers are mounted high on a wall and point forward or directly at the listener.

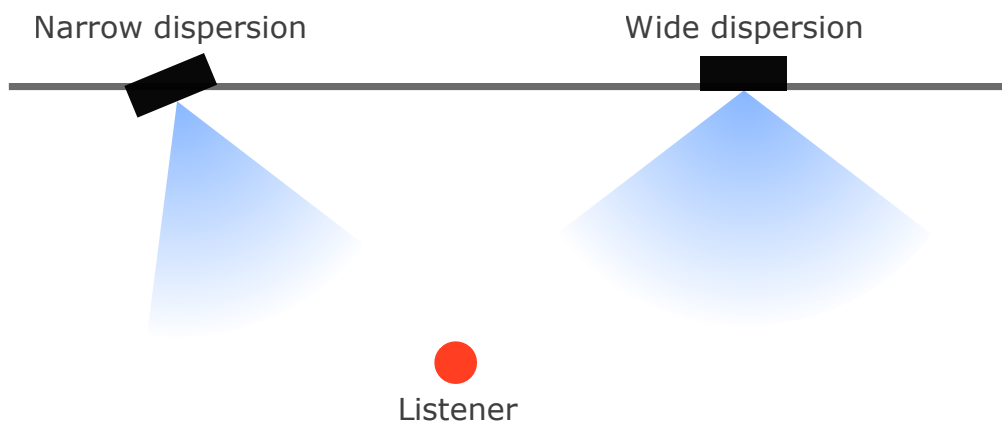
This figure illustrates the three types of height speaker:



Types of overhead speaker

Ceiling-mounted speakers

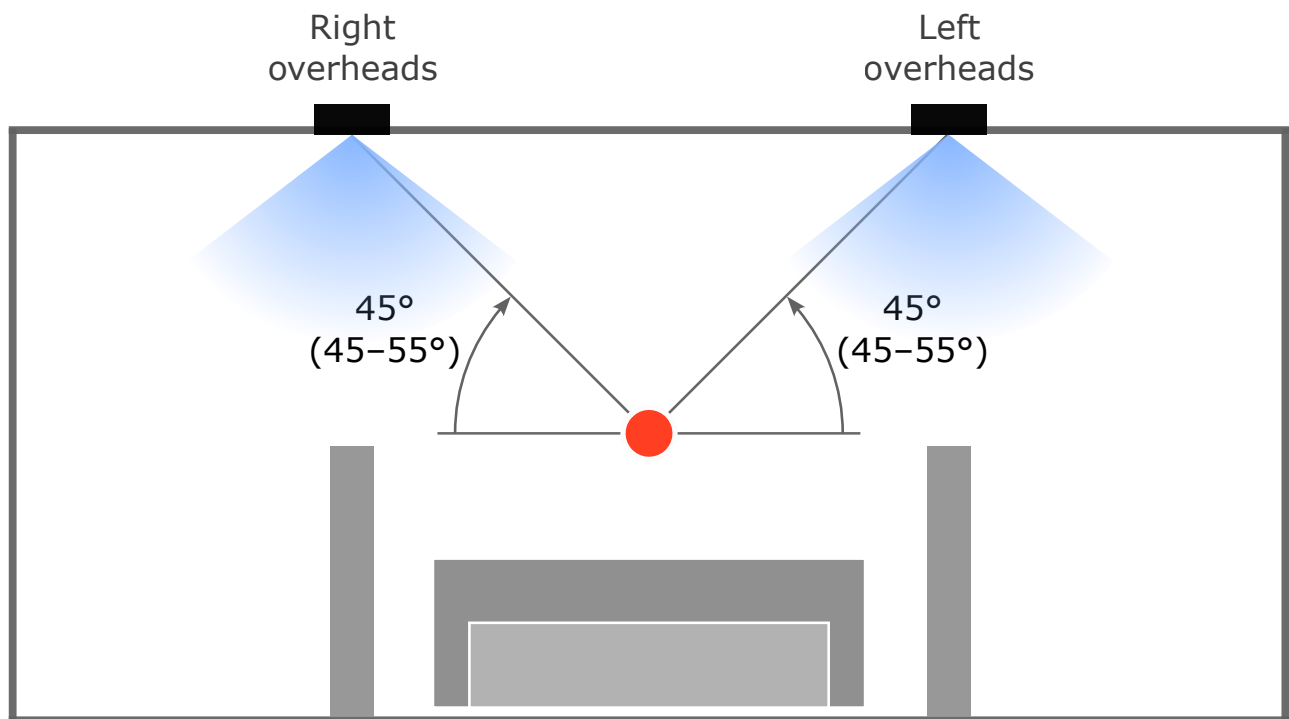
Ceiling-mounted should have a wide dispersion so that they can cover the listening area. As long as the dispersion (from 100 to 10 kHz averaged) is a total of 90 degrees or greater, they can be mounted to point directly downwards. If their dispersion is less than 90 degrees, they should be angled to point towards the listener, as indicated in the following figure.



Dispersion of ceiling-mounted speakers

Lateral (left-to-right) positioning of overhead speakers

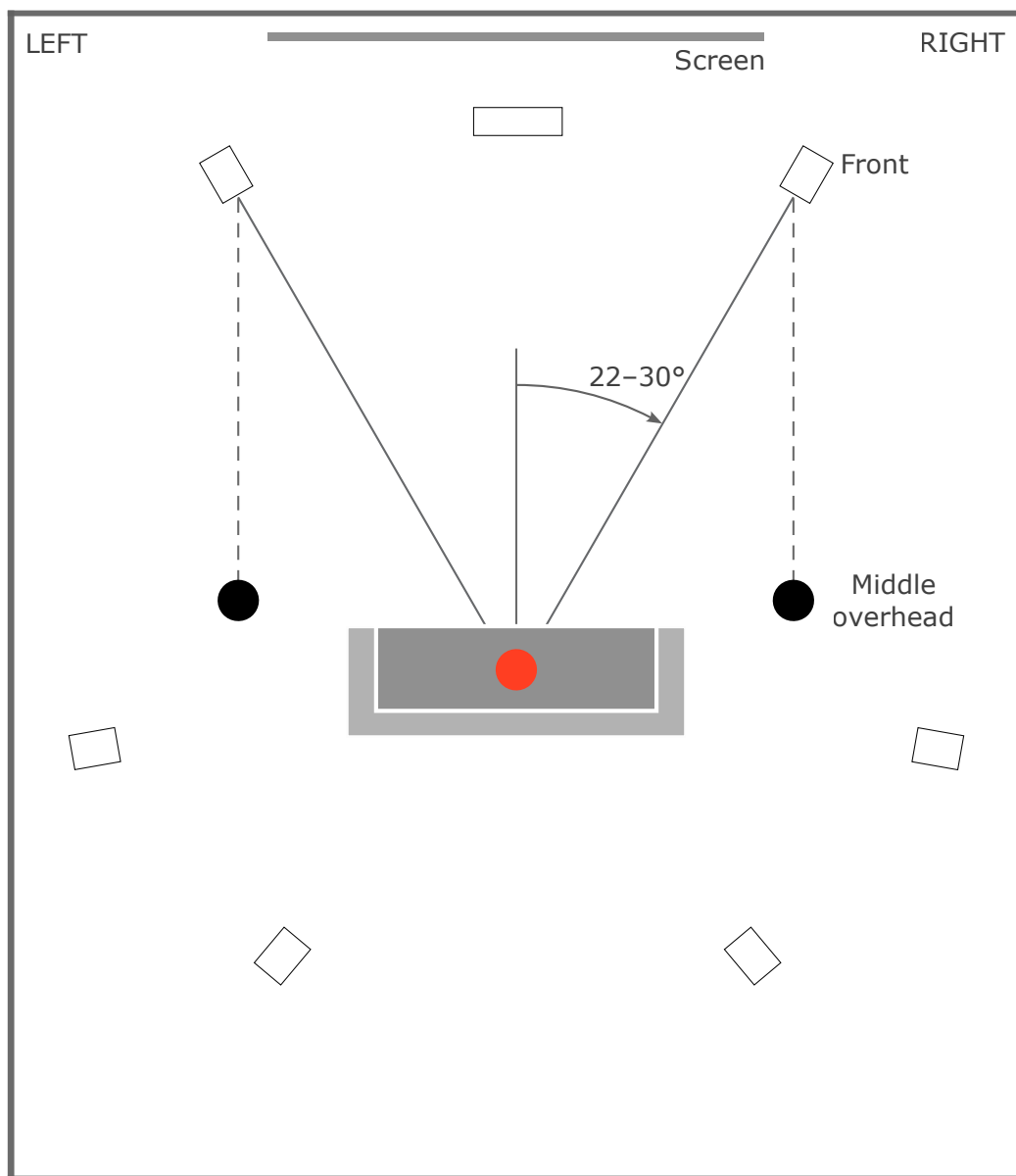
Overhead ceiling-mounted speakers are positioned approximately in-line with the front primary speakers. Typically, this should result in an angle to the speakers of 45 degrees, when viewed from the front of the room. A higher angle up to 55 degrees is acceptable.



Lateral (left-to-right) positioning of overhead speakers, as viewed from the front of the room

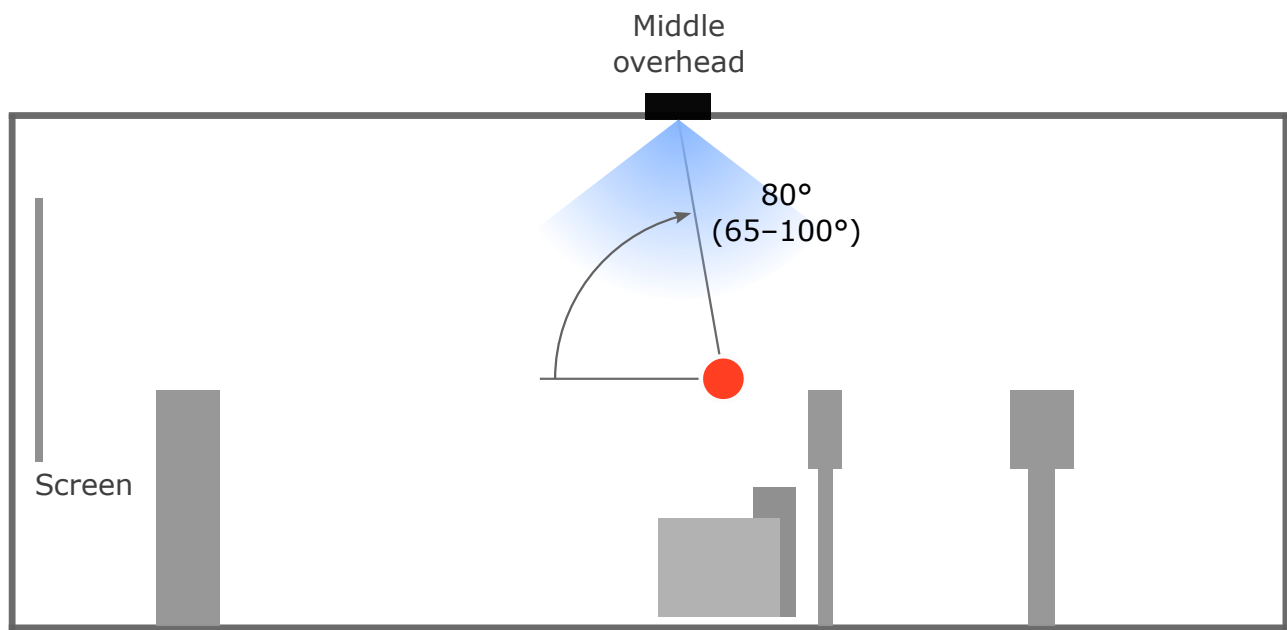
2 overhead speakers

In the left-right direction, the speakers are roughly in line with the front speakers, as shown in this diagram:



Top view, 2 overhead speakers

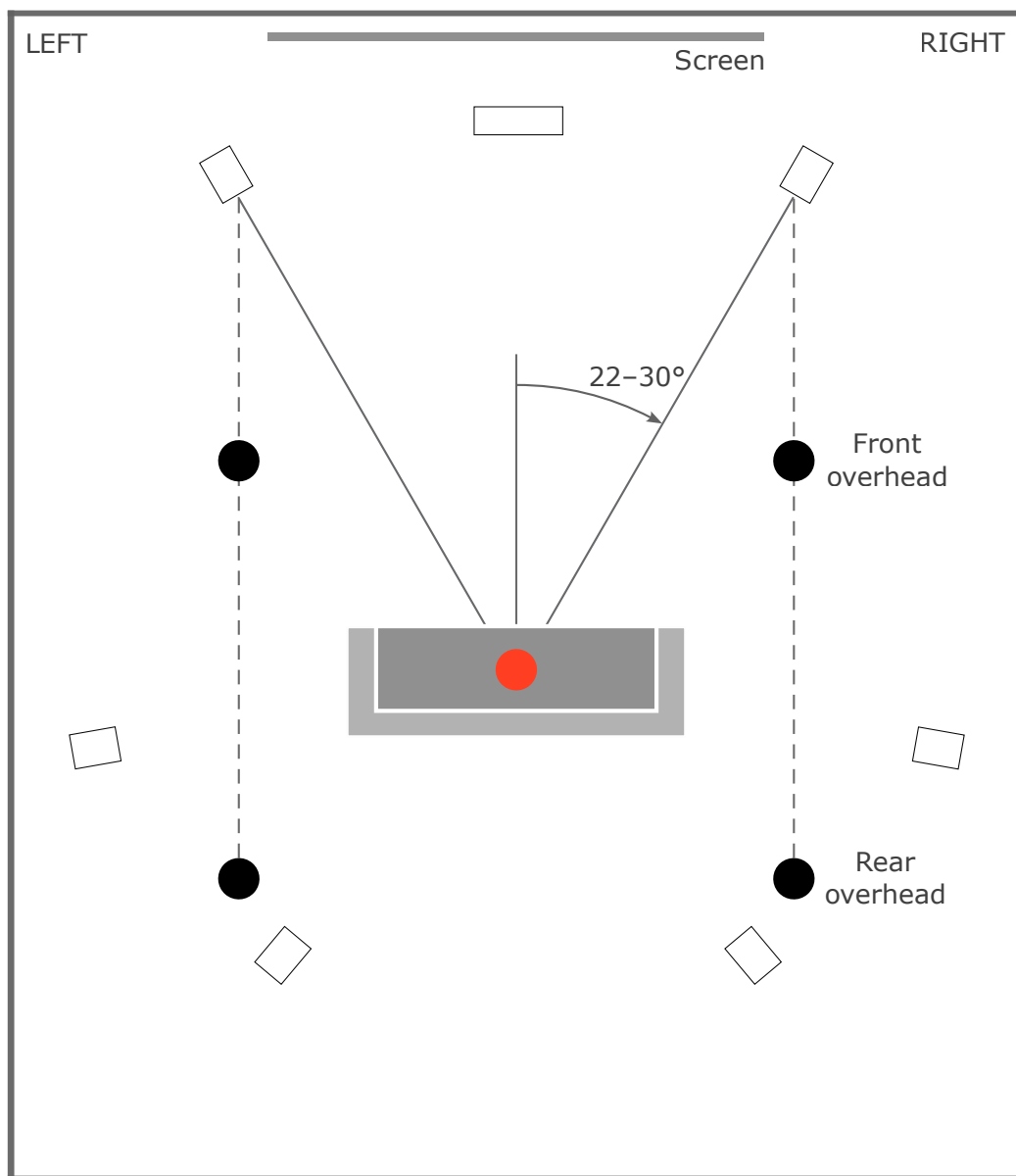
In the front-back direction, they are ideally positioned slightly forward of the listener at an angle of 80 degrees from horizontal, although any angle between 65 and 100 degrees is acceptable:



Side view, 2 overhead speakers

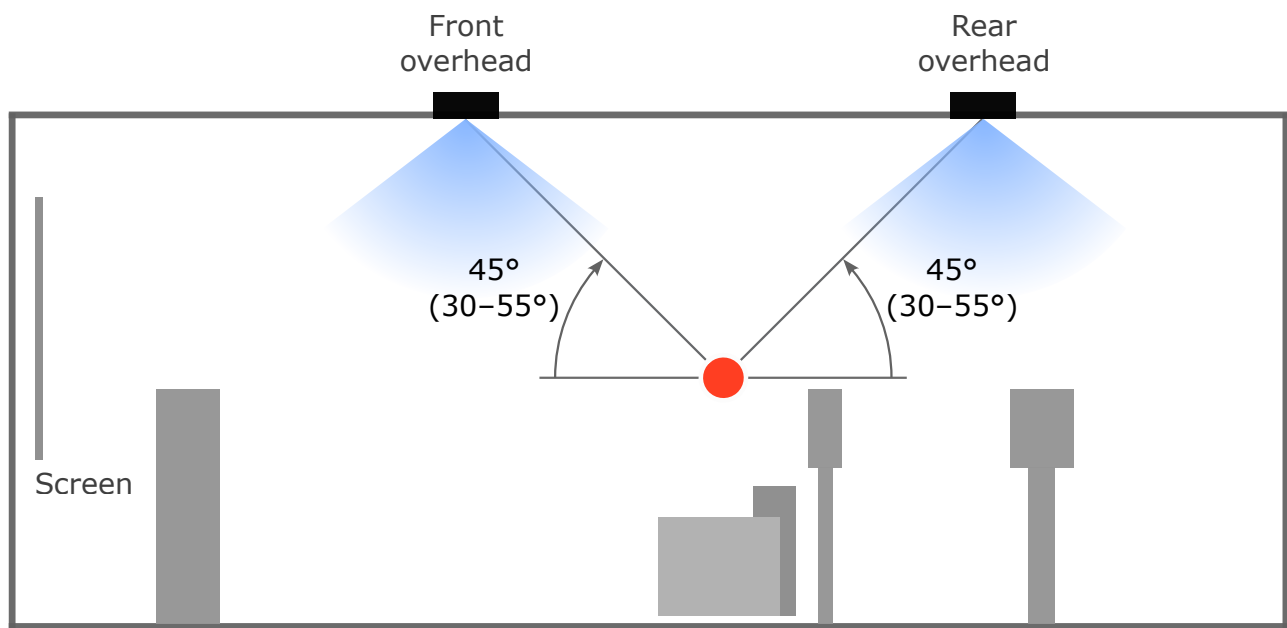
4 overhead speakers

With four overhead speakers, one pair is placed in front of the listener and one pair is placed behind, as shown in this diagram:



Top view, 4 overhead speakers

The four speakers should ideally form a square centered on the listening area. Viewed from the side, the ideal angle to the speakers is 45 degrees, although an angle between 30 and 55 degrees is acceptable:



Side view, 4 overhead speakers

Use of four overhead speakers is supported only if there are four or more primary speakers.

6 overhead speakers

With six overhead speakers, a middle pair is placed between the front and rear overheads:

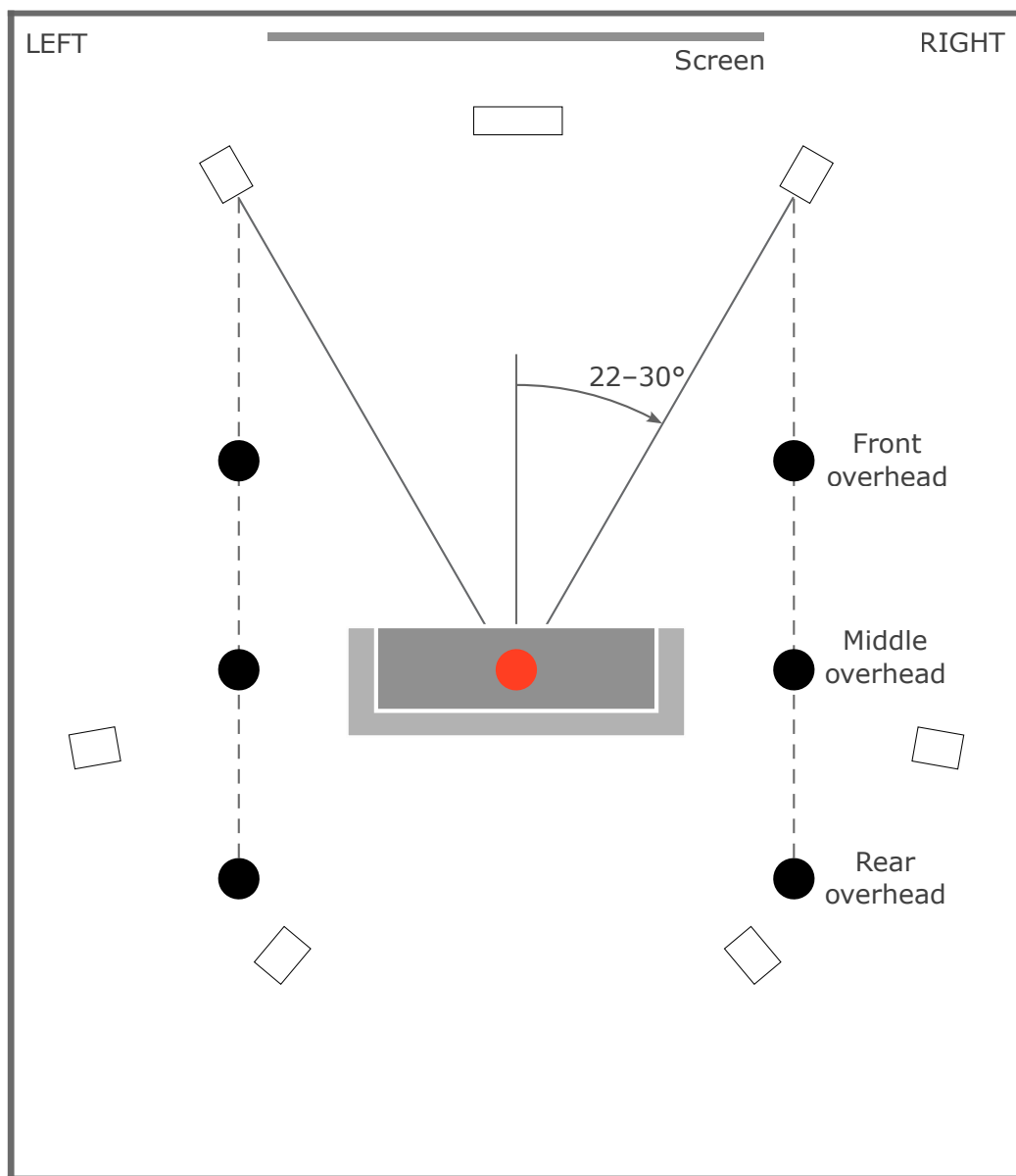


Figure 5. Top view, 6 overhead speakers

Viewed from the side, they are ideally placed in line with the listener, although a range of 70 to 110 degrees is acceptable:

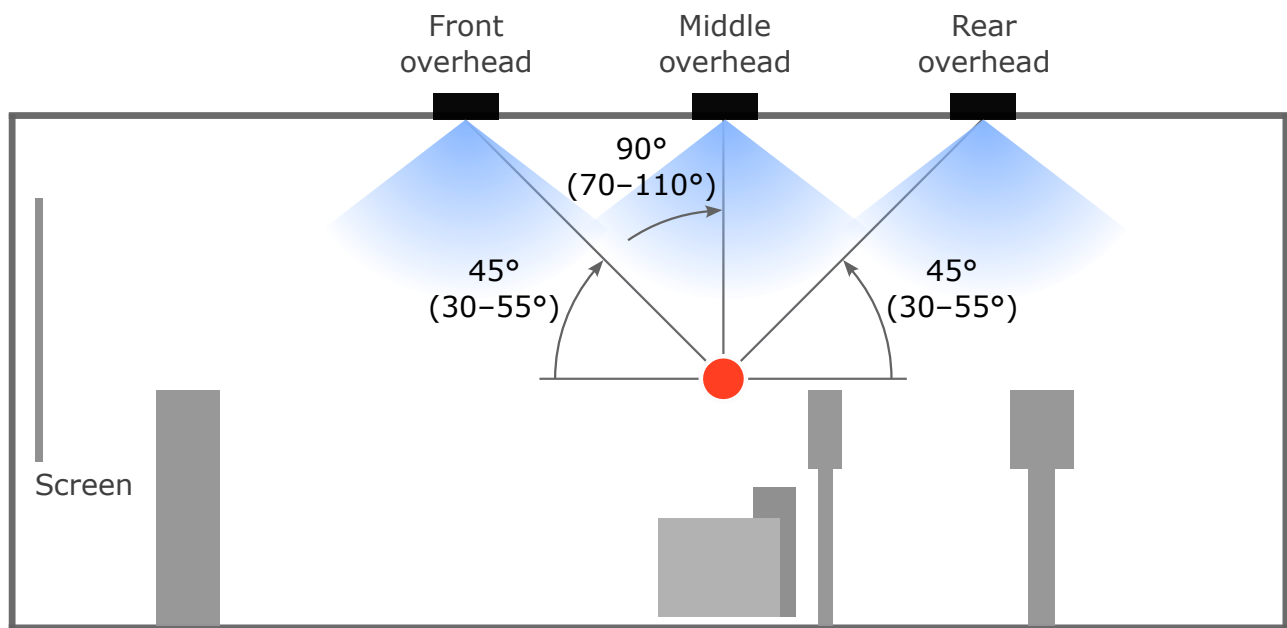


Figure 6. Side view, 6 overhead speakers

Use of six overhead speakers is supported only if there are 7 or 9 primary speakers.

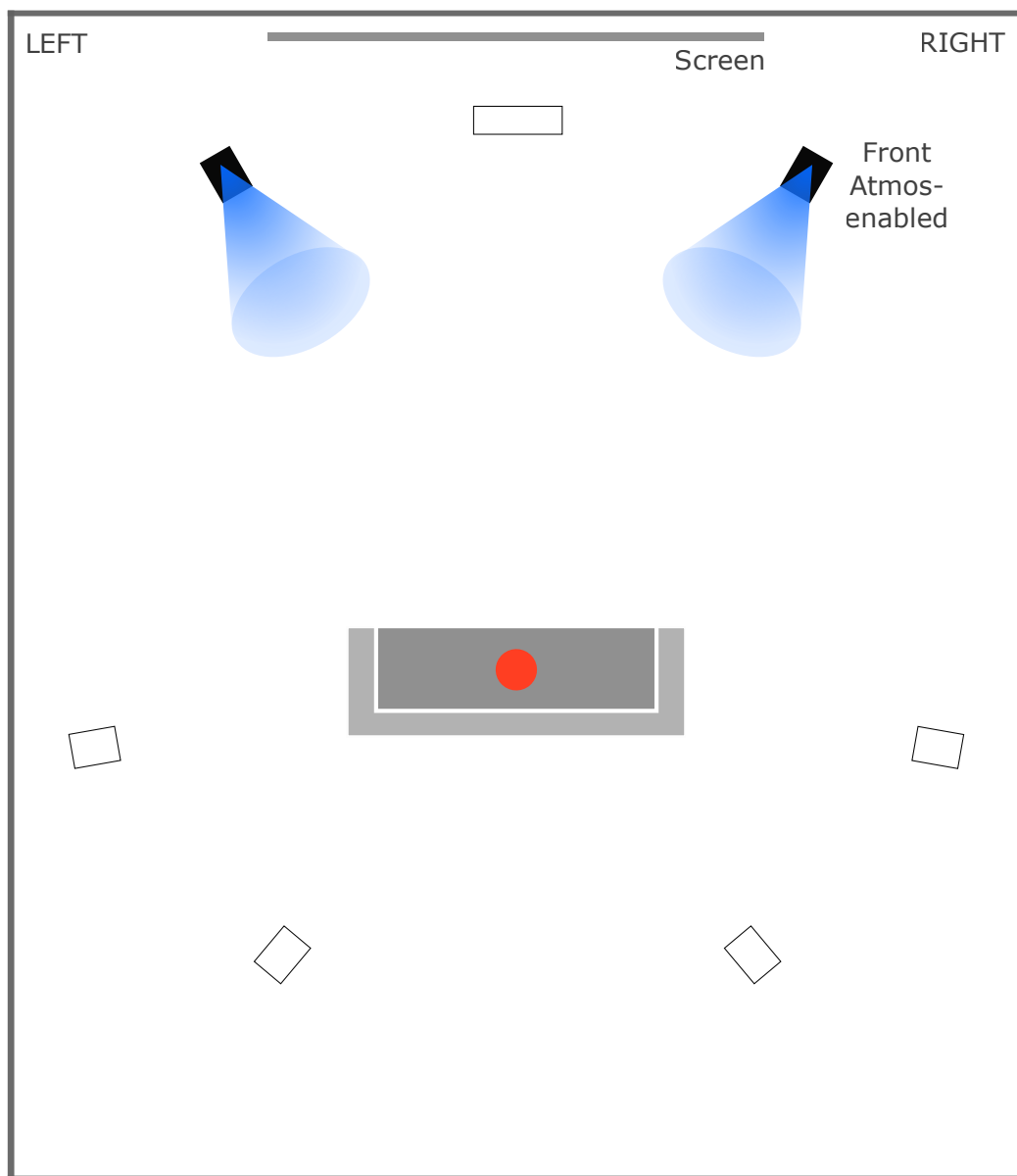
Atmos-enabled speakers

An Atmos-enabled speaker can either be integrated into a forward-firing speaker with two sets of terminals, or an add-on module. Add-on modules are ideally situated directly on top of the primary speaker; or if this is not possible, they should be no more than a meter (3 feet) away.

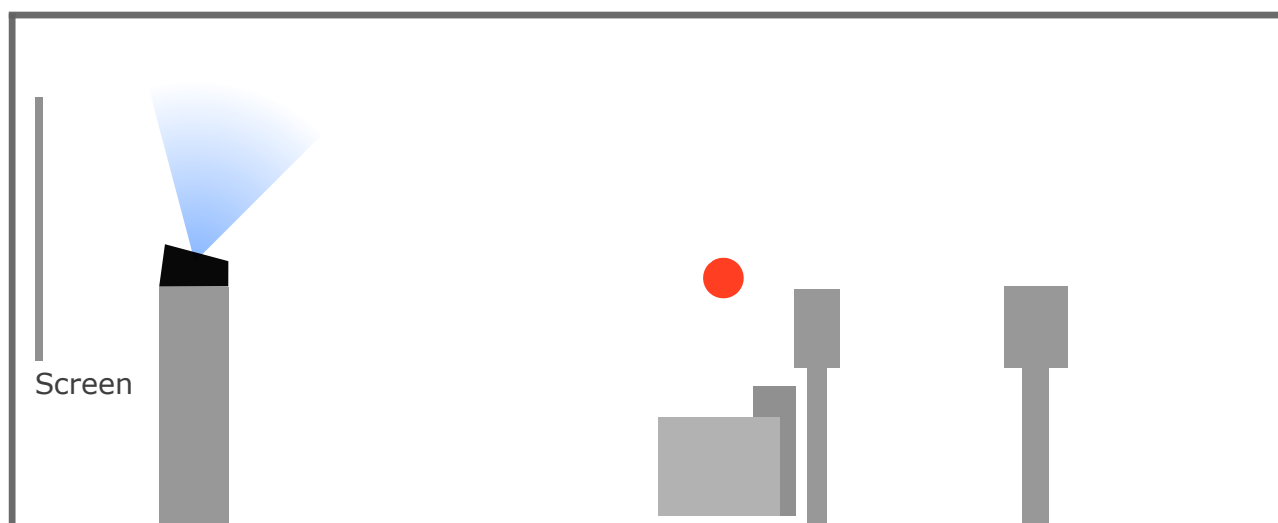
If using Atmos-enabled speakers, Dolby recommends that the ceiling be flat and reflective (drywall/plaster, wood, and similar materials). The ideal ceiling height is between 7.5 and 12 feet (2.3 to 3.66 meters). Acoustic treatment should be used on the floor and walls to absorb sound, but not on the ceiling.

2 Atmos-enabled speakers

With two Atmos-enabled speakers, the front left and right speakers are Atmos-enabled regardless of the number of primary speakers.



Top view, 2 Atmos-enabled speakers



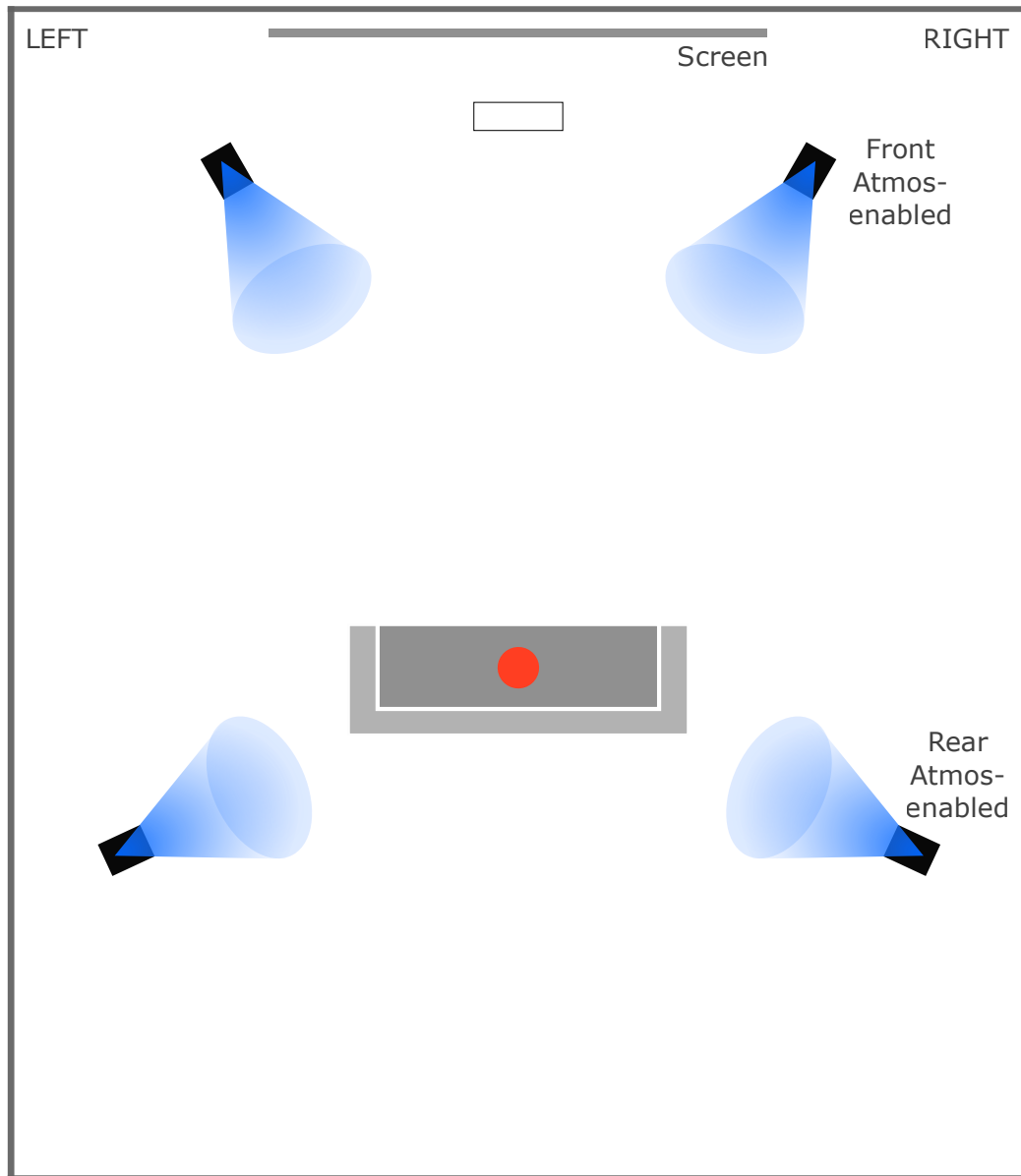
Side view, 2 Atmos-enabled speakers

4 Atmos-enabled speakers

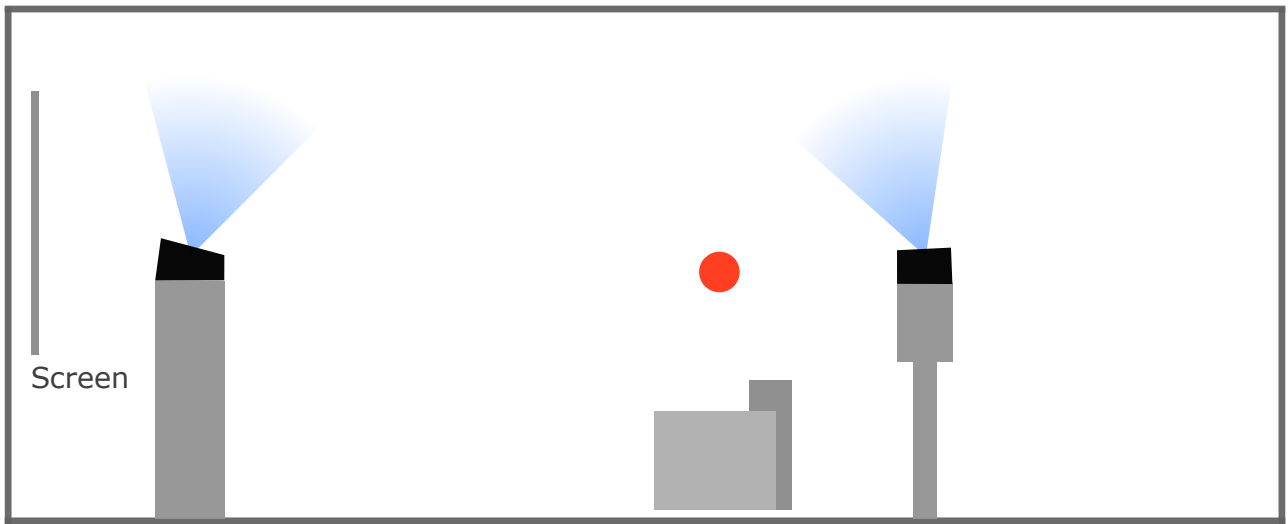
Use of four Atmos-enabled speakers is supported only if there are four or more primary speakers. The front left and right speakers are Atmos-enabled, as are the rear-most surrounds.

4 Atmos-enabled speakers with 4 or 5 primary speakers

If there are four or five primary speakers, the surround speakers are Atmos-enabled:



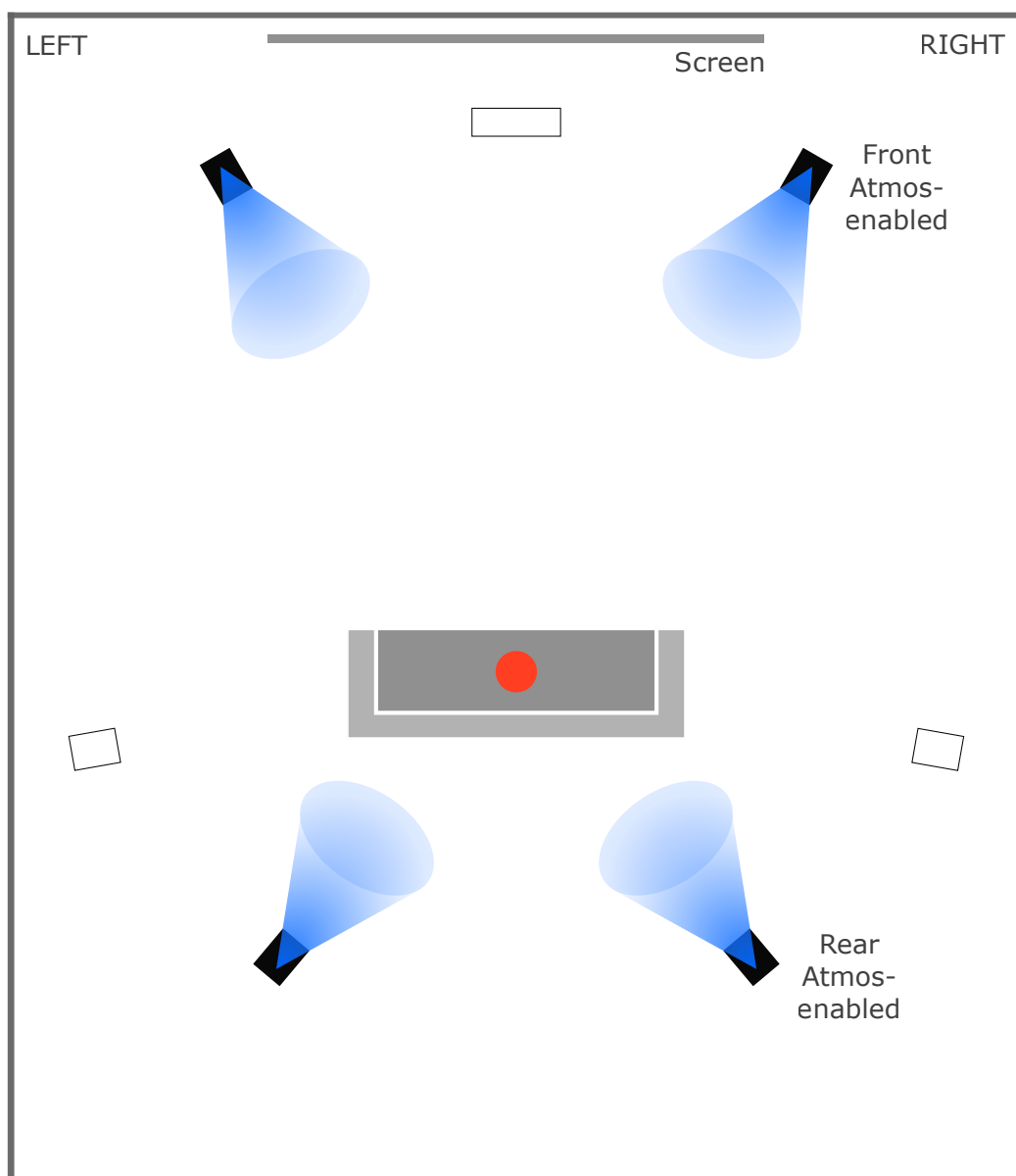
Top view, 4 Atmos-enabled speakers with 4 or 5 primary speakers



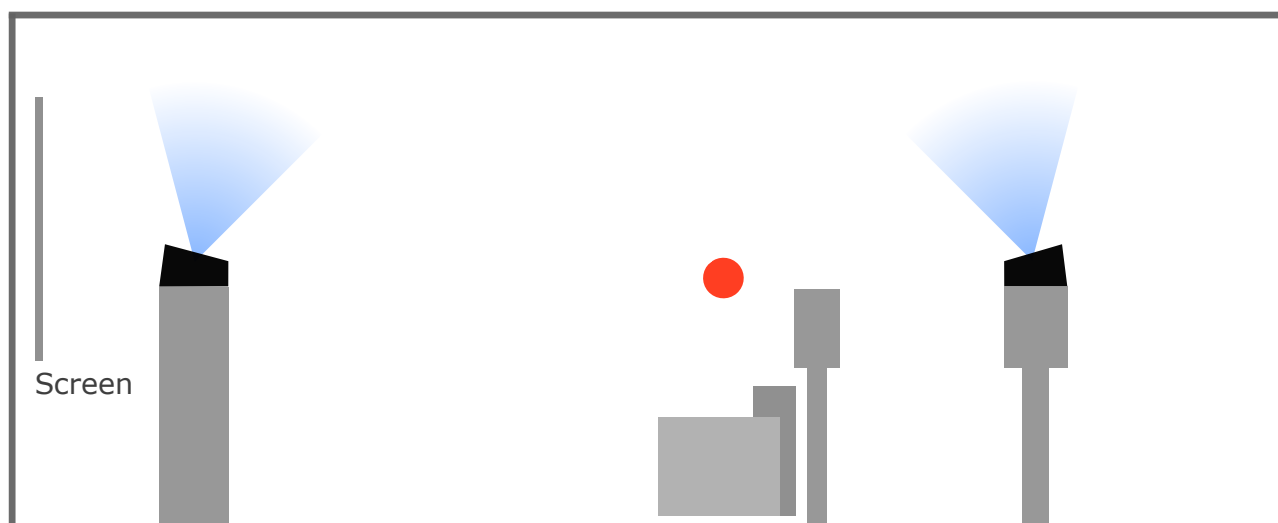
Side view, 4 Atmos-enabled speakers with 4 or 5 primary speakers

4 Atmos-enabled speakers with 7 or 9 primary speakers

If there are seven or nine primary speakers, the rear surround speakers are Atmos-enabled:



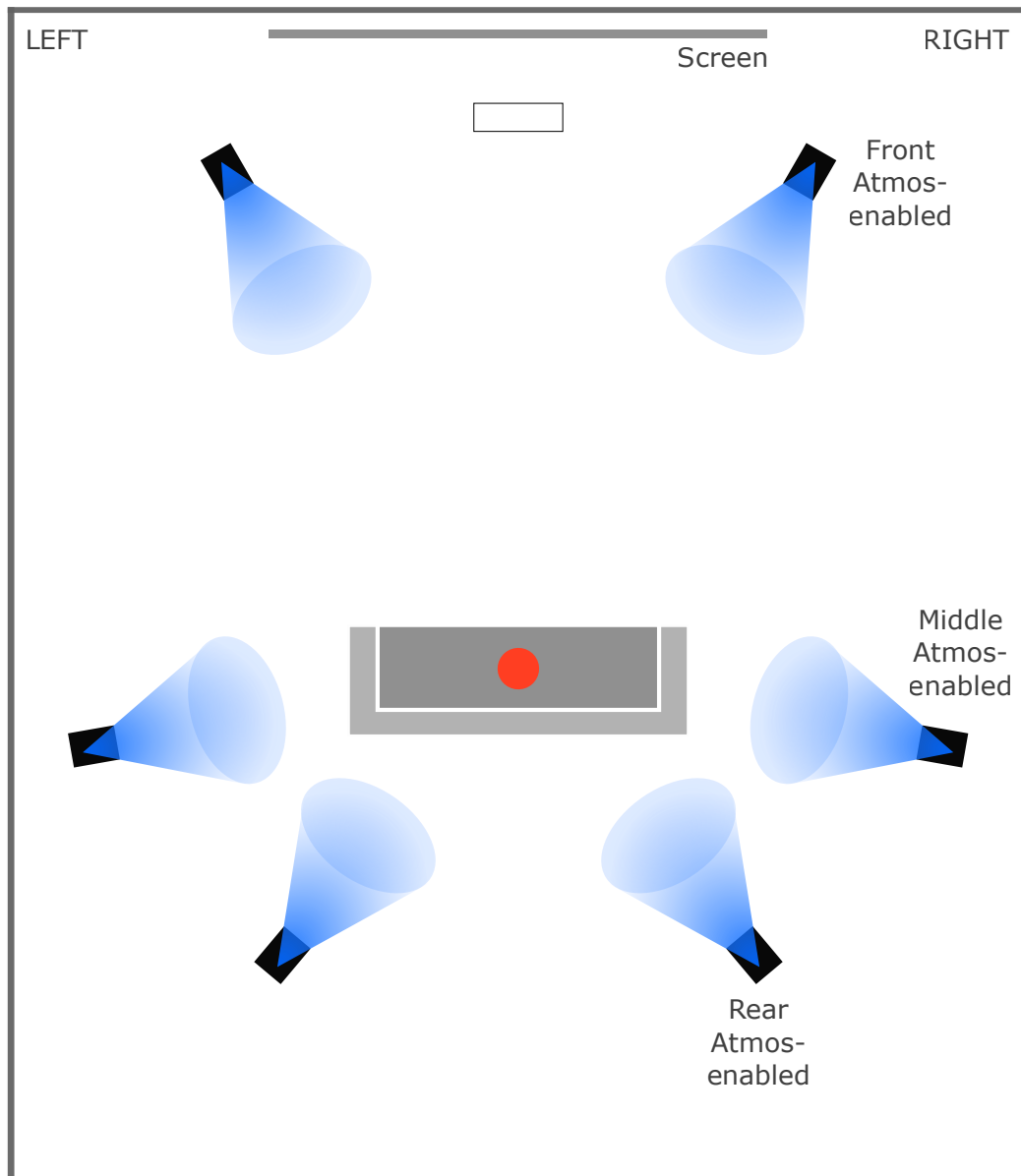
Top view, 4 Atmos-enabled speakers with 7 or 9 primary speakers



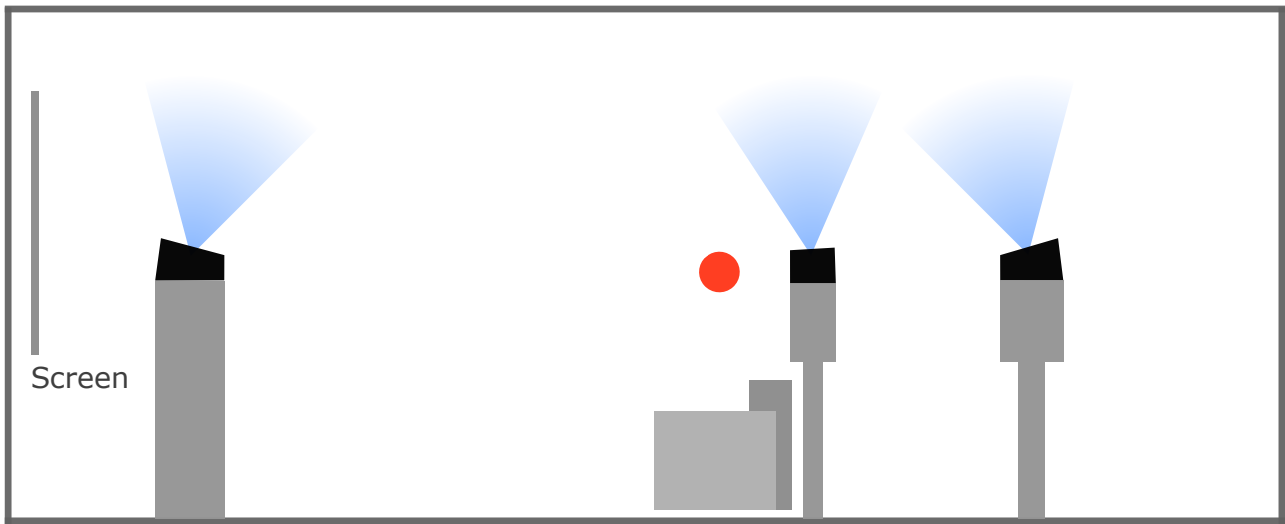
Side view, 4 Atmos-enabled speakers with 7 or 9 primary speakers

6 Atmos-enabled speakers

The front left and right speakers and the four surround speakers are Atmos-enabled:



Top view, 6 Atmos-enabled speakers



Side view, 6 Atmos-enabled speakers

Use of six Atmos-enabled speakers is supported only if there are 7 or 9 primary speakers.

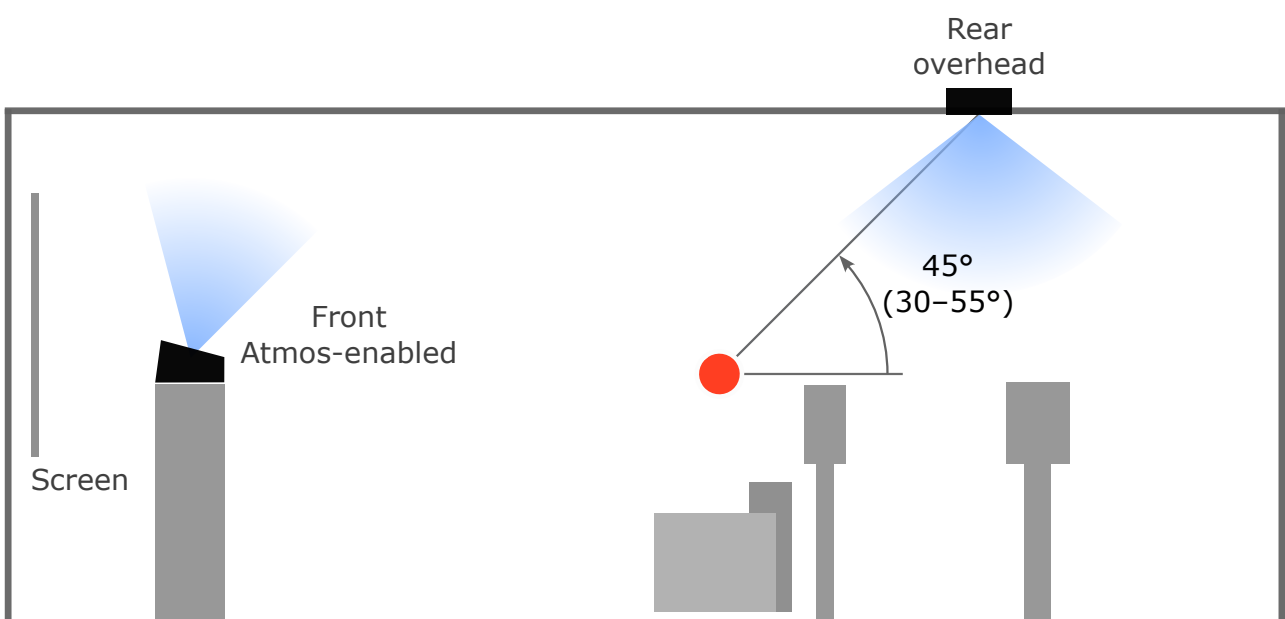
Hybrid configurations

Dolby Atmos supports a limited number of hybrid configurations, which contain a mix of overhead, Atmos-enabled or wall-mounted height speakers. This section describes the supported configurations.

Two overhead, two Atmos-enabled speakers

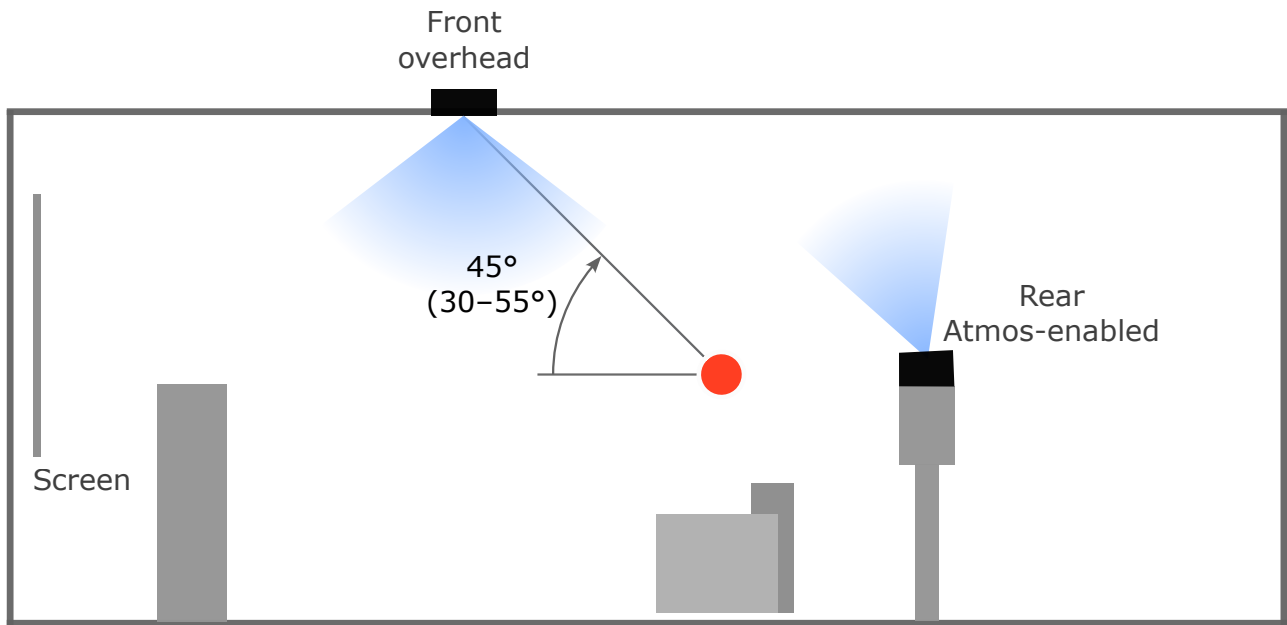
This type of configuration is supported only for 5 or 7 primary speakers.

Front Atmos-enabled, rear overhead



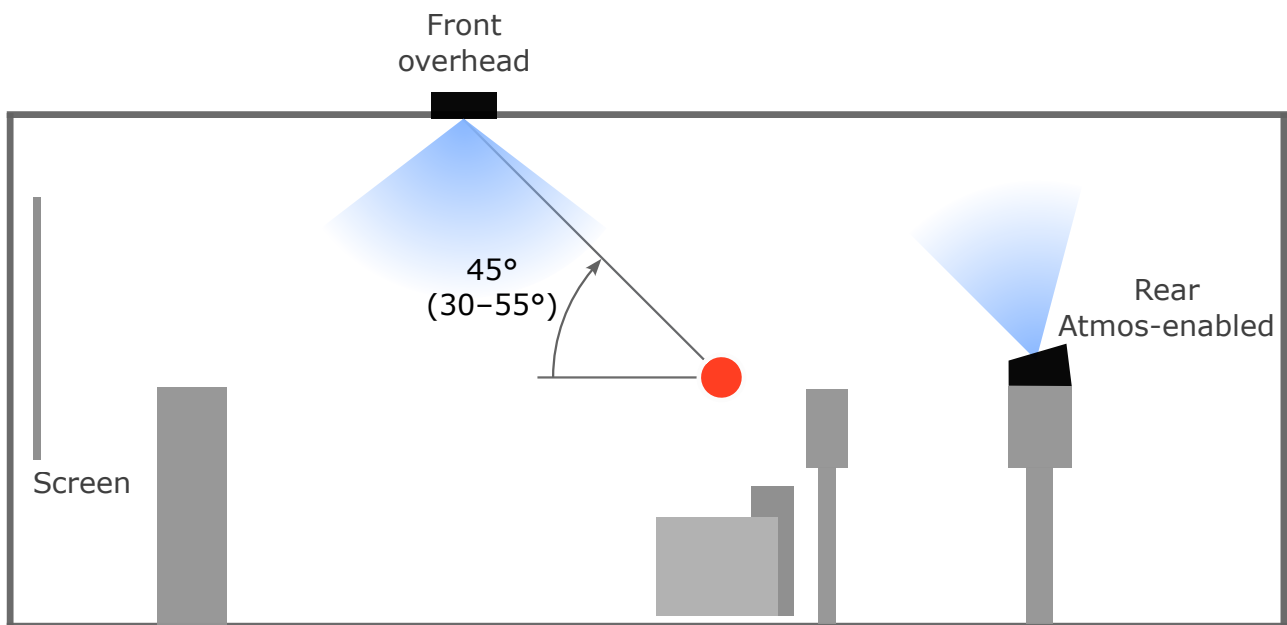
Side view, front Atmos-enabled speakers and rear overhead speakers

Front overhead, rear Atmos-enabled, with five primary speakers



Side view, front overhead speakers and rear Atmos-enabled speakers, with five primary speakers

Front overhead, rear Atmos-enabled, with seven primary speakers



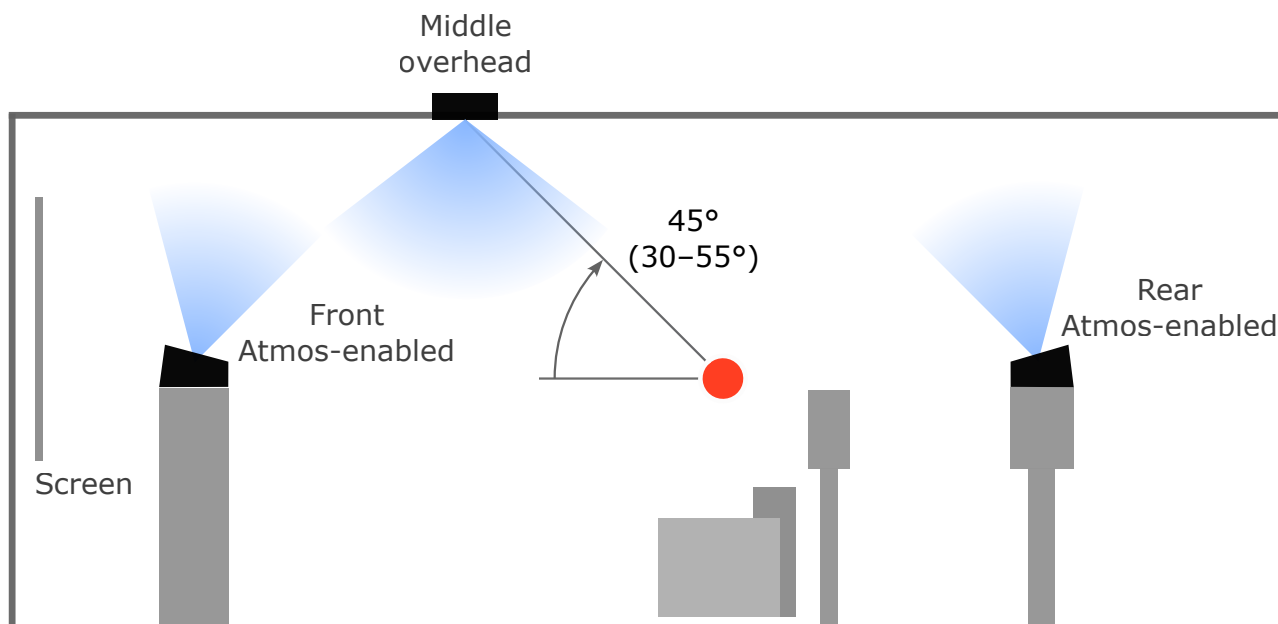
Side view, front overhead speakers and rear Atmos-enabled speakers, with 7 primary speakers

Two overhead, four Atmos-enabled speakers

This configuration is supported only for 7 or 9 primary speakers.

Two overhead, four Atmos-enabled speakers, 7 primary speakers

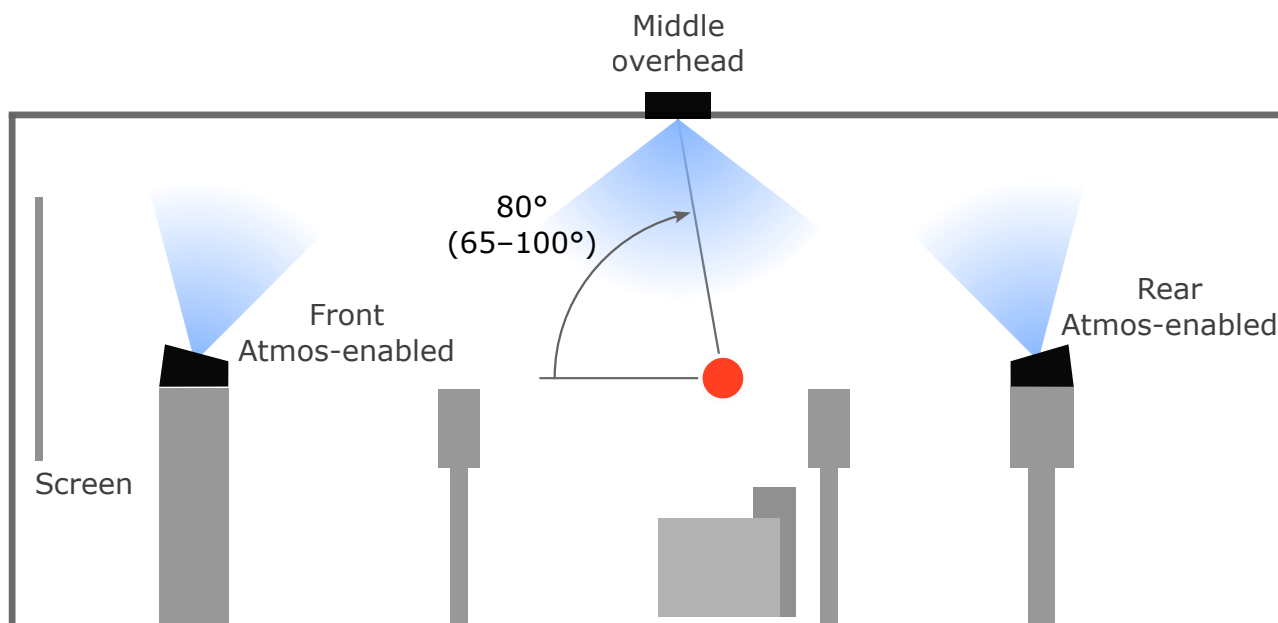
The overhead speakers, viewed from the side, should be located at 45 degrees from the horizontal:



*Side view, middle overhead speakers with front and rear Atmos-enabled speakers
and 7 primary speakers*

Two overhead, four Atmos-enabled speakers, 9 primary speakers

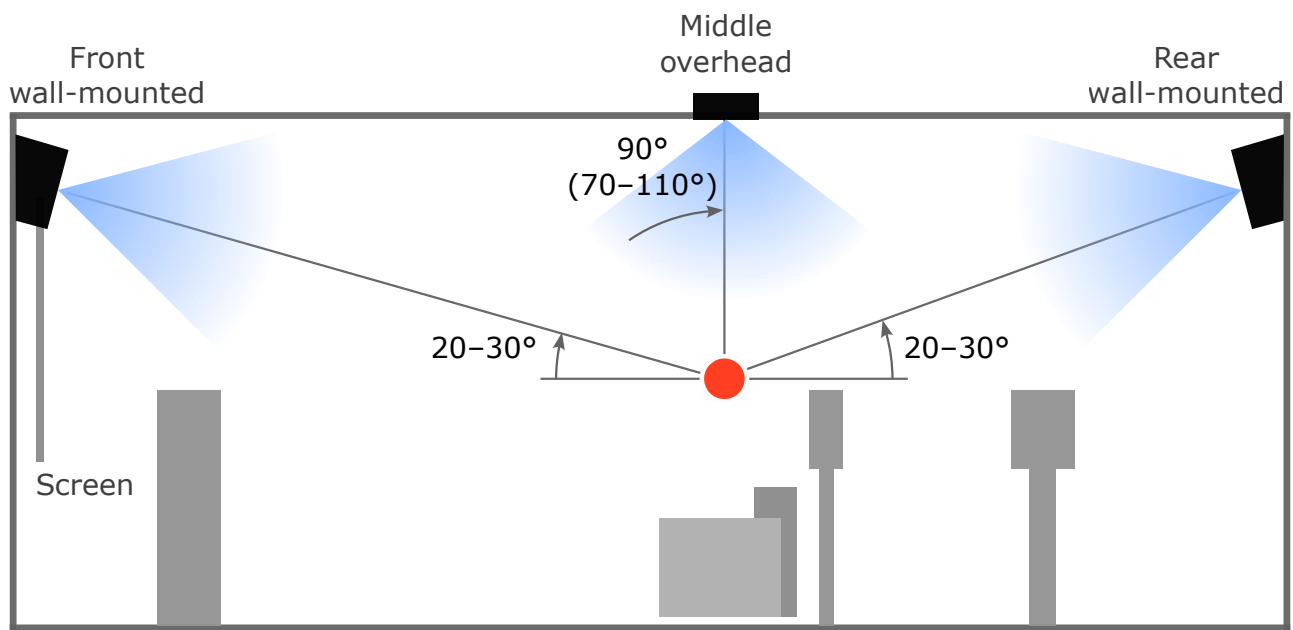
The overhead speakers, viewed from the side, should be located at 80 degrees to the horizontal:



*Side view, middle overhead speakers with front and rear Atmos-enabled speakers
and 9 primary speakers*

Two overhead, four wall-mounted height speakers

This configuration is supported only for 7 or 9 primary speakers.



Side view, middle overhead speakers with front and rear wall-mounted speakers

Subwoofers

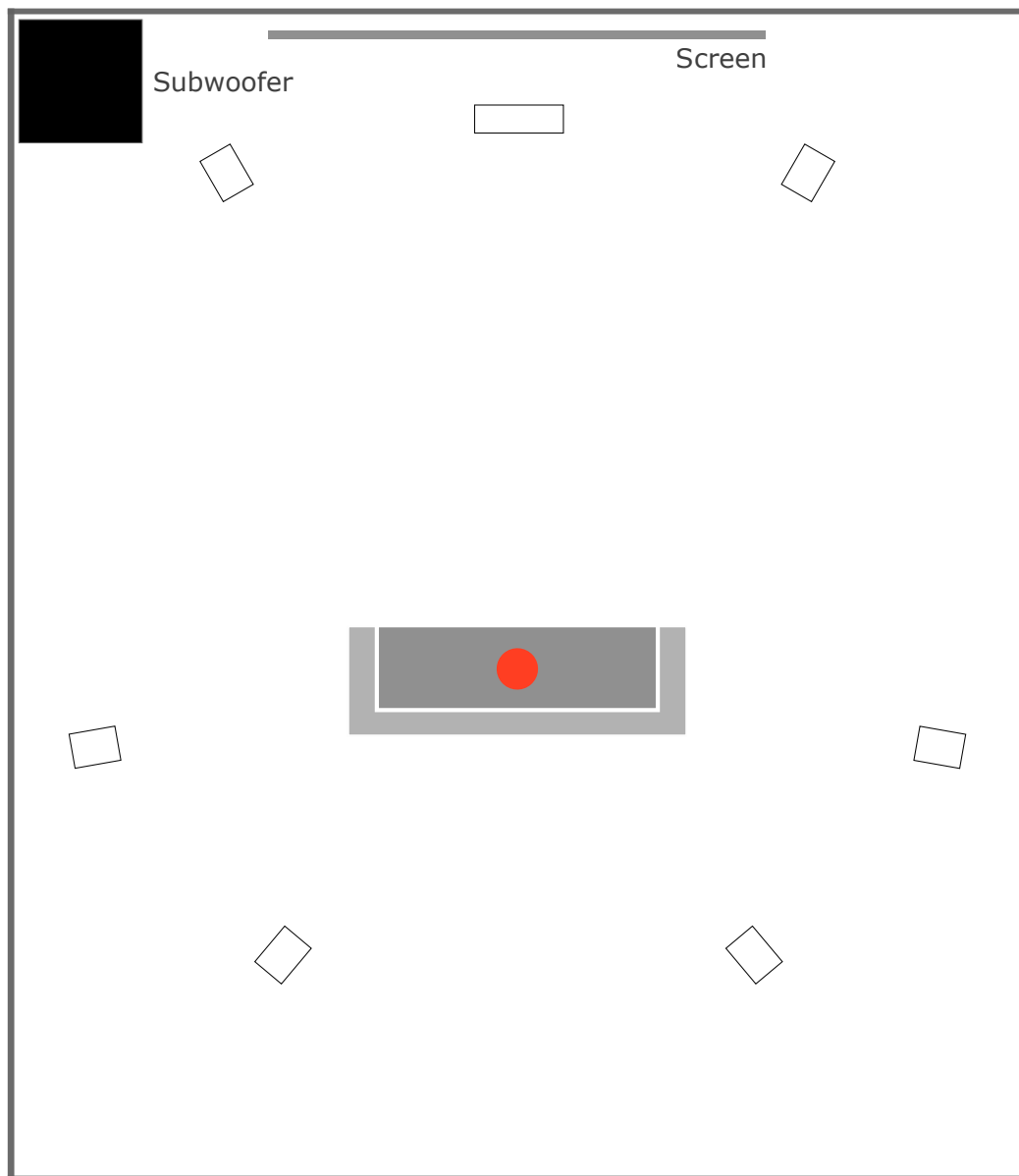
Subwoofers play low-frequency sound. There are two reasons to use a subwoofer or more than one subwoofer:

1. To reproduce the low-frequency effects (LFE) channel. This channel has a high level of low-frequency sound and is used for effects such as explosions.
2. To reduce the load on the speakers. Many or most speakers used in a home theater will be able to produce more output at lower distortion levels if the lowest frequencies are removed from them and sent to the subwoofer instead.

Placement of a single subwoofer

There is no firm rule about where to place a subwoofer.

With that said, one of the front corners of the room is often a good choice. This location doesn't necessarily give the smoothest response, but the response can be smoothed with Dirac Live room correction. The advantage of this location is that it excites a lot of room modes, thus ensuring a good level of output if only a single subwoofer is available.



Single subwoofer in front corner of room

(Bass is omni-directional, so it doesn't matter which direction the subwoofer driver points in.)

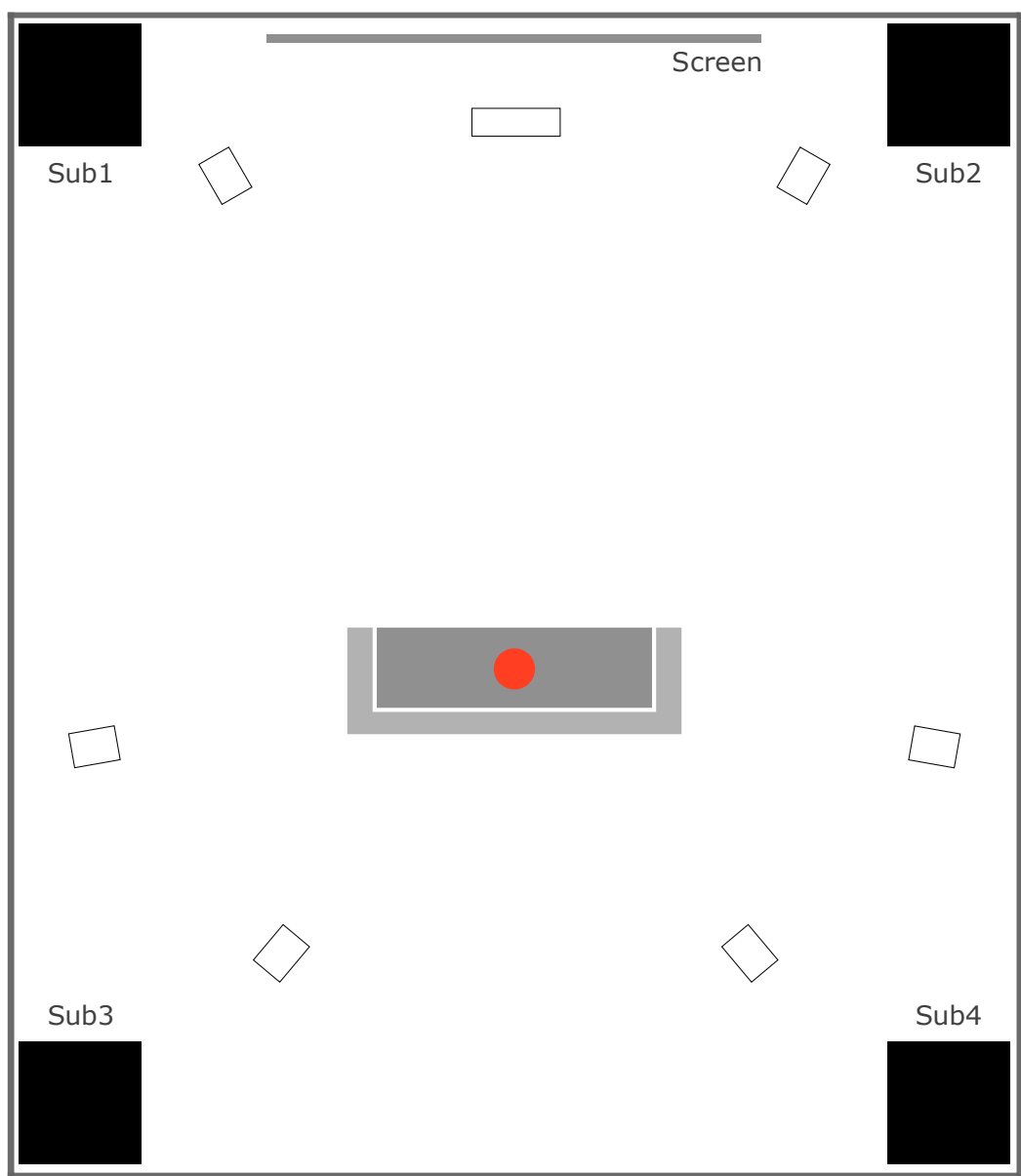
Another choice is the front center of the room, which can result in a naturally smoother response prior to room correction. However, this is often not available.

In practice, of course, home theater rooms are subject to constraints like where the walls and doors are, so it may be necessary to experiment. Regardless of subwoofer location, Dirac Live, optionally combined with Dirac Live Bass Control, will produce the best result for any given location.

Placement of multiple subwoofers

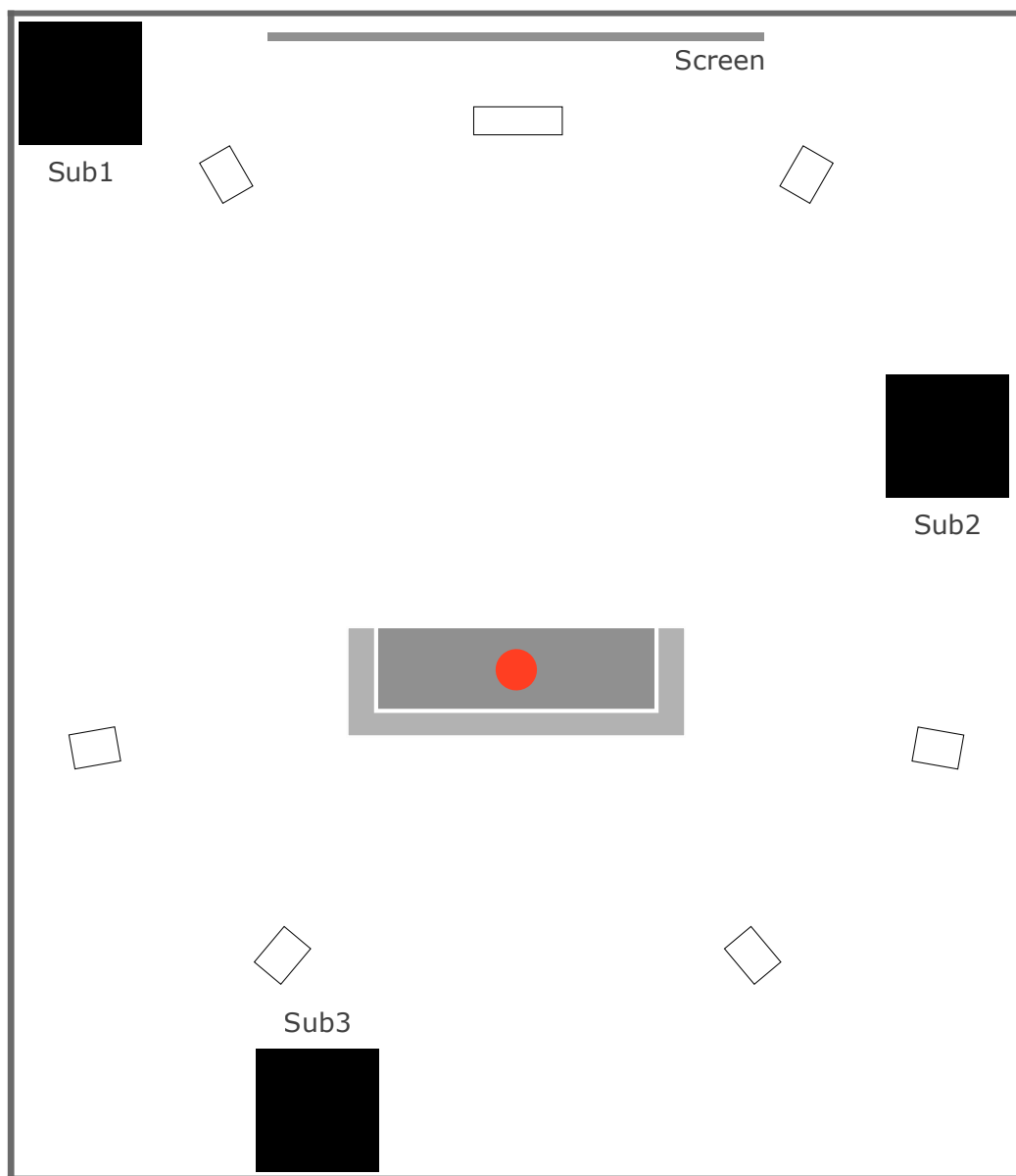
Multiple subwoofers can be used to smooth response across the listening area, so that all listeners get the same accurate low-frequency response.

One style of placement is symmetrical, such as in this diagram that places four subwoofers in the corners of the room:



Four subwoofers, placed symmetrically

Another style is "random," where subwoofers are placed in as irregular a manner as possible. Here is an example:



Threes subwoofers, placed in an irregular pattern

The optional Dirac Live Bass Control will optimize multiple subwoofers and integrate their response with the speakers. Advanced users can instead use a manual optimization approach if they wish. For an introduction to the topic of manually optimizing multiple subwoofers, see this app note on our website:

- [Tuning multiple subwoofers with miniDSP \(https://www.minidsp.com/applications/subwoofer-tuning/tuning-multiple-subs\)](https://www.minidsp.com/applications/subwoofer-tuning/tuning-multiple-subs)

Info

Note that, as far as the Atmos decoder/renderer is concerned, there is only ever 1 LFE channel. If more than one subwoofer is used, generating the signal for those is done *after* the decoder and Atmos renderer, in DLBC or manually in the output channel matrix mixer.

Audio Sources

Audio Sources

The miniDSP Tide16 accepts multiple stereo and multichannel audio formats. Immersive audio formats up to 9.1.6 are supported on the HDMI inputs and over HDMI eARC, while the digital (coax and optical) inputs support compressed audio formats for wide multichannel audio compatibility. Stereo USB Audio, Bluetooth, and two pairs of analog inputs with class-leading distortion and noise performance ensure a no-compromise audio experience for multichannel *and* pure stereo listening.

Pages in this section

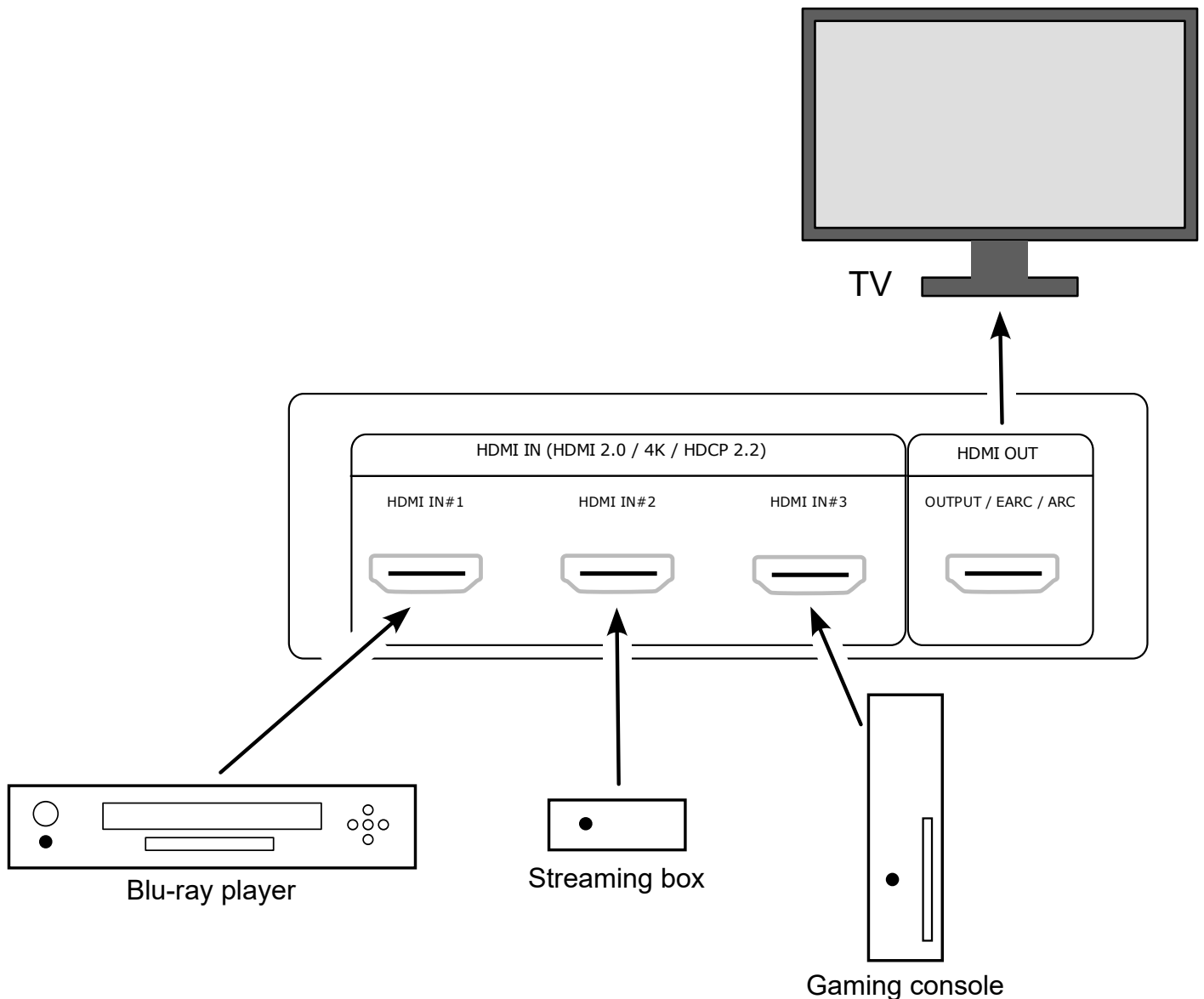
- [HDMI sources](#)
- [HDMI eARC](#)
- [Digital bitstream and stereo sources](#)
- [USB audio](#)
- [Bluetooth audio](#)
- [Analog sources](#)

HDMI sources

Connections

Three HDMI connections are available for input, and one for output. The input connectors can be connected to any HDMI source such as a streamer, gaming console, or Blu-ray player.

The HDMI output will need to be connected to an HDMI input on a TV. This output is eARC-enabled, so can accept the audio return channel from the TV (see the [next page](#)).



HDMI input and output connections

Info

The Tide16 does not output any audio on the HDMI output connection.

HDMI eARC

Overview

In addition to the three HDMI inputs, the miniDSP Tide16 supports HDMI eARC – enhanced Audio Return Channel – to receive multichannel audio from the connected television. This enables the Tide16 to play audio from TV programs (both over-the-air and streaming services). In addition, the HDMI inputs to the TV effectively act as additional HDMI sources.

The Tide16 is also backwards compatible with the older ARC standard, although in that case there will be only two channels of audio from the TV. (The rest of this page will assume that eARC is available.)

Info

The output HDMI port on the Tide16 must be connected to the eARC-compatible input port of the connected television. Check the manual for your TV to ensure that the correct input is connected. For *multichannel* audio, the connected TV must support eARC and not just ARC.

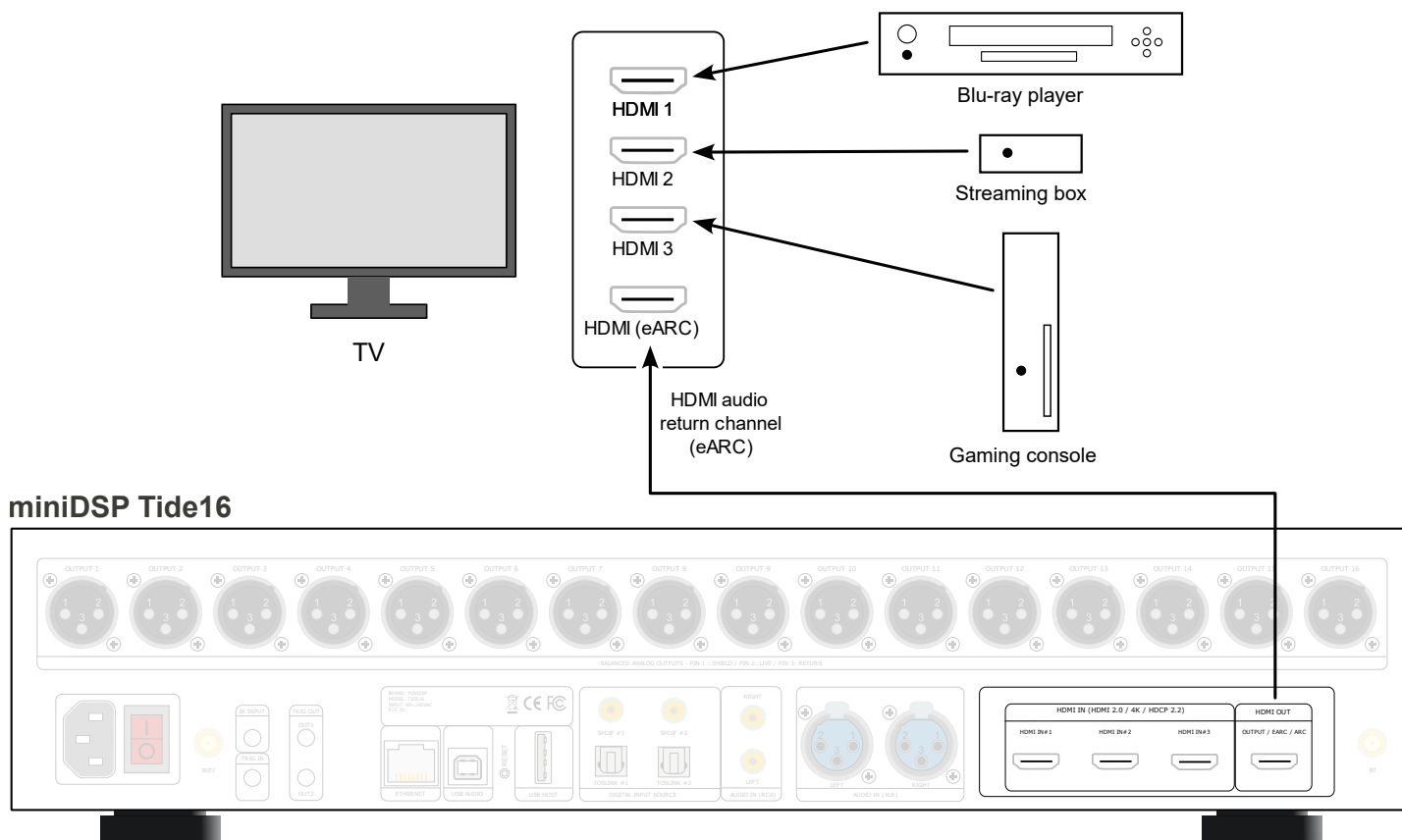
Tip

For information on using HDMI CEC for remote control of the miniDSP Tide16, see [HDMI CEC](#).

Connections

To use eARC, connect the HDMI port of the Tide16 to the eARC-compatible HDMI port on the TV.

Here is a typical connection:



Illustrating eARC connection to the miniDSP Tide16

Info

The output/eARC port on the Tide16 is an **output** that connects to the eARC-enabled HDMI **input** on the TV. The audio goes in the *return* direction (hence the name). If using a directional HDMI cable (e.g. fibre optic), connect the "Source" end to the Tide16 and the "Display" end to the TV.

TV settings

The connected TV will need to support passthrough of multichannel audio to its eARC port, and have its settings set to enable this. The exact method of configuration and the naming will vary between brands, but the key items to check for are:

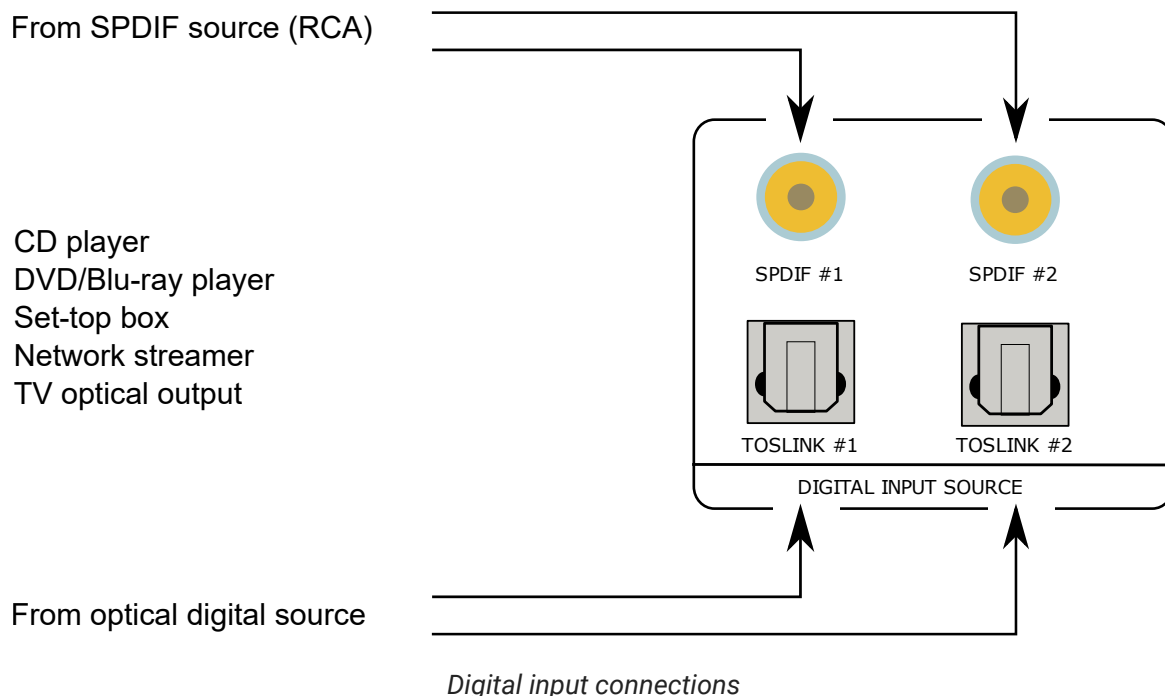
- Enable HDMI-CEC. CEC stands for "Consumer Electronics Control." It allows HDMI devices to send each other control commands.
- Enable eARC. This may not be enabled by default, so be sure to locate the setting and enable eARC. You may also need to set the eARC port as the audio destination.
- Set the audio mode for external devices to Passthrough. This is so that multichannel audio from external devices will be forwarded to the Tide16 over eARC.
- Set the input mode of connected sources. In some cases, the TV will need to be told to *not* convert the input audio signal. A setting such as "Passthrough" or "Bitstream" will have the effect of disabling format conversion.

**Tip**

If in doubt as to the eARC capabilities of your TV, you may be able to find this information on websites that perform detailed testing, such as [rtings.com](https://www.rtings.com) (<https://www.rtings.com/tv>) .

Digital sources

The Tide16 has four digital inputs: two coax SPDIF (RCA), and two TOSLINK optical. Each input can accept stereo PCM audio or encoded bitstream audio (Dolby Digital/DTS).



To play from any of these sources, use the front panel knob or remote control to select SPDIF 1, SPDIF 2, TOSLINK 1 or TOSLINK 2.

USB Audio

About USB Audio

The miniDSP Tide16 accepts stereo PCM audio over USB at sample rates up to 216 kHz. The same USB connector is used for playing USB Audio as well as for configuration and Dirac Live calibration.

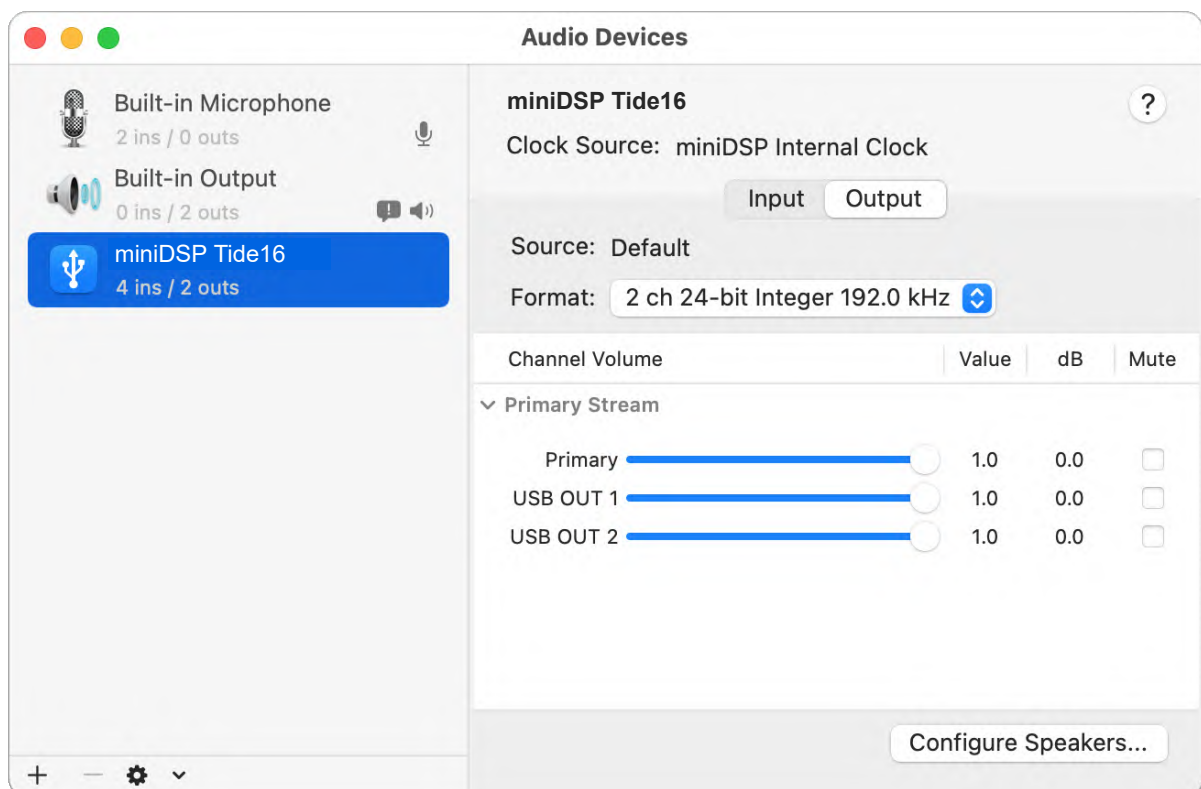
To play USB Audio from a computer, use the supplied cable to connect the USB 2.0 (Type B) port of the Tide16 to a free USB port on your computer.

Note

While some miniDSP processors provide the processed outputs **to** the computer over USB, the Tide16 does not.

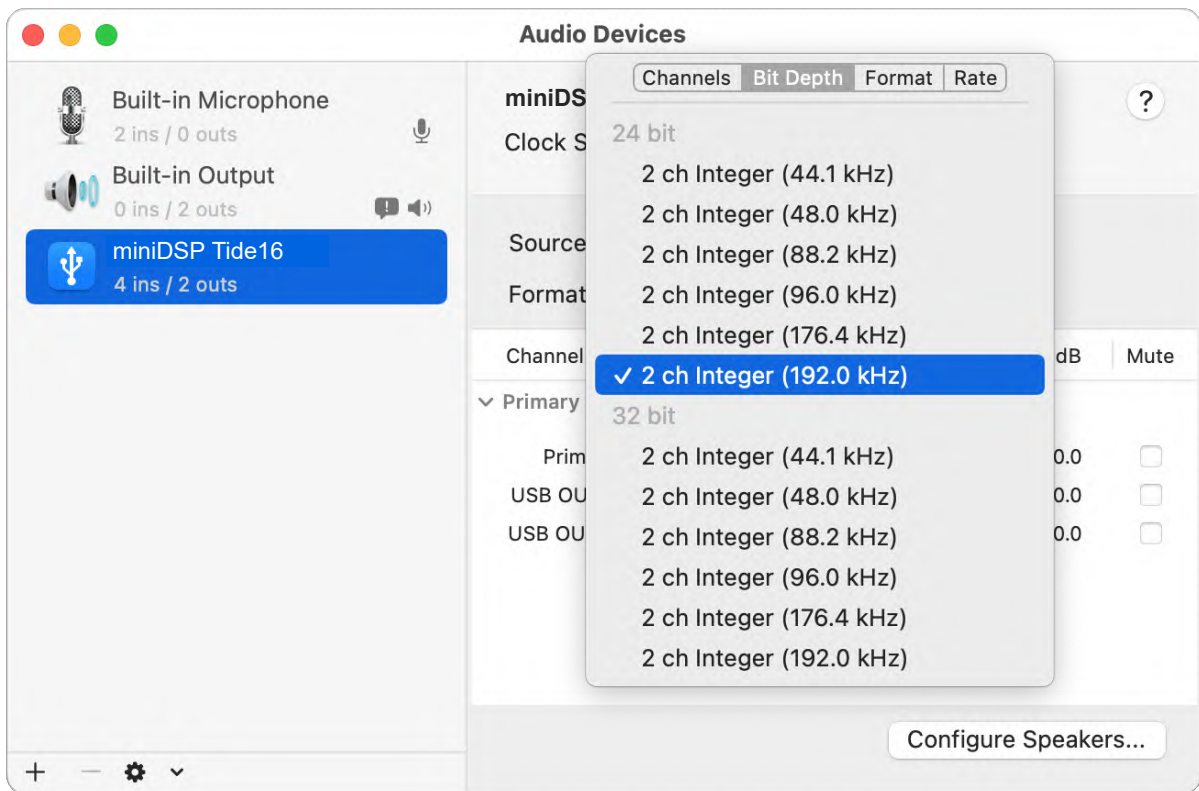
macOS

The miniDSP Tide16 is USB Audio compliant, so no drivers need to be installed to play audio on macOS. Open **Audio MIDI Setup** (in **Applications->Utilities**) and click on its name in the list on the left-hand side.



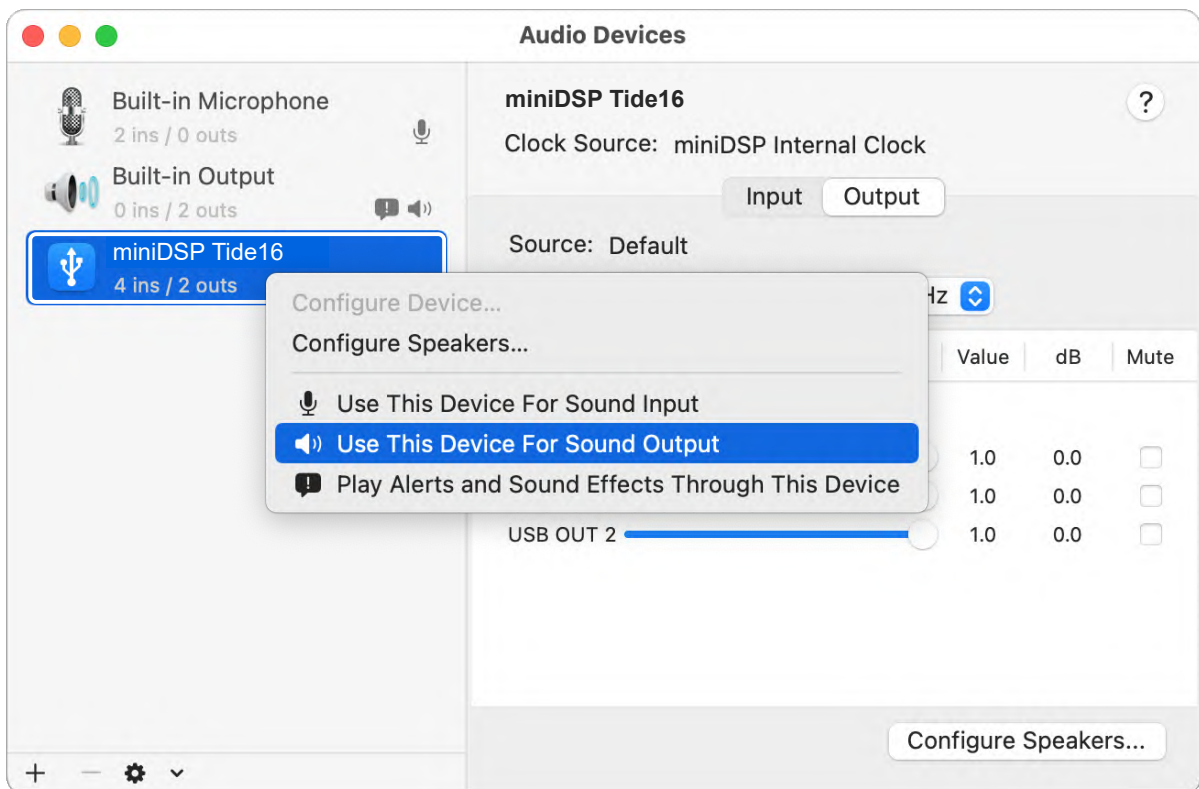
Set sample rate

Click on the selector next to **Format** to bring up the sample rate and bit depth selector. Sample rates up to 216 kHz can be selected:



Default audio device

To set the Tide16 as the default audio output device, right-click and select "Use this device for sound output":



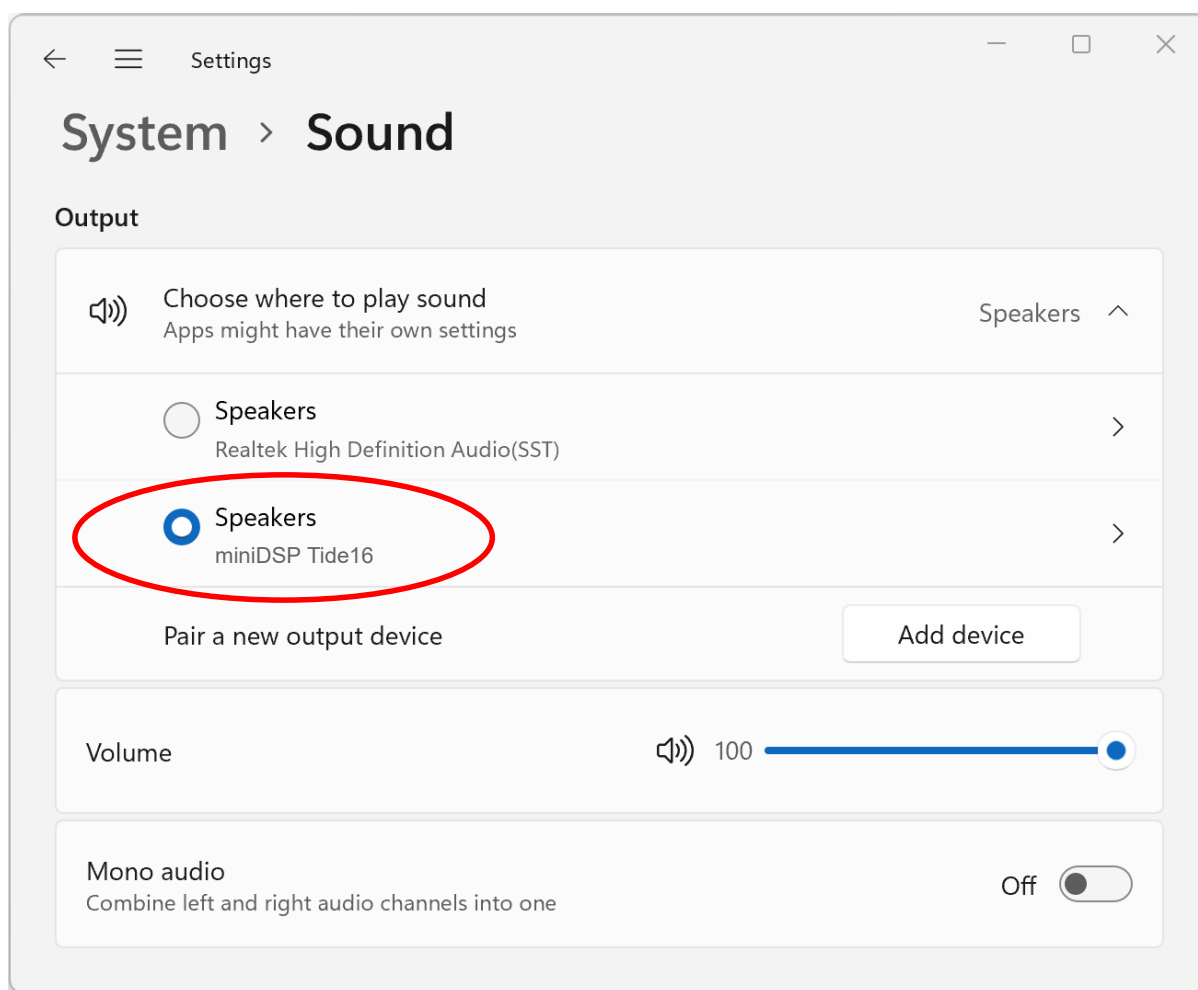
Note that individual audio playback apps may allow the Tide16 to be selected for audio output independently of the system default. They may also control sample rate automatically.

Windows 11

Note: to play USB audio from Windows, the miniDSP UAC2 driver package must be installed first.

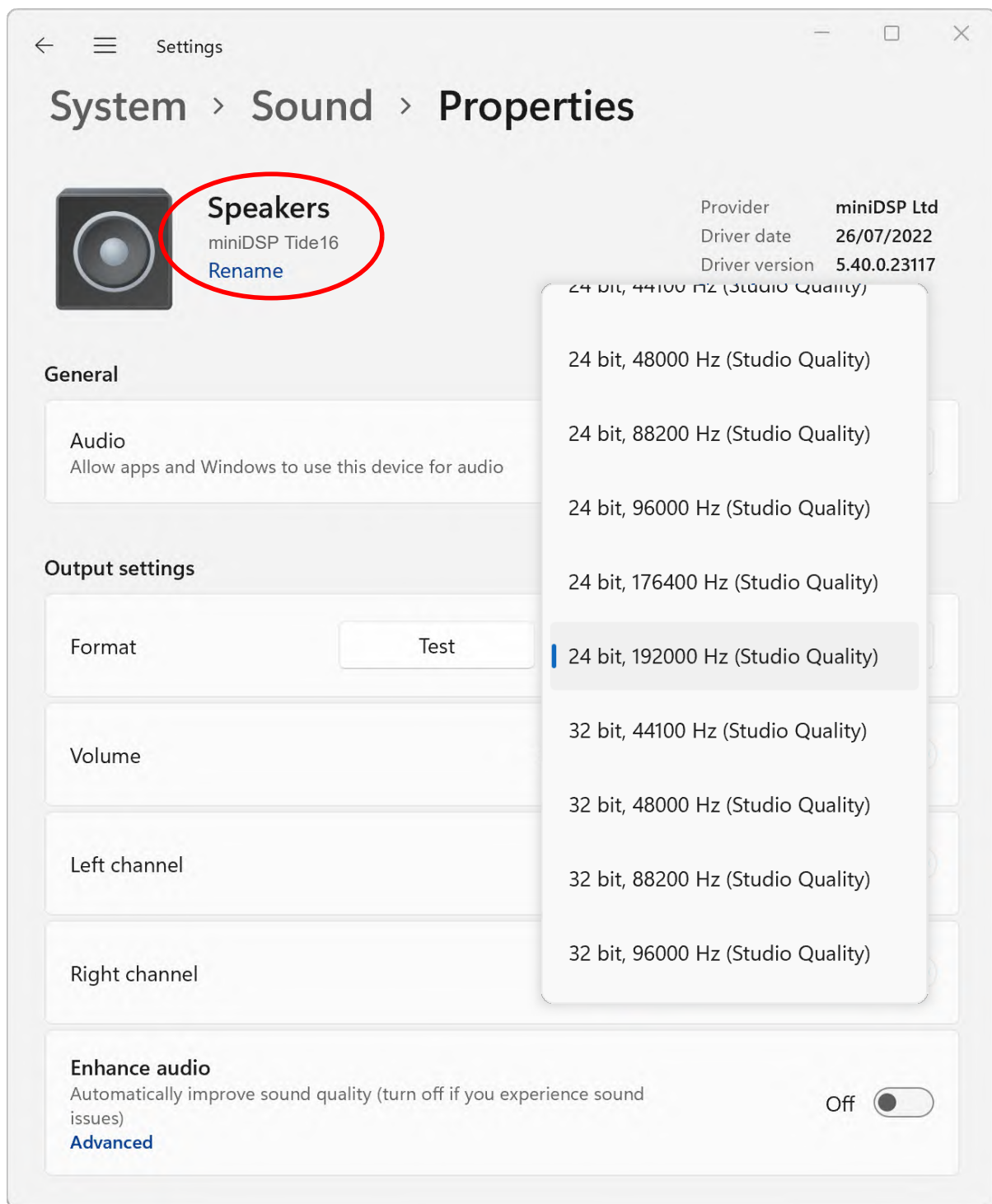
Default audio device

To set the miniDSP Tide16 as the default audio output device, open the Settings app and navigate to the System → Sound page. Select the Tide16 with the radio button:



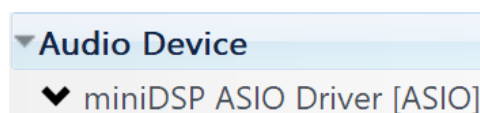
Set sample rate

To change the bit depth and sample rate, click on the rightward angle symbol >. Click the selector next to **Format** to pop up the sample rate menu. Sample rates up to 216 kHz can be selected:



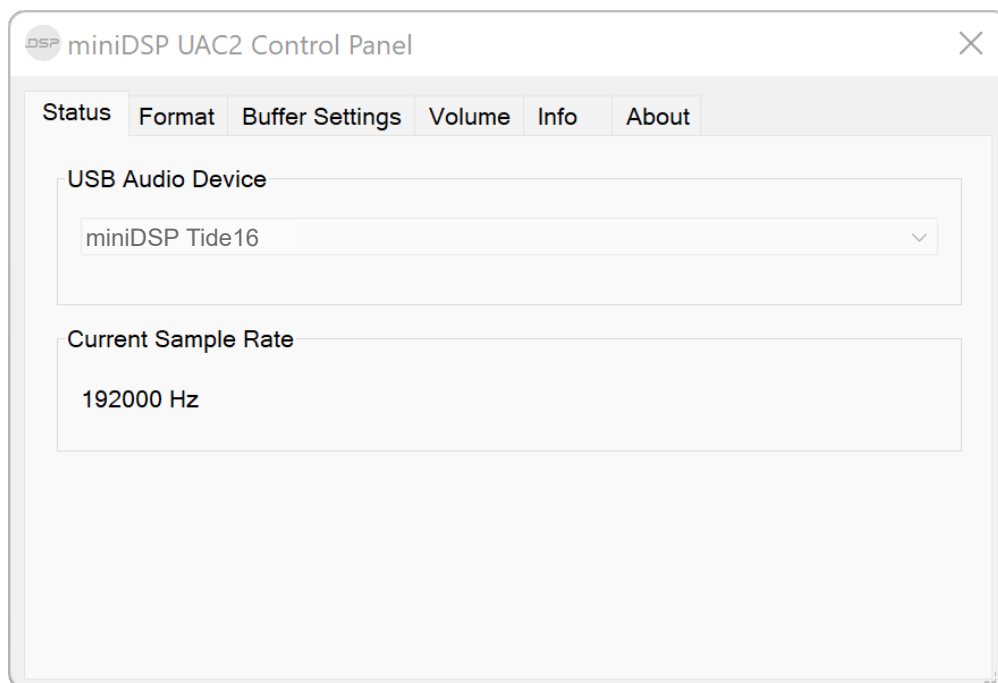
ASIO

If your audio application supports ASIO® audio drivers, we recommend selecting the miniDSP ASIO Driver in its settings. This typically allows the application to automatically change sample rate. For example, in JRiver Media Center:

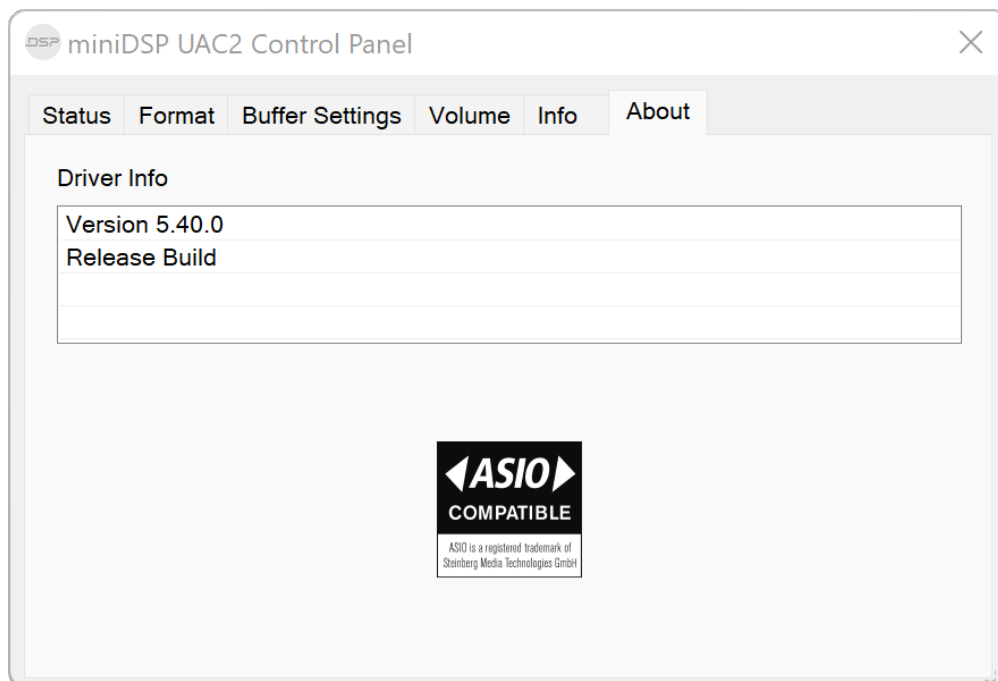


miniDSP UAC2 control panel

The current settings of the miniDSP Tide16 can be viewed by opening the **miniDSP UAC2 Control Panel** from the Windows Start menu (under the **miniDSP Ltd** folder). This control panel allows you to view current settings. In addition, it can be used to set buffer size, although we recommend that you leave this setting at the default. If you are having an issue with inadequate output volume over USB playback, check the Volume tab.



To see the installed version of the UAC2 driver, use the About tab:



Bluetooth Audio

About Bluetooth audio

The miniDSP Tide16 includes the LDAC (<https://www.sony.net/Products/LDAC/>)[™] and aptX[™] HD Bluetooth codecs for high-fidelity Bluetooth[™] audio.

Note that Bluetooth is for audio streaming *only*. Configuration with Device Console or Dirac Live can only be done with a USB connection.

Info

LDAC is an audio coding technology developed by Sony that enables the transmission of High-Resolution (Hi-Res) Audio content, even over a Bluetooth connection. Unlike other Bluetooth compatible coding technologies such as SBC, it operates without any down-conversion of the Hi-Res Audio content, and allows approximately three times more data than those other technologies to be transmitted over a Bluetooth wireless network with unprecedented sound quality, by means of efficient coding and optimized packetization.

LDAC is supported on recent Android devices. If your device does not support LDAC, you can still pair it with the miniDSP Tide16, but Bluetooth audio will use a lower bitrate codec.

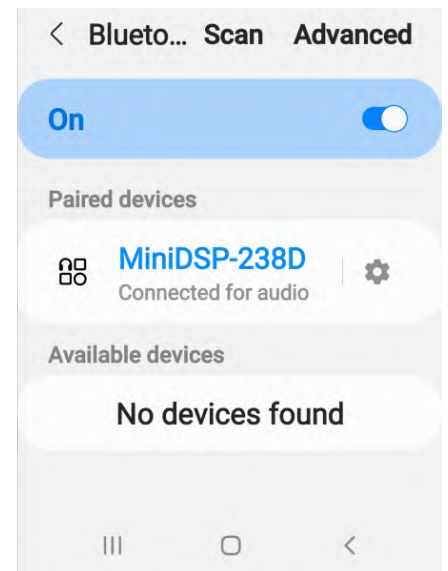
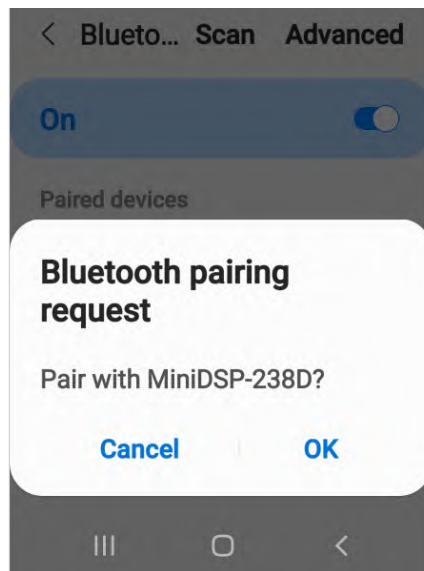
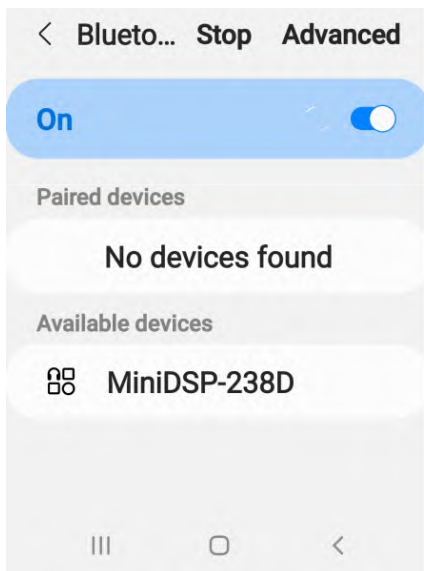
aptX[™] HD is designed to deliver high definition (HD) audio over Bluetooth, to help you get the very most from your music.

Bluetooth pairing

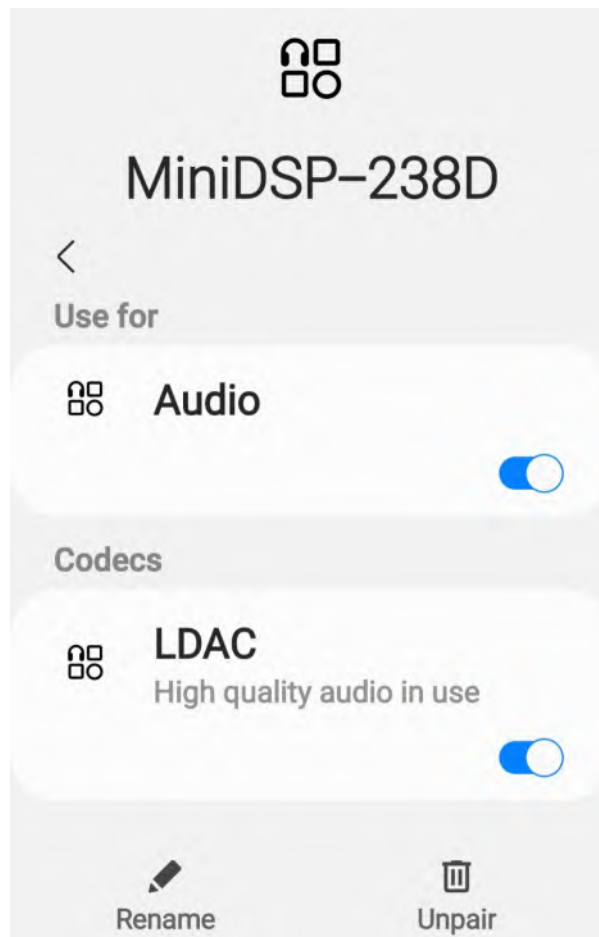
Pairing your mobile device with the miniDSP Tide16 is essentially the same as pairing it with other Bluetooth audio devices such as headphones or your car.

To put the Tide16 into pairing mode:

1. Press the encoder button on the Tide16 twice and rotate it until the display shows "Bluetooth."
2. Press and hold the encoder and the display will change to "BTPairing." The Tide16 is now in pairing mode.
3. Open the Bluetooth Settings on your mobile device to pair with the Tide16. The exact appearance will vary depending on your specific device, but this series of screenshots illustrates a typical sequence:



1. If your device supports LDAC, enable it by using the gear icon:



When Bluetooth audio is selected as the source, the usual front panel display will display the source (lower right corner) as one of:

BT(C)

The Tide16 is paired over Bluetooth.

BT(NC)

No Bluetooth device is paired.

BT(P)

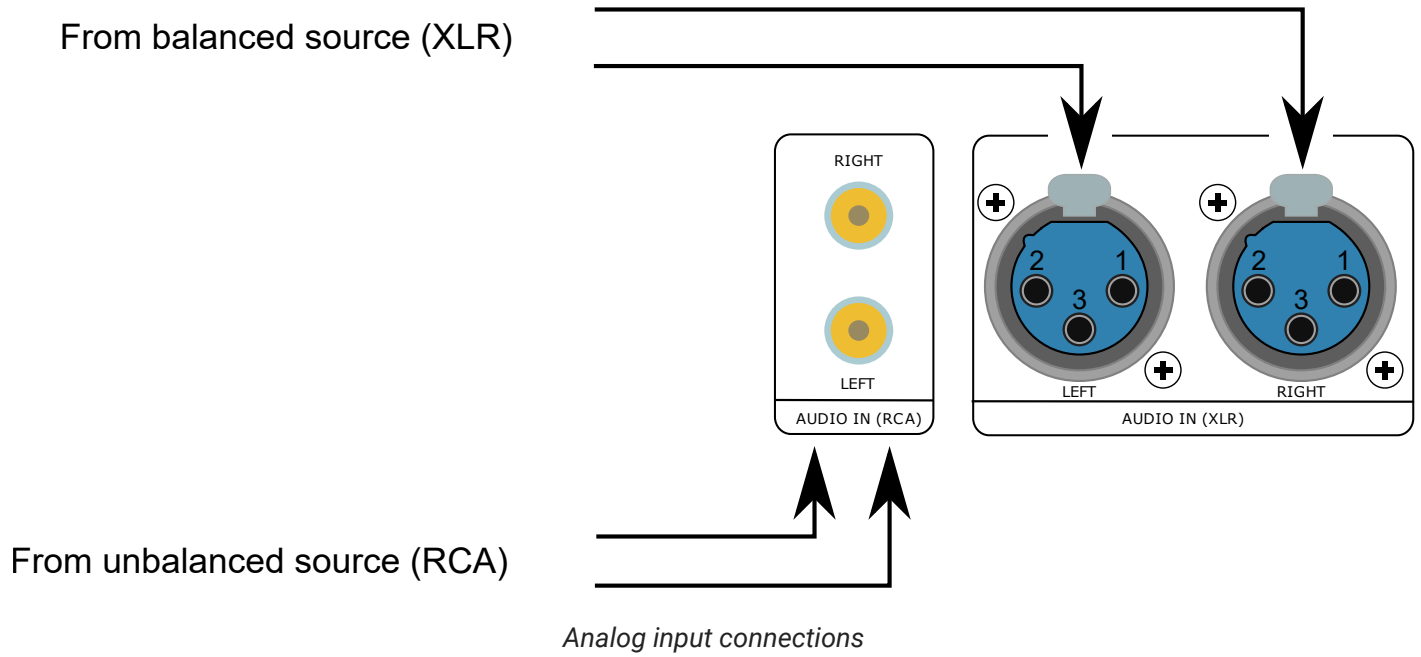
The Tide16 is in pairing mode.

Playing audio

Once paired, the Tide16 will receive and play the audio stream from the paired device. If the Bluetooth input is not selected when you start audio playback, the Tide16 will automatically switch to the Bluetooth input source when Bluetooth audio is detected.

Analog sources

The Tide16 has two stereo analog inputs, one RCA and one balanced XLR.



To play from either analog input, use the front panel knob or remote control to select RCA or XLR.

Dirac Live

Dirac Live

The miniDSP Tide16 implements **multichannel** Dirac Live correction. That is, there are sixteen channels of Dirac Live correction. After Dirac Live correction, the audio signal is routed to the sixteen output channels for processing such as parametric EQ and crossovers.

Dirac Live overview

Dirac Live uses from 9 to 17 measurements made at different locations in your listening room to calculate correction filters for your speakers and subwoofer. You will take these measurements using the miniDSP processor, the **Dirac Live** application running on your computer, and a miniDSP UMIK-1 or UMIK-2 measurement microphone.

Info

This software runs on **Windows 10 or later** and **macOS 10.14 Mojave or later**. Other versions of Windows or macOS/OS X are not supported.

Pages in this section

- [Prerequisites](#)
- [First steps](#)
- [Configure Dirac Live](#)
- [Take your measurements](#)
- [Filter design](#)
- [Dirac Live Bass Control](#)
- [Filter export](#)

Prerequisites

Install or upgrade Dirac Live

In addition to miniDSP Device Console, you will need to separately install the Dirac Live software from Dirac Research.



Tip

If you have previously installed Dirac Live, check that your installed version is up to date, especially if you run into issues. You can see the list of versions in the [changelog \(https://www.dirac.com/live/faq/helpdesk/software-changelog/\)](https://www.dirac.com/live/faq/helpdesk/software-changelog/).

Download the **Dirac Live** application for your platform from the [Dirac Research download page \(https://www.dirac.com/live/downloads/\)](https://www.dirac.com/live/downloads/). On macOS, double-click on the `diraclive-latest.zip` download if your browser did not unzip it.

Double-click on the downloaded installer to run it. It will be named **diraclive-latest.exe** on Windows and **DiracLive v3.x.y Setup Darwin** on macOS (the version number x.y will change as updates are issued). We strongly recommend that you accept the default installation settings.

Do not run the application from the installer, as it must be started with the **Start Calibration** button in Device Console.

Download your microphone calibration files

Each UMIK-1 and UMIK-2 measurement microphone is individually calibrated to ensure accuracy. To download the unique calibration files for your microphone, go to the [UMIK-1 page \(https://www.minidsp.com/products/acoustic-measurement/umik-1\)](https://www.minidsp.com/products/acoustic-measurement/umik-1) or the [UMIK-2 page \(https://www.minidsp.com/products/acoustic-measurement/umik-2\)](https://www.minidsp.com/products/acoustic-measurement/umik-2). Enter your microphone's serial number. It is in the form xxx-yyy and labelled on the microphone.

Two calibration files are downloaded:

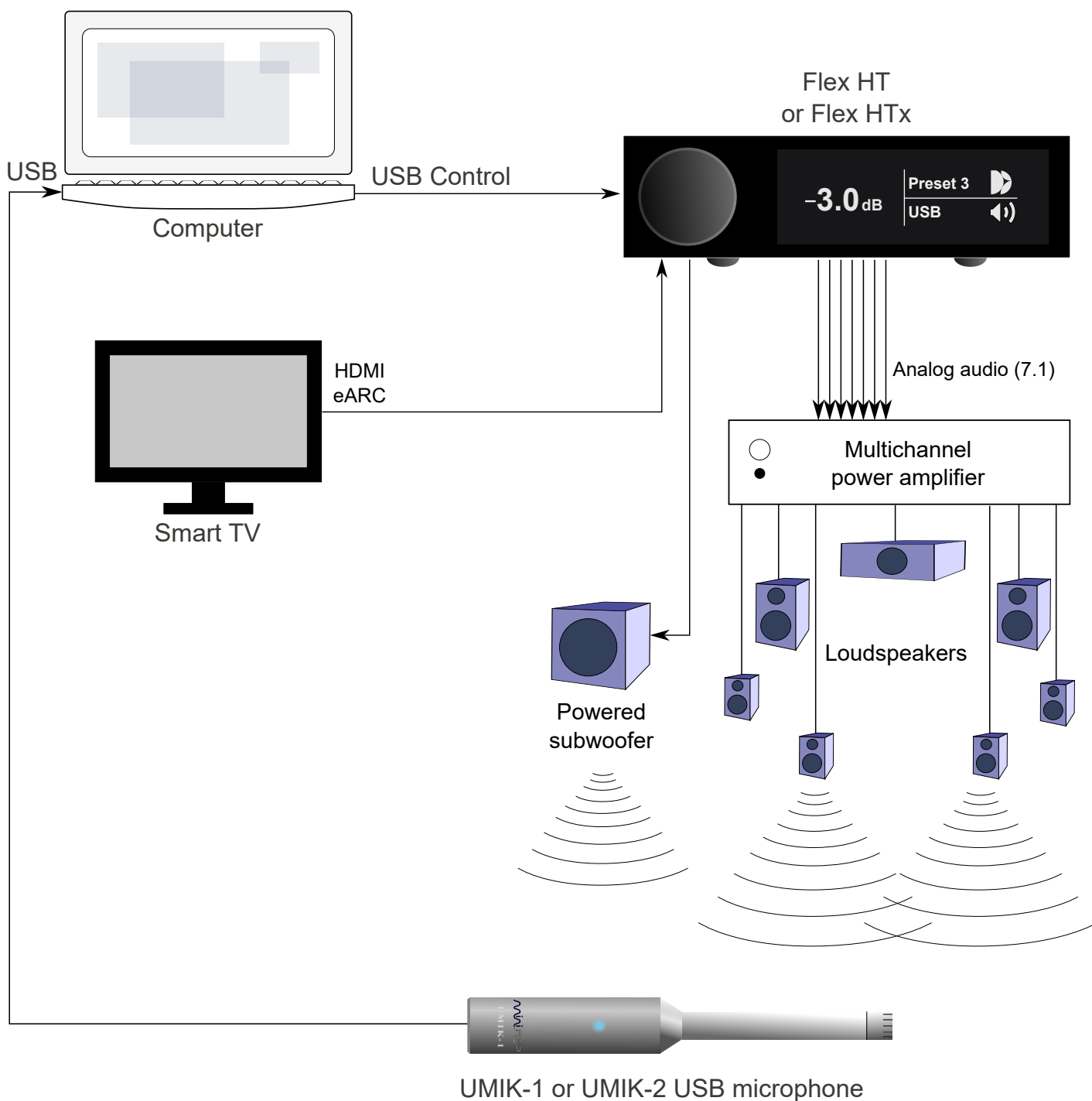
- The regular or "on axis" calibration file will be saved to the computer with a name that is the same as the serial number e.g. "7001870.txt". This is the one that you should use when pointing the microphone towards the speakers.
- The second calibration file has "_90deg" in the name e.g. "7001870_90deg.txt." This corrects the frequency response when the microphone is oriented at 90 degrees to the sound source, such as when pointing the microphone towards the ceiling.

For a multichannel system, we recommend pointing the microphone to the ceiling and using the 90 degree calibration file.

Connections for Dirac Live calibration

The diagram below shows typical connections for acoustic measurement with the Dirac Live application. Usually, you do not need to change any of the audio connections, as the Dirac Live test signals are generated inside the miniDSP processor.

1. Connect the supplied USB cable (type A to type B) from the miniDSP Tide16 to a USB port on the computer.
2. Connect the supplied USB cable (type A to mini type B or type C, depending on version) from the UMIK-1 or UMIK-2 to a USB port on the computer.



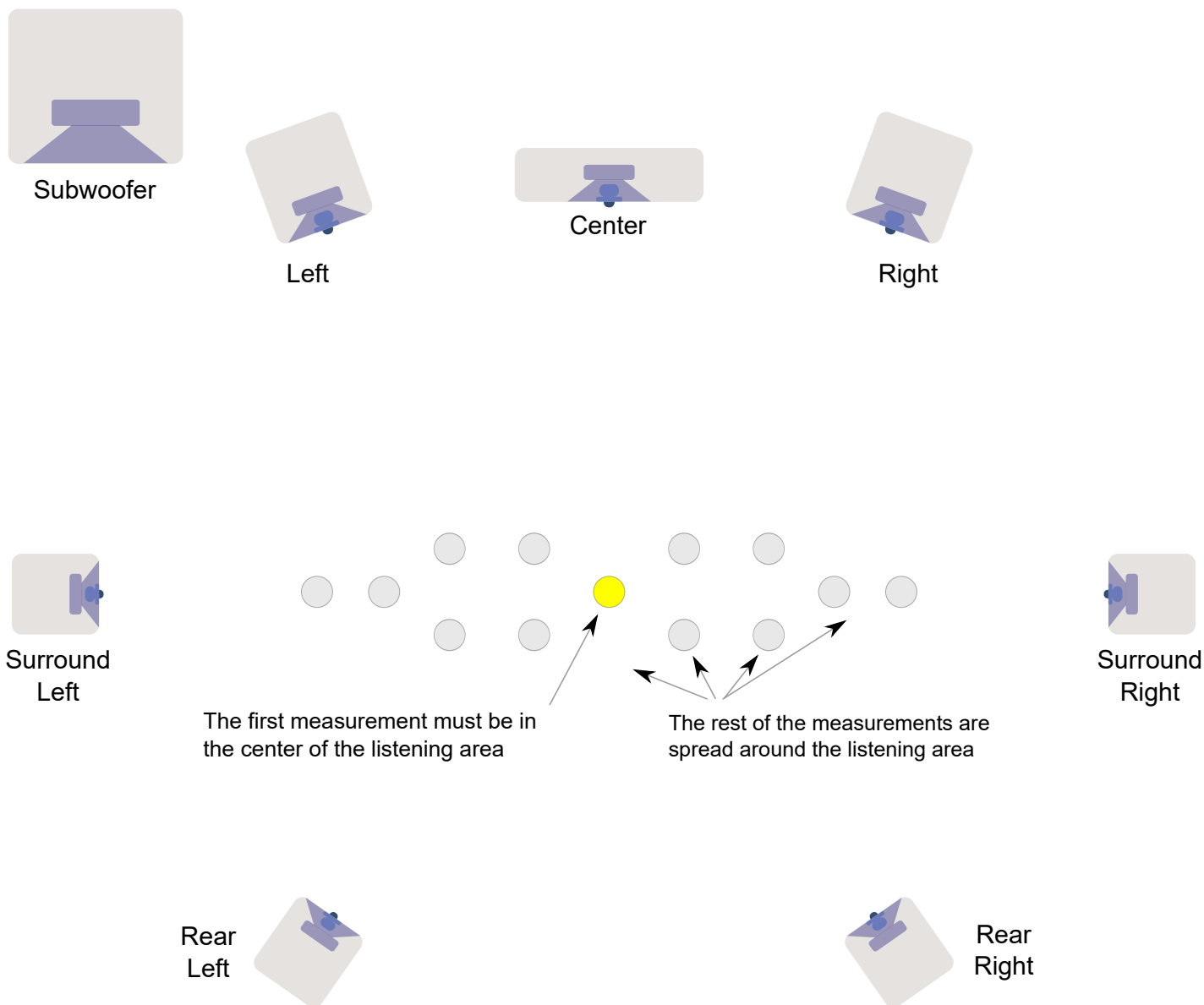
System connections for a multichannel Dirac Live system

Place the UMIK-1 microphone into a microphone stand and position the computer and cabling so that there is enough freedom of movement to move the microphone into the needed locations. A small tripod stand is supplied with the UMIK-1, but a larger stand with boom arm can be used if desired. If necessary, a USB extension (up to a total USB cable length of 5 meters) can be used. In larger spaces, an active USB repeater may be needed.

- For surround/multichannel applications, we recommend that the microphone be pointed at the ceiling and the "90 degree" calibration file used.

Loudspeaker and microphone positioning

Prior to performing acoustic measurements, loudspeaker and subwoofer positioning should be optimized. In particular, the location of the subwoofer will have a large impact on bass response. With Dirac Live®, you have more freedom with loudspeaker and subwoofer placement, but the best result will still be achieved if optimal placement is used together with Dirac Live®.



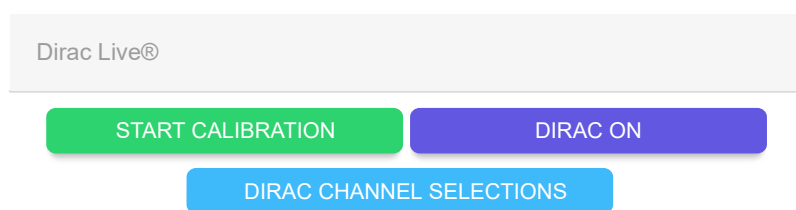
Speaker and microphone positioning for multichannel Dirac Live

A total of nine, 13 or 17 measurements is recommended, with the microphone located in different positions in the room and pointed vertically (that is, at the floor or ceiling). The first measurement must be taken at the **exact center** of the listening area, so that Dirac Live can set the levels and delays of each speaker. Additional measurements are then taken at locations spread around the listening area and at different heights from the floor.

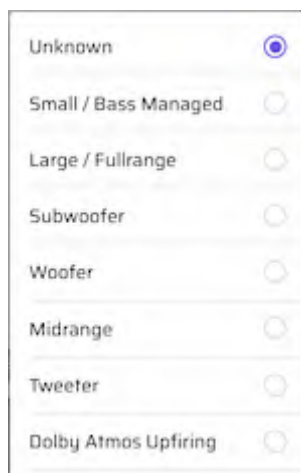
Note that all measurement positions should have acoustic "line of sight" i.e. the direct signal from the speaker to the microphone should not be obstructed by furniture or other objects.

Dirac Live channel configuration

Multichannel Dirac Live processors can be configured into multiple zones. The channel configuration must be set up correctly for your speaker and subwoofer arrangement. To do this, click on the **DIRAC CHANNEL SELECTIONS** button in the left sidebar.



In the dialog, select the speaker type for each channel:



This example shows a single zone for a 7.1 system with "small" speakers for bass management:

Dirac Channels Configuration

Sequence	Zone	Channel	Speaker Type
1	Zone 1 ▾	Dirac 1 ▾	Small / Bass Managed ▾
2	Zone 1 ▾	Dirac 2 ▾	Small / Bass Managed ▾
3	Zone 1 ▾	Dirac 3 ▾	Subwoofer ▾
4	Zone 1 ▾	Dirac 4 ▾	Small / Bass Managed ▾
5	Zone 1 ▾	Dirac 5 ▾	Small / Bass Managed ▾
6	Zone 1 ▾	Dirac 6 ▾	Small / Bass Managed ▾
7	Zone 1 ▾	Dirac 7 ▾	Small / Bass Managed ▾
8	Zone 1 ▾	Dirac 8 ▾	Small / Bass Managed ▾

APPLY

KEEP PREVIOUS SETTINGS

If you are not using all eight channels of Dirac Live correction, set the **Channel** drop-down to "Not Used" for unused channels. For example, this is a 5.1 system:

Dirac Channels Configuration

Sequence	Zone	Channel	Speaker Type
1	Zone 1 ▾	Dirac 1 ▾	Small / Bass Managed ▾
2	Zone 1 ▾	Dirac 2 ▾	Small / Bass Managed ▾
3	Zone 1 ▾	Dirac 3 ▾	Subwoofer ▾
4	Zone 1 ▾	Dirac 4 ▾	Small / Bass Managed ▾
5	Zone 1 ▾	Dirac 5 ▾	Small / Bass Managed ▾
6	Zone 1 ▾	Dirac 6 ▾	Small / Bass Managed ▾
7	Zone 1 ▾	Not used ▾	Unknown ▾
8	Zone 1 ▾	Not used ▾	Unknown ▾

APPLY

KEEP PREVIOUS SETTINGS

You can also create multiple zones. This example shows Zone 1 used for a 5.1 system (channels 1 through 6) and Zone 2 used for a stereo system (channels 7 and 8):

Dirac Channels Configuration

Sequence	Zone	Channel	Speaker Type
1	Zone 1 ▾	Dirac 1 ▾	Small / Bass Managed ▾
2	Zone 1 ▾	Dirac 2 ▾	Small / Bass Managed ▾
3	Zone 1 ▾	Dirac 3 ▾	Subwoofer ▾
4	Zone 1 ▾	Dirac 4 ▾	Small / Bass Managed ▾
5	Zone 1 ▾	Dirac 5 ▾	Small / Bass Managed ▾
6	Zone 1 ▾	Dirac 6 ▾	Small / Bass Managed ▾
7	Zone 2 ▾	Dirac 7 ▾	Small / Bass Managed ▾
8	Zone 2 ▾	Dirac 8 ▾	Small / Bass Managed ▾

APPLY
KEEP PREVIOUS SETTINGS



Tip

Be sure to set each zone to the correct set of channels. If you have Dirac Live channels that don't produce audio, Dirac Live will throw an error when it fails to detect an audio signal on those channels.

Click the **APPLY** button when your settings are done. If you have not changed the settings, you can simply click **KEEP PREVIOUS SETTINGS**.

Subwoofer settings for multichannel systems

When using a subwoofer in a multichannel system, we recommend that its low pass filter be disabled if possible, or set to its highest frequency if it cannot be disabled. Any EQ on the subwoofer should be disabled or set "flat." High pass filters used to protect the driver from over-excursion should be left in place.

If you have not already done so, take the time now to adjust the analog gain on your subwoofer channel to account for the 10 dB reduction in recorded level on the LFE channel, present in all soundtracks. For more information, see [LFE channel gain](#).

Check your preset

If you have used the miniDSP Device Console to set up routing, crossovers or parametric EQ on the output channels, check that you have the correct preset selected before starting Dirac Live. This is because the Dirac Live test signal originates in the Dirac Live blocks and therefore passes through the routing matrix and the output channel processing. Refer to the diagram in the [Signal Flow Overview](#) page to refresh your memory if needed.

For example, suppose that you have set up preset 2 with routing and crossovers for a subwoofer. Before starting Dirac Live with the **START CALIBRATION** button, select preset 2 from within the miniDSP Device Console or with the remote control.

Windows

Double-check the following items *before* starting the Dirac Live application.

UMIK-1 plugged in

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

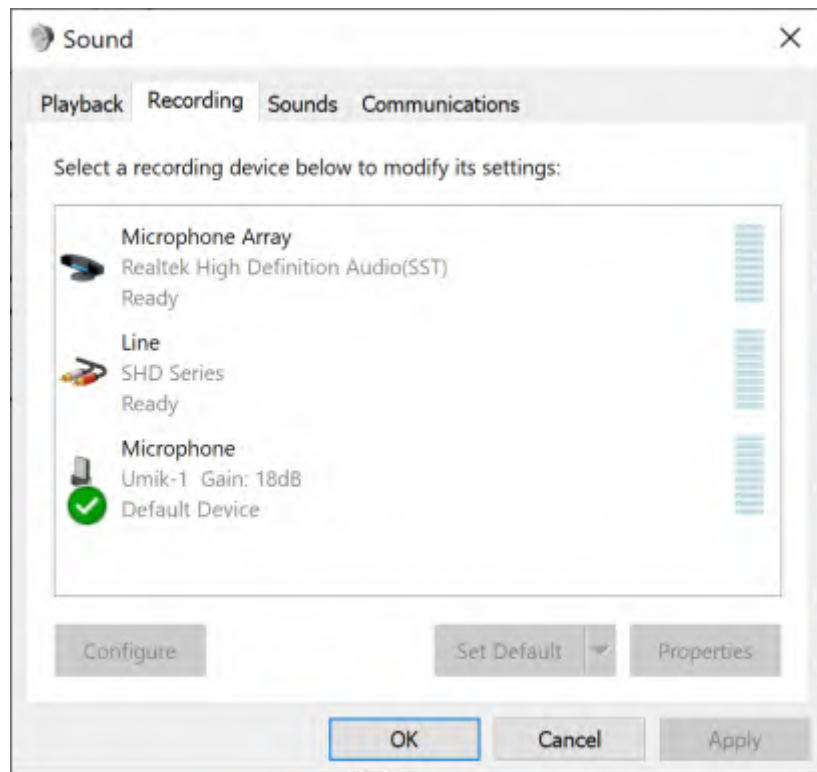


Tip

Be sure to plug in the UMIK-1 **before** starting Dirac Live.

Check that 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 the microphone

Open the Windows 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.



Allow apps to access 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.



On

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
Last accessed 24-Nov-19 2:50:43 PM

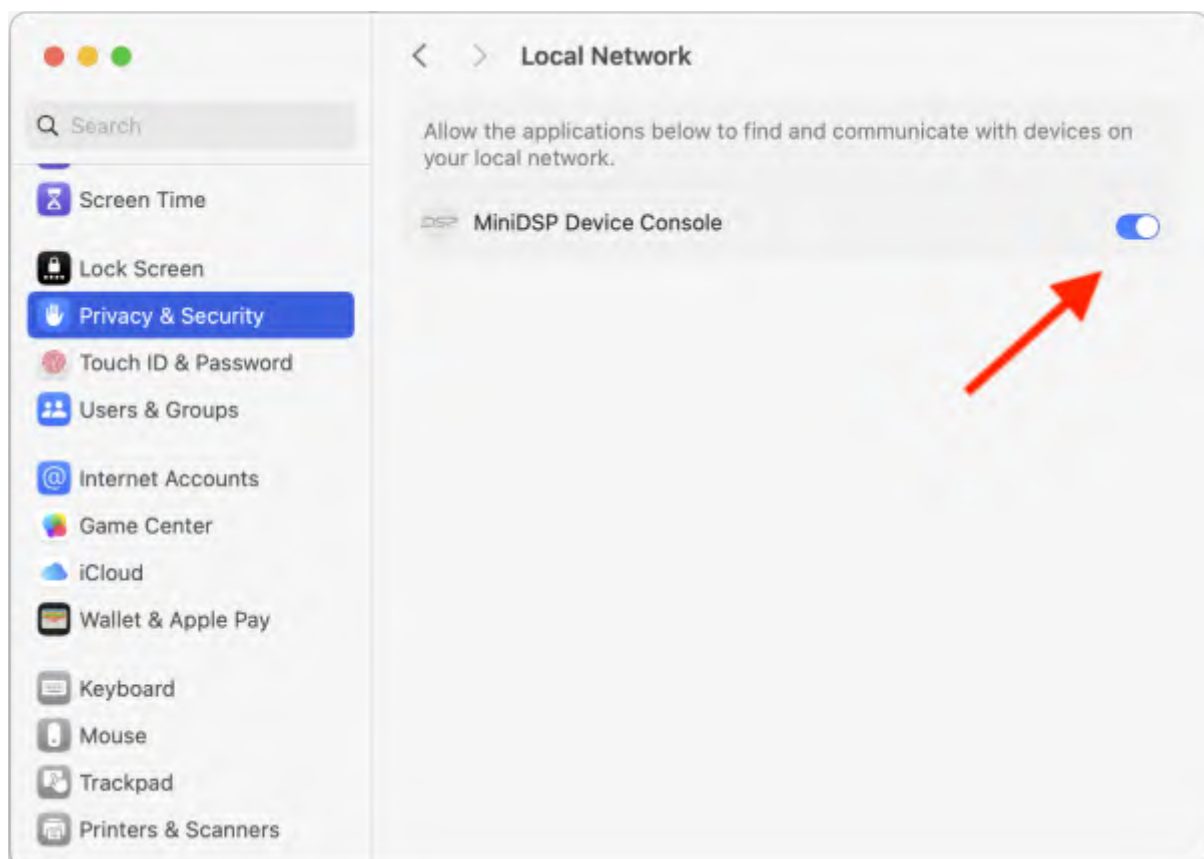


DiracLive.exe
Last accessed 24-Nov-19 2:56:32 PM

macOS users

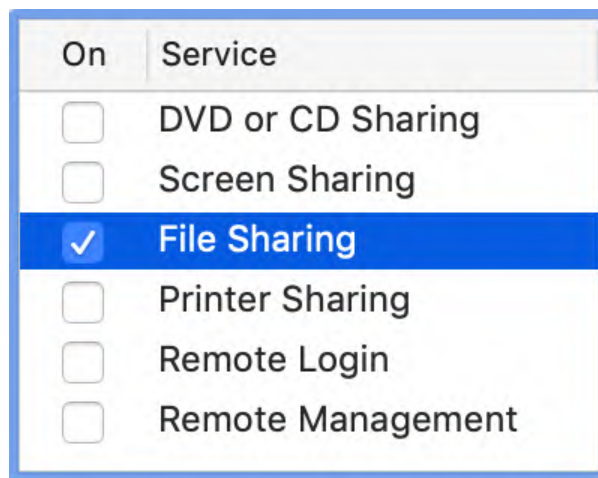
Enable local network access (macOS Sequoia and later)

Check that miniDSP Device Console is permitted local network access. Open System Settings, scroll down on the left sidebar and select **Privacy & Security**, then scroll down on the right and click on **Local Network**. If miniDSP Device Console is not enabled, enable it here:



Enable 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.

UMIK-1 plugged in

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



Tip

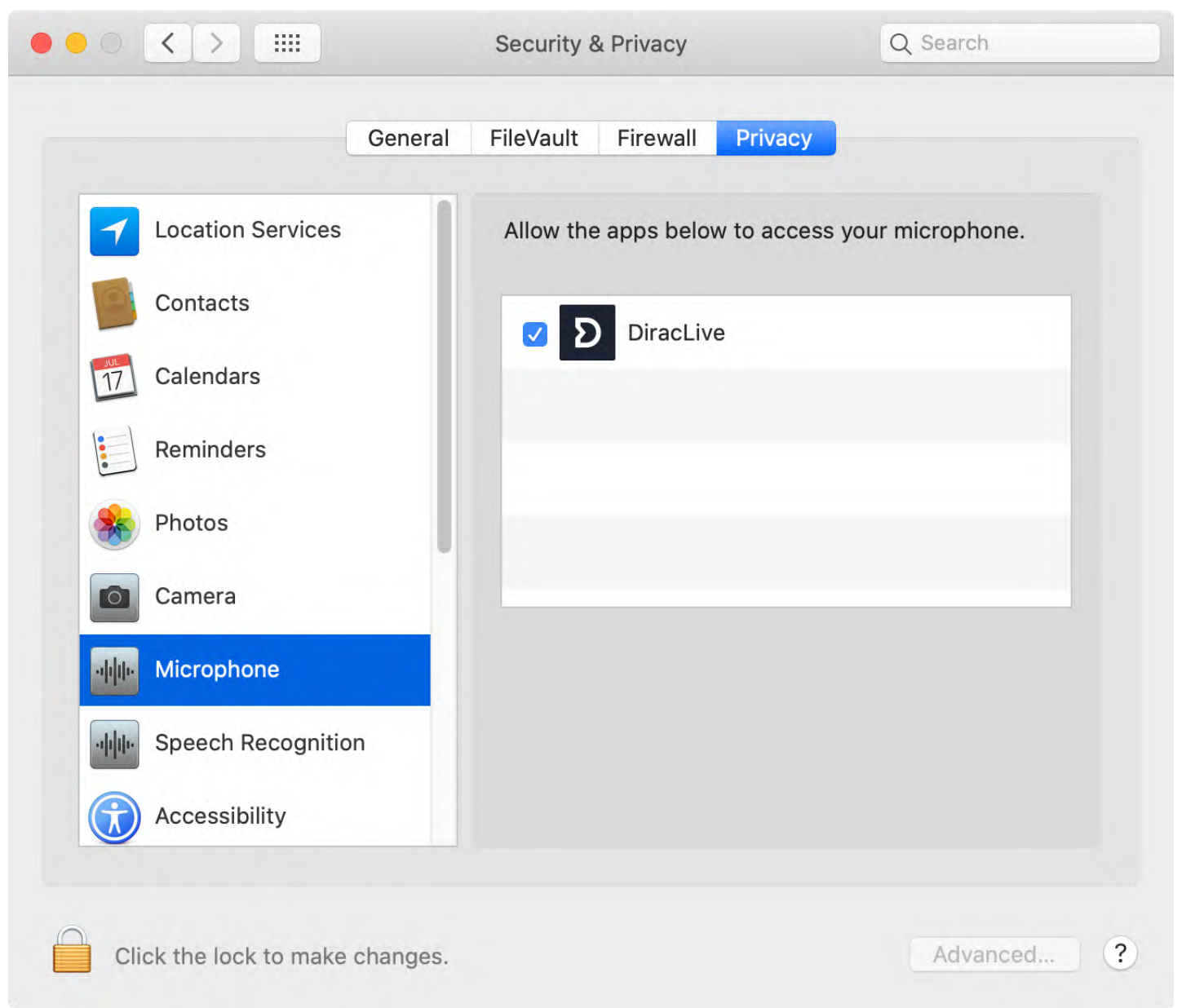
Be sure to plug in the UMIK-1 **before** starting Dirac Live.

Grant microphone access

The heightened security in recent versions of macOS can cause some difficulties with the Dirac Live application accessing the UMIK-1. The Dirac Live application should request microphone access when it first runs. A dialog like this will appear:



When it does, click **OK**. You can confirm that access has been granted by opening System Preferences, then going to the Security&Privacy pane, selecting the Privacy tab, then clicking on Microphone at the left:

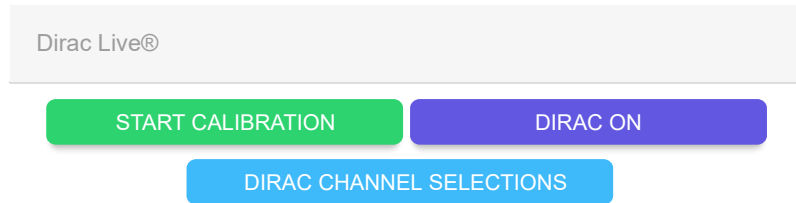


The application "Dirac Live" should appear here. You will typically have additional applications to which you have given microphone access.

First steps

Starting Dirac Live

To start Dirac Live calibration, click on the START CALIBRATION button:



The Device Console will disconnect and the Dirac Live application will start.

Info

Be sure to start the Dirac Live application from within the Device Console using the **START CALIBRATION** button. If you open the Dirac Live application by itself, it will not be able to detect the Tide16.

Info

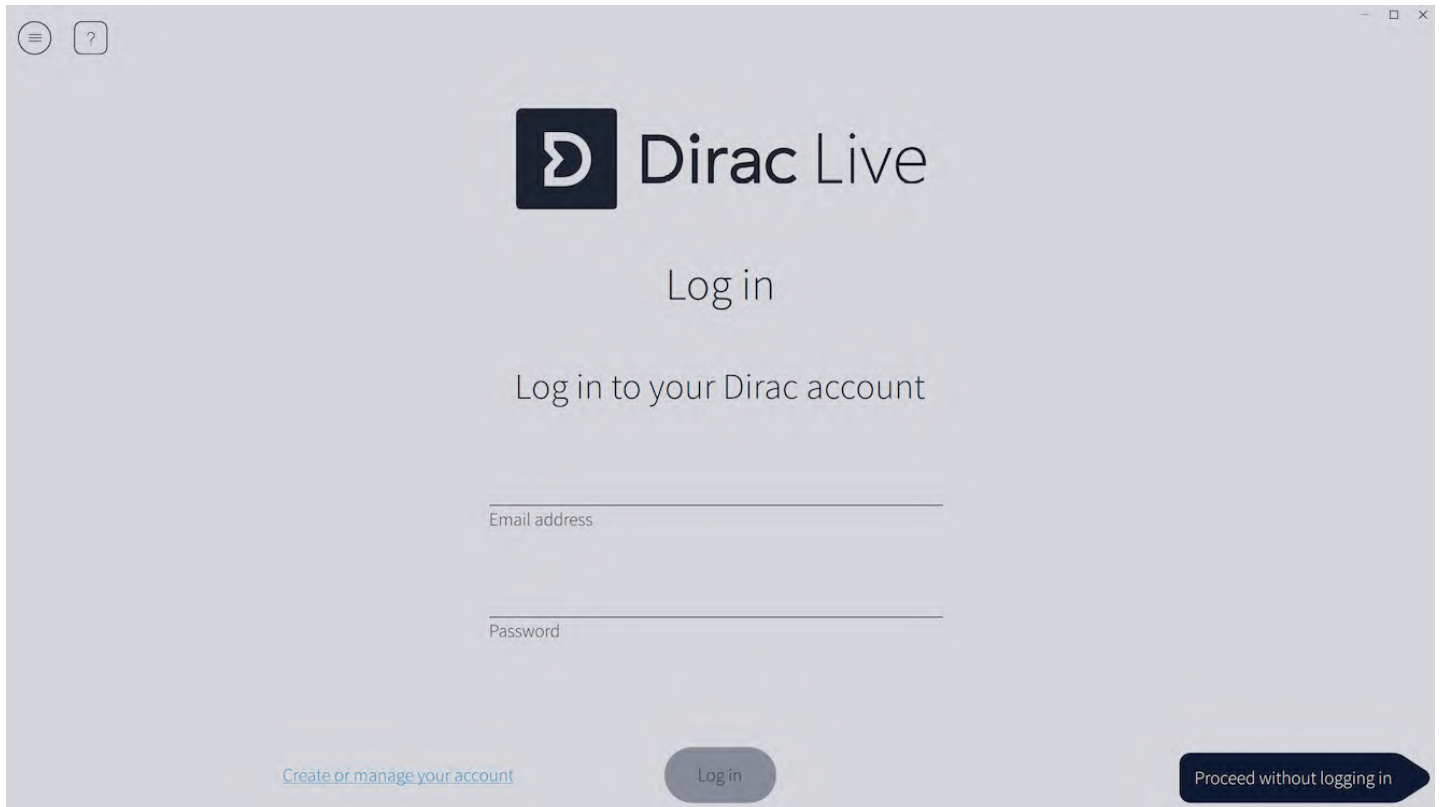
Dirac Live calibration **can not** be performed over the network, so the START CALIBRATION button will be visible only if the Tide16 is connected to the computer by USB.

Tip

Before starting Dirac Live, check that you have the correct preset selected on the Tide16. (This applies only if you have changed the internal audio processing parameters with Device Console.)

Dirac account login or creation

The first time you start the Dirac Live application, the option to log in to or create a Dirac account appears:



Dirac Live

Log in

Log in to your Dirac account

Email address

Password

[Create or manage your account](#) Log in Proceed without logging in

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 the Dirac Live website.

Info

If you wish, you can click "Proceed without logging in" to perform a calibration. You can log in or create an account later by selecting **Disconnect and log in** from the hamburger menu.

The following functions are enabled only if you are logged into your Dirac account:

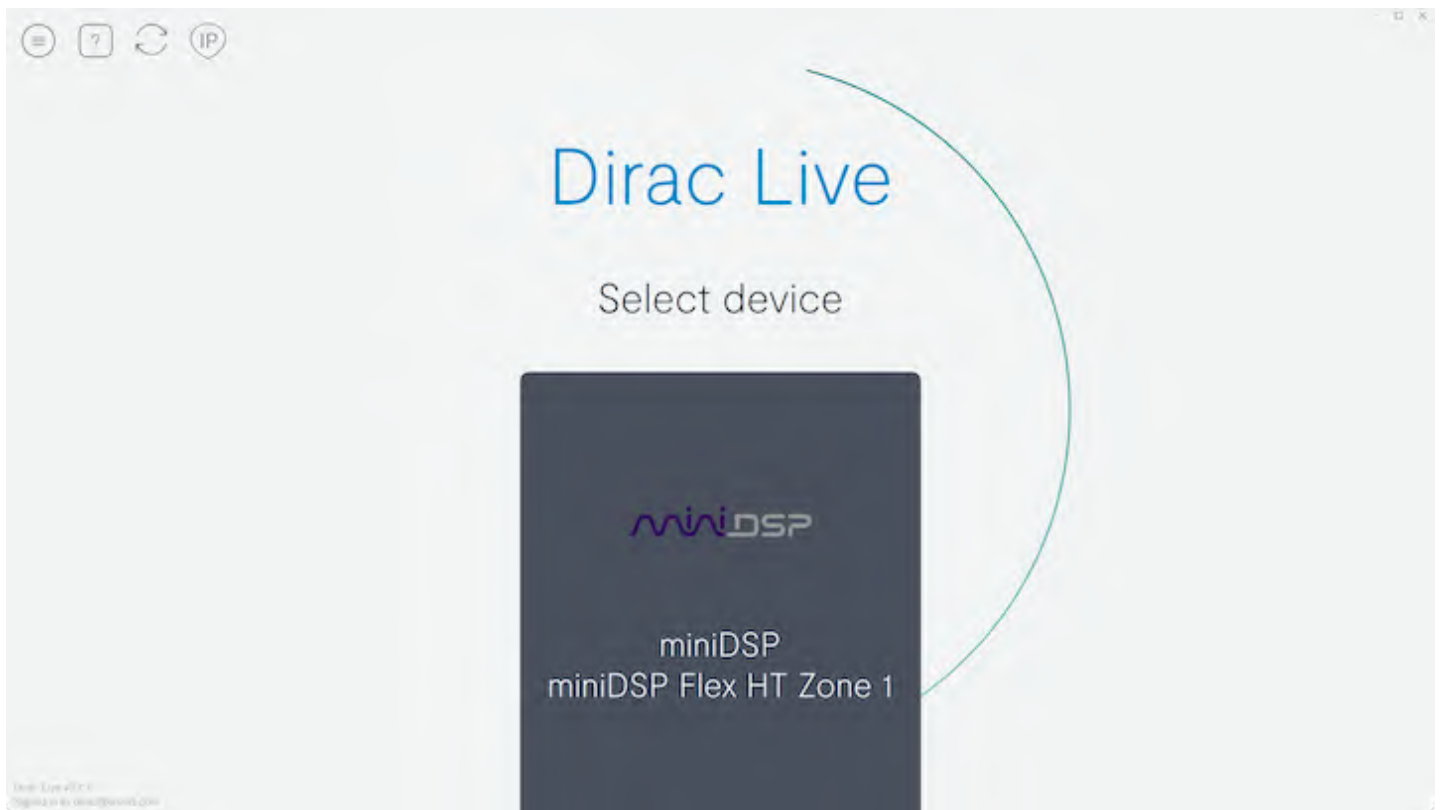
- Load a previously saved project. You can only load an existing project if you are logged into a Dirac account. If you don't log in, you will be able to save your measurements as a project, but you will not be able to open them again.
- Other optional or paid-for features. miniDSP always provides the "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.

Select device/zone

Tip

You must have set up your Dirac Live zones already or you will get an error at this point. See [Dirac Live channel configuration](#).

If you have a single zone, click on it:



(If necessary, close the help overlay that obscures the device icon.)

If you have more than one zone, click on the desired zone e.g. Zone 1 or Zone 2 in this example:



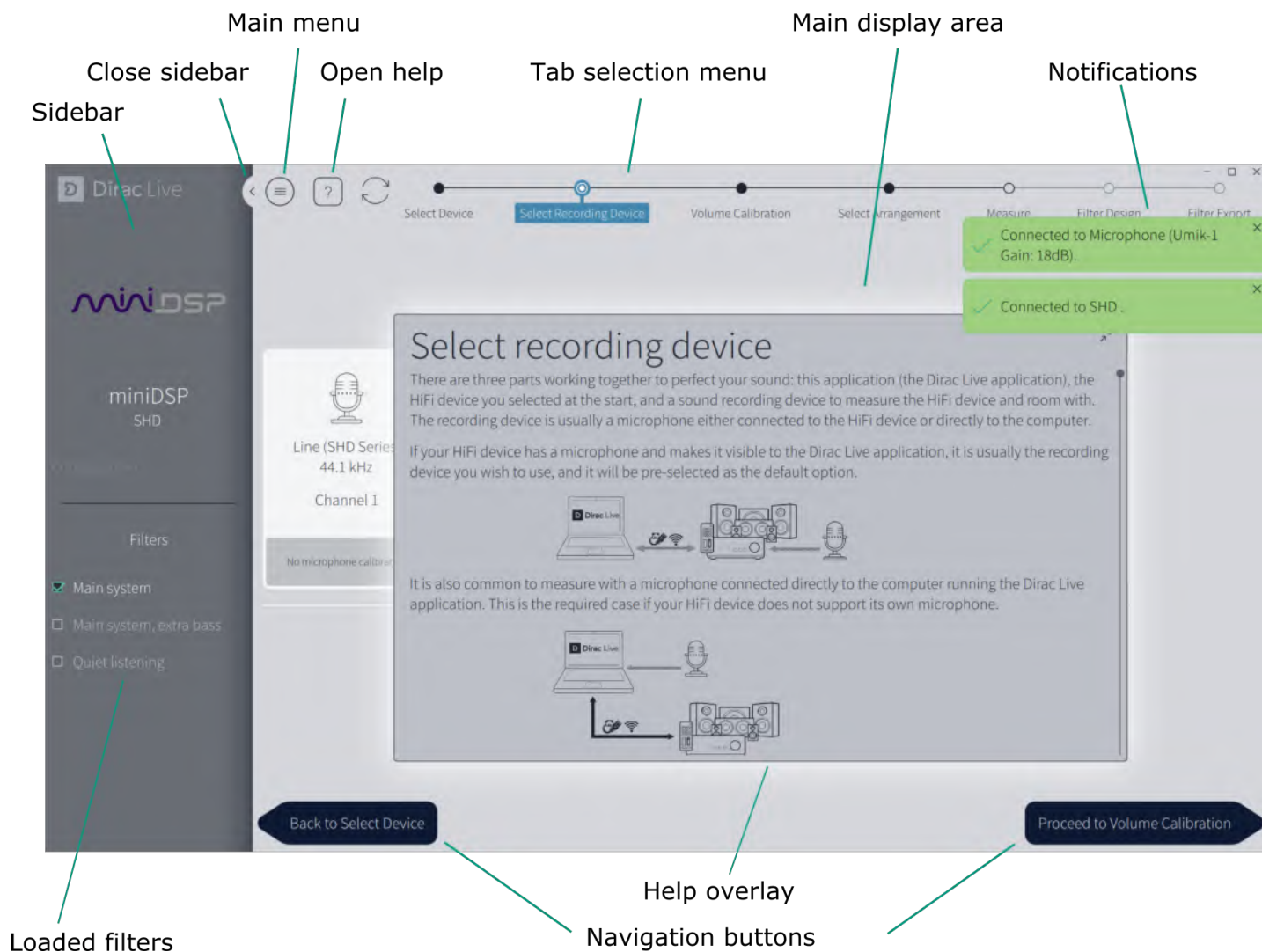


Tip

If Dirac Live doesn't find your device, see [Dirac Live-related connectivity issues](#).

Features of the Dirac Live UI

Once you have selected the miniDSP Tide16, the full Dirac Live UI becomes visible. This section describes the common features of the UI.



Sidebar

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



Loaded filters

After correction filters have been loaded into the miniDSP Tide16, the list of loaded filters appears here.



Tab selection menu

Once the output device has been selected, the main tab menu appears. This menu indicates which tab you are currently viewing. Each tab has buttons to navigate to the previous and next tabs. You can also navigate directly to a tab by clicking on its name in the menu.

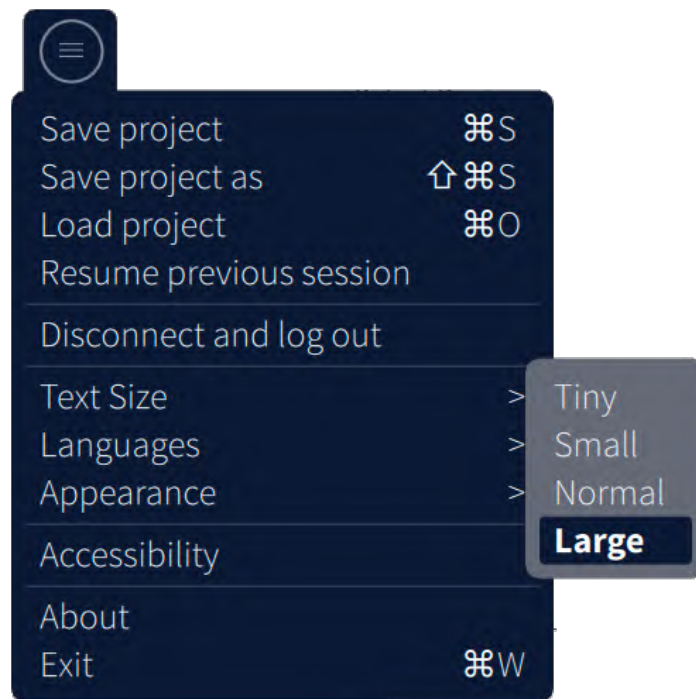


Main display area

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

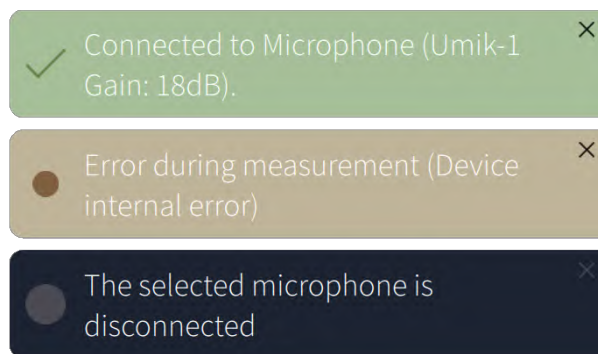
Main menu

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



Notifications

When events happen, a notification appears to the top right of the window. 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.

Help overlay

The help overlay appears on each tab the first time you open it. You can scroll to read all of it. Note that the recommendations in the Help overlay are generic – 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 Tide16.

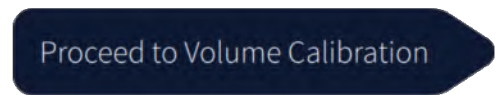
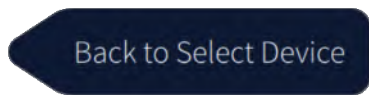
To close the overlay, click on the icon at its top right:



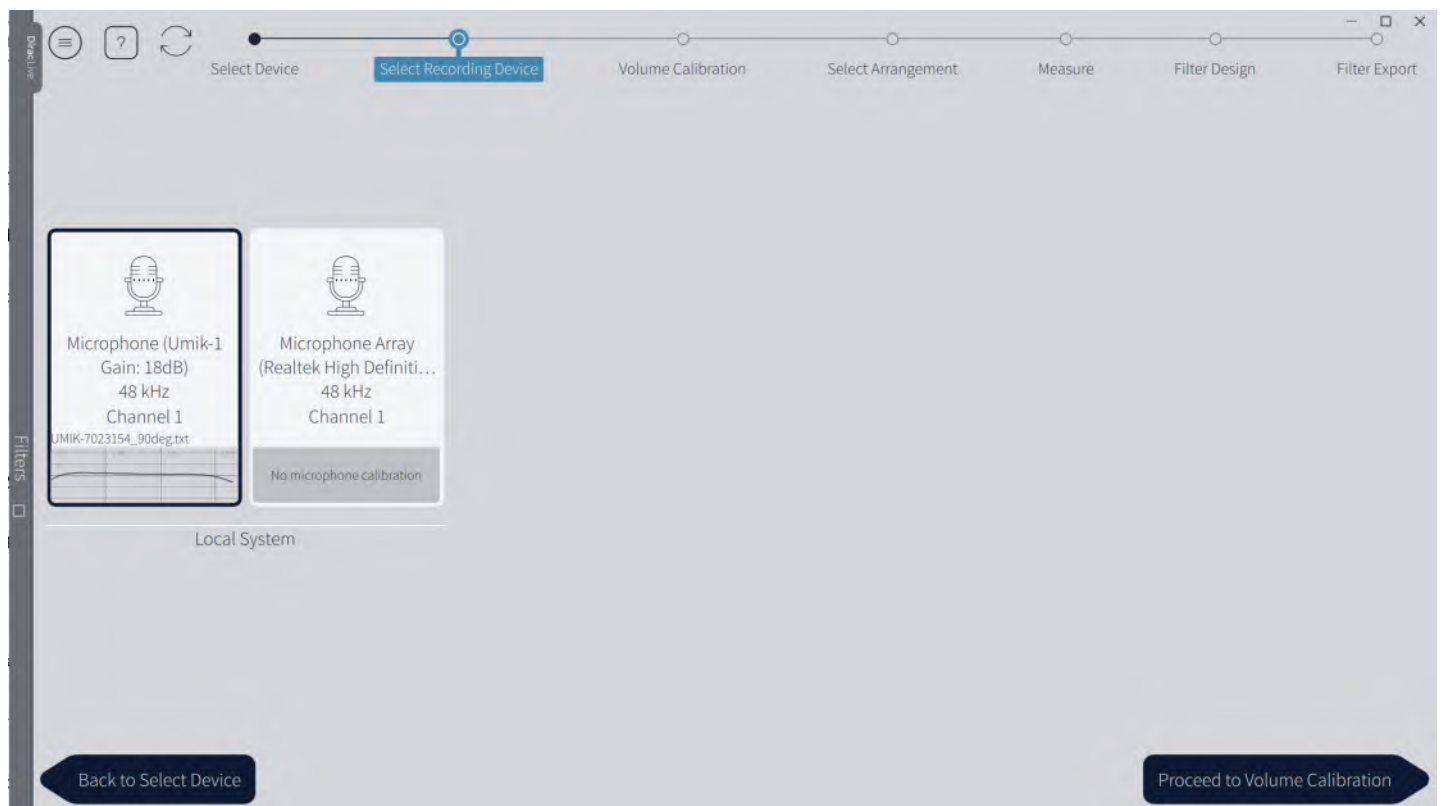
To open the help overlay again, click on the question mark icon:



Navigation buttons

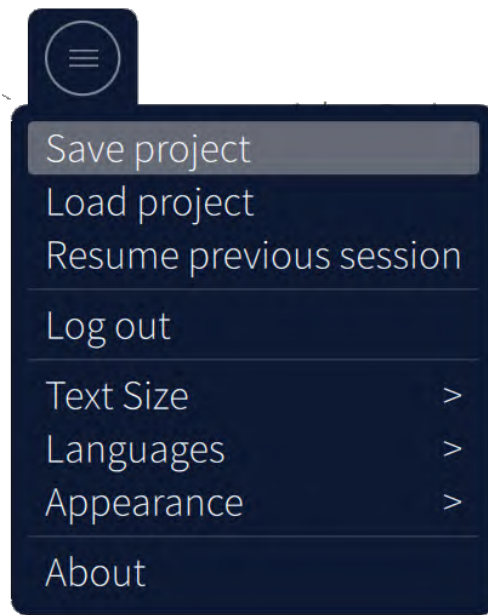


The navigation buttons to the lower left and lower right of the main display area link to the next and previous tab, using the order in which a complete calibration is normally performed.



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**.

 Info

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

 Info

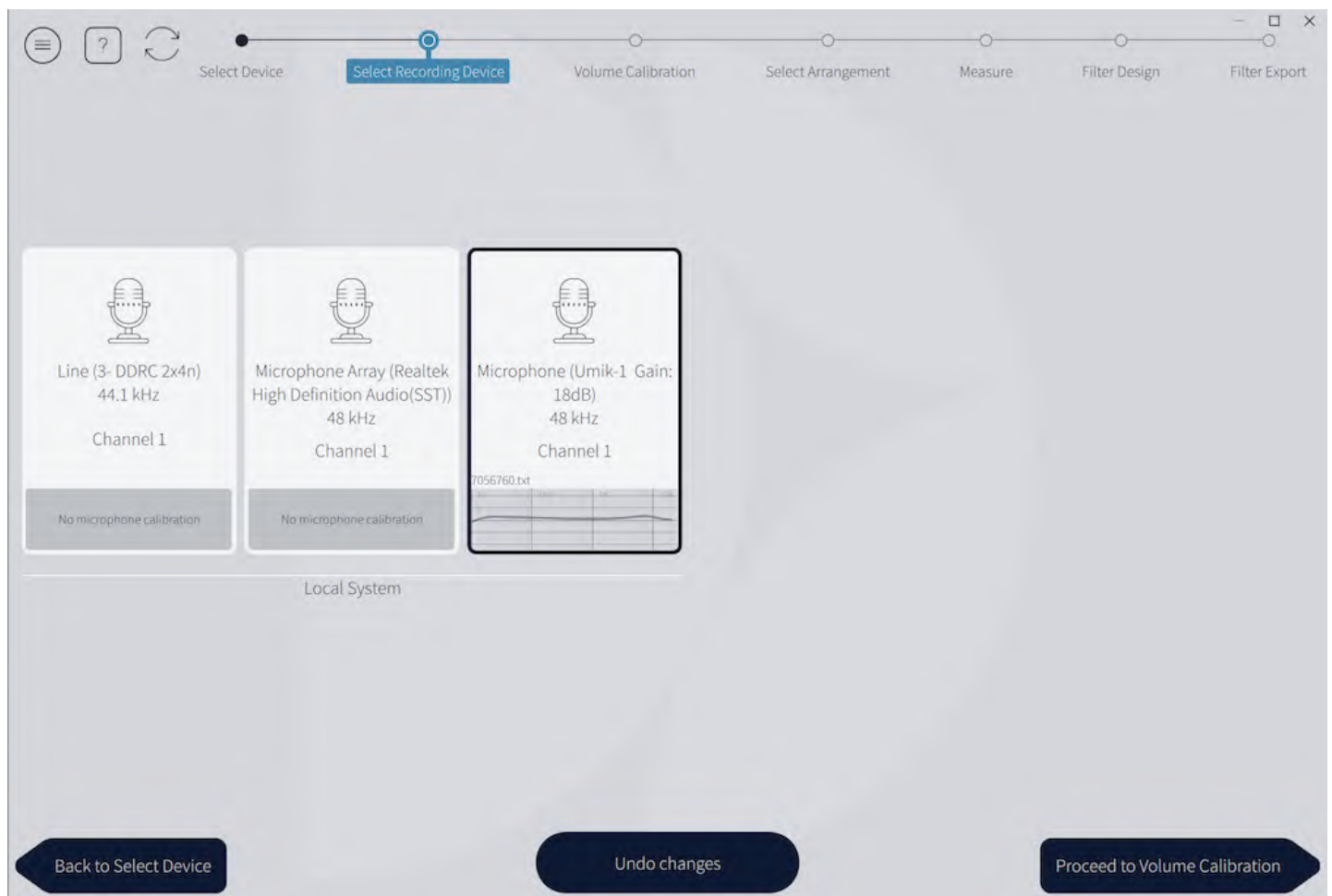
Note that if you have changed the Dirac Live speaker configuration, you may not be able to load the project.

Configure Dirac Live for measurement

Select Recording Device

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

1. Click on the UMIK-1 microphone to select it. It will be labelled "Microphone (Umik-1 Gain: 18 dB)" or similar.
2. At the bottom of the grey rectangle, click on "No microphone calibration" and then "Load from file."
3. Locate your UMIK-1 calibration file in the file system and select it. The calibration file name and the calibration curve will then be displayed.



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

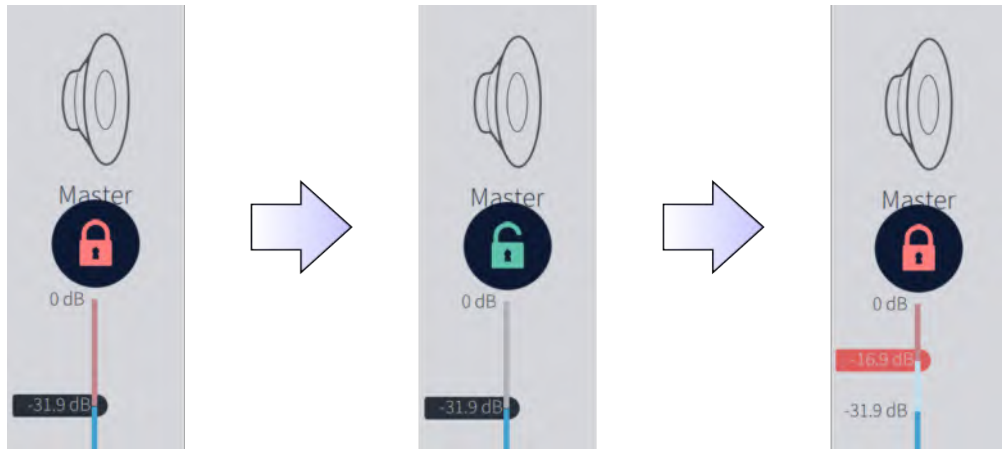
Volume Calibration

Use this tab to set the output level and microphone recording level. 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 Dirac 1 channel and gradually increase the **Master output** slider. You should hear pink noise playing from the left front 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. Setting it so that the level meter reads between -20 and -30 dB will generally give good results.
4. Click on the triangular button for the Dirac 2 channel and confirm that the level is around the same as the first channel. Repeat for the rest of the channels.

As a safety feature, output volume is limited to -32.0 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.



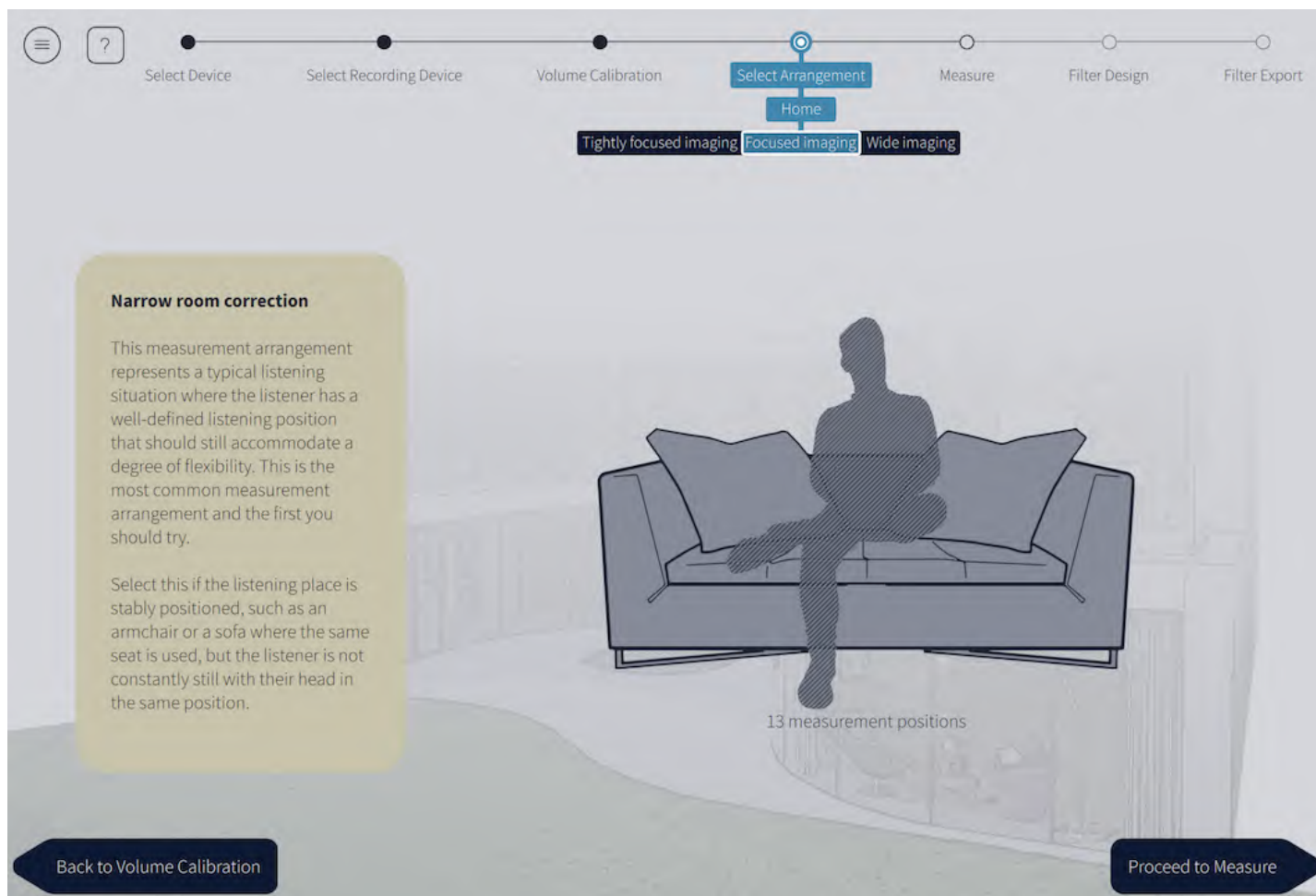
Once you have set the input and output levels, click the **Proceed to Select Arrangement** button.

Tip

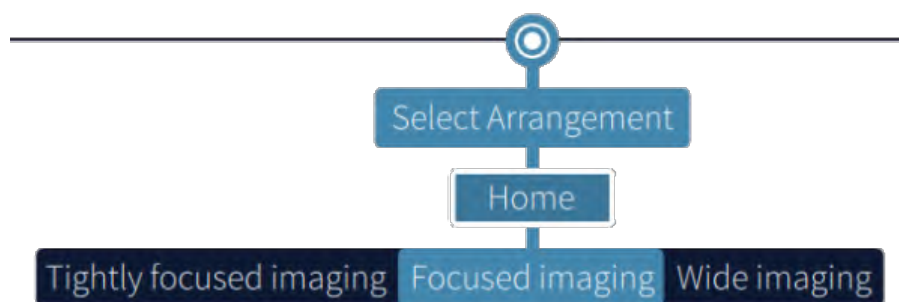
While the measurement technique used by Dirac Live is quite robust, low-frequency noise (traffic, HVAC, machinery, aircraft, storms) in particular can adversely affect measurement accuracy. A high level of ambient noise can degrade signal to noise ratio and prevent the algorithm from analyzing the test 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.

Select Arrangement

The **Select Arrangement** tab selects the type of seating arrangement to calibrate for. Each arrangement has a different number of measurement positions.



The menu bar shows the selection choices:



Use the menu to select the arrangement that is most appropriate for your listening area. They are described more below.

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 auditioning the results. Up to four different sets of correction filters can be loaded into the miniDSP Tide16.

After selecting the seating arrangement, click on the **Proceed to Measure** button.

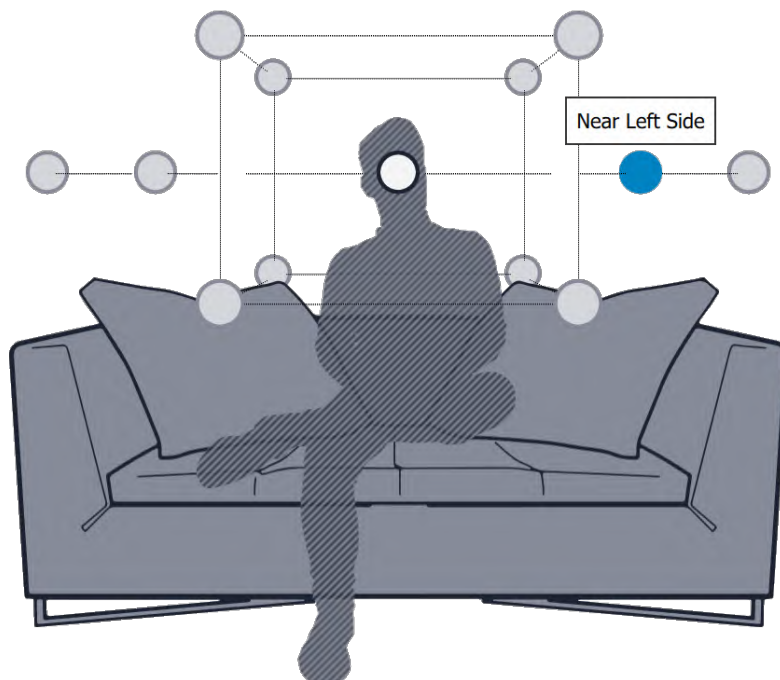
Tightly focused imaging

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



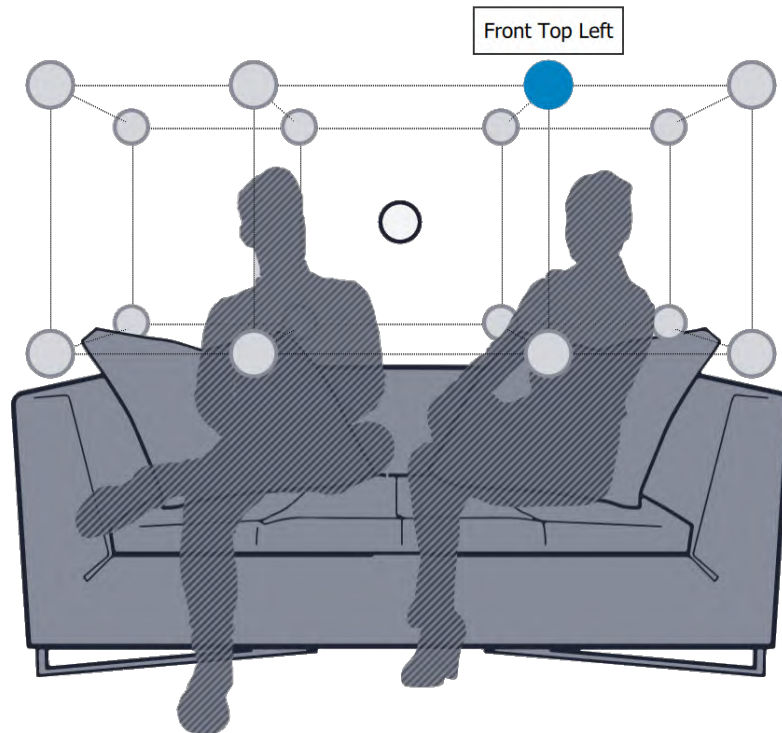
Focused imaging

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



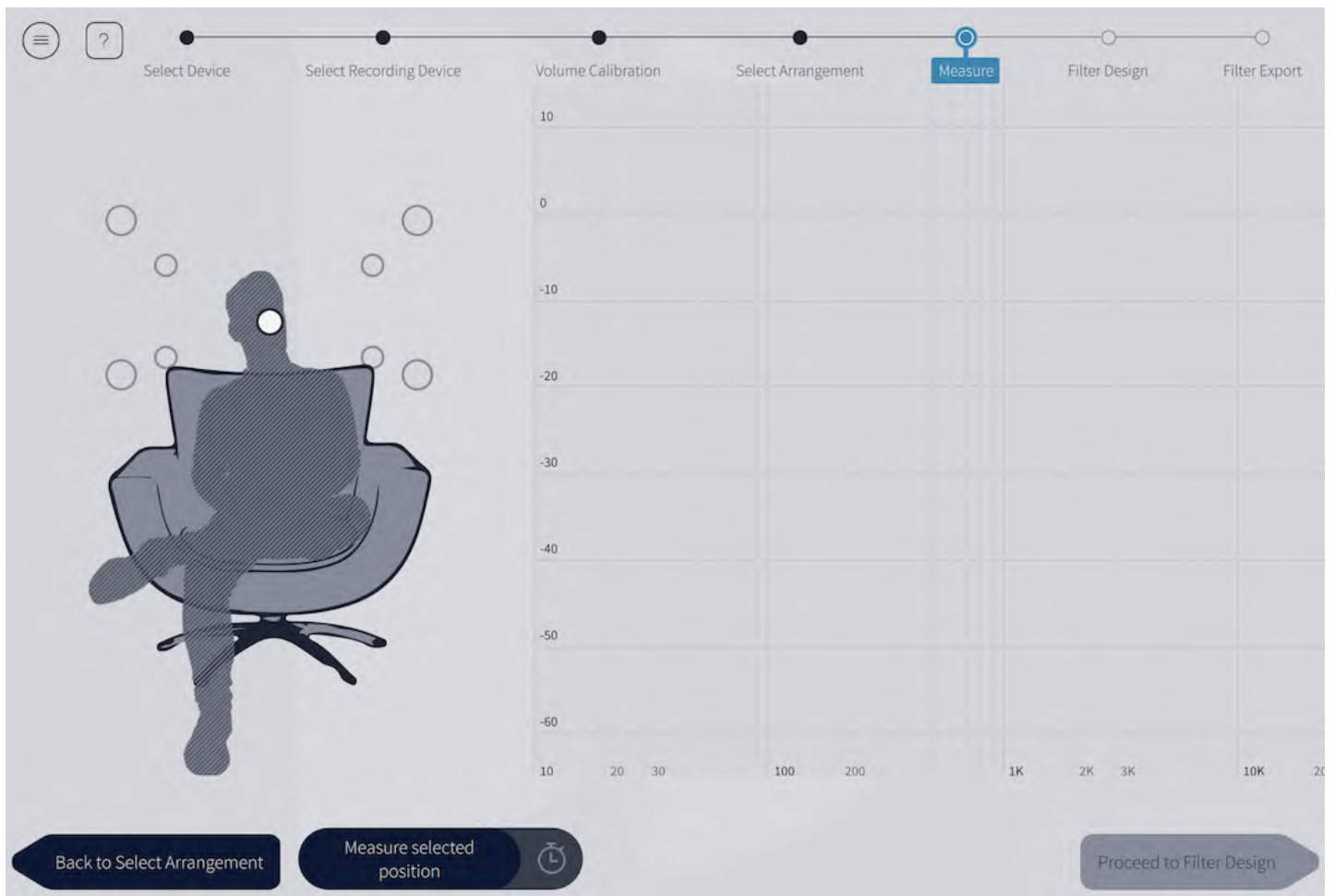
Wide imaging

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

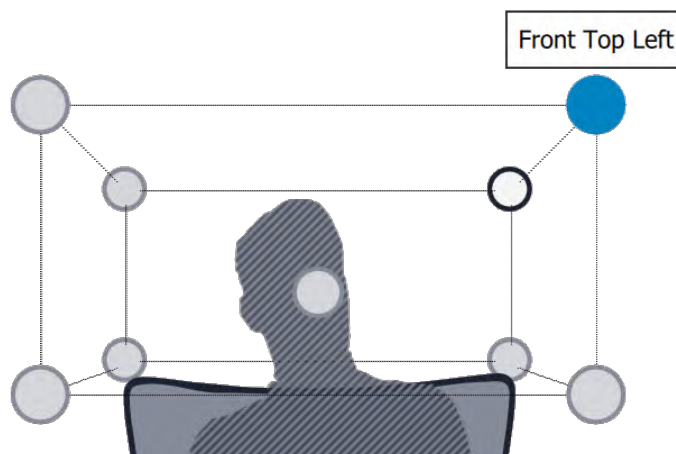


Take your measurements

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



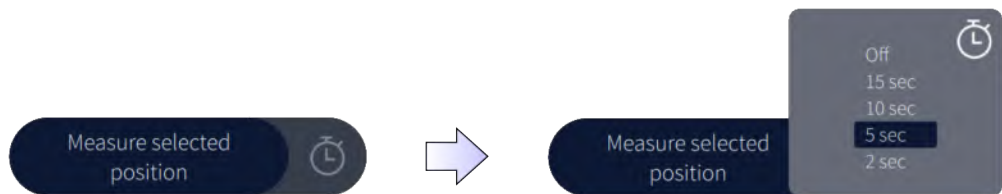
The left side of the window displays a visual guide to the measurement positions. The position that will be measured is shown in white. To display the name of a position, hover the mouse over it – the position will be highlighted in blue and its name displayed. For example:



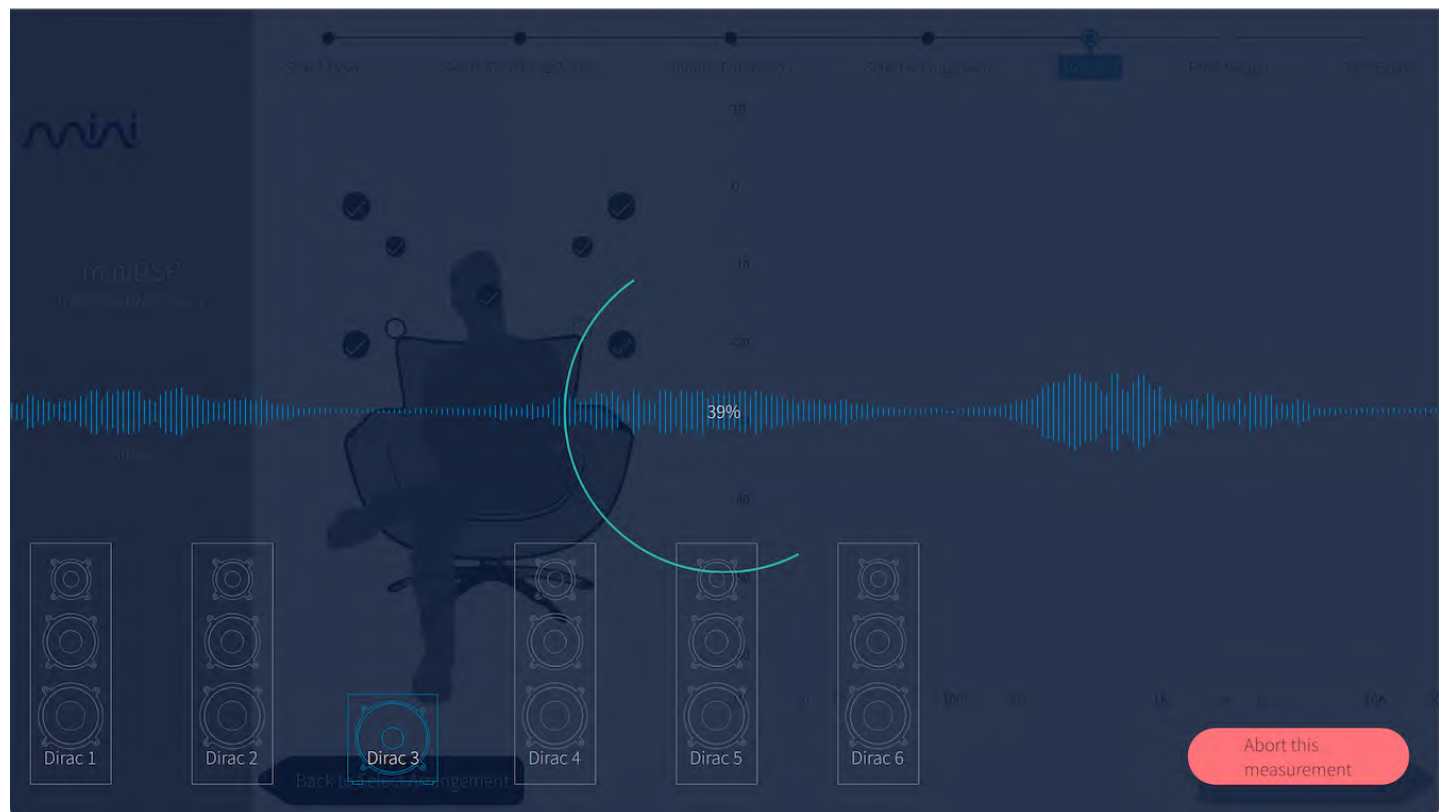
While the visual guide indicates a suitable set of microphone positions, these can be varied to suit individual circumstances. It is, however, important that the first measurement, named "Main Position," is taken in the center of the listening area, as this measurement is used to set the level and delay of each channel.

Run the first measurement

Prior to running the first measurement, you can optionally set a short delay before the measurement starts. To do so, click on the small clock icon on the right side of the **Measure selected position** button and choose the delay:



With the microphone in the center of the listening area, click on **Measure selected position**. The miniDSP Tide16 will generate a test signal, audible as a frequency sweep through the left front speaker, then the right front, and so on through all channels. Finally, the sweep plays through the left front speaker again.

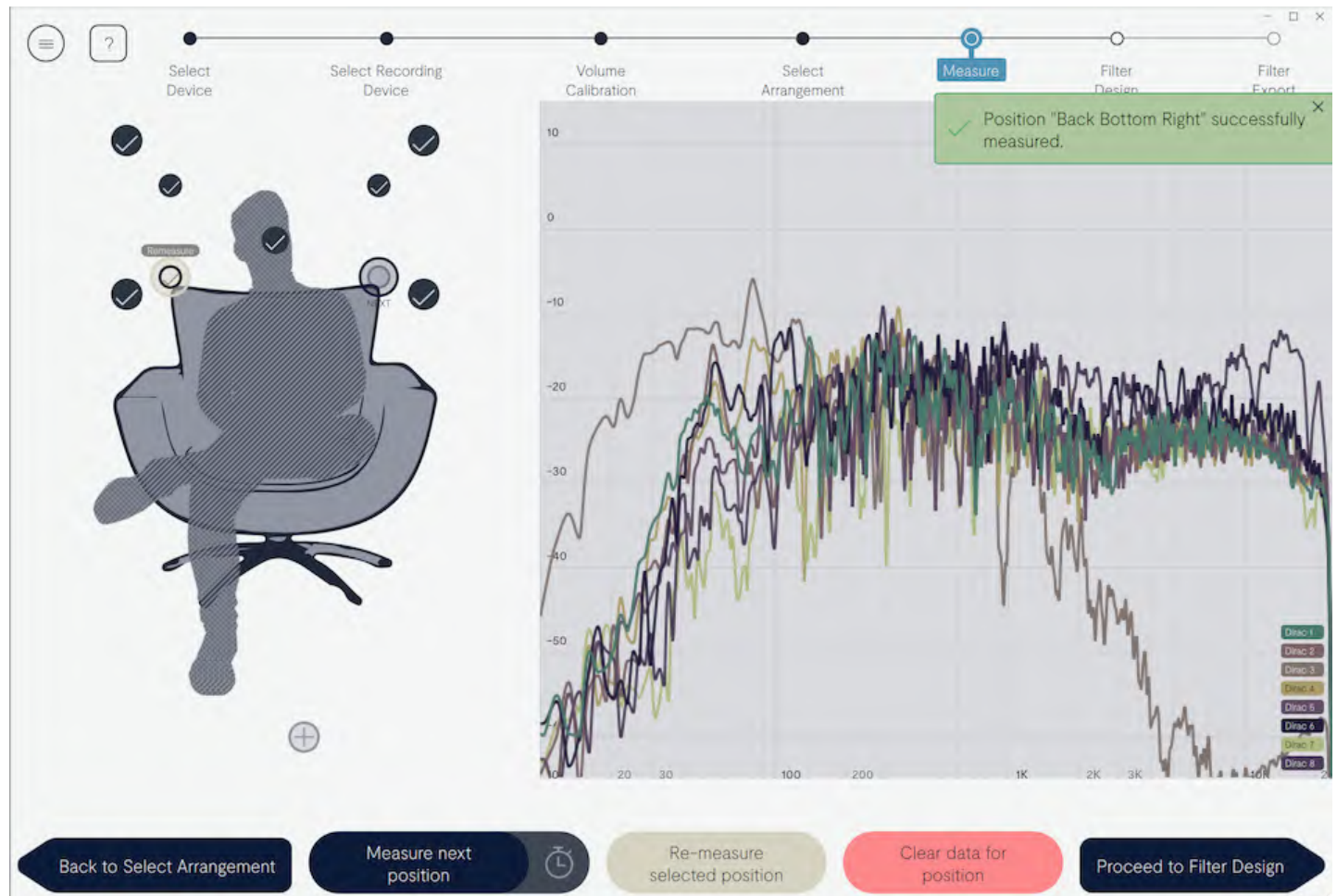


Warning

If your speaker sounds distorted or strained during the measurement, click **Abort this measurement** immediately. Go back to the Volume Calibration screen and lower the output volume.

While the measurement proceeds, a time-domain graph of the captured audio signal is overlaid on the screen. 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.

On completion of a successful measurement, the window will update with a graph of the measured frequency response:



If the measurement is successful, a check mark will be shown on the visual guide and the next measurement position will be highlighted.

If the application 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 time domain display.

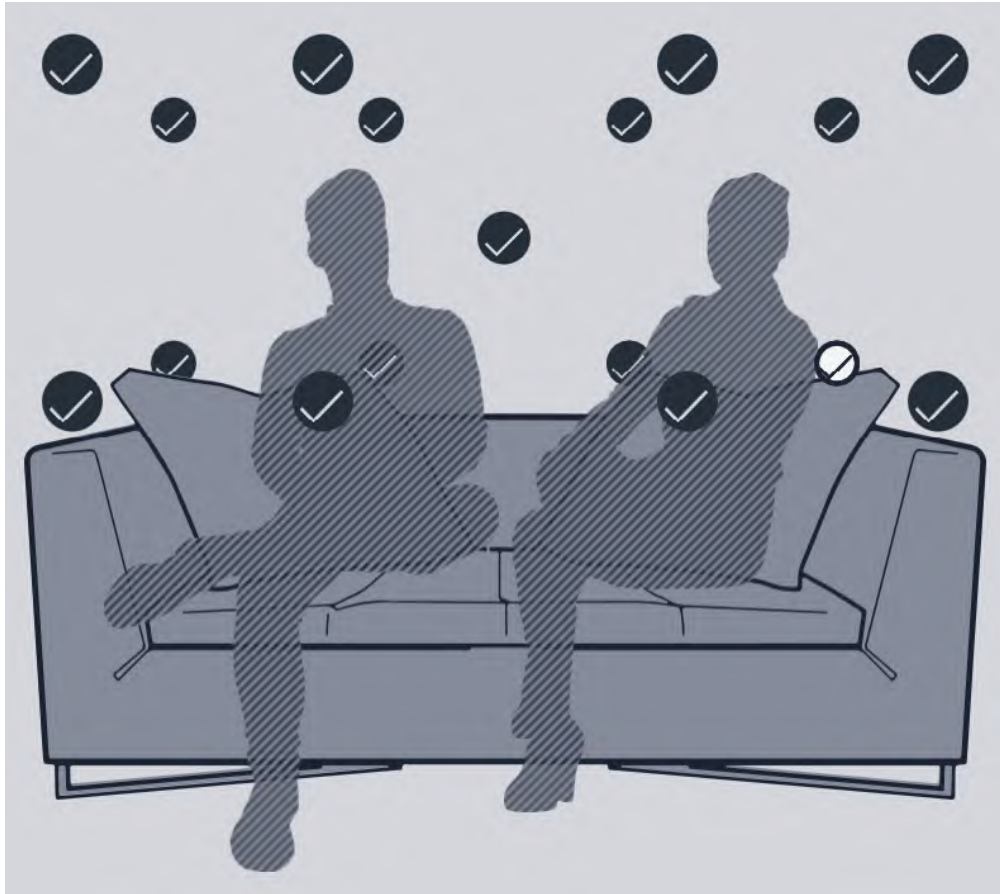
In either of the above cases, go back to the **Volume Calibration** tab and adjust **Master output** or **Mic gain**. Then re-run the measurement.

Completing the measurements

To take the next measurement, move the microphone to the highlighted location -- labeled "Next" on the seating visual -- then click on **Measure next position**.

If the measurement produces an error that the signal was too low or high, go back to the **Volume Calibration** tab and adjust **Master output** or **Mic gain**. Return to the Measure tab and then click on **Remeasure selected position**. You do not need to redo measurements that you have already successfully completed.

Repeat until all positions have a successful measurement:





Tip

The measurement positions 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. Typically, you should 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. Placing all measurement positions too close to each other may result in "over-correction" that will sound dry and dull.

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 the measurement positions 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.

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 to delete it:



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

Filter design

The Filter Design screen

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

Frequency response display

The **Filter Design** tab shows -- by default -- the average measured response of the left front speaker (mauve line) and the target curve (yellow/black line):



Note: the graph as shown is the default initial display. The "curtains" at about 95 Hz and 1.5 kHz are the automatically detected range of correction. These are incorrect because they include all speakers including some small speakers (so Dirac Live sets the low frequency limit too high) and the subwoofer (so Dirac Live sets the high frequency limit too low).

You will want to:

1. Create groups for each type of speaker, and
2. Change the curtains to be more appropriate for each group.

Channel selection and groups

By default, there is one group for all channels. This means that one target curve and frequency correction range will apply to all channels.



Click on the individual channel names to display the response graphs of that channel, or on the group name to display the response graphs for all channels in that group. To display a selection of channels within a group, hold the Control button (Windows) or Command key (macOS) while clicking on the channel names.

For most multichannel applications, you will need more than one group. To separate a channel into a different group, click on the channel name and drag it out of the group box. There will then be two groups. Drag other channels into the new group, or drag channels into the blank space to create another new group.

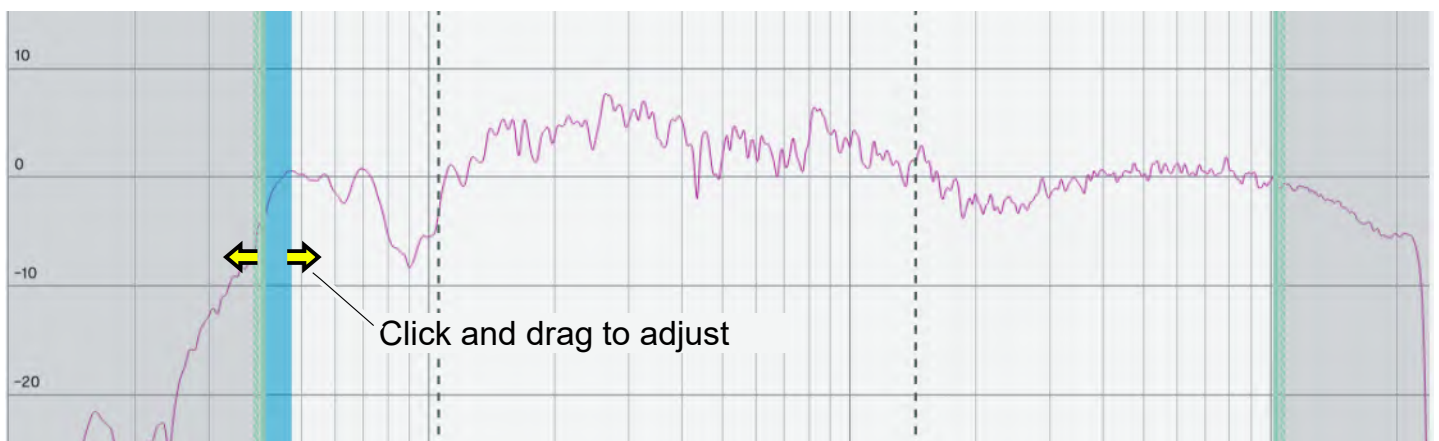
Here is a typical example for home theater, with groups for the two front channels, the subwoofer, the center, and four surrounds:



To display the graphs of multiple groups, hold the Control button (Windows) or Command key (macOS) while clicking on the group names.

Range curtains

The grey regions to the left and right of the graph are excluded from magnitude correction. You can adjust the frequency range of correction by dragging the "curtains" to either side of the graph. There is a separate pair of range curtains for each group.



By default, Dirac Live sets the range curtains to the detected range of all speakers. The detected range is shown as a pair of vertical dotted lines. After splitting the speakers (and subwoofer) into multiple groups, set the range curtains of each group.

- Avoid setting the low frequency curtain too low, as this can result in excessive boost and increase distortion.

- The high frequency curtain can be set where you like. We recommend trying a full-range correction for at least one of your profiles. Or, if you are happy with the inherent in-room response at higher frequencies, try setting the upper curtain to limit correction to the modal region (up to 300 Hz, in a typical room). Be careful not to allow the speakers to differ too much at higher frequencies, as this can result in audible changes in the soundstage.

Display controls

There are several controls at the right of the graph:

Measured		Corrected
☒	Spectrum	☐
☐	Group Colours	☐
☐	Spread	☐

☒	Target Curve
☒	Curtains
☒	Detected Range

Spectrum

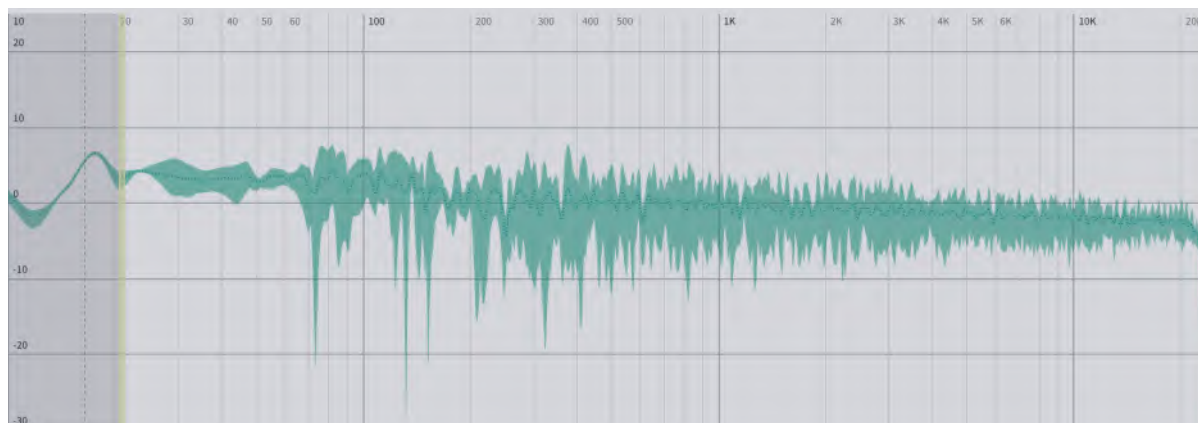
Display the average of all magnitude responses. If the "Measured" checkbox on the left is on, the average of the uncorrected measurements is displayed. If the "Corrected" checkbox on the right is on, the average of the response after correction is displayed.

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. This is useful when displaying the responses of multiple groups.

Spread

Display the responses at all measurement locations as a lighter highlight on the graph. This can be individually selected for the measured and corrected responses. This example shows the spread of responses after correction:



Target curve

Display the target curve for the current group or groups.

Curtains

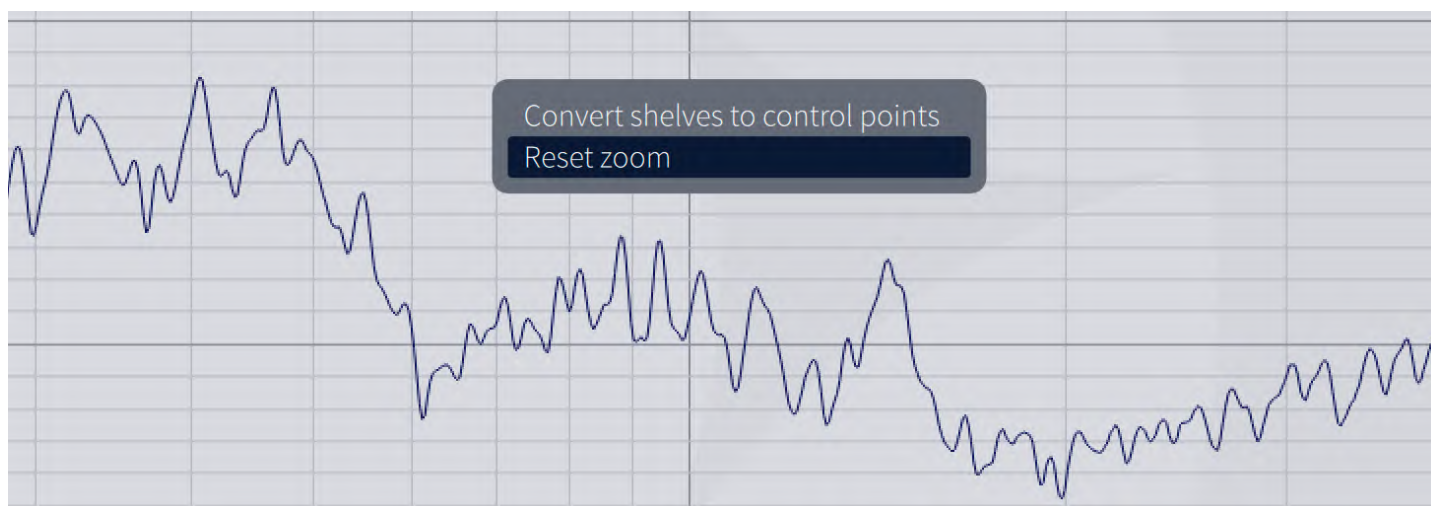
Display the correction frequency range for the current group or groups. This is shown as "curtains" to the left and right of the graph.

Detected Range

Display two vertical cursors indicating the frequency range within which Dirac Live has determined the speakers of the current group to have reasonable output. Note: at low frequencies, environmental noise can cause this estimate to be incorrect.

Zooming in on the graph

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

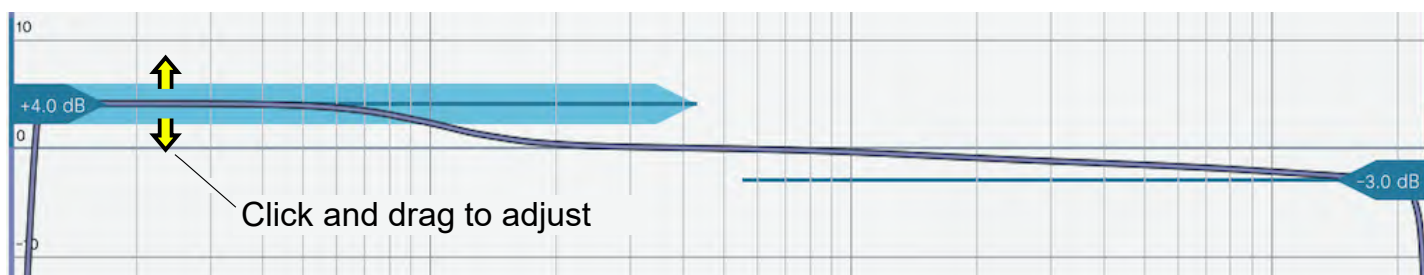


Adjusting the target curve

The target curve is the response you desire from the speakers after correction. This will be an average of different locations around the listening area.

Using the shelving controls

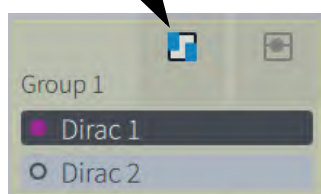
By default, the target curve provides two controls: bass shelf and treble roll-off. Simply grab and drag the horizontal lines to move the level of the bass shelf or degree of treble roll-off or boost. The bass shelf ranges from 0 to +12 dB, while the treble control ranges from -3 to +4 dB.



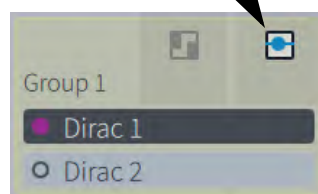
Editing with control points

If the shelving filters don't provide enough control you can switch to using control points with the icons located with each group on the right side of the window:

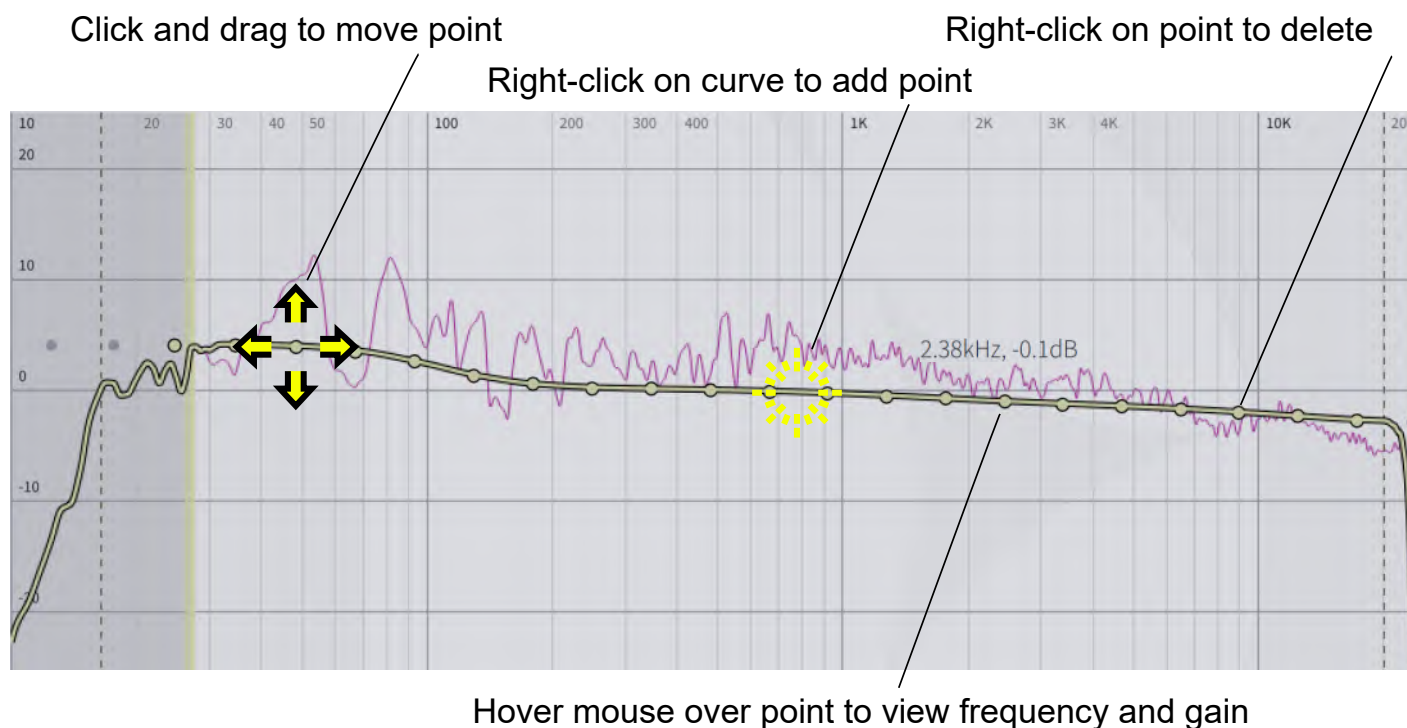
Use shelves



Use control points

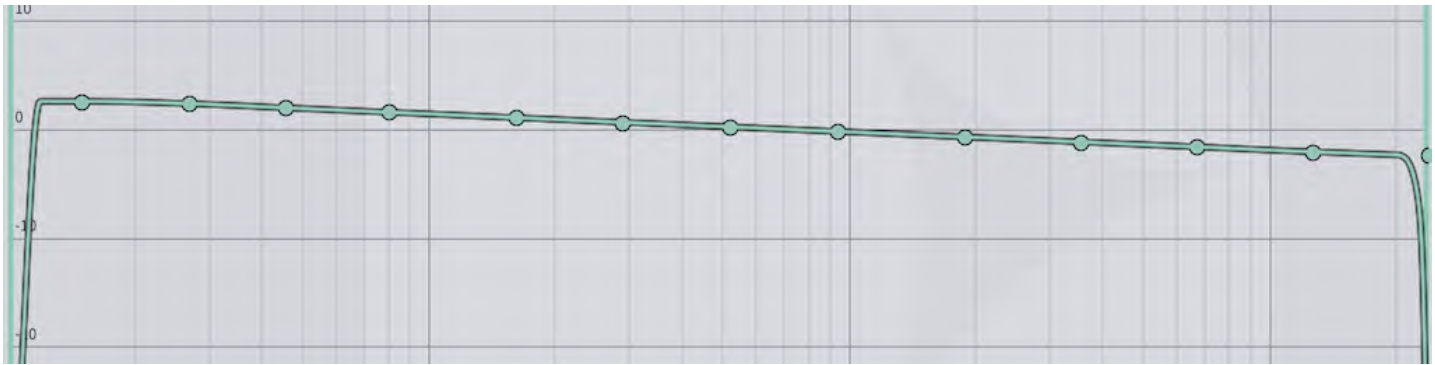


The control points are shown as dots on the target curve, which can be used to edit the target curve as shown here:

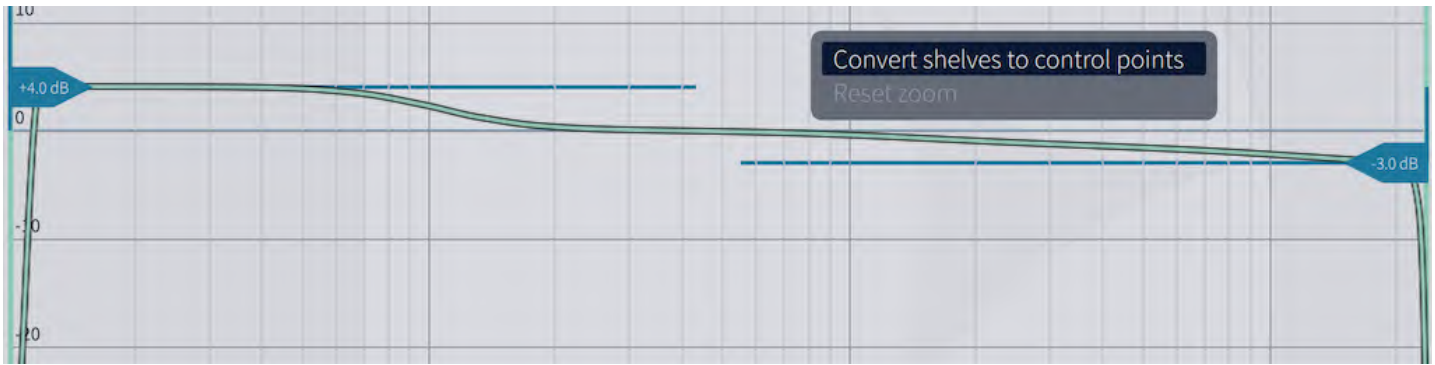


Converting shelving filters to control points

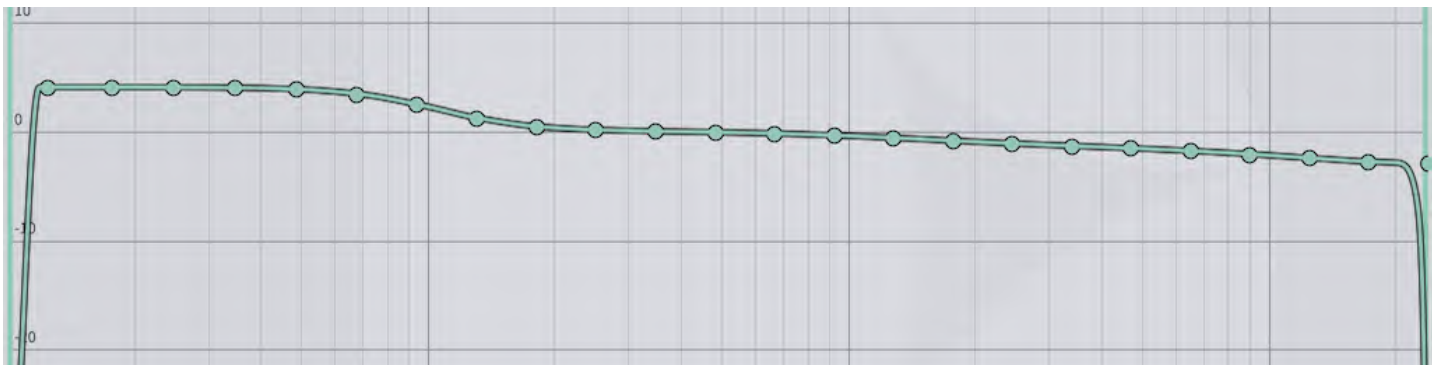
The target curve with shelving filters and the target curve with control points are stored separately, and you can switch back and forth between them. The default target curve with control points is a straight line with a slight downward tilt:



If you would prefer to start with the same shape as the shelving filters, click the icon to view the shelving filter, then right-click on the graph and select **Convert shelves to control points**:

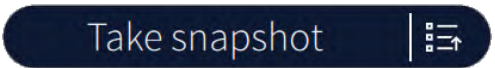


The shape of the target curve with control points will now be the same as the shelving filters, and you can edit further as described above:

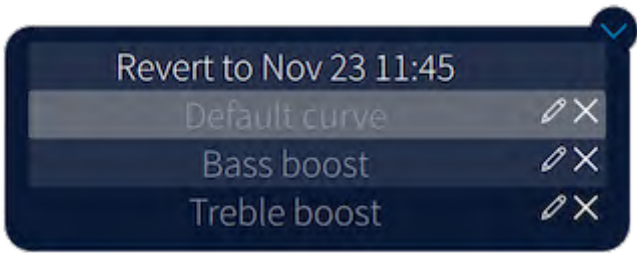


Snapshots

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 Enter key:

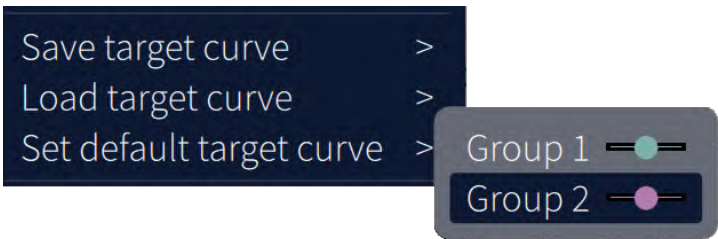


To select a saved snapshot, click on the right side of the button and then click on the desired snapshot.

To delete a saved snapshot, click on the right side of the button and then click on the "x" icon.

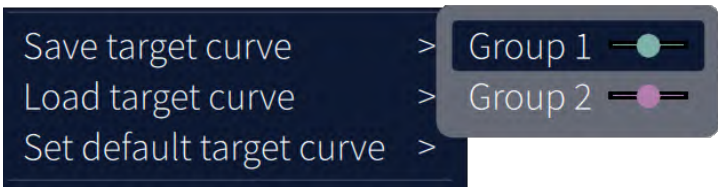
Reset to default

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

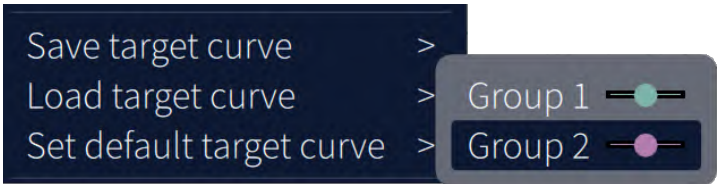


Saving and loading individual target curves

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:



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.

If you initially don't achieve a satisfactory result, 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.

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. Typically, a slight increase in the target curve below 100 Hz will give a more balanced sound.

Magnitude response dips

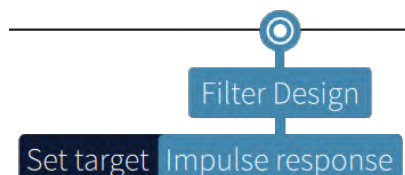
In some cases, it may be helpful to adjust the target curve to follow dips in the measured response. This can occur where, for example, the listening area is very close to the speakers and the measurements exhibit a dip caused by the vertical response of the speakers themselves. Experiment with a target curve that follows the dips. You may also wish to try a different set of measurement positions.

Ungrouping left and right channels

Usually, each pair of corresponding left and right channels (front left and right, surround left and right, and rear left and right) should be in the same group for target curve adjustment, to ensure that both sides produce the same response across the listening area. In certain unusual circumstances, such as where the magnitude response dip discussed above shows up on only one side, you can try ungrouping channels and making separate adjustments.

The Impulse response graph

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



Example impulse response

Below is an example impulse response display. This example shows the original impulse response at the top and the corrected and delayed impulse response below.



Impulse response controls

There are several controls at the right of the graph:

Measured		Corrected
☒	Impulse response	☒
☐	Group Colours	☐

☒	Show latency
☐	Separate curves
☐	Dense grid
☐	Cursor coordinates

Impulse response

Display 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 impulse responses.

Show latency

Show the corrected impulse responses on a time scale that includes processing delay.

Separate curves

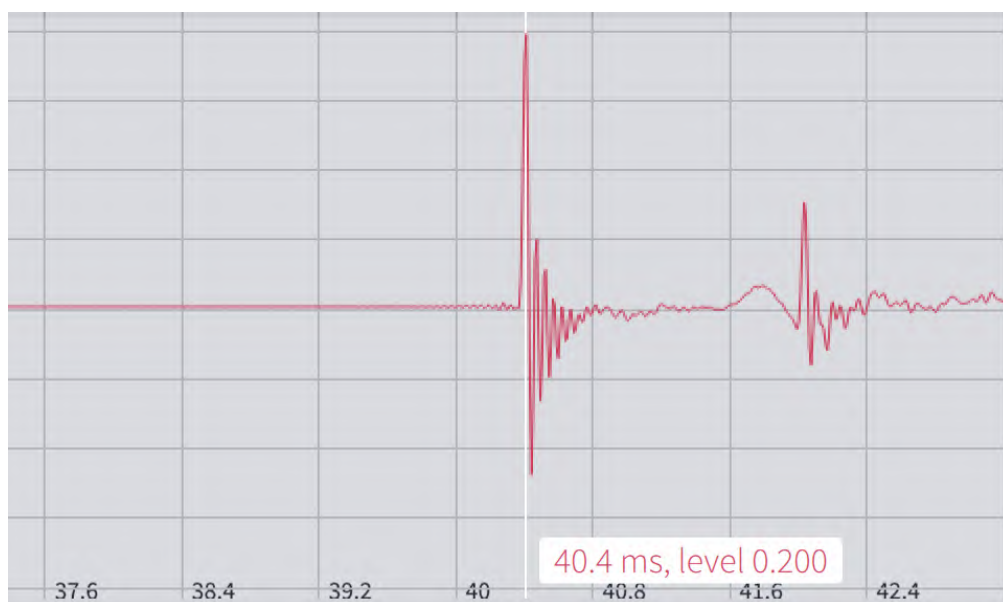
Show the measured and corrected responses on separate graphs. See above for an example.

Dense grid

Display additional grid lines on the graph.

Cursors coordinates

Display a vertical cursor line where the mouse is, together with the time delay and impulse response value at the cursor position.



Dirac Live Bass Control (DLBC)

Dirac Live Bass Control (DLBC) is an optional add-on that provides simple integration of one or more subwoofers. In the case that there is more than one subwoofer, it alters the response of each separately so that the *combined* response of all subwoofers over the listening area is improved.

Enabling DLBC

If you have DLBC, then the options below appear in the right sidebar of the Filter Design page:



Off

Don't use DLBC. You can set up bass management manually.

Upmix Only

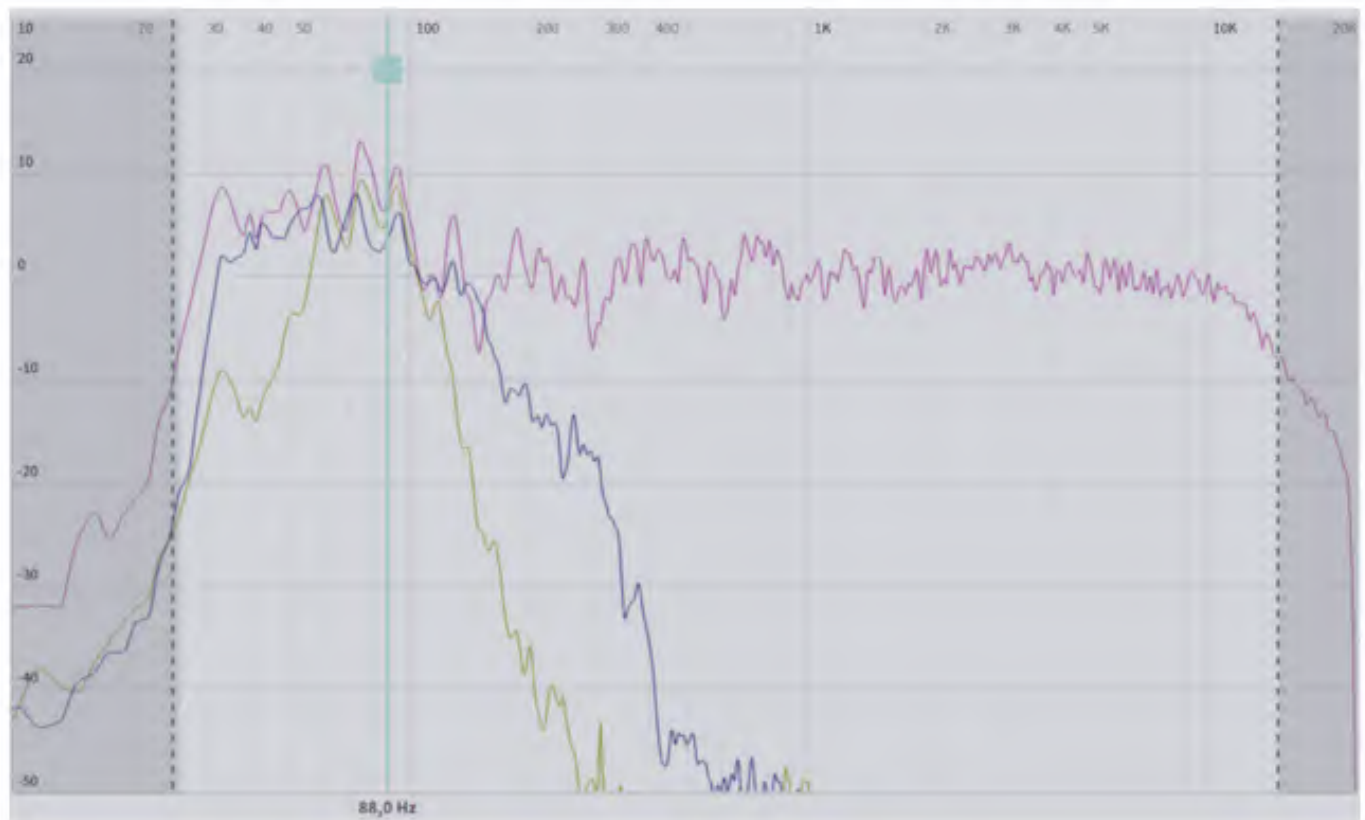
Set up the crossover to the subwoofer or subwoofers, but don't optimize the subwoofers individually.

Full Bass Optimization

Set up the crossover to the subwoofer or subwoofers *and* optimize the subwoofers individually for the best combined response.

Select the crossover frequency

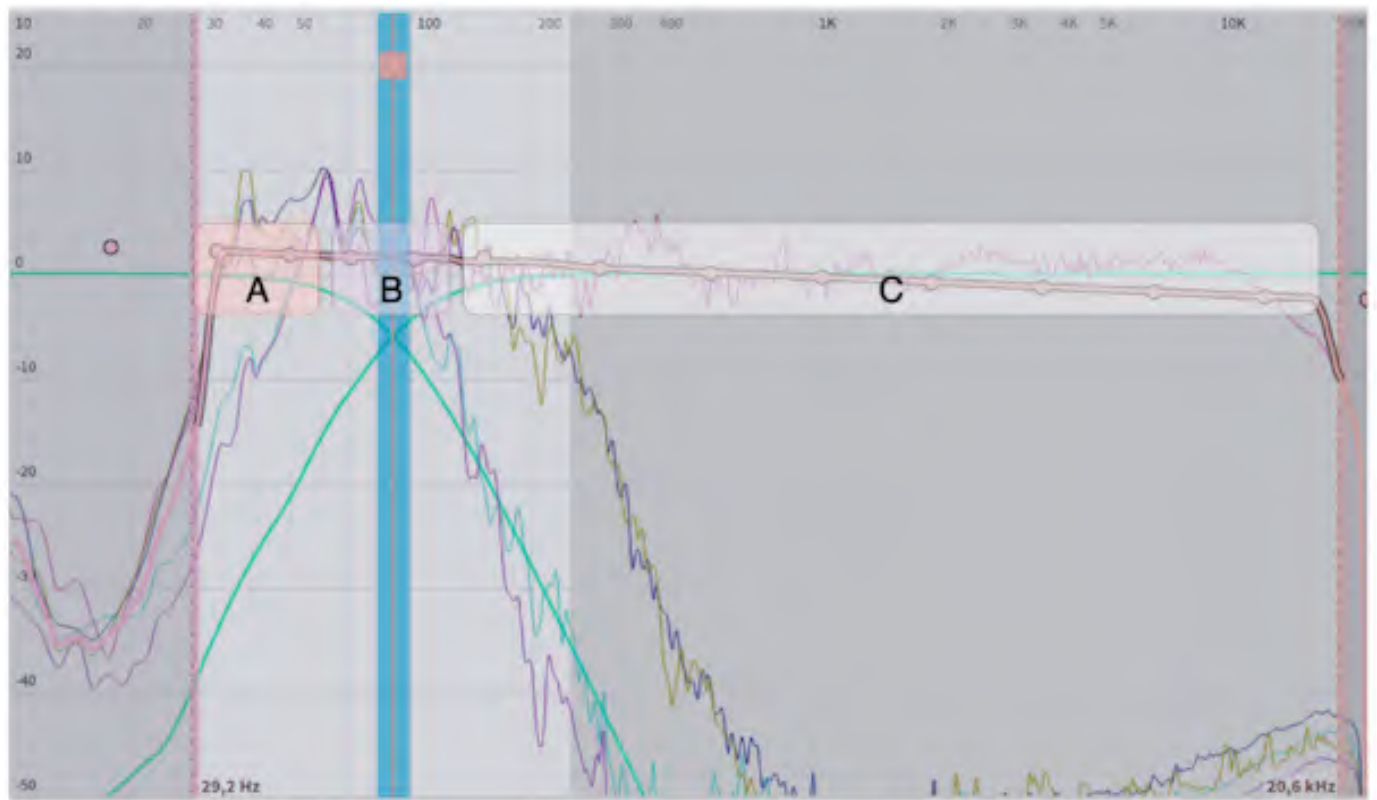
As long as DLBC is enabled, the graphs display the individual responses of the speakers and the subwoofers. Move the slider to a frequency that indicates that the speakers *and* the subwoofer(s) have good output. A common frequency to use is 80 Hz.



Note that the target curve behaves a little differently when using DLBC: because the low frequency region is handling by the subwoofers, the target curve has to be the same in this frequency region. If you change the target curve in the subwoofer region, the target curve for all groups is changed. However if you have the target curve in the subwoofer region, only that group has its target curve changed.

Optimize the subwoofers

Click on the **Calculate** button at the lower right. Dirac Live runs the bass optimization algorithm. This is an iterative algorithm and can take a little time, so be patient.



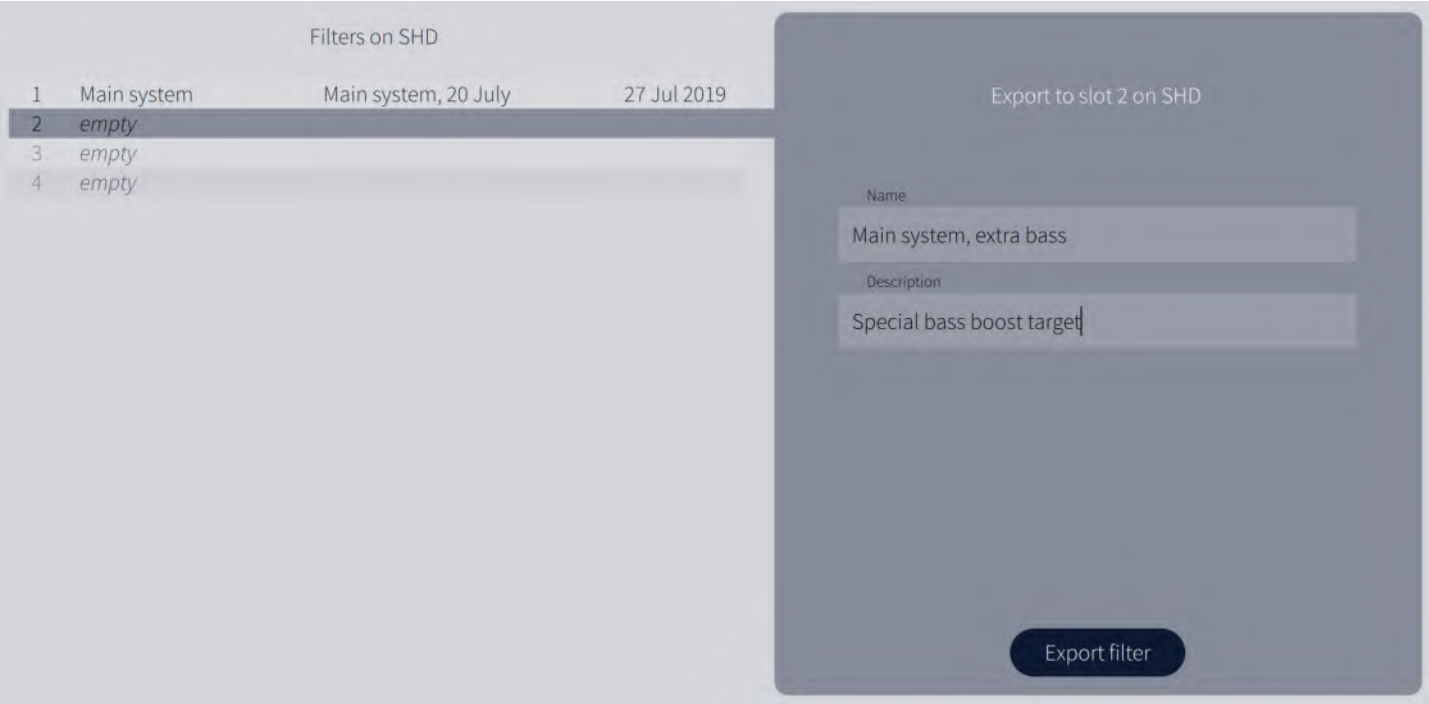
Once the algorithm completes, you can proceed to the Filter Export tab.

Exporting filters

The **Filter Export** tab initially shows four empty "slots" for filter sets (a filter set is one filter for each channel).

Export a filter

To export a filter into a slot, click on the slot. At the right, enter the name and description and click **Export filter**:



A circular progress indicator will indicate that the filter is being downloaded to the miniDSP Tide16. When filter export is complete, the UI will return to the **Measure** tab so you can adjust the target curve to create a different set of filters. Return to the **Filter Export** tab 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		

 **Check your device volume**

Check your device volume before you return to normal playback. The Dirac Live app may have reduced the device volume as a safety feature.

Replace a filter

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

Replace existing filter

Info

If you have set up any back-end processing (subwoofer, active speaker, etc.), be sure to load the filter into the same slot as the preset selected when running the Dirac Live calibration measurements.

Delete a filter

Hover the mouse over a filter in the sidebar list. A red circled "x" will appear. Click on it to delete that filter.



Switch between filters

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



 Info

Selecting a filter here will also select the matching preset in the back-end processing set up by miniDSP Device Console.

Check your device volume

Check your device volume before you return to normal playback. The Dirac Live app may have reduced the device volume as a safety feature.

Additional Information

Additional information

This section contains additional information that supplements the main body of this manual.

Pages in this section

- [Important information](#)
- [Trigger output timing](#)
- [Troubleshooting](#)
- [Obtaining support](#)

IMPORTANT INFORMATION

DISCLAIMER/WARNING

miniDSP cannot be held responsible for any damage that may result from the improper use or incorrect configuration of this product. Please read this manual carefully to ensure that you fully understand how to operate and use this product, as incorrect use or use beyond the parameters and ways recommended in this manual have the potential to cause damage to your audio system.

Please also note that many of the questions we receive at the technical 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 documentation. And if an issue arises with your unit, please read through the Troubleshooting section first. Thank you 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 Tide16 has passed the test performed according to European Standard EN 55022 Class B.

Trigger output timing

The 12V trigger output can be used to power external amplification on and off when the miniDSP Tide16 is powered on, put into standby, and taken out of standby.

The figure below illustrates the timing. On power-up:

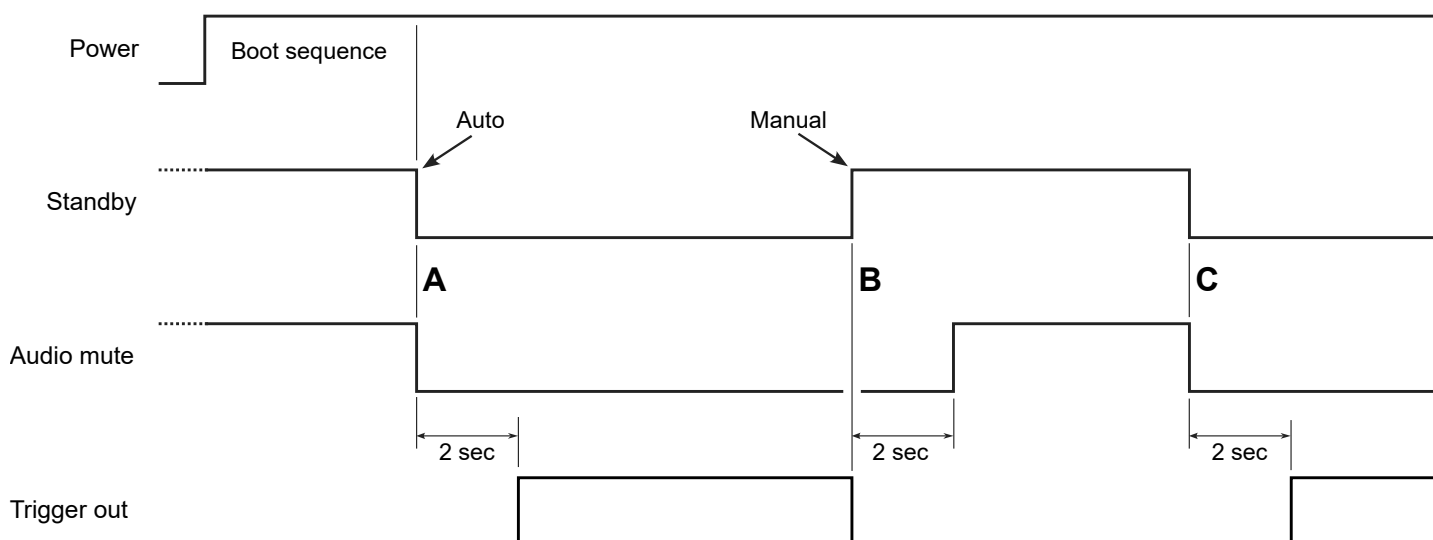
- Power is applied to the miniDSP Tide16.
- After the boot sequence, the Tide16 automatically takes itself out of standby (A) and starts processing audio.
- Two seconds later, the trigger output goes high.

From then on, standby is activated manually by the user with the remote control or front panel. When the user activates standby (B):

- The trigger output goes low immediately.
- Two seconds later, audio output is muted.

When the user deactivates standby (C):

- Audio output is muted immediately.
- Two seconds later, the trigger output goes high.



Obtaining support

If you are experiencing issues with your miniDSP Tide16 that are not resolved by this manual and by following the trouble-shooting steps above:

1. Check the [miniDSP community forum \(https://www.minidsp.com/community/\)](https://www.minidsp.com/community/) to see if this issue has already been raised and a solution provided.
2. Contact miniDSP via the support portal at [support.minidsp.com \(https://support.minidsp.com/support/home\)](https://support.minidsp.com/support/home) with:
 - a. A clear explanation of the symptoms you are seeing.
 - b. A description of troubleshooting performed and your results.
 - c. The firmware versions obtained from the Display Versions button in Device Console.
 - d. (Recommended) For quickest resolution of your issue, include the current program snapshot. This can be obtained from the [Device Console Settings](#) screen.

Federal Communications Commission (FCC) Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: 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 against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful 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.

Warning: Changes or modifications made to this device not expressly approved by

may void the FCC authorization to operate this device.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

RF exposure statement:

The transmitter must not be colocated or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a Minimum distance of 20cm between the radiator and any part of your body.