

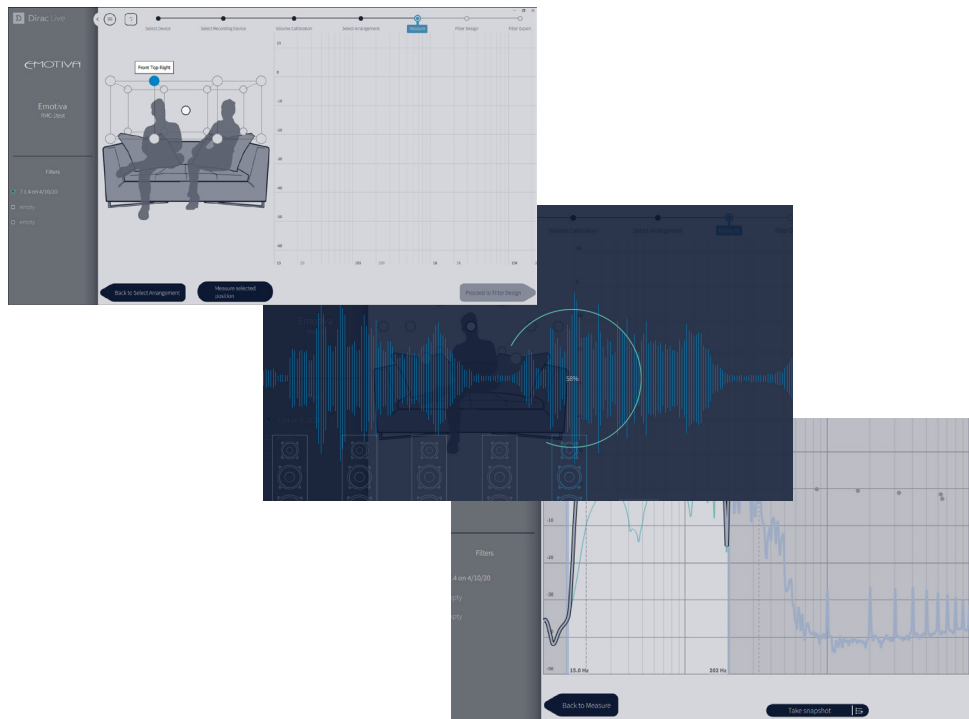
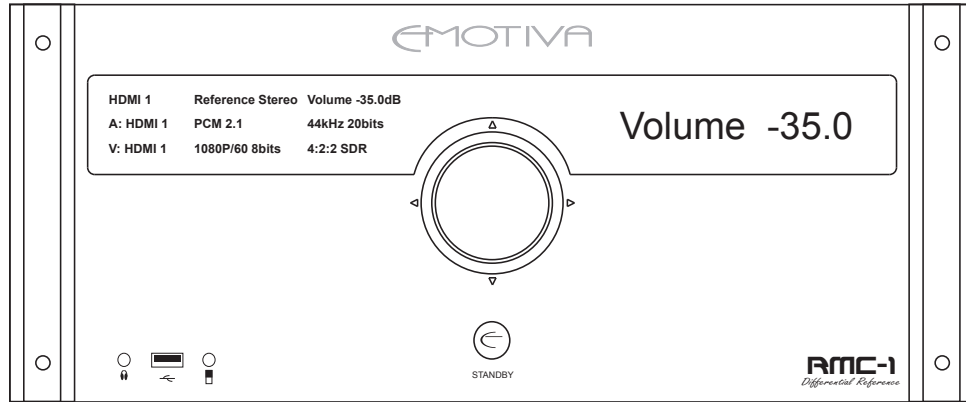
EMOTIVA®



Dirac Live For Emotiva Processors User Manual

RMC-1 RMC-1L XMC-2

Dirac Live for Emotiva Processors



Dirac Live for Emotiva Processors

We STRONGLY urge you to read this entire manual at least once before using the Dirac Live automatic room correction software included with your Emotiva processor.

It includes many important details that you will need to know in order to enable Dirac Live to work properly and deliver excellent results.

NOTE:

CURRENT EMOTIVA PROCESSORS, INCLUDING THE RMC-1, RMC-1L, AND XMC-2, USE THE CURRENT VERSION OF DIRAC LIVE.

THE VERSION OF THE DIRAC LIVE SOFTWARE WHICH WAS CUSTOMIZED TO WORK WITH OUR XMC-1 PROCESSOR WILL NOT WORK WITH OUR CURRENT PROCESSORS.

THE NEW VERSION OF THE DIRAC LIVE SOFTWARE, WHICH WORKS WITH OUR CURRENT PROCESSORS, WILL NOT WORK WITH OUR LEGACY XMC-1 PROCESSOR.

(If you have an XMC-1 you must download or purchase the correct version of Dirac Live LE for Emotiva or Dirac Live FULL for Emotiva that will work with your XMC-1.)

NOTE:

THE DIRAC LIVE SOFTWARE IS UPDATED PERIODICALLY.

When you download the Dirac Live software you will receive the latest version. Once it is installed, the software may automatically update itself, or it may instruct you to manually download and install updates.

Newer versions of the Dirac Live software may include additional features or controls, may enable the addition of optional new features or capabilities, and may include other changes that cause their user interface to differ slightly from the illustrations shown in this manual.

Automatic Room Correction

Audio recordings themselves, and modern audio playback and amplification equipment, both achieve very high levels of accuracy; the weakest links in a modern audio system are the speakers and the room. The limitations of speakers themselves, and the complex ways in which they interact with various characteristics of the listening room, can cause the way music sounds in your listening room or home theater to be quite different from what you expect, and from what the recording engineer intended. Simple variations in frequency response - as experienced at your listening position - can make the music you're listening to sound bright or dull, or change the tonal balance in more subtle ways, and errors in timing and phase can transform the sound stage from a precise recreation of the original recording venue to a blurry and jumbled mess.

In the early days of audio, you could use a test disc and a sound pressure level (SPL) meter to graph the frequency response of your audio system, then manually adjust the gain at various frequencies using some sort of equalizer to produce a relatively flat frequency response. While this process was usually carried out by experts who had the necessary equipment and expertise, the basic principle was really quite simple. Most modern pre/pros incorporate automatic room correction systems like Audyssey™, and our own EmoQ™, which will perform the entire process for you. If you prefer the manual approach, our high-end processors include powerful parametric equalization controls, and built-in programs to generate test tones. Together they give you far more accuracy and control than even the most experienced expert had at his or her disposal a few years ago. However, while performing frequency response corrections manually can be quite effective, it can also be somewhat difficult and time consuming.

Also, while correcting the frequency response of the audio signal at the listening position can often produce a marked improvement in sound quality, because of the complex ways in which speakers and rooms interact, simple frequency response correction may not be enough. Even if the measured frequency response is quite accurate, differences in the precise times at which different frequencies reach the listener can interfere with proper imaging - resulting in vocalists and instruments seeming to be spread out and blurred, or shifting location when different notes are played. Timing and phase errors can also cause transients to be rendered incorrectly, which may result in drumbeats and other transients sounding blurred *in time*, or other similar errors, which can make your music sound slow, or lacking in "liveliness".

Dirac Live® Automatic Room Correction

Dirac Live takes the correction process a step further than other room correction systems. Because Dirac Live uses mixed-phase filters, it is able to calculate filters that not only correct the frequency response, but also compensate for errors in time response. This allows Dirac Live to correct more of the differences between how your speakers perform in your room, and how ideal speakers, in an ideal room, would sound - and enables Dirac Live to correct both frequency response and transient response. In simplest terms, because Dirac Live is not limited to correcting only problems related to frequency response, it does a better job of making your room sound more like it theoretically should.

Dirac Live for Emotiva Processors

In addition to an extensive set of manual adjustment and calibration tools, our RMC-1, RMC-1L, and XMC-2 processors now include the latest version of Dirac Live automatic room correction. The latest version of Dirac Live now offers an improved user interface that is easier to use, full software compatibility with both current Apple and Microsoft Windows computers, and a consistent user interface across all processor makes and models.

Overview

The current version of Dirac Live, which works with our current processors, consists of three main components:

The Dirac Live filter engine is an integral part of the firmware in our RMC-1, RMC-1L, and XMC-2 processors. This is the part of the room correction system that actually applies the precision digital corrections to your music and movie sound tracks. The current version offers two independent Speaker Presets, each of which can store up to three Dirac Live room correction profiles, along with one manual EQ profile. Various menu options allow you to choose a default profile, associate particular profiles with specific inputs, or manually switch between profiles on the fly.

The part of Dirac Live that controls the test tones, takes the measurements, analyzes the results, and calculates the correction filters, is a software program that runs on your Apple or Microsoft Windows computer. The current version of this software is standardized between all current processor models that offer Dirac Live automatic room correction. Because of this, as updates and new features are added to the Dirac Live software, they will immediately become available to everyone who uses Dirac Live. (New versions of Dirac Live going forward will work with our RMC-1, RMC-1L, and XMC-2 processors. They will not work on our older XMC-1 processor - which uses an older version of the Dirac Live software.)

The third component of the automatic room correction system is the Emotiva Dirac Network Interface. This module is a small hardware unit, which contains its own independent processor and software, and facilitates communication between our processors and the Dirac Live software.

The package included with our processors includes a license for the Dirac Live software, the Emotiva Dirac Network Interface unit, and a high quality calibrated measurement microphone. It also includes a digitizer cable, which enables the microphone to connect directly to your computer, a desktop microphone stand, and a miniature Ethernet switch and cables which you may use to connect your processor and the Network Interface to your network.

Your processor, the Network Interface unit, and your computer, will only need to be connected to your network when you are actually taking measurements and calibrating your system. After calibration if performed the resulting filters are transferred to your processor, where they are stored internally, and may be selected whenever you wish to use them.

Your Listening Room

Even though Dirac Live is the most powerful automatic room correction system available today, and it will produce a dramatic improvement in your listening experience in virtually every room, you will still get the best results if you optimize your room and system configuration before you run Dirac Live. We will be releasing several instructional videos covering this subject in detail, but here are a few guidelines you can follow that will help you achieve the best results:

- In order to achieve a focused sound stage and proper imaging, it is very helpful if your room and seating arrangements are as symmetrical as possible - from right to left. Ideally, your front speakers should be the same distance from the wall behind them, the same distance from their respective side walls, and at the same height. The ideal listening position will be located along a line drawn from the center of the front of the listening room to the center of the rear, and about one third to one half of the way back. Likewise, ideally the surrounds and rear surrounds will be located symmetrically, and your center will actually be located in the center of the front wall. While your particular listening room may limit your options, the closer you can get to this goal the better.
- Ideally, your room itself should also be as symmetrical as possible acoustically. For example, if you have a large window on your left wall, and a large tapestry on the right wall, you should consider adding heavy curtains over the window.
- Listening positions directly against the rear wall, or in corners, should be avoided
- Your speakers should be positioned and angled so they produce the best imaging and the smoothest sound before you run Dirac Live. (By avoiding obvious major problems, you will enable Dirac Live to better focus on the smaller issues, and will end up with a more precise room correction.)
- It is especially important that your subwoofer (or subwoofers) be properly positioned before using any type of room correction. While Dirac Live will do a great job of evening out response issues caused by room effects, it may not be possible for even the best room correction to entirely eliminate strong nulls or room modes, and attempting to do so may cause other issues. (Some locations, in some rooms, are just plain bad spots to locate a sub, and no amount of room correction can correct them entirely.)

Measurement and Microphone Positions

Note: Dirac Live relies on having multiple sets of measurements, taken at different physical locations, to produce the most accurate room corrections. Dirac Live offers several different room measurement options, optimized for different seating arrangements, each of which includes a recommended number of measurement locations. While you can calculate a set of correction filters after taking fewer measurements, and may choose to do so to save time, for best results we recommend that you allow Dirac Live to take the full set of measurements it suggests.

The Dirac accessories that you received with your Emotiva processor include a convenient tabletop microphone stand which will allow you to position the microphone in many locations. However, you may find it easier to position the microphone accurately at all of the recommended locations if you purchase your own fully adjustable microphone stand.

If it isn't convenient to take measurements at the positions shown by the Dirac Live software, do your best to take the full set of measurements in the relative *pattern* of locations shown, even if the individual locations must be closer together. It is also critical that, when taking the measurement at the location shown as the "center position" or "sweet spot", the microphone be positioned accurately where your head is normally located while listening critically.

Note: The calibrated microphone provided with your processor is intended to be used vertically - with the point facing vertically towards the ceiling - regardless of how many speakers you have. The frequency response of the microphone has been calibrated to be correct in this orientation. DO NOT position the microphone facing the front speakers for two channel systems, and DO NOT try to reposition the microphone to face each individual speaker as it is measured.

Target Curves

Dirac Live works by taking a series of measurements, analyzing the results to calculate the current response of your room and speakers, comparing those results to a selected Target Curve, and calculating a set of Correction Filters. When applied to the music you're playing the Correction Filters adjust the response of your system to match the Target Curve. If you wish to adjust the way your room and system sound with a specific set of Correction Filters, you can do so by editing the Target Curve.

The measured frequency response of a given room and set of speakers will vary depending on which measurement method you use. Because of this, the default Target Curve used by Dirac Live is not flat; instead, it has been carefully chosen to produce a perceived neutral frequency response in a typical listening room with typical speakers. If you prefer a different sound signature, we encourage you to edit the Target Curve to suit your personal preferences.

It's your system... so make it sound the way you like!

Installing The Dirac Live Software

Preparing To Run Dirac Live

Along with your Emotiva processor you will receive the following:

- A precision calibrated microphone.
- A USB digitizer cable - for connecting the microphone to your computer.
- The Emotiva Dirac Network Interface - which connects to your network to facilitate the network connection between the Dirac Live software and your processor.
- A small 5-port Ethernet switch and some Ethernet cables.
- (Depending on how your network is configured you may need to purchase one or more additional low cost Ethernet cables of various lengths.)
- AC adapters for the Network Interface and the Ethernet switch.

Soon after receiving your unit you will receive an e-mail that includes instructions about where to activate your Dirac Live user account and download the latest version of the Dirac Live software.

Here are the steps required to use Dirac Live:

- UPDATE THE FIRMWARE ON YOUR PROCESSOR TO THE CURRENT VERSION.
- Create your Dirac User Account.
- Download the microphone calibration file onto your computer and place it where you will be able to find it.
- Download the software and install it on your computer.
- Connect your processor, the Network Interface box, and your computer, to your network.
- Connect the microphone to your computer via the provided USB digitizer cable.
- Run the software.
- Follow the onscreen directions in the software, take your measurements, and download the filter or filters you create to you processor.
- (At this point, if you prefer, you may disconnect your processor, the Network Interface box, and your computer, from your network.)
- Set up the configuration options in your processor to instruct it which Dirac Live filters to use with which Inputs.

Note: When you Enable Dirac Live in your processor's Speaker Preset Menu all other processor controls are locked out until you uncheck the box to indicate that you are finished performing your Dirac Live calibration.

Connecting Everything To Your Network

Connecting Everything To Your Network

There are a variety of different ways in which the necessary components can be connected to each other and your network. In this manual we're going to show you the simplest ways in which this can be accomplished. These are the ways we recommend and which we know will work for most of our customers.

Those of you who are familiar with network architecture will realize that there are many other network connection options which will also work - but many of which will require extra configuration settings on your other network equipment. Note that the RMC-1, RMC-1L, and XMC-2 processors do not have internal WiFi adapters and so require a wired Ethernet connection or equivalent to your network.

The basic requirement is that your processor, your computer, and the Emotiva Dirac Network Interface box, must all be connected to the same network segment, which must also have access to the Internet. A significant amount of data is transferred across your network between your computer, the Network Interface box, and your processor, so we recommend a high speed network connection with relatively low latency. The Internet connection is only used to validate your Dirac Live license each time the software is run.

The following page shows three different ways in which you can connect your computer, processor, and the Emotiva Dirac Network Interface box. The first - fully wired - connection will work consistently for most users, and so is the recommended option.

The second option, with the processor and Network Interface directly wired, and the computer connected via WiFi, will work for most users who have a fast stable WiFi connection. If you have multiple routers or access points you must ensure that the computer and other components are connected to the same one. The third option is equivalent to the second, and will allow you to avoid using the separate Ethernet switch if you have a cable modem that is conveniently located and has multiple Ethernet ports.

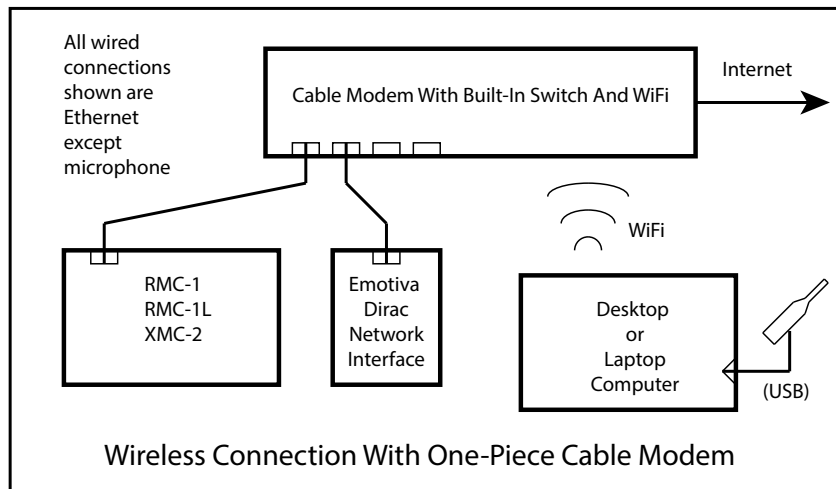
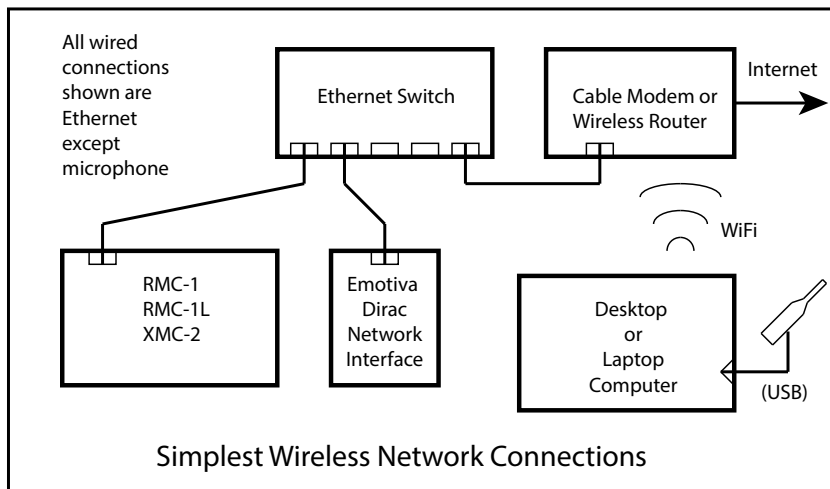
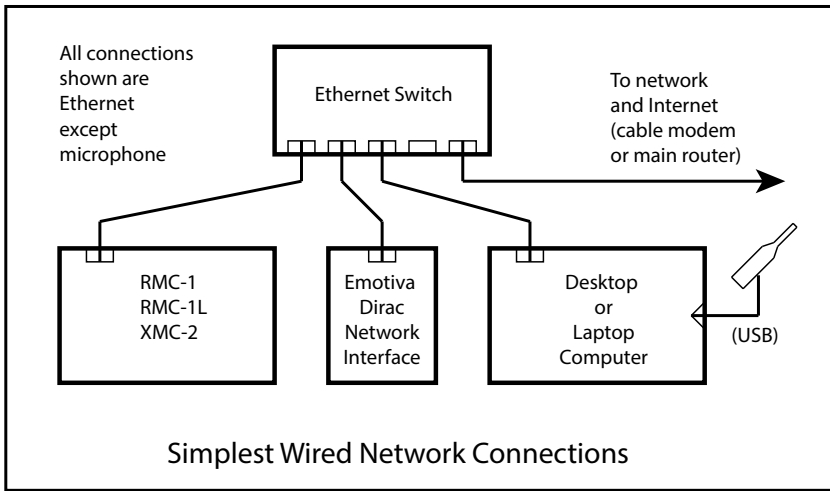
Note: The Network Interface box may be located at a different location from your computer and processor - as long as it resides on the same logical network segment. However, if you have any doubts about how your network is logically arranged, the easiest way to ensure that this is true is to connect the computer, processor, and Network Interface box to the same switch, as shown in the first example.

Note: We STRONGLY recommend that the Network Interface box be shut down after each calibration session. After doing so, the Network Interface box must be rebooted by disconnecting, then reconnecting, its AC power adapter. The easiest way to accomplish this is to shut down and then unplug the Network Interface box when you finish a calibration session, then plug it back in when preparing to start the next calibration session. This will be much easier if you locate the Network Interface box in an accessible location.

Note: The RMC-1, RMC-1L, and XMC-2 must be connected to your network via Ethernet cable because they do not have built-in Ethernet WiFi capabilities. There are a variety of third-party wireless adapters and access devices which can be used to connect the Ethernet port on your processor to your network, many of which will work. (But, because they vary considerably, and can be complex to configure, we cannot recommend or support any particular one.)

Connecting Everything To Your Network

Suggested network connection options:



Installing The Dirac Live Software

Installing The Dirac Live Software On Your Computer

The Dirac Live software which performs all of the measurements, calculates the correction filters, and downloads the correction filters to your Emotiva processor, can be installed on any reasonably current Microsoft Windows or Apple computer.

Note: The Dirac Live software is an actual Microsoft Windows or Apple MacOS program and must be run on a fully capable desktop or laptop computer. While it can be run on computers which use a touch screen rather than a keyboard, it CANNOT be run on tablets or smart phones which run a limited operating system, or which are only capable of running a specific subset of specialized "Apps". For example, it will NOT run on an Android tablet, or an iPhone. You may refer to the Dirac website, or to www.emotiva.com, for a list of supported hardware.

Activating Your Dirac Live Software License

Your Dirac Live software license is linked to the unique hardware identity of your processor.

If you received your Dirac Live software license separately from your processor, before downloading your Dirac Live software and using it for the first time you must visit the web page link included in your welcome letter (and on the product page) and follow the instructions to enter some basic information about your processor to activate your Dirac Live product license.

If you received your Dirac Live software at the same time as your processor then the license may be preactivated. If so then you may skip this step.

Downloading And Installing The Dirac Live Software

In order to install the latest version of the Dirac Live software, simply follow the provided download link, and install the program on your computer as you would any other software program.

Note: Depending on the other software and settings on your computer, you may be asked whether to allow the Dirac Live software to make changes to your computer, or asked if your security software should allow it to connect to or send data to your network or the Internet. YOU MUST GIVE THE DIRAC LIVE SOFTWARE FULL PERMISSION TO MAKE CHANGES TO YOUR COMPUTER AND TO ACCESS YOUR NETWORK AND THE INTERNET. IF YOU FAIL TO DO SO THEN THE DIRAC LIVE SOFTWARE WILL NOT BE ABLE TO FUNCTION PROPERLY.

The first time you run the Dirac Live software you will be asked to enter the User Name and Password you created when you activated your license.

Note: The User Name and Password are CASE SENSITIVE and must be entered exactly.

Preparing To Run Dirac Live

Downloading The Microphone Calibration File

Every high quality measurement microphone includes a calibration file which is used by the measurement software to correct for variations between individual microphones. When you run the Dirac Live software, and select which microphone to use, you will be asked to select the calibration file associated with it.

Your activation e-mail will include a link where you can download the calibration file for the calibrated microphone we provide. We suggest that you download this file and save it in a location on your computer where you will be able to find it easily. On Microsoft Windows computers you may simply save this file to the Windows Desktop.

If you choose to purchase a different calibrated microphone, it will include its own calibration file, so be sure to save or copy that file to a location where you will be able to locate it easily.

Preparing To Run Dirac Live

Connecting Everything Together

Before running the Dirac Live software to calibrate your system you must ensure that everything is connected to your network and is operating properly. Refer to the section entitled Connecting Everything To Your Network for details.

- Your processor should be connected to your network and turned on.
(We suggest that you select an unused or inactive input.)
- Your computer should be connected to your network and turned on.
(We assume you have already downloaded and installed the Dirac Live software.)
- Your microphone should be plugged into your computer via the included USB digitizer cable.
- The Emotiva Dirac Network Interface box must be connected to your network and running.

Note: The Emotiva Dirac Network Interface box is actually a fully functional Raspberry Pi computer, running its own custom software, which facilitates communications between the Dirac Live software on your computer and your processor. EACH TIME THE NETWORK INTERFACE BOX IS POWERED ON IT WILL AUTOMATICALLY GO THROUGH A BOOT-UP SEQUENCE, WHICH WILL TAKE ABOUT TWO MINUTES, BEFORE IT IS READY TO OPERATE. WHEN YOU ARE DONE WITH A CALIBRATION SESSION YOU WILL BE ASKED TO SHUT DOWN THE NETWORK INTERFACE AND UNPLUG IT FROM ITS AC POWER.

If you fail to unplug the Network Interface box after issuing it the Shutdown command, or if you simply fail to shut it down, and there is an AC power fluctuation, the Network Interface box may end up in a state where it is powered on but NOT running. IF THIS HAPPENS, THE NETWORK INTERFACE BOX WILL NOT WORK, AND YOU WILL BE UNABLE TO PERFORM A DIRAC LIVE CALIBRATION, UNTIL YOU RESTART AND REBOOT THE NETWORK INTERFACE BOX.

To Reboot the Network Interface box, simply remove AC power from it by unplugging the AC adapter from the Network Interface box, leave it disconnected for about thirty seconds, then plug it back in. It will then take a minute or two for the Network Interface box to reboot itself and be ready for normal operation. (You will observe a lot of flickering of the status LEDs during the boot-up process.)

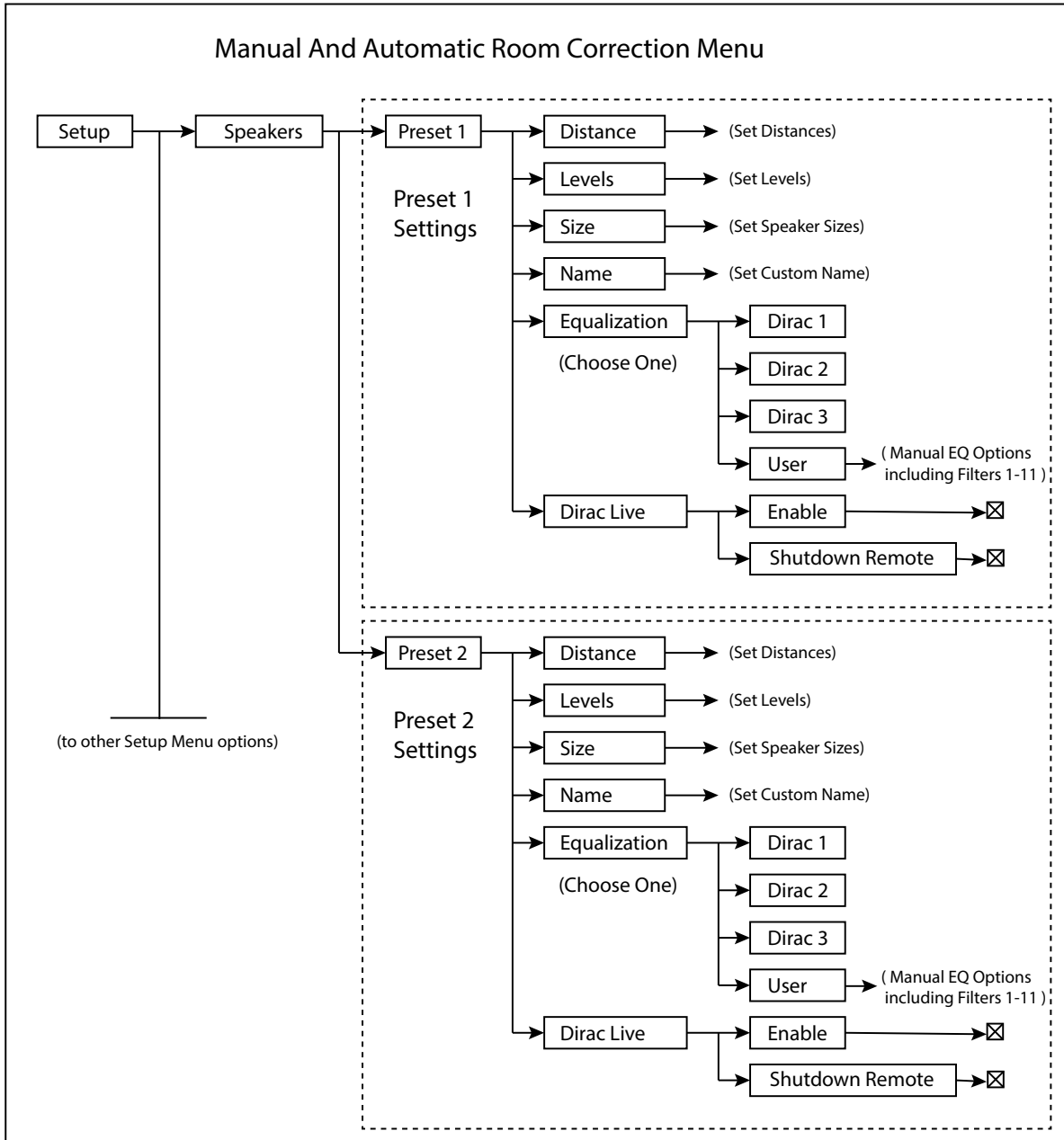
Using Speaker Presets And Dirac Filters

Using The Speaker Presets On The RMC-1, RMC-L, and XMC-2

PLEASE READ THIS SECTION CAREFULLY AND MAKE SURE YOU UNDERSTAND IT.

Failure to do so may cause you to end up with unexpected and unsatisfactory results.

The following illustration shows the Speaker Presets section of the Setup Menu on our current processors. Note that this section of the menu has been changed to include three Dirac Filter presets for EACH of the main speaker presets.



Using Speaker Presets And Dirac Filters

Your processor includes two separate Speaker Presets which are independent and can be configured differently.

For each Speaker Preset, you can configure the following:

- The Name of the preset itself (the default names are Preset 1 and Preset 2).
- Which speakers are active in that Speaker Preset and their sizes. (Speakers whose Size is set to None will NOT be active when that Speaker Preset is selected.)
- The Distance settings for each speaker.
- The Trim Levels for each set of speakers.

Note: Because the Size settings for each speaker include the option of None you can configure the two Speaker Presets to recognize entirely different speaker layouts and configurations.

For example... You could configure Preset 1 with a full 7.1.4 Dolby Atmos setup, with a subwoofer, for watching movies, and you could configure Preset 2 with only your Front Speakers, configured as Large, for listening to stereo music. You could then associate Preset 1 with your Blu-Ray player and Preset 2 with your stereo CD player, or switch between them using your remote control.

HERE ARE THE IMPORTANT DETAILS TO REMEMBER...

THE TWO SPEAKER PRESETS ARE ENTIRELY SEPARATE.

Each Speaker Preset has one Manual EQ slot and three Dirac Correction Filter slots. You will configure which of these four slots is the default for each Speaker Preset. You can then associate either Speaker Preset with a particular input or manually switch between the two Speaker Presets using the Menu or the remote control.

When you select one of the Speaker Presets in the Setup Menu, and enable Dirac Live from THAT Speaker Preset, Dirac Live will read the current system configuration from the configuration you currently have set for THAT Speaker Preset, and it will use THAT configuration for taking measurements, and for creating Correction Filters. Then, when you create a new set of Correction Filters, you will have the opportunity to save your new Correction Filters ONLY to THAT Speaker Preset.

In order to create Dirac Correction Filters in the other Speaker Preset you must exit your current session, Disable Dirac Live on the processor, exit the current Speaker Preset, switch to the other Speaker Preset, then re-Enable Dirac Live from the other Speaker Preset.

WHEN YOU CHOOSE TO USE A DIRAC FILTER SET IN ONE OF THE SPEAKER PRESETS IT IS VERY IMPORTANT THAT THE CONFIGURATION YOU HAVE SET IN THE SPEAKER PRESET MATCH THE CONFIGURATION THAT WAS USED TO CREATE THAT DIRAC CORRECTION FILTER SET.

Failure to do so may result in some speaker sets failing to play entirely or playing with incorrect correction filters applied to them. You may change speakers from Small to Large, or from Large to Small, but you should not add or remove speakers from the configuration.

Because of this we STRONGLY suggest that, when you name your Dirac Correction Filter sets, you use a descriptive name that includes this information.

You might, for example, use names like: "FilterSet1-714" and "FilterSet2b-200".

Performing A Dirac Live Room Calibration

Performing A Dirac Live Room Calibration

Preparations

At this point you have finished all of the preparations necessary to perform a Dirac Live automatic room calibration:

- You've connected the RMC-1, RMC-1L, or XMC-2 to your network.
- You've connected the Emotiva Dirac Network Interface box to your network (you've turned it on and, if necessary, waited for it to boot up).
- You've downloaded the Dirac Live software and installed it on your computer.
- You've downloaded the microphone calibration file that goes with your measurement microphone onto the computer somewhere you can find it when asked to do so.
- You've connected the microphone to your computer, connected the computer to your network, and started up the computer.
- You've temporarily turned off any noisy air conditioners, put the children and pets safely out of the way, and turned off anything else that makes a lot of noise.

Starting The Dirac Live Room Calibration Process On Your Processor

On the RMC-1, RMC-1L, or XMC-2 processor:

- Select **Menu | Setup | Speakers | Preset 1** (or Preset 2) to enter one of the Speaker Presets.
- In the Speaker Preset check the box to **Enable Dirac**.

Note: If the Dirac Enable box displays UNAVAILABLE it means that the Emotiva Dirac Network Interface box is not responding. This could be because the Network Interface box is not connected to your network, has been shut down and has not since been restarted, or has stopped running and will need to be rebooted. It could also indicate that there is some sort of problem with your network or that your processor is not properly connected to your network .

Do not proceed until the Network Interface can be enabled.

Note: The Dirac Live calibration software will now read the speaker configuration from THIS SPEAKER PRESET and save the correction filters it creates to THIS SPEAKER PRESET.

All future operations will now be controlled by the Dirac Live software on your computer.

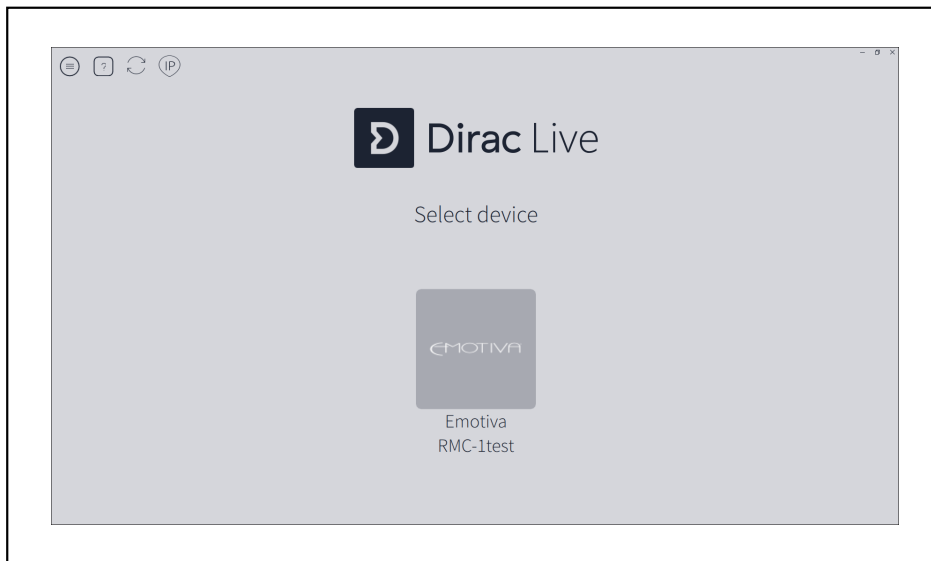
Note: WHEN YOU ENABLE DIRAC LIVE IN YOUR PROCESSOR'S SPEAKER PRESET MENU ALL OTHER PROCESSOR CONTROLS WILL BE LOCKED OUT UNTIL YOU UNCHECK THE BOX TO INDICATE THAT YOU HAVE FINISHED PERFORMING YOUR CURRENT DIRAC CALIBRATION PROCEDURE.

Performing A Dirac Live Room Calibration

Starting The Dirac Live Software On Your Computer

At this point we have finished all of the preparations necessary to perform a Dirac Live automatic room calibration. Click on the appropriate icon or select the program from the Start Menu on your computer to run The Dirac Live software program.

When you start the Dirac Live software on your computer you will be asked to select the processor you wish to calibrate. If you have assigned a Friendly Name to your processor it will be displayed here. You will only be shown the processors that are currently attached to your network and have the Enable Dirac box enabled.



Performing A Dirac Live Room Calibration

Select Recording Device

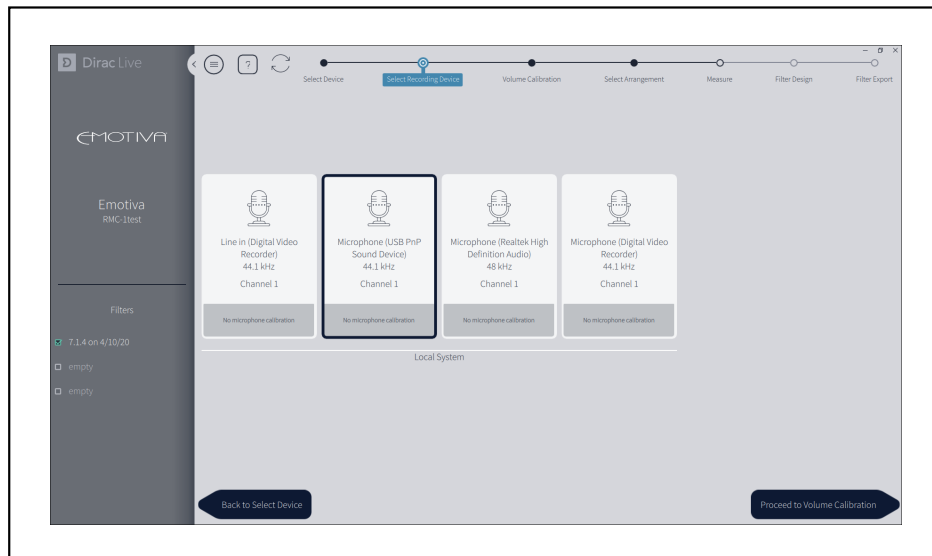
On the next screen you will be prompted to select the calibrated measurement microphone you wish to use. The calibrated microphone and digitizer set provided by Emotiva will identify itself as “Microphone (USB PnP Sound Device)”. If you have purchased a different third-party calibrated microphone then you should select it instead.

After selecting the correct microphone by highlighting it, click on the shaded button directly underneath it to select the calibration file that goes with it. (In a previous step we had you copy the calibration file that goes with the microphone we provide to a convenient location.)

Note: Always be sure to use the specific calibration file that has been provided with the microphone you are using. All of the current batch of calibrated measurement microphones provided by Emotiva use the same calibration file - and each microphone is individually tested to ensure that they fit the calibration curve it contains quite closely. With some other brands of microphone a separate calibration file may be provided with each individual microphone. In either case, using the wrong calibration file, or simply not using one at all, will result in inaccurate results.

Note: The internal microphones included on many laptop computers are often extremely inaccurate and are NOT appropriate for taking system calibration measurements.

After selecting the proper microphone calibration file click the button labelled **Proceed To Volume Calibration**.

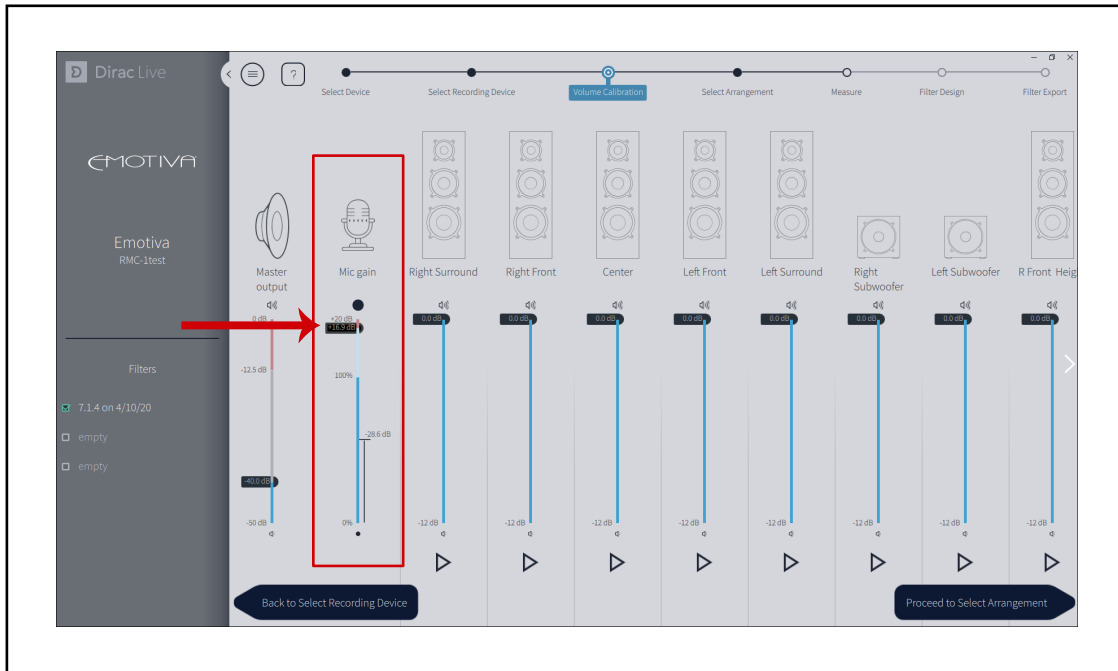


Performing A Dirac Live Room Calibration

Volume Calibration - Microphone Gain

On the next screen you will set the Microphone Gain and Master Output levels.

The object of this setting is to set the Microphone Gain as high as possible while being careful to avoid allowing the background noise in the room to interfere with the accuracy of our measurements. So, while being as quiet as possible, raise the Mic Gain slider (the small black tab) up until the meter bar to the right of the blue line reads close to but just below -30 dB. If the slider reaches the top before the meter reads -30 dB then simply leave it set at the top.



Performing A Dirac Live Room Calibration

Volume Calibration - Master Output Level

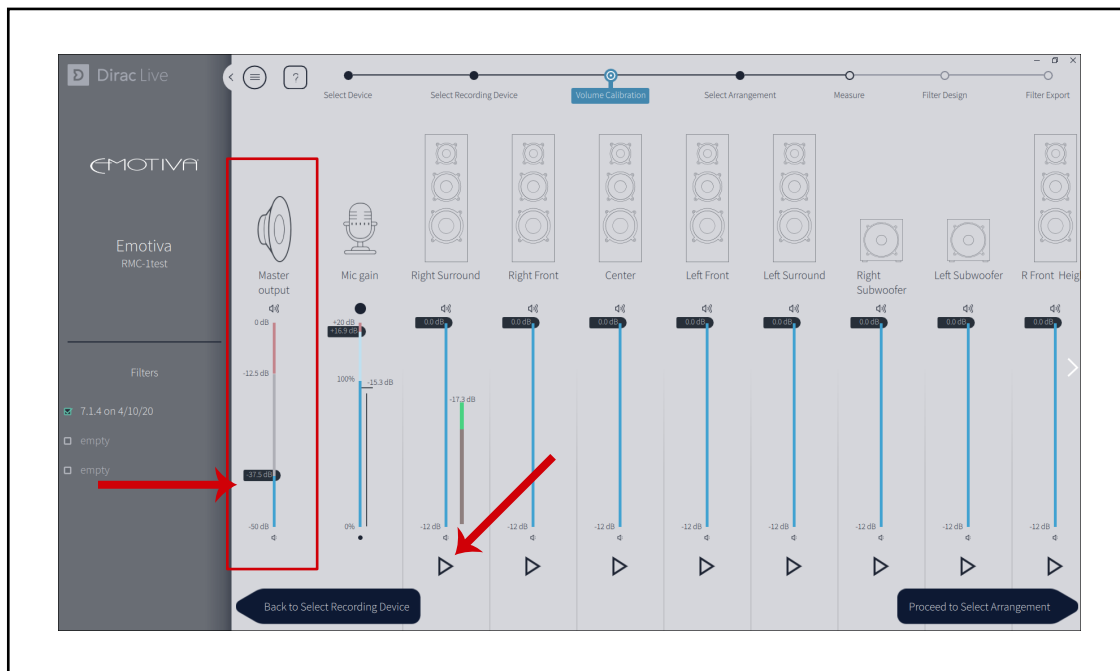
Now we are going to set the overall Master Output level for our test tones.

In order to do this we are going to play a test tone through one of our speakers and adjust the Master Output level, which is the small black tab on the Master Output bar. Start by selecting the speaker that you believe has the lowest efficiency or generally plays the least loudly. This isn't critical so, if you're unsure, simply select the Right Surround as shown in the illustration.

Note: In the next step we're going to be playing test tones. The test tone used for full range speakers is a type of hiss called pink noise while a sweep tone is used for subwoofers. These tones may be somewhat annoying but should not be loud enough to damage your speakers. If the test tones seem EXCEPTIONALLY loud, or you hear no test tones, stop the test, and call Emotiva Technical Support.

Start by sliding the Master Output level tab all the way down. Now click on the small triangle under the speaker you've chosen (it looks like a "Play" button) observe the level indicated by the meter bar next to the speaker you've chosen. DO NOT ADJUST THE BLACK TAB THAT GOES WITH THE SPEAKER THAT YOU HAVE CHOSEN. Gradually move the Master Output level tab up. As you do so the sound will get louder and the meter bar next to the speaker will show a higher level. Stop raising the level when the meter bar shows an indication about halfway up the green zone - at about -15 dB. You may then press the button under the speaker (which now looks like a square "Stop" button) to stop the test tone.

Note: While the test tone is playing a small line will start filling in a circle around the button... and the test tone will shut off when the line reaches the end. Try to make your adjustment before the test tone stops playing. If you need more time you may simply press the button again to repeat the test tone.



Performing A Dirac Live Room Calibration

Volume Calibration - Individual Channel Levels

Now we are going to set the levels for each individual channel.

Now, leaving the individual channel slider tab set to 0 dB for the first channel we chose, we are going to set the channel levels for all the remaining channels.

For EACH remaining channel:

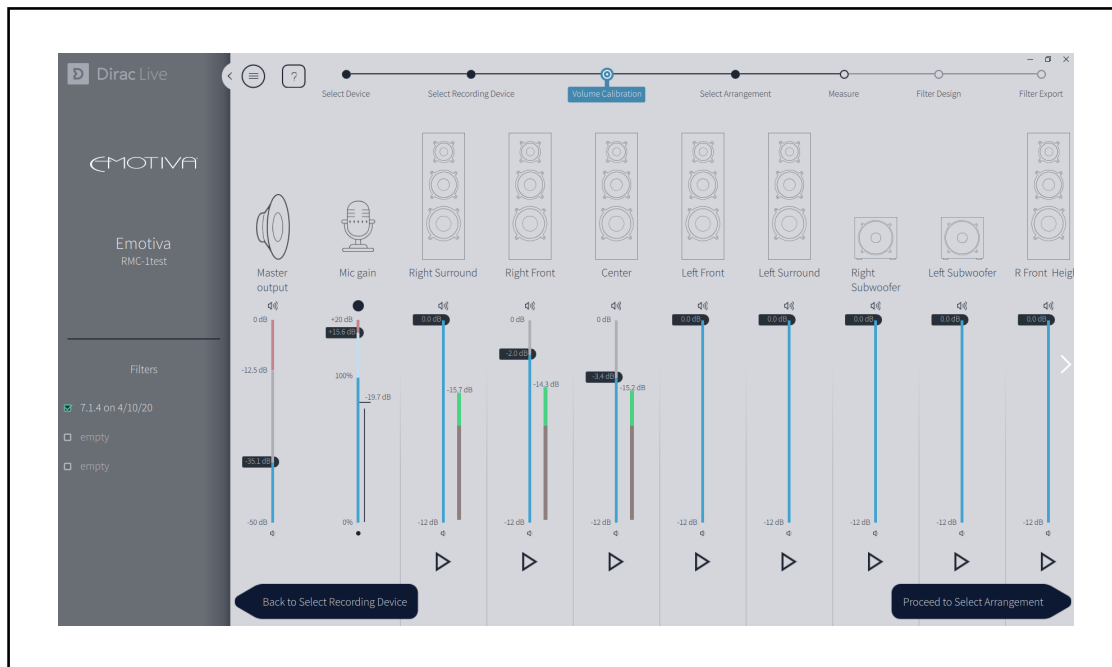
- Click the triangle Play button below the channel setting bar to play the test tone.
- Move the setting tab for that channel down to bring the level shown on the meter bar into the middle of the green zone.
- Click the Stop button to stop the test tone.

Note: Make sure you set the level for all of the speakers you have configured. If the channel sliders for some of your speakers scroll off the right edge of the screen you can access them by pressing the > symbol at the right edge of the screen.

Note: It is NOT critical that all channels are set to the same exact level - as long as all are set near the middle of the green range. However, if you find that several channels are too low, even when set to 0 dB, you may go back and raise the Master Output level. If you do so you should then recheck the channels you have previously adjusted.

Note: The test tone used to set the level on full range speakers is modified pink noise, and the test tone used to set the level on subwoofer channels is a sweep tone.

After completing the Volume Calibration click the button labelled **Proceed To Select Arrangement**.

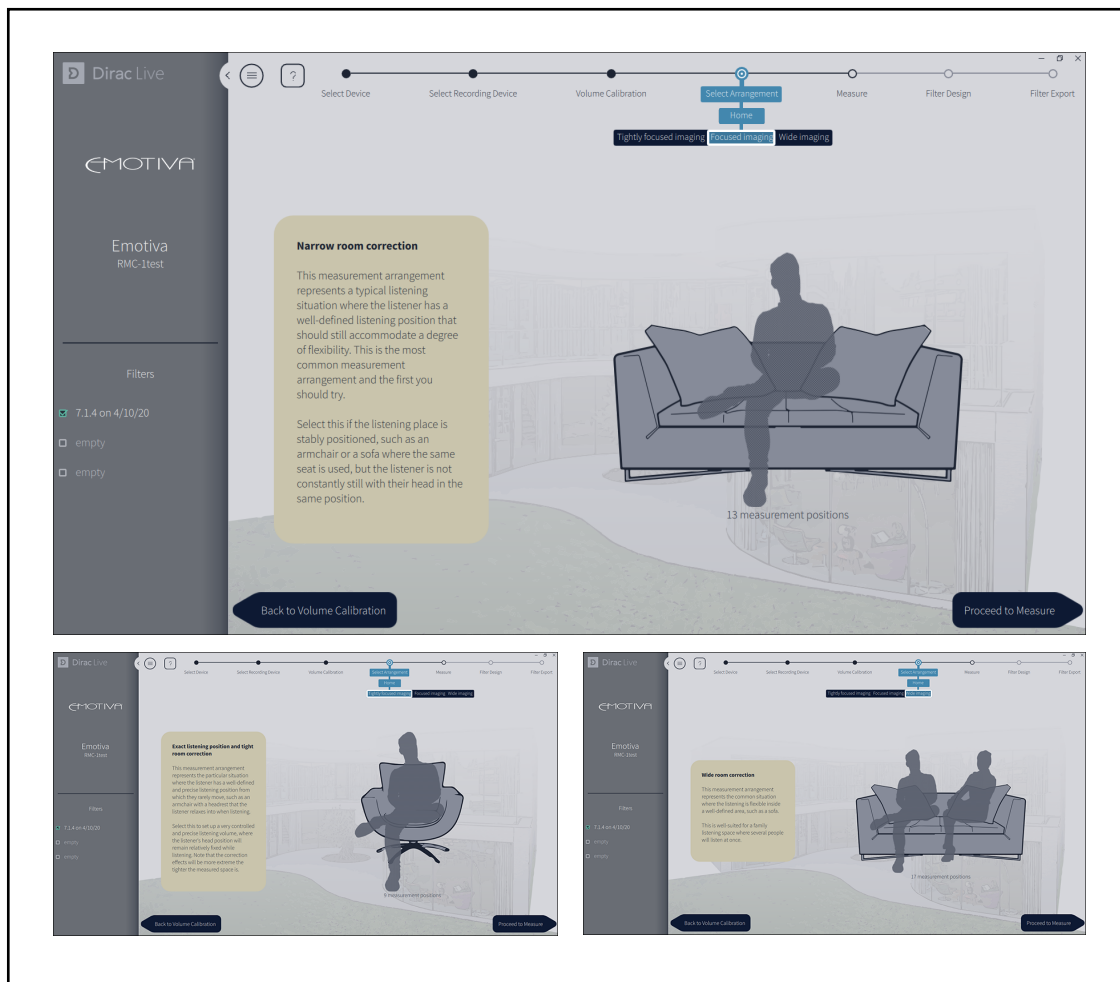


Performing A Dirac Live Room Calibration

Select Arrangement

The Dirac Live calibration software offers three choices between Correction Filters that are more precisely optimized for a single listening position and Correction Filters that are optimized for a somewhat wider range of listening positions. A more focused choice will deliver the most accurate listening experience at the central seating position; a wider focus offers a slightly less highly optimized correction that still works very well over a wider range of seating positions.

Select the Seating Arrangement that best describes how you normally listen to music or movies then click the button labelled **Proceed To Measure**.

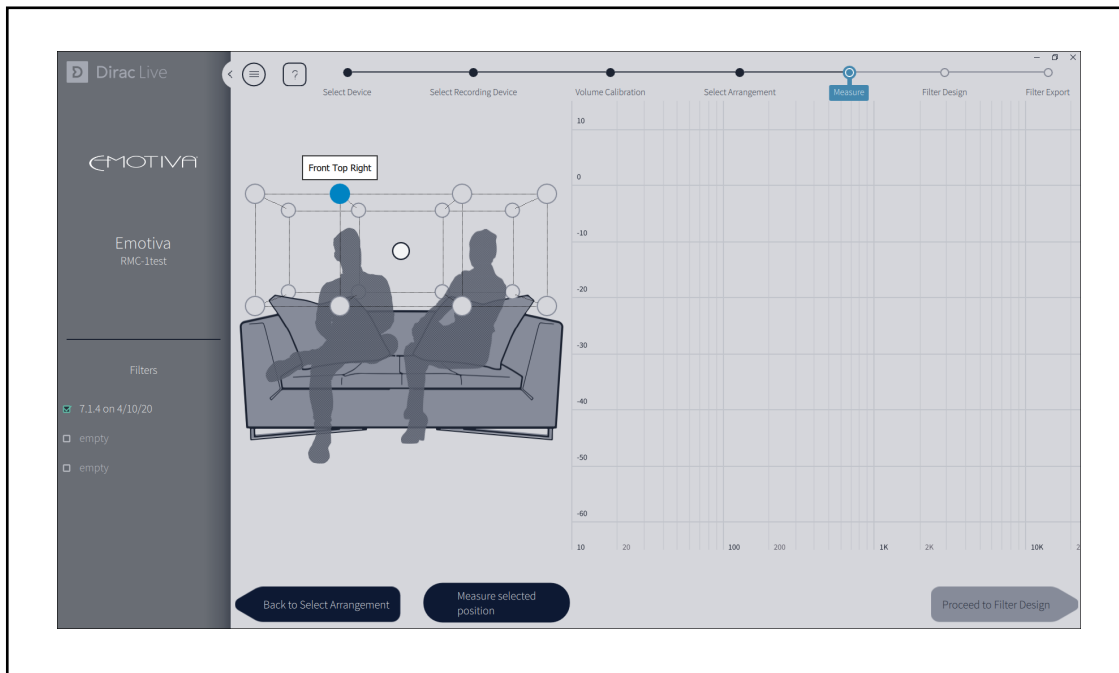


Performing A Dirac Live Room Calibration

Measure

The Dirac Live software will now play several test tones through our processor, amplifier, and speakers, and measure the response of your speakers and room using your calibrated microphone. For the central “sweet spot” measurement, which is the most critical, you should be sure that the microphone is located exactly at your preferred listening position.

The Dirac Live software will instruct you to make a different number of measurements depending on which Seating Arrangement you have chosen. While you can choose to make fewer measurements you will get the best result if you complete the entire set. In any case you **MUST** take the central measurement at your preferred listening location.



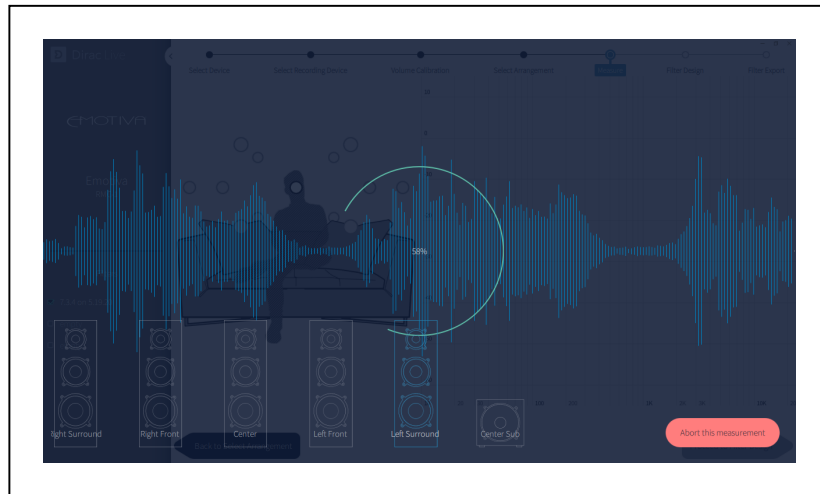
Note: In order to make accurate measurements the calibrated microphone must have an unobstructed path between itself and each of your speakers. When taking measurements, avoid standing where you will block the microphone, and avoid placing the microphone where it will be blocked by furniture.

We suggest crouching or squatting down behind a centrally located couch or chair when actually taking measurements. This minimizes the likelihood that your body will interfere with the measurements and assures that any effect your presence has on the measurements will be symmetrical between the left and right.

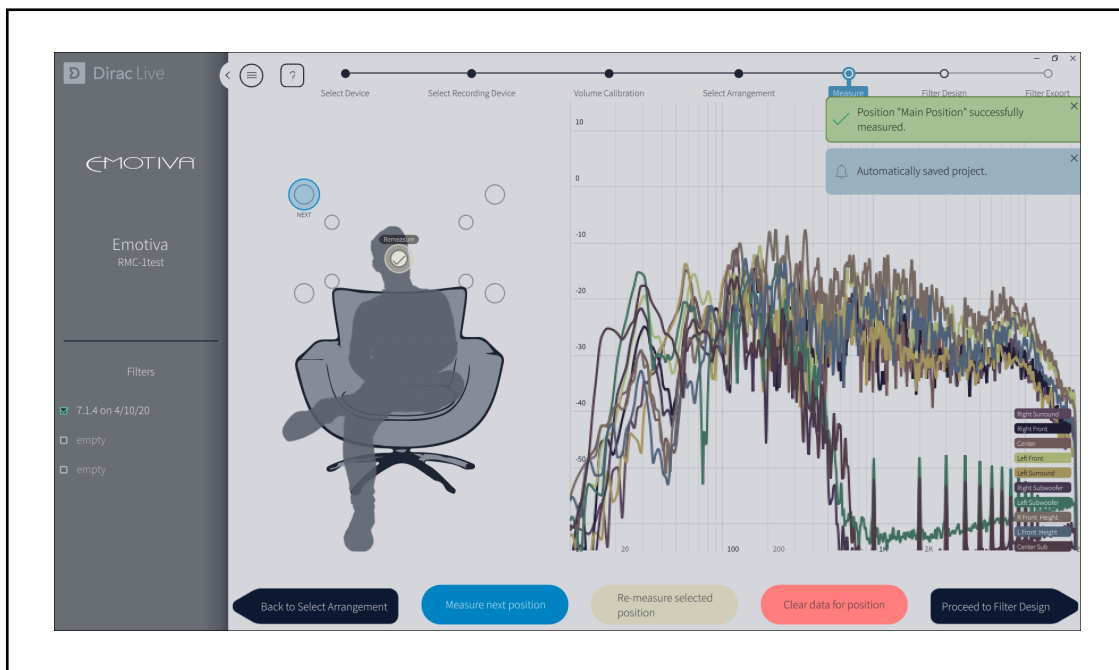
Note: The microphone MUST NOT move while a single measurement is in progress. Make sure that the microphone is seated securely before pressing the Measure button.

Performing A Dirac Live Room Calibration

For each measurement position Dirac Live will play a series of test tones through each of your speakers in turn. Avoid moving around or making any noise while the test tones are playing. You will see a screen like the one below while the test tones are playing.



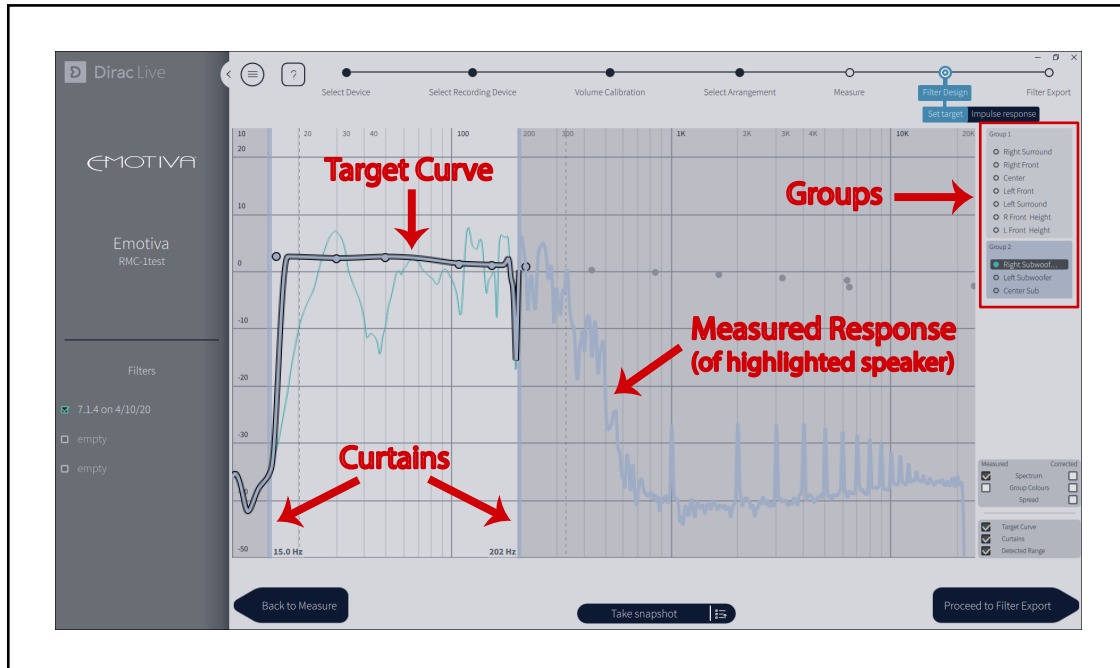
After each set of test tones is completed you will see the screen below, where you will be shown the results of the measurement that has just been completed, and you will have the opportunity to perform more measurements, clear or repeat previous measurements, or **Proceed To Filter Design** when the measurements are completed. We suggest that you perform the full recommended set of measurements before proceeding.



Performing A Dirac Live Room Calibration

Filter Design

The following illustration shows the important parts of the Filter Design screen.



Dirac Live room correction works by using a series of test tones to measure the frequency response of your system and room, analyzing the results, comparing them to a desired frequency response Target Curve, and calculating a set of Correction Filters that will adjust the frequency response of your system and room so that it matches the Target Curve. (Dirac Live also performs calculations that enable it to correct phase anomalies as well as variations in frequency response.)

The **Measured Response** represents the combined frequency response of your system and room that Dirac Live has determined from its measurements. Depending on how you have the program configured you may see a single line representing the combined frequency response of all of your channels or a separate line for each channel.

The **Target Curve** represents the frequency response which Dirac Live will attempt to achieve. After analyzing your system Dirac Live will suggest a Target Curve. You may then adjust this Target Curve to suit your personal preference by dragging the small circles located along the curve up or down.

Note: Most people agree that, in a typical listening room, a measured flat frequency response actually sounds somewhat bright, and that a curve that slopes slightly downwards towards the high frequencies actually sounds more natural.

The **Curtains** represent the upper and lower limits of the range of frequencies which Dirac Live will attempt to correct. The range of frequencies that lies in the bright area “between the curtains” will be corrected. Frequencies outside that range will remain uncorrected.

Performing A Dirac Live Room Calibration

Note: Frequencies that lie outside of the Curtains will NOT be filtered out or otherwise altered. Dirac Live will simply NOT attempt to adjust them.

Note: For various technical reasons it is impossible to adjust the frequency response curve to bend sharply or exhibit a very sharp step in response. Because of this, under some conditions, the Target Curve may diverge from the response you have configured in order to smoothly meet the ends of the uncorrected curve outside the Curtains.

Dirac Live will also display a pair of vertical dotted lines which indicate what it calls the **Detected Range**. This is the range of frequencies which Dirac Live considers to be the practical usable limits of the frequency range of each of your speakers.

Groups. By default Dirac Live will assign your speakers to several different Groups, including:

- Mains - for your Front Left and Front Right speakers.
- Center - for your Center Channel speaker.
- Surrounds - for your Surrounds and Rear Surrounds.
- Heights - for your Height Speakers.
- Subs - for your Subwoofer or Subwoofers.
- Wides - for your Front Wides and Rear Wides.

Dirac Live 2 will then apply a unique set of Curtains and Target Curves to each of these Groups. The Groups assigned by Dirac Live will work well for most users, but you may create new Groups, move speakers between Groups, or combine Groups, if you choose to do so. You can create Groups, and move individual channels between Groups, by simply dragging the individual channel names around in the Groups panel. The goal is to arrange your speakers so that each Group contains speakers that have similar sonic signatures and capabilities.

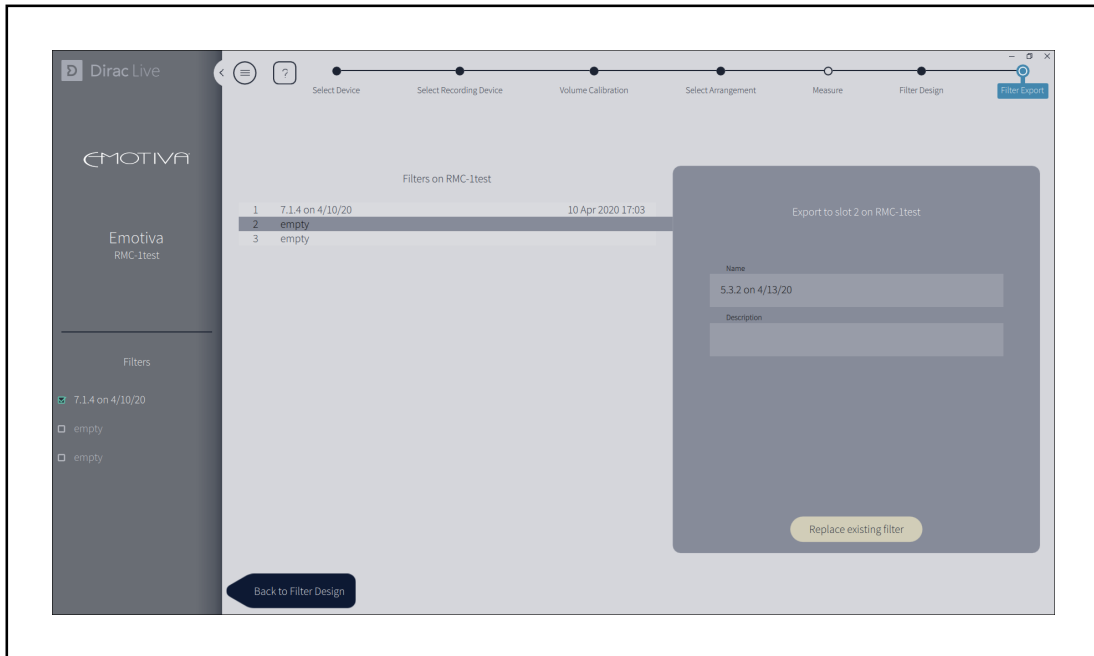
We suggest that you set the Lower Curtain for your subwoofers as low as allowed and the Upper Curtain at around 150 Hz. There are various philosophies about how to set the adjustment curtains for your other channels. We generally prefer to allow Dirac Live to correct the widest possible range of frequencies - since the bass management crossover in the processor will be controlling the range of frequencies which are routed to each set of speakers. Some users may prefer to prevent Dirac Live from attempting to correct the lower frequencies on speakers with limited low frequency capabilities. Conversely, some users may choose to narrow the Curtains to prevent Dirac Live from applying corrections to frequency ranges that they feel their speakers handle very well on their own.

Once you complete your adjustments click the button to proceed to **Filter Export**.

Performing A Dirac Live Room Calibration

Filter Export

On the Filter Export screen you will be offered the opportunity to download a new set of Correction Filters to your processor which have been created using the current set of measurements and Target Curves. You will be shown the list of Correction Filters that currently exist in the current Speaker Preset on your processor, offered the opportunity to overwrite an existing filter or create a new one, and to choose a name and enter a description for your new set of Correction Filters.



Note: We STRONGLY suggest that you name each set of Correction Filters you save using a descriptive name that includes the channel configuration. The Name that you use here will be visible in the Speaker Preset on your processor but the Description will NOT be visible on the processor.

Note: You will ONLY see the list of Dirac Live Correction Filters that are present IN THE SPEAKER PRESET FROM WHICH YOU ENABLED THE DIRAC LIVE SOFTWARE when you started your Dirac Live calibration session. You will NOT see the Dirac Live filters that exist in the other Speaker Preset and will NOT be able to save Correction Filters to the other Speaker Preset.

After the Filter Export operation is completed successfully you will be returned to the Design Filter screen - where you may create additional Correction Filter sets based on the same set of measurements. At this point you may also exit Dirac Live or return to an earlier step and select a different Seating Arrangement and make a new set of measurements.

Performing A Dirac Live Room Calibration

Exiting Dirac Live And Ending Your Room Calibration Session

At this point, if you're done creating Dirac Live Correction Filters, you may close the Dirac Live program.

Now that you have completed your Dirac Live room calibration session you need to do a little housekeeping on your processor.

First, you must UNCHECK the Dirac Live Enable check box in the current Speaker Preset to end the Dirac Live calibration session on your processor.

At this point, if you wish to create Dirac Live Correction Filter sets in the other Speaker Preset on your processor, you may exit the current Speaker Preset, enter the other Speaker Preset, and check the Dirac Live Enable check box in that Speaker Preset.

Shutting Down Your Emotiva Dirac Network Interface

Once you have completed all of the Dirac Live room calibration sessions you wish to perform at this time you should SHUT DOWN the Emotiva Dirac Network Interface device and unplug it.

You may shut down the Emotiva Dirac Network Interface by checking the Shutdown Remote check box in EITHER Speaker Preset.

Note: If you fail to SHUT DOWN and unplug your Emotiva Dirac Network Interface box and there is an abrupt power fluctuation or power surge, the firmware on the Network Interface box MAY become corrupted, and may fail to start up properly the next time you wish to use it. While it is not necessary to shut down the Network Interface if you plan to take a break for a few hours, we STRONGLY recommend that, if you plan not to use it for more than a few hours, you shut it down and unplug.

Note: Once you shut down the Emotiva Dirac Network Interface box, it MUST be rebooted in order to restart it, before it can be used again. This is achieved by disconnecting, and then reconnecting, the AC power to the device.

YOU WILL RECEIVE AN ERROR MESSAGE IF YOU ATTEMPT TO ENABLE DIRAC LIVE IN THE SPEAKER PRESET AND THE NETWORK INTERFACE BOX IS EITHER DISCONNECTED OR HAS BEEN SHUT DOWN AND HAS NOT BEEN REBOOTED.

Dirac Live for Emotiva Processors

Congratulations!

You have successfully calibrated your listening room and speakers using Dirac Live for Emotiva.

The Dirac Live Room Correction filters you have created are activated by configuring one or both Speaker Presets to use one of the Dirac Correction Filters and then selecting that Speaker Preset.

Remember:

WHEN YOU CHOOSE TO USE A DIRAC FILTER SET IN ONE OF THE SPEAKER PRESETS IT IS VERY IMPORTANT THAT THE SPEAKER CONFIGURATION YOU HAVE SET IN THE SPEAKER PRESET MATCH THE CONFIGURATION THAT WAS USED TO CREATE THAT DIRAC CORRECTION FILTER SET. Failure to do so may result in some speaker sets failing to play entirely or playing with incorrect correction filters applied to them. You may change speakers from Small to Large, or from Large to Small, but you should not add or remove speakers from the configuration.

Dirac Live for Emotiva Processors

Notes

You may want to record your Dirac Live license information here so you can keep track of it. (We suggest you also keep a copy of your original activation e-mail.)

My Dirac account User Name is: _____

My Dirac account password is: _____

All information contained in this manual is accurate to the best of our knowledge at the time of publication. In keeping with our policy of ongoing product improvement, we reserve the right to make changes to the design and features of our products without prior notice.

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