TRINNOV AUDIO

ELEVATE YOUR SOUND
ALTITUDE 32

V. 4.1

Thank you for choosing Trinnov Audio

ALTITUDE^{32} USER GUIDE

Software version v4.1

Last update: February 1, 2017

NOTICES

LIABILITY

The legal guarantees of conformity and latent defects under no circumstances cover any damage arising from accidents, misuse or an assembly error, negligence or considerable modification of the appearance or functioning of the returned equipment.

Trinnov Audio reserves the right to refuse any guaranteed return for a damaged product on account of misuse.

TERMS OF GUARANTEE

I. Duration

All the Trinnov products include a guarantee which lasts for two (2) years (extensible to three (3) years) as from the invoice date.

In the event of a malfunction subsequent to a fault detected in the device, the guarantee is total and no sum may be claimed from the acquiring party in terms of its replacement or repair, subject to the terms below. Any replaced parts and the repair of the malfunction are guaranteed for six (6) months.

This guarantee applies to the Trinnov Audio product, provided that it has been purchased in mainland France.

II. Conditions

The guarantee applies only if the product is confirmed as being faulty by the technical services of Trinnov Audio.

This guarantee applies if the faulty product is presented during the guarantee period, accompanied by a copy of the invoice (which indicates the purchase date, the model of the device and its serial number). Trinnov reserves the right to refuse the free application of the guarantee if these documents are not submitted or if they are incomplete or illegible. This guarantee will not apply if the name of the model or the serial number appearing on the product has been modified, deleted, removed or rendered illegible.

To prevent any damage or loss/deletion of data stored on the device, you must have saved them prior to returning your device to the services responsible hereunder.

The transport cost to Trinnov is to be met by the customer, including any return in mainland France. The device is transported at the risks of the customer. In the event of any damage observed upon its return, all the reservations must be made by the recipient with the carriers.

This guarantee does not cover any of the following points:

- Regular repair and maintenance work or replacements of parts subsequent to normal wear and tear,
- Consumables (elements of limited use, to be replaced on a regular basis)
- Damage or modifications brought about by misuse, including:
  - Handling which brings about a physical, aesthetic or superficial modification or damage to the product or damage to the display;
  - An installation or a use of the product not in keeping with its intended purpose or the instructions of installation or use of Trinnov Audio;
  - Maintenance work to the product not in keeping with the instructions of Trinnov Audio;
  - An installation or a use of the product not in keeping with standards or technical or safety regulations applicable in the country in which it is installed or used.
- Viral infections or use of the product with software not provided or incorrectly installed,
- The condition or faults of the systems with which the product is used or on which it is integrated, unless these are other Trinnov Audio products intended for use with the product,
- The use of the product with accessories, peripheral devices and other products whose kind, condition and standards do not meet with the requirements of Trinnov Audio,
- Any repair work carried out or attempted by any persons other than the repairmen of Trinnov Audio,
- Any modifications or alterations made without the prior written consent of Trinnov, including:

- The upgrade of the product not in keeping with the specifications or functionalities described in the user manual,

- The replacement of sub-elements in relation to its original configuration, without the prior written consent of Trinnov Audio,

- Any modifications made to the product to bring it into line with technical or safety standards, whether at a national or local level, applicable in any country other than those for which the product has been originally designed and manufactured.

- Any accidents, fires, liquids, chemical products, other substances, floods, vibrations, excessive heat, unsuitable air supply, over voltage, an excessive or inadequate power supply, radiation, electrostatic discharge, including lightning and other forces and external effects,

- Unsuitable storage conditions for this kind of product.

This guarantee only covers the hardware components of the product. It does not cover the software (of the Trinnov brand or other but installed by Trinnov).

A normal repair period of a maximum of 4 weeks (excluding transport time) must be accepted, but if this period is exceeded, and on demand, equivalent hardware may be loaned which gives entitlement to an extended guarantee of an equivalent duration. Trinnov Audio reserves the right to replace any parts or products which are deemed to be faulty with new parts or products reviewed in the factory without any other obligation for us as regards any direct or indirect consequences of the malfunction of this hardware both in relation to people and the goods. All replaced parts and products will become the property of Trinnov.

In the event that a latent defect is detected, the Purchaser must immediately notify Trinnov Audio of the same in writing by a detailed note explaining the circumstances in which he/she became aware of it, not later than eight (8) days from the time it is discovered, failing which, he/she loses the right to any guarantee.

III.Exclusions and restrictions

Excluding the considerations above, Trinnov Audio offers no guarantee (explicit, implicit, statutory or otherwise) for the product or the software that it contains or which accompanies it, concerning the quality, functioning, accuracy, reliability, suitability for a particular purpose or otherwise. If this exclusion is not, or only partially, permitted by applicable regulations, Trinnov Audio excludes or restricts its guarantees exclusively to the maximum extent permitted by applicable regulations. Any guarantee which is unable to be fully excluded will be limited (to the extent permitted by applicable regulations) to the duration hereof.

Under this guarantee, the only obligation for Trinnov Audio is to repair or replace products which meet with the conditions hereof. Trinnov Audio is in no way liable for any loss or damage related to the products, service, this guarantee or otherwise, including - financial or intangible losses - the price paid for the product - a loss of profit, income, data, enjoyment or use of the product or any associated product - an indirect or unforeseen loss or damage. This restriction is applicable, whether the loss or damage is attributable to:

- A malfunction or failure to operate of the product or related products on account of faults or unavailability while it/they is/are at the premises of Trinnov Audio, thereby resulting in delays, wasted time for the user or a discontinuation of activity;

- An error in the production of the product or related products;

- Damage or loss of software or data;

- A virus and other causes.

This applies to loss and damage in any legal context, including negligence and other torts, the termination of a contract, the explicit or implicit guarantee, and the unconditional liability (even when Trinnov Audio has been informed of the possibility of this damage).

When the applicable regulations forbid or limit these exclusions of liability, Trinnov Audio excludes or limits its liability only to the extent permitted by the applicable regulations. Some countries forbid, for instance, the exclusion or the restriction of damage arising from negligence, gross negligence, deliberate breach of contract, deceit and similar acts. Under this guarantee, the liability of Trinnov Audio will, under no circumstances, surpass the price paid for this product, but if the applicable regulations allow more significant restrictions of liability, the more significant restrictions will apply.

IV.   Protection of your legal rights

By virtue of the national regulations in force, the customers enjoy legal (statutory) rights concerning the sale of the product. This guarantee in no way limits your statutory rights, if applicable, which may not be excluded or restricted, or your rights vis-à-vis the seller of the product. You are permitted to assert your rights at your sole discretion.

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IMPORTANT SAFETY INSTRUCTIONS

To ensure optimal performance, please pay attention to the instructions in this Quick Start Guide:

- Read these instructions.

- Keep these instructions.

- Follow all instructions.

- Install the Altitude^{32} on a solid, flat, level surface that is dry, well ventilated and out of direct sunlight. Be sure that all four feet are supported.

- Do not use this apparatus near water.

- Clean only with a dry cloth. Do not use liquid solvent-based cleaners.

- Protect the detachable power chord from being walked on or pinched particularly at plugs, convenience receptacles,   and the point where they exit from the apparatus. If the ac cord becomes damaged, do not use it. Immediately replace it with a new one of the same or better rating.

- Unplug this apparatus during lightning storms or when unused for long periods of time.

- Do not open the equipment case or remove any of the cover panels. There are no user serviceable parts in this equipment. Refer all servicing to qualified service personnel.

- To prevent fire or shock hazard, do not allow liquids to spill or objects to fall into any openings of the product.

- Use only attachments/accessories specifies by the manufacturer.

- This unit is supplied with a two 3 pin grounded ac plugs. Always insert the ac plug into a grounded outlet. Do not remove the ground pin or disable the ground for any purpose. The main AC has to be protected by a 20 Ampere circuit breaker.

- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider that the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

- Before connecting the equipment, check that the main power supply voltage rating corresponds with the local main power supply. The rating of the main power supply voltage is printed on the equipment.

- If replacement of the ac line fuse and/or any internal fuse becomes necessary, replace only with same value and type of fuse (110V: T1A Schurter FST 5x20; 220V: T800mA Schurter FST 5x20). Never bypass the fuse.

- It is imperative that the Altitude^{32} be operated in a well ventilated environment and the immediate external temperature be maintained as specified. Do not expose the Altitude^{32} to humidity, steam, smoke or excessive dampness or dust. Maximum permissible operating conditions: 0°C to 40°C, 20-65% relative humidity. External cooling fans may be required in some cases.

- Do not stack any equipment directly above or below the Altitude^{32} as to protect it from overheating, as well as the continued functionality of any equipment near and around it.

- Remote control battery use trademark GP Batteries International, Panasonic or Varta, reference CR2032 or trademark Duracell reference DL2032. *CAUTION : Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions, including list of batteries allowed.

- Do no ingest the remote control battery. The remote control supplied with this product contains a coin battery. If the coin / button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death. Keep new and used batteries away from children. If the battery compartment does not close securely, stop using the product and keep it away from children. If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

- To completely disconnect the aparatus from the AC, completely remove the power cable from the main outlet.

- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug in damaged, liquid has been spilled or object have fallen into the apparatus, or the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

- Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.

- The main plug of the power-supply cord shall remain readily operable.

- Do not expose batteries to excessive head such as sunshing, fire or the like.

> **TO COMPLETELY DISCONNECT THIS APPARATUS FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE.**

CAUTION

RISK OF ELECTRIC SHOCK. DO NOT OPEN.

THE LIGHTNING FLASH WITH AN ARROWHEAD SYMBOL, WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE USER TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" WITHIN THE PRODUCT'S ENCLOSURE THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK TO PERSONS.

THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE USER TO THE PRESENCE OF IMPORTANT OPERATING AND MAINTENANCE (SERVICING) INSTRUCTIONS IN THE LITERATURE ACCOMPANYING THE PRODUCT.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

TABLE OF CONTENTS

1 INTRODUCTION

Trinnov stands for 3D innovation and our company's constant focus in this field of research has allowed us to develop the most advanced, innovative, powerful and scalable 3D AV Preamplifier ever manufactured.

Thanks to a unique hardware platform, Trinnov Audio offers the first implementations of the latest home theatre audio technologies. The Altitude^{32} has established a new leadership position within the luxury home cinema processors category, opening the way for a whole new generation of modern, scalable and software oriented home cinema processors.

1.1 ABOUT THIS GUIDE

This guide includes the most important information you need in order to use and setup the Altitude[32] in your home theatre system. From the most frequent daily operations to advanced calibration and optimization functionality, this document will guide you through every step of the task you wish to accomplish.

This guide is organized in the following parts:

PART I: GETTING STARTED WITH THE ALTITUDE[32]:

Introduction: unpacking the Altitude[32] and an overview of the hardware and the software.

Network Setup: setting up the network to start using the software.

PART II: USING THE ALTITUDE[32] ON A DAILY BASIS IN YOUR HOME THEATRE:

Daily Operations: Explains how to perform simple operations such as power-on/power-off, volume control, source selection, preset selection and decoder settings via the front panel, with the IR remote control or through the software user interface.

Basic Settings: Explains how to name and configure your sources, how to switch on/off the main optimization and remapping options, how to manage presets, and how to backup/restore presets to/from a USB memory stick.

PART III: INTEGRATING THE ALTITUDE[32] IN YOUR HOME THEATRE SYSTEM:

Overview of the setup procedure: A summary of the main steps you must follow in order to successfully integrate the Altitude[32].

Essential tools and settings: Provides important information about the software tools and settings you need to know before starting the setup process.

Specify the Speaker Layout: How to provide the Altitude[32] with all the information about your set of speakers. This information is required for the automatic calibration of the speakers in the room.

Specify an Array of Speakers: Provides information to setup an array of speakers.

Decoder/Upmixer Settings: Provides necessary information on the different decoders supported, their upmixer and the settings available.

Getting ready for calibration: Provides important tips and recommendations you need to know before running the calibration procedure, including tips about *microphone placement*.

Optional: Calibrate the Active Crossovers: Explains the setup procedure for multi-amplified speakers using the Altitude[32]'s intelligent crossover calibration tool;

Calibrate the Speakers in the Room: Explains the calibration process for the speaker system and how to compute the optimization filters.

Setup Bass Management: Explains the advanced bass management options supported by the Altitude[32].

Setup the Target Curves: Explains how to use the powerful target curve functionality of the Altitude[32] to reach your required frequency response.

Verify the Sound of your Optimized System: A short chapter to remind you that it is crucially important to verify the sound of your system after each calibration.

PART IV: TUNING THE SOUND OF YOUR HOME THEATRE SYSTEM WITH THE ALTITUDE[32]:

Tuning the Optimization Settings: Explains how to use the advanced settings of the Altitude[32] to make further improvements to the automatic optimization.

Performing Multi-point Measurements: How to improve the optimization by performing multiple measurements with different microphone placements.

ADDITIONAL INFORMATION ABOUT THE ALTITUDE[32] PREAMPLIFIER:

Appendix: Technical information about automation, the signal flow, the 3D speaker placement recommendations, connector pinouts and the 3D Measurement Microphone.

To improve clarity throughout this document, references to user interface items will be shown in **bold** letters and illustration's caption will be shown in ***italic bold*** letters.

This guide also includes information about the latest 3D formats and common practice in terms of speaker placement to help you understand the new approach of 3D Sound in the best possible and least confusing way.

In addition, important information will be indicated with the following symbols.   NOTE   IMPORTANT NOTE

Record of Changes:

Date	Software version
April 2015	Software version 4.0 – Pre-release version
May 2015	V4.0: Software version 4.0.0 RC4
July 2015	V4.0: Software version 4.0.0 RC7
October 2015	V4.0: Software version 4.0.0 RC9
February 2016	V4.0: Software version 4.0.9 RC8
June 2016	V4.0: Software version 4.0.10
October 2016	V4.0: Software version 4.0.12
February 2017	V4.1: Software version 4.1.5

IMPORTANT NOTE: The content of this document is subject to change without notice.

1.2 PRODUCT INFORMATION

MAIN FEATURES

- 32 Channel Digital Audio Processor
- Universal Spatial-Accurate 3D Audio playback
- Best-in-class Room Optimization fully integrated
- Superior multi-subwoofer management and active crossovers calibration
- 118 digital and analog inputs + 80 audio outputs

- 8x HDMI Inputs, 2x HDMI Outputs
- User-friendly, self-explaining user interface
- Builtin Wi-Fi & UPnP/DLNA Compliant Digital Media Renderer
- Wide choice of Remote Options

EXCLUSIVE TECHNOLOGIES

- Trinnov patented 2D/3D spatial remapping
- Trinnov Loudspeaker/Room Optimization
- Next Generation Hardware platform:
  - Revolutionary architecture, scalable processing platform
  - 64 bits floating point & 24 bits / 192 kHz native processing
  - Future-proof software-oriented upgrades provided over internet, no DSP upgrade required
  - Robust design, inspired from our professional audio product lines
- Trinnov high-performance AD/DA converters, used daily by the most demanding mastering studios

SUPPORTED AUDIO/VIDEO FORMATS

- LPCM Audio: 16-channels AES input compatible with Digital Cinema Servers
- 3D Audio Codecs (optional): Auro-3D, Dolby Atmos and DTS:X, including their respectives upmixers
- HD Audio Codecs: Dolby TrueHD, DTS-HD Master Audio
- HDMI 1.4b compliant digital audio with 4K and 3D video pass-through (HDCP 2.2 : HDMI input #1, HDMI output #2) (HDMI 2.0 upgrade supported)
- UPnP/DLNA renderer: WAV, AIFF, OGG, FLAC up to 24 bits / 192 kHz

SUBWOOFER MANAGEMENT

- Adjustable High-pass / Low-pass editable by individual satellite/sub or by group of speakers
- Support from 0 to 32 subwoofers
- Automatic level, delay and phase alignment

REMOTE MANAGEMENT

- VNC Remote Control through the network from any smartphone, tablet or laptop
- Web-based responsive interface
- Automation via Telnet and RS232 protocols

- Crestron and Savant modules available
- Built-in Gigabit Ethernet and Wi-Fi
- IR remote control included
- 12V Trigger in/out

AUDIO PROCESSING

- Comprehensive Processing latency control
- Automatic Processing :
  - Multi-point acoustic measurement (Trinnov 3D measurement microphone)
  - Time/Frequency acoustic analysis based on impulse response measurement
  - Loudspeaker/Room optimization
  - Target Curves

- Manual Processing
- Several layers of 31 bands Graphic EQ, FIR EQ, gains, polarity and delays available for every channel.
- Total delay given in meters / milliseconds / frames for the listening point and adjustable global delay for accurate Lip Sync

PHYSICAL CHARACTERISTICS

Chassis: 3.5U
Power supply: 240V AC / 50-60 Hz. *Option: 130V AC*
Consumption: 90 W max.
Weight: ~14.5kg
Environmental conditions:
 - Operating: 0°C-40°C (32°F-104°F)
 - Humidity: 20%-80% relative humidity (without condensation)

445 mm

165 mm
(with feet)

442 mm

1.3   SYSTEM INTEGRATION

The Altitude[32] is inserted before loudspeakers to correct imperfections of the loudspeakers and the room. During calibration, the speakers are calibrated with a 3D acoustic probe.

SOURCE

NAS

BLU-RAY

TV

ALTITUDE[32]

SPEAKERS

Figure 1: Altitude[32] system integration

1.4   TRINNOV CERTIFIED INSTALLERS

Depending on how far you want to dig into its features, the Optimizer is either a straightforward and easy-to-use automatic compensation system or an incredibly flexible and powerful tool, including numerous advanced filter parameters, target curves and manual EQ's, all being re-computable on the fly.

By following an iterative installation procedure, the Optimizer achieves results beyond expectations in record time but it surely requires a good understanding of the audio and acoustic basics and more especially experience to clearly identify a problem and therefore use a relevant method to solve it.

Therefore we strongly recommend you request the services of a Certified Trinnov Installer to setup and fine tune your Altitude[32] in your home theater system.

1.5 UNPACKING THE ALTITUDE³²

You will find in the Altitude[32] packaging:

The Trinnov Altitude[32] AV preamplifier

| 3D Microphone (Optional) | Power Chord | Wi-Fi Antenna | CRO32 Battery |

| Remote Control | Rack Ears |

1.6   THE HARDWARE

1.6.1   FRONT PANEL LAYOUT

Back Button

Select Button

Menu Button

Jack 6.35 mm Headphones output

Power Switch

Mute Button

Volume Knob

Direct Source Selection

Source/Item Selection Knob

1.6.2   FRONT PANEL DISPLAY

Output Meters

Output Level

Audio Sync Status

Optimizer Status

Current Upmixer

Audio Format

Current Source
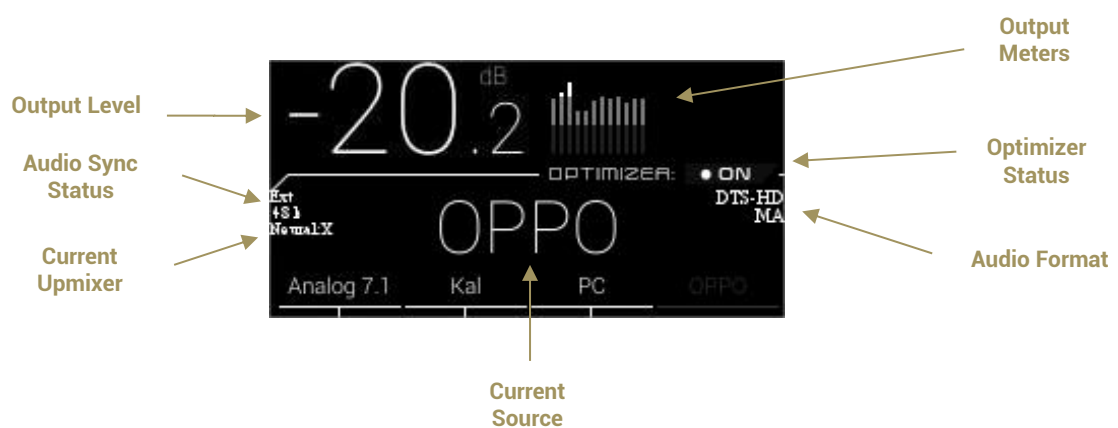
1.6.3 REAR PANEL LAYOUT
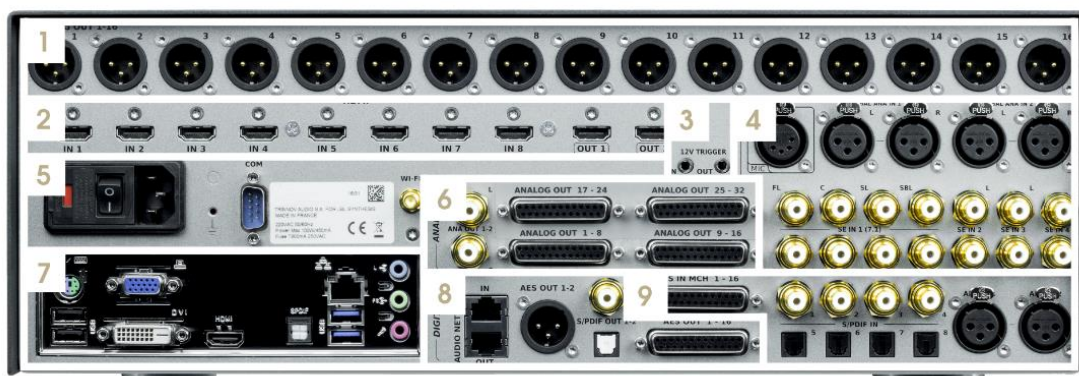
1 ANALOG OUTPUTS 1-16 ON XLR CONNECTORS

2 HDMI 1.4A 8 INPUTS, 2 OUTPUTS

- Input #1 and output #2 are HDCP 2.2 compliant

3 TRIGGER 12V IN/OUT

4 ANALOG INPUTS

- 1x 3D Microphone Input on 5-pin XLR
- 2x Stereo Inputs on XLR
- 1x 7.1 Input on RCA
- 3x Stereo Inputs on RCA

5 POWER

- AC Input
- Fuse
- Master Power Switch
- RS232
- Serial Number
- Wi-Fi Antenna Connector

6 ANALOG OUTPUTS

- 1-32 on 4x DB25 Connectors
- 1x Stereo on RCA

7 PC CONNECTORS *may change following the mother board reference*

- Video output (VGA/DVI/HDMI)
- 2x USB 2.0 + 2x USB 3.0
- PS/2 Keyboard/Mouse
- RJ45 Gigabit Ethernet
- Audio ports (unused)

8 DIGITAL OUTPUTS

- 1x AES3 (8 or 16 channels) on DB25
- 1x Stereo AES/EBU on XLR
- 1x Stereo S/PDIF on RCA
- 1x Stereo S/PDIF on Toslink
- 1x Network Audio Input
- 1x Network Audio Output

9 DIGITAL INPUTS

- 1x AES3 DCI compliant (8 or 16 channels) on DB25
- 4x SPDIF on RCA / 1x 7.1 PCM
- 4x SPDIF on Toslink / 1x 7.1 PCM
- 2x Stereo AES/EBU on XLR

1.6.4 IR REMOTE CONTROL

1 TO 4
Direct source selection

SOURCE
Source selection

FORMAT
Playback mode selection

OPTIMIZER PRESETS
Preset selection

MENU / BACK / ARROWS
Navigation in the front panel menu

LIGHT
Switch off the backlight on the front panel

VOL +/-
Volume control (1dB step)

DIM
Decreases the volume by 20dB (toggle button)

MUTE
Mutes audio outputs (toggle button)

BYPASS
Optimizer bypass

1.7 THE SOFTWARE

1.7.1 AVAILABLE OPTIONS TO ACCESS THE GRAPHICAL USER INTERFACE

The Altitude[32] offers multiple options to display and control the user interface:

- **Directly** with a physical display, a mouse and a keyboard connected to the Altitude[32].

- **Remotely** with a **VNC Client** over the network, from any computer or tablet to access the full user interface in order to operate and/or setup the Altitude[32].

- **Remotely** with an **internet browser,** with a *limited* access to the user interface allowing to operate the Altitude[32] but without all the setup menus.

The Graphical User Interface of the Altitude[32] is specifically designed for touch screen use but it is just as easy to use with your laptop's trackpad or with a mouse.
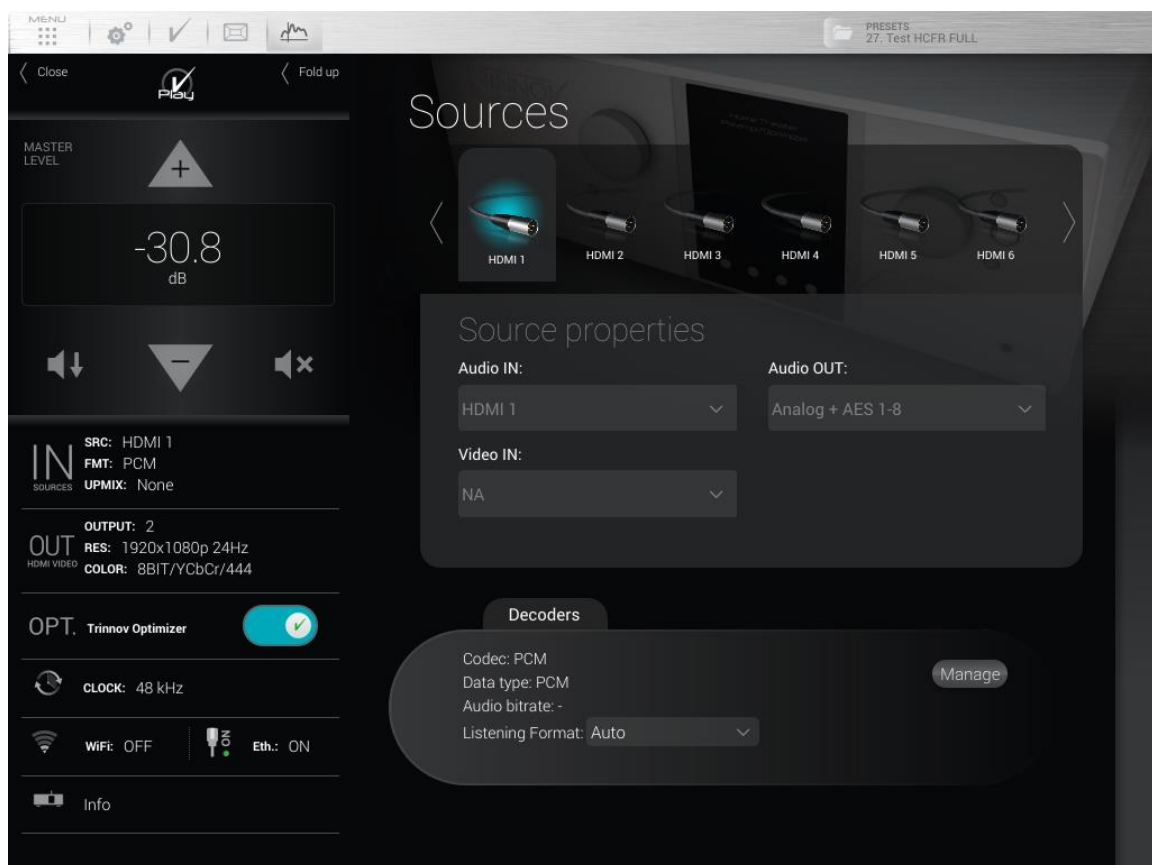
Figure 2: graphical user interface of the Altitude[32]

> **NOTE:** the design and the user experience of the Altitude[32]'s Graphical User Interface are constantly improved with software updates.

1.7.2　IMPORTANT NOTE ABOUT THE WEB-BASED INTERFACE

The Altitude[32]'s full user interface can only be accessed by connecting a display or through a VNC client.

If you've already completed the setup of the Altitude[32] in your home theatre system and you only need to operate it, a *limited part* of the Altitude[32]'s user interface is also available from a *web browser*.

> **NOTE:** The web browser can only display the *HTML-based pages* of the user interface. However, most of the system setup pages of the Altitude[32] are currently *Linux-based*. Therefore, the web browser can only be used for daily operations of the Altitude[32] but cannot be used to setup, measure and optimize your speaker system.

To connect to the web user interface of the Altitude[32]'s you need to enter its **IP address** in your web browser.

The **IP address** of the Altitude[32] can be retrieved:

- via the front panel: go to the **Setup/Network/Ethernet** menu.
- by connecting a monitor and a mouse to the back panel. Go to the **Network** page of the graphical user interface.

If you are *already connected* to the Altitude[32] with a VNC Client, you can easily check its **IP address**:

- in *Mocha VNC:* click on the blue arrow, located at the right of the VNC Server address field;
- in *Chicken of the VNC:* select the Altitude[32] from the server list.

Please refer to the **Network Setup** chapter for further details about network configuration.

1.7.3　USING A DISPLAY, MOUSE AND KEYBOARD CONNECTED TO THE ALTITUDE[32]

A very straightforward option to access and control the user interface of the Altitude[32], provided that you have the necessary equipment, is to connect a physical display and use a mouse and a keyboard to control the Altitude[32]'s software.

These devices shall be connected to the PC connectors, located on the rear panel of the Altitude[32]:

- PC/Mouse can be connected either using the **PS/2** or **USB** ports.
- Physical monitor can be connected through the **VGA**, **DVI-D** or **HDMI** ports. *The PC video outputs may change following the mother board reference.*

Figure 3: Altitude[32] PC connector's panel

1.7.4 THE TOP MENU BAR

The Top Menu provides access to the main features of the Altitude[32].

Opens the **Advanced settings** graphical user interface, used for configuring your sources, room calibration, advanced processor settings, network setup, etc... Most of its functionality is explained in the chapters *Calibrate the Speakers in the Room* and *Tuning the Optimization Settings*.

Opens the lateral **Play menu** used for daily operation: level adjustment, source selection and general information. See the chapter *Daily Operations*.

Opens the **Speakers/Room setup tool**, used for setting up your speaker system and for routing the channels to the speakers. See the chapter *Specify the Speaker Layout*.

Opens the **Fine Tuning page**, which includes the Bass Management and the Optimizer Settings. See the chapters *Setup Bass Management* and *Tuning the Optimization Settings*

is a drop-down menu useful for quickly selecting a preset.

1.7.5 THE MAIN USER INTERFACE

The main page of the Altitude[32] is used for daily operation:

1. Click on the Play button on the top left corner of the interface: the lateral menu unfolds,

2. Select one of the tabs to open the corresponding panel. For example, the **Input Sources** tab opens the **Sources** panel,

3. Perform a daily operation, such as selecting a different source.
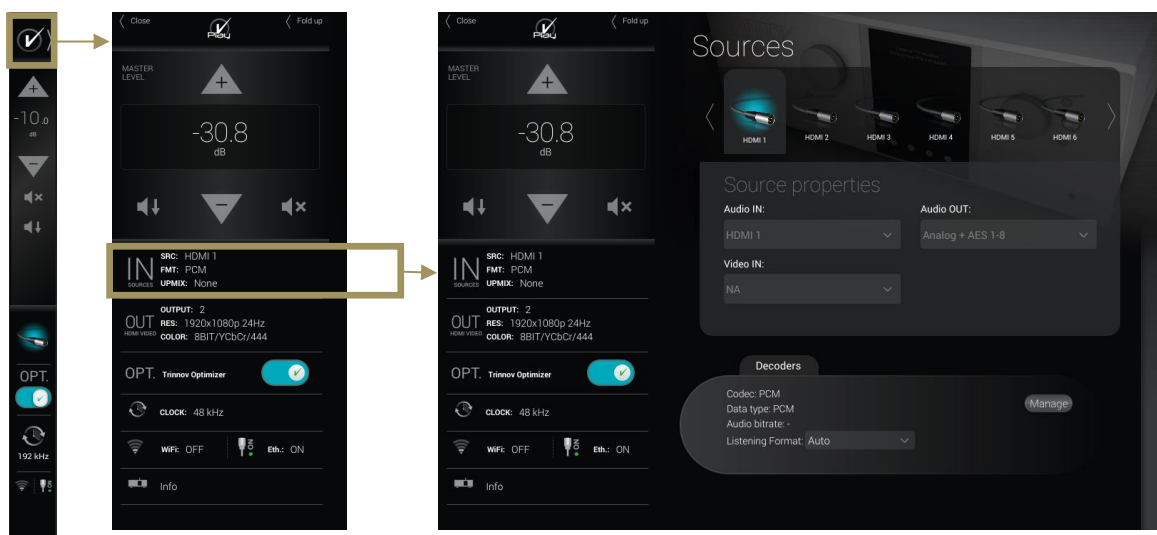
A detailed description of this interface is provided in the following pages.

1.7.6 THE LATERAL MENU BAR
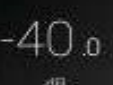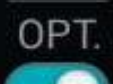
You can access the Play menu, located on the left-hand side of the user interface, at any time by clicking on the "V" button on the Top menu.

This menu constantly provides information about the **current status** of the Altitude[32]. It can be **folded** or **unfolded** depending on the task you wish to perform.

1.7.7 FOLDED LATERAL MENU

When folded, the lateral menu provides the following features:

	Click to unfold the lateral menu.	**Unfold button**
	Click to increase output level by 1dB steps.	**Volume Control**
	Displays the current output level.	
	Click to decrease output level by 1dB steps.	
	Mute: cuts all outputs.	
	Dim: attenuates the output level (by default -20dB).	
	Displays which audio source is currently selected as you move the cursor over the icon.	**Source Information**
	Displays the current status of the Optimizer. Click to enable/disable the Optimizer.	**Optimizer Status**
	Displays the clock's current sampling rate.	**Audio Clock**
	Displays the current status of the Wi-Fi and Ethernet network interfaces of the Altitude[32].	**Network Status**

1.7.8 UNFOLDED LATERAL MENU

When unfolded, the lateral menu displays extra information about the current settings
of the Altitude[32]:

IN sources	• **SRC**: the name of the current audio source
	• **FMT**: the audio format
	• **UPMIX**: the upmix format
OUT channels	• **OUTPUT**: the current HDMI output
	• **RES**: the current video resolution
	• **COLOR**: Color settings used on the HDMI video output

OPT displays the current status of the Optimizer.

CLOCK displays the current sampling rate.

Wi-Fi and **Ethernet** network status

More information on your Altitude[32].

1.7.9 THE SPEAKERS/ROOM SETUP TOOL

The speakers/room setup tool is a highly practical tool used to setup your system. It is explained in the **Specify the Speaker Configuration** chapter.
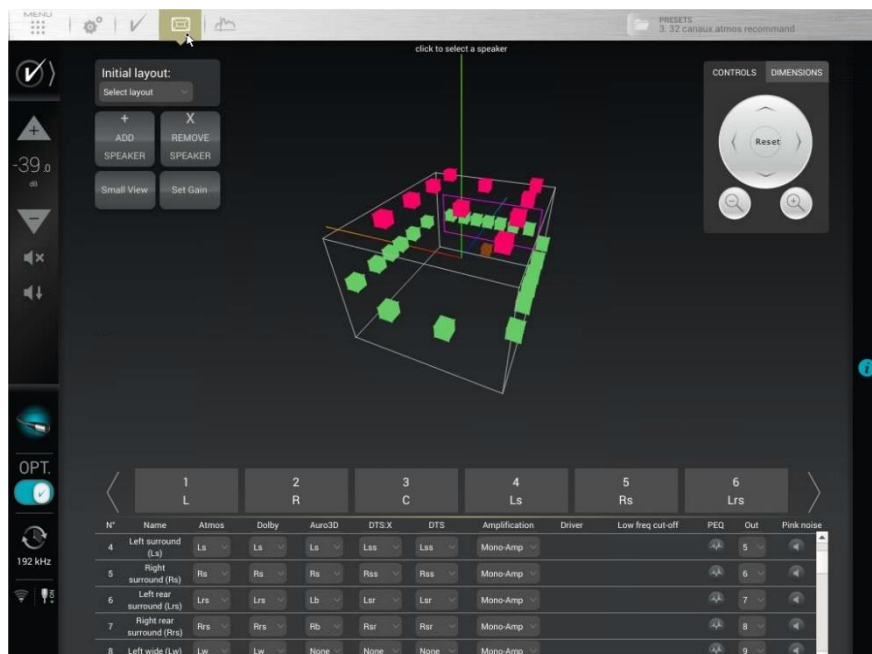
Figure 4: the Speakers/Room setup tool

1.7.10 THE FINE TUNING PANEL

The Fine Tuning panel gives access to the **Bass Management** and **Optimizer settings**:
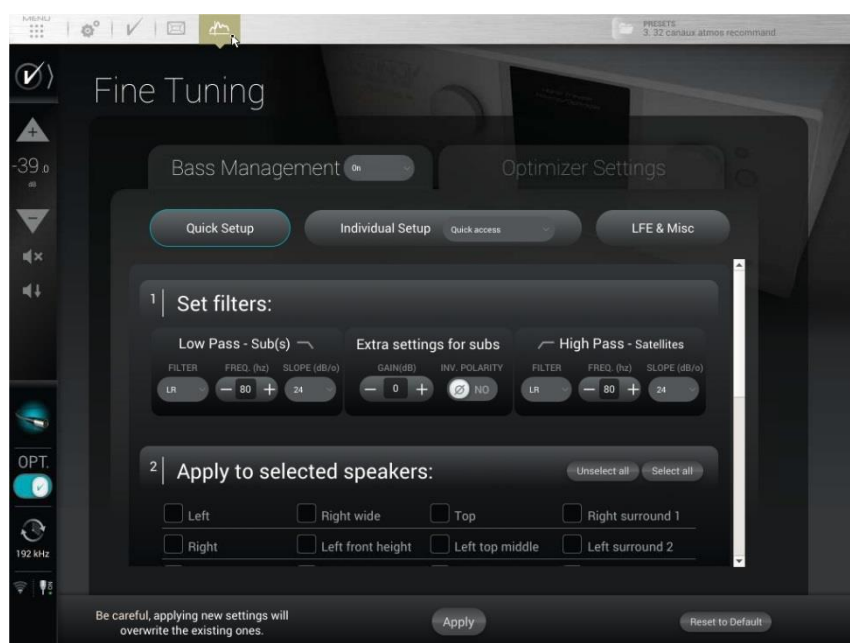
1.7.11 THE ADVANCED SETTINGS INTERFACE

The advanced settings of the Altitude[32] are currently available through a specific user interface:
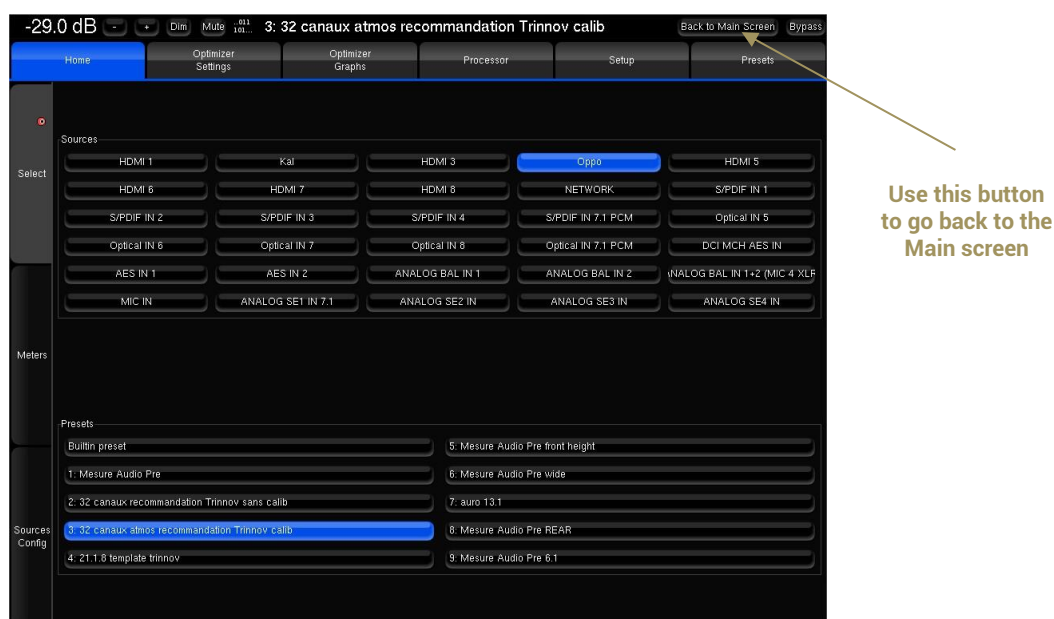
Figure 5: the advanced settings user interface of the Altitude[32]

For more information about the advanced settings in the chapter **Tuning the Optimization Settings**.

1.7.12 PRODUCT INFORMATION

Product Information can be displayed on the Graphical User Interface default startup page and/or on the front-panel menu of the Altitude[32].
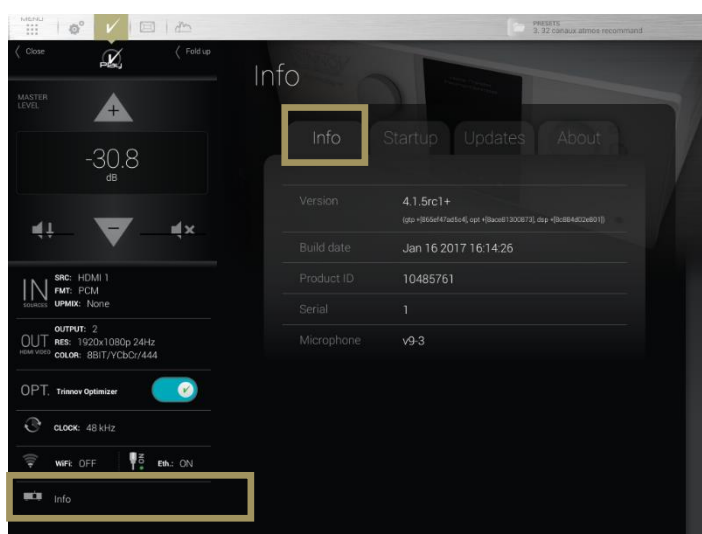
- **Version:** software version currently installed
- **Build date:** software release build date
- **Product ID:** Trinnov unique id number of the unit
- **Serial:** serial number of the unit
- **Microphone:** default microphone compensation file

Figure 6: product information page

To display the About page on the front panel, hit the **Menu** button on the front panel of the Altitude[32], select the last item **About** and hit the **Select** button.

ID: 10485761
Serial: al-000001
Version: 4.1.6rc1+
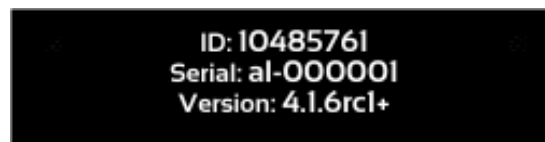
Figure 7: front-panel About page

1.7.13 SOFTWARE UPDATES

The Altitude[32] was designed to maintain its leadership over time and will therefore benefit from continuous updates as well as new features. In order to receive updates on the latest developments of the Altitude[32], please fill and return the **warranty registration form** with your email address and your Altitude[32] serial number.

Software updates and support can be performed remotely by Trinnov provided that the Processor is connected to the internet and that outgoing connections to port 22 are open.
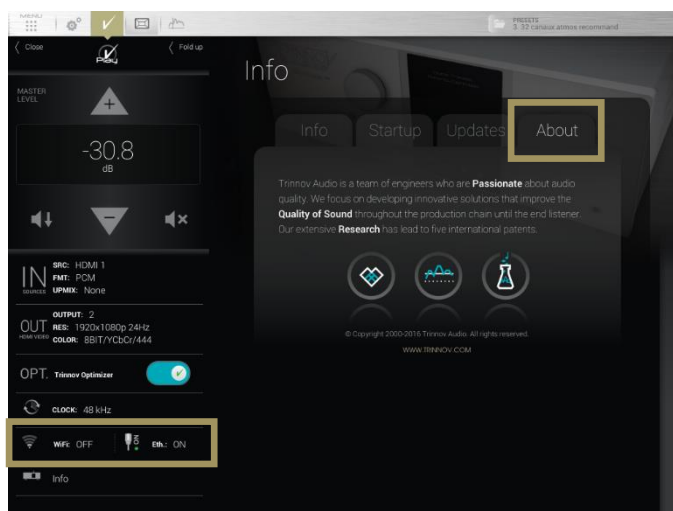
Figure 8: the Network/Service page

Use the **Info/Updates** page to check for new software updates:

When the processor is connected to Trinnov's server, the **Network Status** in the Setup/Network page will change to *"Connected to Trinnov Audio Server"*.

If the processor is connected to a network, but the Network Status is "Local Network OK", it means that the Trinnov Server cannot be reached from your network.
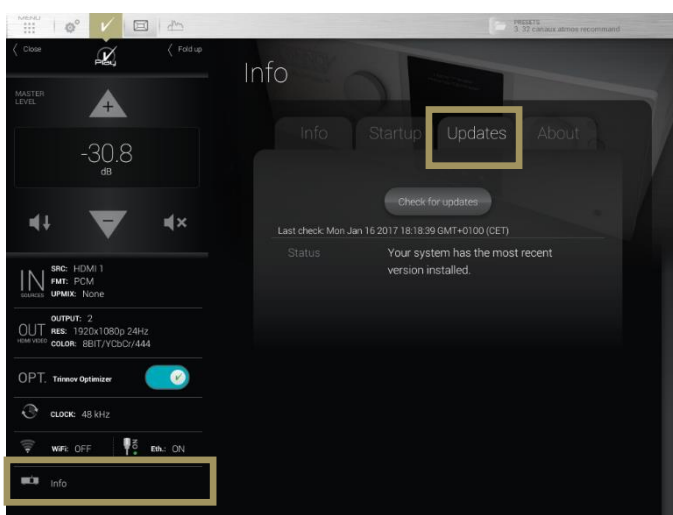
Figure 9: the Info/Updates page

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2   NETWORK SETUP

This chapter explains how to connect with your preferred device (tablet, laptop or desktop computer) to the Altitude³² through a Wi-Fi or Ethernet network.

2.1   CHOOSING A NETWORK CONFIGURATION

The Altitude³² offers multiple network options in order to meet two important requirements:

- using a wireless device (tablet or laptop computer) throughout the room while performing acoustical measurements with the Altitude³²'s calibration tools;

- seamlessly integrating the Altitude³² into your home theatre's technical environment;

Depending on the specific technical environment of your home theater, each of these requirements may or may not correspond to the same network configuration.

We recommend the following strategy for the network setup of your Altitude³²:

1. **Setup Procedure**: choose a network configuration that meets your requirements for the setup process. Three options are possible:

   A.   The Altitude³² joins your local Wi-Fi network as a Wi-Fi client;

   B.   The Altitude³² joins your local Ethernet network as an Ethernet client;

   C.   Your device connects to the Altitude³²'s own Wi-Fi network (Access Point).

2. **Final installation**: if needed, change the network configuration to meet the requirements for integrating the Altitude³² into your overall home theater system. For the final installation of the system, we suggest to leave your Altitude³² permanently connected to the local network. Two options are possible:

   A.   Connect an Ethernet cable between the Altitude³²'s back panel and your ISP box. With this option, the Altitude³²'s will always be available through your local network. This is the easiest option because the Altitude³²'s default DHCP network settings allows it to connect automatically to a local Ethernet network.

   B.   Setup the Altitude³²'s network settings to connect as a Wi-Fi client to your ISP Box's Wi-Fi access point. This process is explained in the ***Advanced Wi-Fi Settings*** *subchapter at the end of this chapter*.

NOTE: you could also choose to leave the Altitude³² disconnected from your local network but this will probably be less convenient if you want to access the Internet from the same device that is used to operate the Altitude³².

IMPORTANT NOTE: whatever option you choose for connecting to the Altitude³² through a network, please keep in mind that the Altitude³² and your control device (tablet or computer) must be connected to *the same network*, or to interconnected networks, such as a Wi-Fi network interconnected to an Ethernet network.

2.2   CONNECTING TO THE ALTITUDE[32]

2.2.1   OVERVIEW OF THE NETWORK CONNECTION PROCEDURE

The factory settings of the Altitude[32] are designed to make it as easy as possible to establish the first network connection between your device (tablet or computer) and the Altitude[32] so that you can access its graphical user interface.

> **IMPORTANT NOTE:** please keep in mind that another straightforward option for using the Altitude[32]'s software is to connect a display, a mouse and a keyboard directly to its back panel PC connectors.

The following overview introduces the main steps of the network connection procedure in order to help you understand the overall process and choose your preferred options:

1. **Step 1**: download and install a *VNC Client* software application on your device.

2. **Step 2**: put the Altitude[32] and your device *on the same network*. Choose one of these options:

    A.   Your device joins the Altitude[32]'s Wi-Fi network: *disconnect* your device from your *usual* Wi-Fi network and *connect* it to the Altitude[32]'s own Wi-Fi network (Access Point).

    B.   The Altitude[32] joins your existing Wi-Fi network: use the Altitude[32]'s front panel menus to connect it to your local Wi-Fi network.

    C.   The Altitude[32] joins your existing Ethernet network: use an Ethernet cable to connect the Altitude[32] to your local Ethernet network.

3. **Step 3**: open your VNC Client and configure it to connect to the Altitude[32]'s VNC Server. Choose one of these options:

    A.   iOS devices, Android devices or Mac OS X computers: the zeroconf-enabled VNC clients available for these devices *will not require* knowing the IP address of the Altitude[32].

    B.   Windows computers: you will need to configure your VNC client (*Tight VNC*) with the IP address of the Altitude[32].

4. Once your VNC Client is configured correctly, connect to the Altitude[32]'s VNC Server and start using the Altitude[32]'s graphical user interface.

These steps are described in detail in the following pages.

2.2.2 STEP 1: DOWNLOAD AND INSTALL A VNC CLIENT ON YOUR DEVICE

2.2.2.1 USING A TABLET

If you are connecting from an iOS, Android or Windows tablet you need to download and install a *VNC Client* app on your tablet. A number of VNC Clients/Viewers are currently available. We recommend the *Mocha VNC Lite* free app:

iOS devices (Apple iPad): use the **App Store** app to download and install the **Mocha VNC Lite** app from Apple's App Store.	
Android devices: use the **Play Store** app to download and install the **Mocha VNC Lite** app from Google's Play Store.	
Windows mobile devices: use the **Windows Store** app to download and install the **Mocha VNC Lite** app from the Windows Store.	

2.2.2.2 USING A MAC OS X COMPUTER

If you are connecting from a Mac OS X computer running OS X version 10.5 or higher, you can choose to use Apple's *Screen Sharing* VNC client integrated into the OS X operating system. In this case you don't need to download an additional app and you can skip to the next step.

If your Mac is running OS X version 10.4 or lower, you need to install a VNC client software: download and install **Chicken of the VNC** from *www.macupdate.com*
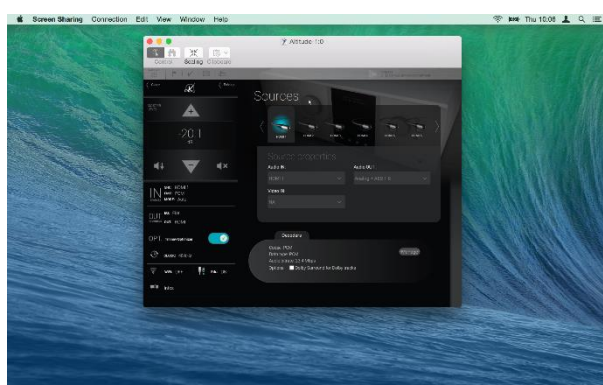
Figure 10: the Altitude[32]'s graphical user interface from a Mac OS X desktop

2.2.2.3 USING A WINDOWS COMPUTER

If you are connecting from a Windows computer, you need to download and install a *VNC Client* software. A number of VNC Clients/Viewers are currently available.

We recommend *Tight VNC*: download and install **Tight VNC** from *www.tightvnc.com*

NOTE: Tight VNC is not *zeroconf-enabled*. You will need to enter the IP address of the Altitude[32] in order to connect.
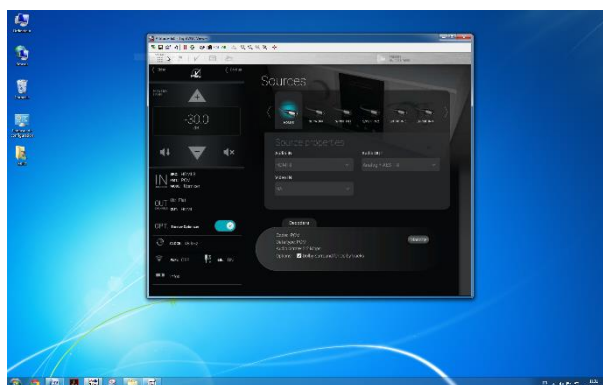
Figure 11: the Altitude[32]'s graphical user interface from a Windows desktop

2.2.3 STEP 2: PUT THE ALTITUDE³² AND YOUR DEVICE ON THE SAME NETWORK

2.2.3.1 OPTION A: YOUR DEVICE JOINS THE ALTITUDE³²'S WI-FI NETWORK

The factory settings of the Altitude³² are preconfigured to allow it to run as a Wi-Fi *Access Point*. Provided that the Wi-Fi antenna is connected to its back panel, the Altitude³² will run its own Wi-Fi Access Point. The Altitude³² AP should appear in the list of Wi-Fi networks under the name "**Altitude-XX**", where **XX** is the number of your Altitude³².

The fully wireless option for connecting to the Altitude³² is as follows:

Disconnect your device (computer or tablet) from your usual Wi-Fi network;
Connect your device to the Altitude³²'s own Wi-Fi network: in your list of Wi-Fi networks, choose the network named "**Altitude-XX**", where "**XX**" is the **number** of your Altitude³². Enter the following password: **calibration**
Use the Altitude³²'s front panel to check its network status: go to the **Setup/Network** menu to see its IP address.

Once your computer or tablet is on the Altitude³²'s own Wi-Fi network, you can move to the *Next Step* of this procedure to configure and connect your VNC client to the Altitude³²'s VNC server.

> **IMPORTANT NOTE:** the Altitude³² Access Point's password is **calibration**
>
> The Altitude³²'s Access Point details are available through the front panel menu in the Setup > Network > Wi-Fi page.
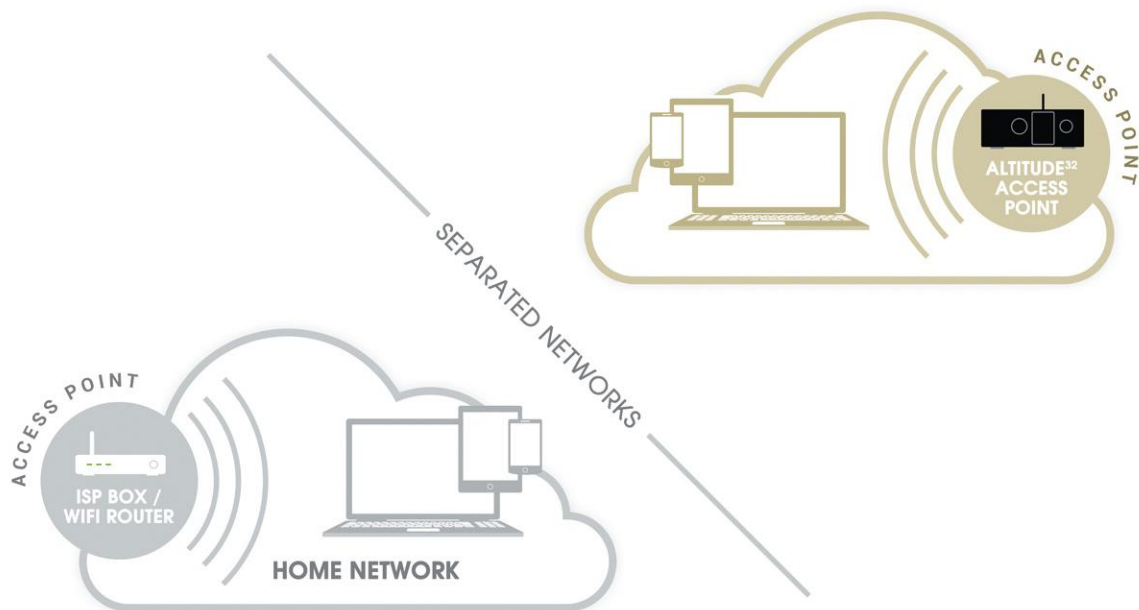
Figure 12: joining the Altitude³²'s network (Access Point)

> **IMPORTANT NOTE:** Once connected to the Altitude³²'s Access Point, it is possible to remotely access the Altitude³²'s graphical user interface but access to Internet will be lost, as indicated in the figure above. You must switch back to your usual Wi-Fi network in order to reconnect to the internet.

CONNECTING WITH YOUR IPAD

The following screenshots, created on an iPad, are provided as an example of how to connect to the Altitude32's Access Point. The process is extremely similar on a Mac OS X, Android, or Windows device, you simply need to find the **Wi-Fi Settings** page.

Go to **Settings** and click on the **Wi-Fi** menu item located in the top left side of the page.
In the "**Chose a network…**" list, click on the network **Altitude-XX**, where XX is the number of your Altitude32.
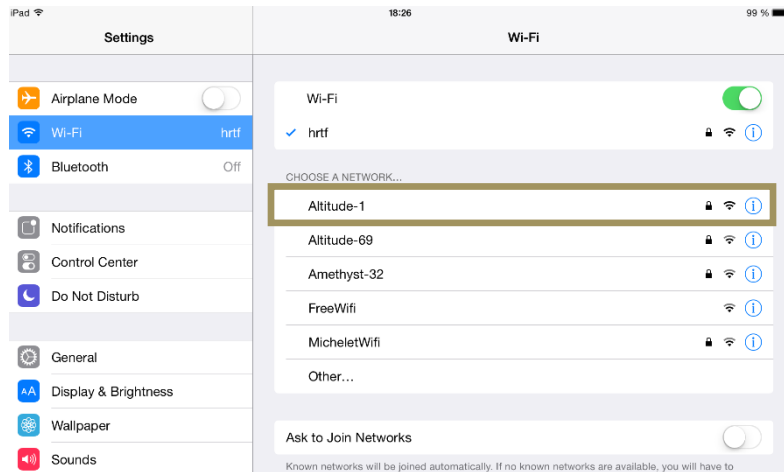
Figure 13: choosing a Wi-Fi network in the iPad settings

When asked to Enter the password for "Altitude-XX", type the following password: **calibration**
Click on the Join button.
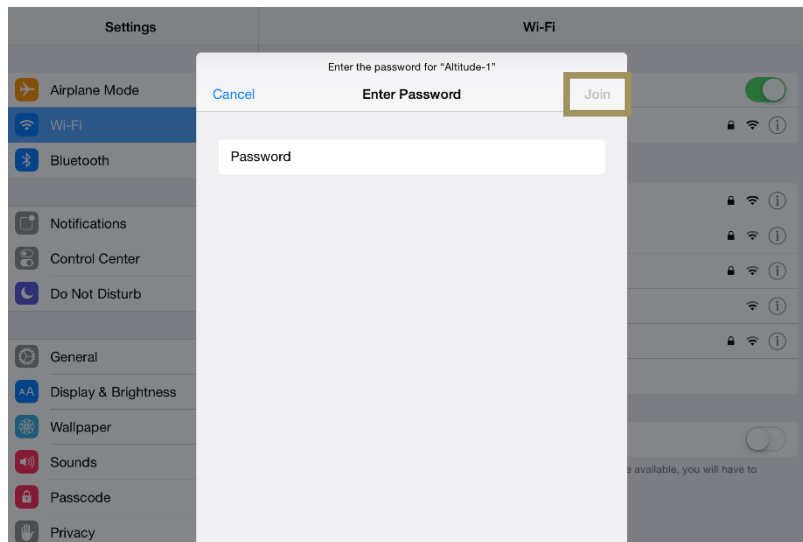
Figure 14: entering the password to join the Altitude32's Wi-Fi network

You should now see the Altitude-XX network as the currently connected Wi-Fi network on top of the page and on the top left side of the page:
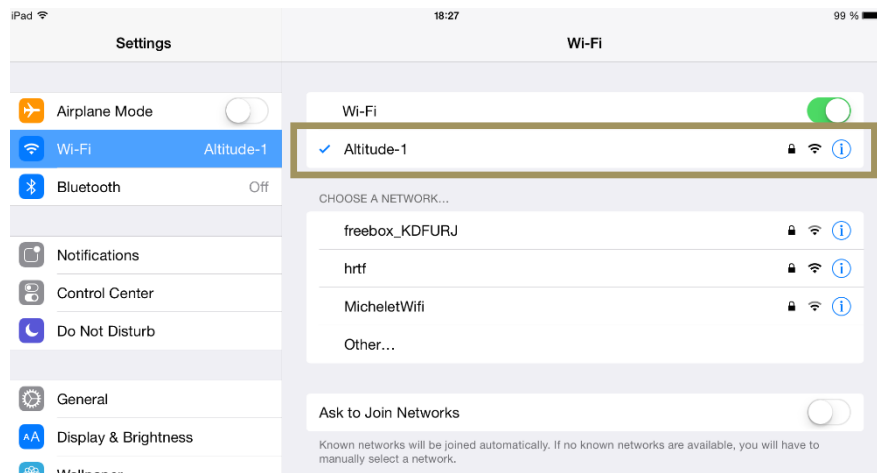
Figure 15: the iPad is now connected to the Altitude-XX Wi-Fi network

Once you are connected, you can move to the next step of the procedure: configure and connect your VNC client to the Altitude[32]'s VNC server.

2.2.3.2 OPTION B: THE ALTITUDE[32] JOINS YOUR EXISTING WI-FI NETWORK

The most flexible network option for the final installation of your Altitude[32] is to connect it as a Wi-Fi client to *your existing Wi-Fi network*. This will allow you to connect to the Altitude[32] and to the Internet *simultaneously*, without switching back and forth between two different Wi-Fi networks.

To connect the Altitude[32] to an existing Wi-Fi network you need to use the front panel menus to change the Wi-Fi settings:

- Click on the menu button on the front panel.

- Select the Setup > Network > Wi-Fi page.

- Turn the Source/Item selection knob to scroll through the settings until you see the Connection item:

- Push the Select button. This will display the list of available Wi-Fi networks:

- Scroll to the name of the Wi-Fi network you want to join, and press the Select button. If you select an encrypted Access Point, you will be asked for the passphrase.

- Enter the passphrase and press the OK button:

- You should now see that the Wi-Fi status has changed to "Link: Connected":

This means that your Altitude[32] is now connected to the chosen Wi-Fi network.

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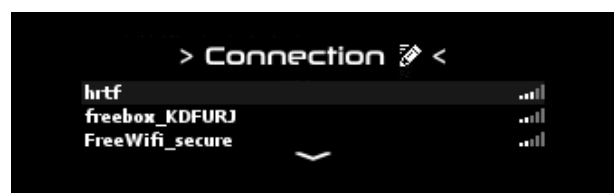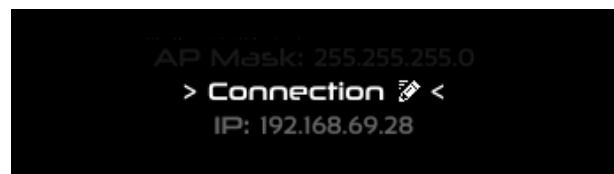
2.2.3.3 OPTION C: THE ALTITUDE[32] JOINS YOUR EXISTING ETHERNET NETWORK

The factory setting for the Altitude[32]'s Ethernet mode is set to DHCP. Therefore, the Altitude[32] will automatically be detected and configured on most local networks.

The benefit of this Ethernet-based option is that you don't need to switch your own device to another network. Therefore, if your network has Internet access, you will remain connected to the Internet while also being connected to the Altitude[32].

To connect the Altitude[32] to your local Ethernet network:

Use an **Ethernet cable** to connect the Altitude[32] to your router or ISP Box;
Use the Altitude[32]'s front panel to check that it now has an IP address: go to the **Setup/Network** menu to see the network configuration.

Once the Altitude[32] is connected to your local network, you can move to the next step of the procedure: configure and connect your VNC client to the Altitude[32]'s VNC server.
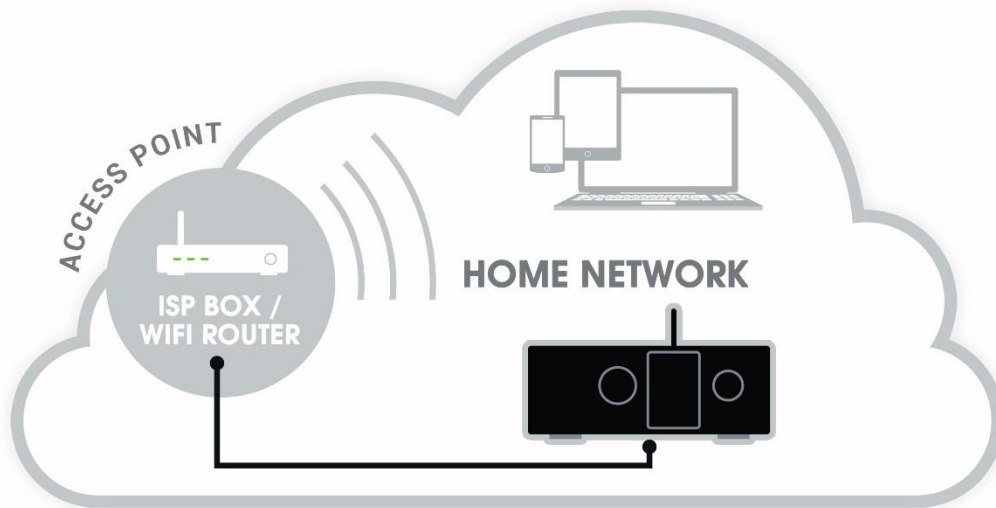
Figure 16: connecting the Altitude[32] to an ISP box or Wi-Fi router

The figure above shows that the Altitude[32] is hard-wired to the Internet Service Provider Box / Wi-Fi Router of the local home network.

If your local network has a Wi-Fi Access Point, you can then access the Altitude[32] from any wireless device connected to your local Wi-Fi Access Point.

NOTES:

- This configuration only works if the router includes an *active DHCP server*.

- The standard settings of your ISP box should allow the Altitude[32] to reach Trinnov Audio's server for software updates through the Internet.

2.2.4   STEP 3: CONNECT TO THE ALTITUDE32 FROM YOUR DEVICE

2.2.4.1   USING A TABLET WITH MOCHA VNC LITE

To connect to the Altitude32's VNC Server from an iOS or an Android device, use the *Mocha VNC Lite* application:

- Open the Mocha VNC Lite app in your iOS or Android device.

- Click on the Configure menu item located in the top left of the page.

- In the Configure page, click on the line "New... Add a configuration".
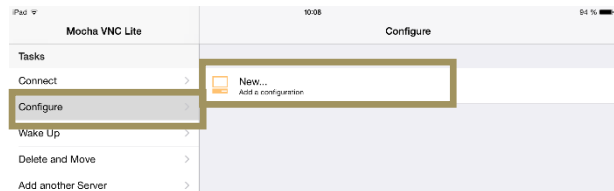
Figure 17: adding a new VNC Server configuration

In the list of VNC Server parameters, click on the "i" button located in the top right of the page, next to the VNC server address.
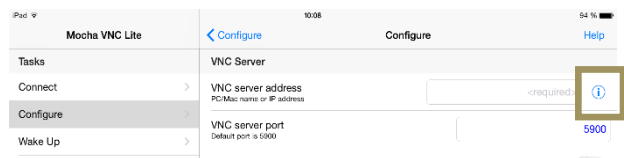
Figure 18: configuring the VNC Server

In the list **Find local workstations**, select the line named "**#VNC Server on Altitude-XX**", where XX is the number of your Altitude32.
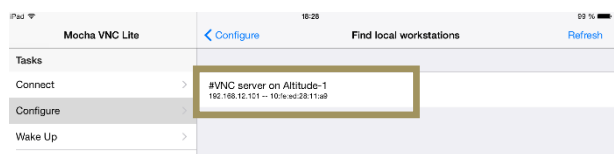
Figure 19: selecting the VNC Server Altitude-XX

The field **VNC server address** now shows the name "**#VNC Server on Altitude-XX**", where XX is the number of your Altitude32.

Go to the field **VNC password** and enter the password, which is the **six-digit** serial number of your Altitude32:

- the password is **00000X**, if the number of your Altitude32's VNC Server has a single digit;

- the password is **0000XX** if the number of your Altitude32's VNC Server has 2 digits;

- the password is **000XXX** if the number of your Altitude32's VNC Server has 3 digits;

- etc…

The VNC Server is now configured.
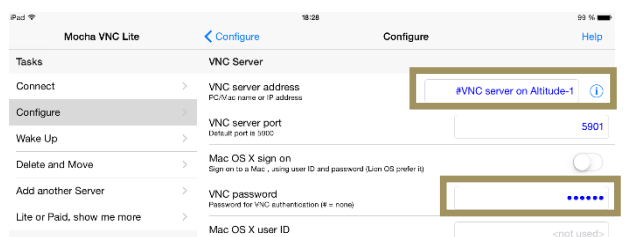
Figure 20: entering the password

Now click on the **Connect** menu item. The "**#VNC Server on Altitude-XX**" should be listed in the page.

Select the line "**#VNC Server on Altitude-XX**".

The graphical user interface of your Altitude32 should now be visible on the screen of your device.

Figure 21: connecting to the Altitude32's VNC server

2.2.5 USING A MAC OS X COMPUTER WITH SCREEN SHARING

To connect to the Altitude[32]'s VNC Server from your Mac OS X computer, you can use the integrated Screen Sharing VNC client included since OS X version 10.5 (Leopard):

Open the Finder application in your Mac OS X computer.

Select the item Go > Network in the Finder's menu. This will display the available VNC servers in your network.

Select (double-click) the server "VNC server on Altitude-XX", where XX is the number of your Altitude[32]. This will display the following window

Click on the Share Screen… button. This will display the Screen Sharing login panel

Enter the password, which is the six-digit serial number of your Altitude[32]:

- the password is **00000X**, if the number of your Altitude[32]'s VNC Server has a single digit;
- the password is **0000XX** if the number of your Altitude[32]'s VNC Server has 2 digits;
- the password is **000XXX** if the number of your Altitude[32]'s VNC Server has 3 digits;
- etc…

Click on the **Connect** button located in the lower left corner of the window.
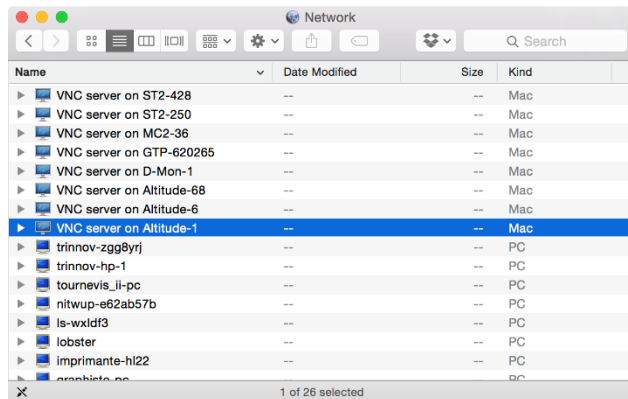
Figure 22: the Network page in Mac OS X's Finder
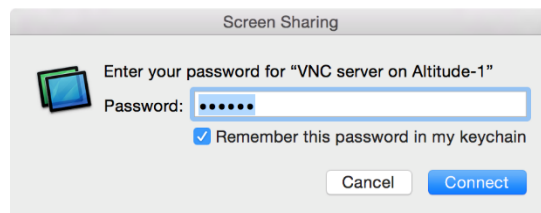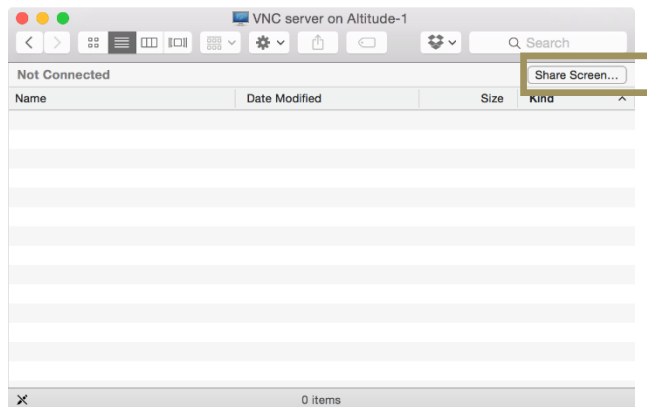
The graphical user interface of your Altitude[32] should now be visible on the screen of your Mac.

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2.2.6 USING A MAC OS X COMPUTER WITH CHICKEN OF THE VNC

To connect to the Altitude[32]'s VNC Server with the *Chicken of the VNC* client from a Mac OS X computer:

1. Open the ***Chicken of the VNC*** software in your Mac OS X computer.

2. The VNC Login window shows a list of available VNC servers. Select the server "**VNC server on Altitude-XX**", where XX is the number of your Altitude[32].
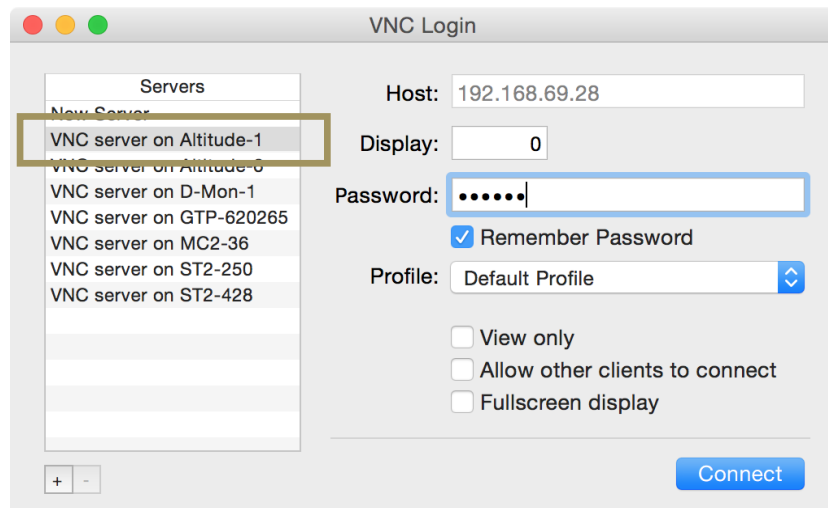
Figure 23: Chicken of the VNC Login window

3. The Host's IP address is automatically filled. You only need to enter the password, which is the **six-digit** serial number of your Altitude[32]:

   o the password is **00000X**, if the number of your Altitude[32]'s VNC Server has a single digit;

   o the password is **0000XX** if the number of your Altitude[32]'s VNC Server has 2 digits;

   o the password is **000XXX** if the number of your Altitude[32]'s VNC Server has 3 digits;

   o etc…

4. Click on the **Connect** button located in the lower left corner of the window.

5. The graphical user interface of your Altitude[32] should now be visible on the screen of your Mac.

2.2.7 USING A WINDOWS COMPUTER WITH TIGHT VNC

Since Tight VNC is not a zero-conf client, the connection procedure requires some additional steps, which are described below.

WRITE DOWN YOUR ALTITUDE³²'S SERIAL NUMBER

1. Go to your Altitude³²'s back panel to find out its serial number. The **6-digit serial number** is printed above the MADE IN FRANCE tag: it is "123456" in the example below:

Figure 24: a serial number as printed on the back panel of the Altitude³²

2. the VNC password is the **six-digit** serial number of your Altitude³²:

    - The password is **00000X**, if the number of your Altitude³²'s VNC Server has a single digit;
    - The password is **0000XX** if the number of your Altitude³²'s VNC Server has 2 digits;
    - The password is **000XXX** if the number of your Altitude³²'s VNC Server has 3 digits;
    - Etc…

WRITE DOWN THE IP ADDRESS OF THE ALTITUDE³²

If your VNC client is not *zeroconf-enabled* it cannot find the Altitude³²'s VNC Server automatically. This is the case of the *Tight VNC* client for Windows. Therefore, you'll need to enter the Altitude³²'s **IP address** in the connection window. More precisely, the IP address you need to enter is:

- The **IP address of the Ethernet interface**, if the Altitude³² is connected to the router via an Ethernet cable.

- The **AP IP address** of the Wi-Fi interface, if the remote device is connected to the Access Point of the Altitude³².

- The **IP address of the Wi-Fi interface**, if the Altitude³² is connected to an existing Wi-Fi network.

> **NOTE:**
>
> the **IP address** of the Altitude³² can be retrieved:
>
> - via the front panel, in the **Setup/Network/Ethernet** page or in the **Setup/Network/Wifi** page;
> - from the **Network** page of the graphical user interface, displayed to a monitor via the VGA or DVI port.

GETTING THE IP ADDRESS FROM THE WI-FI SETTINGS

To get the IP address from the Wi-Fi settings via the front panel:

Click on the **menu** button

Go to the **Setup > Network > Wi-Fi** page:

Turn the Source/Item selection knob to scroll through the settings.
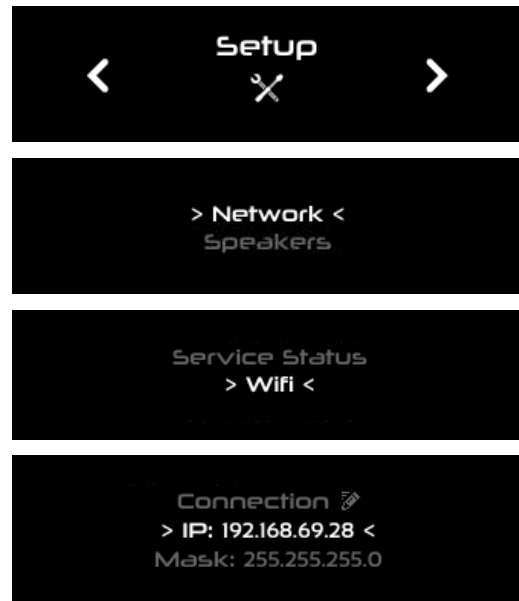
Figure 25: IP address in the Setup > Network > Wi-Fi page via the front panel

GETTING THE IP ADDRESS FROM THE ETHERNET SETTINGS

To get the IP address from the Ethernet settings via the front panel:

Click on the menu button

Select the **Setup > Network > Ethernet** page

Turn the **Source/Item selection knob** to scroll through the settings.
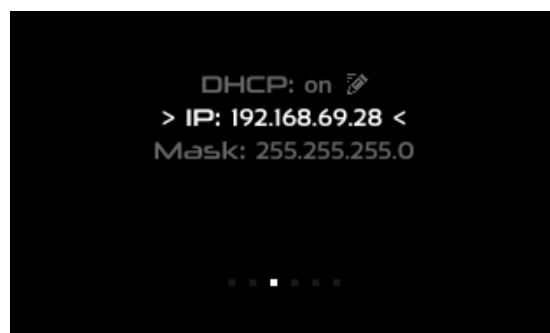
Figure 26: IP address in the Setup > Network > Ethernet page via the front panel

CONNECT WITH TIGHT VNC

First of all, use the Altitude[32]'s front panel display to find out the **IP address** of its VNC Server (see the detailed explanation above).

To connect with your VNC client to the Altitude[32]:

1. Open the Tight VNC software in your Windows computer.

2. In the VNC client's connection window, enter the **IP address** of the Altitude[32]'s VNC Server (see the detailed explanation above),

3. Click on the **Connect** button. This will open the **VNC Authentication** window :

4. In the **VNC Authentication** window, enter the password, which is the **six-digit serial number** of your Altitude[32], printed on the back panel.

   a. The password is **00000X**, if the number of your Altitude[32]'s VNC Server has a single digit;
   b. The password is **0000XX** if the number of your Altitude[32]'s VNC Server has 2 digits;
   c. The password is **000XXX** if the number of your Altitude[32]'s VNC Server has 3 digits;
   d. Etc…

5. Once you've entered the correct password, the Altitude[32]'s graphical user interface will be displayed.
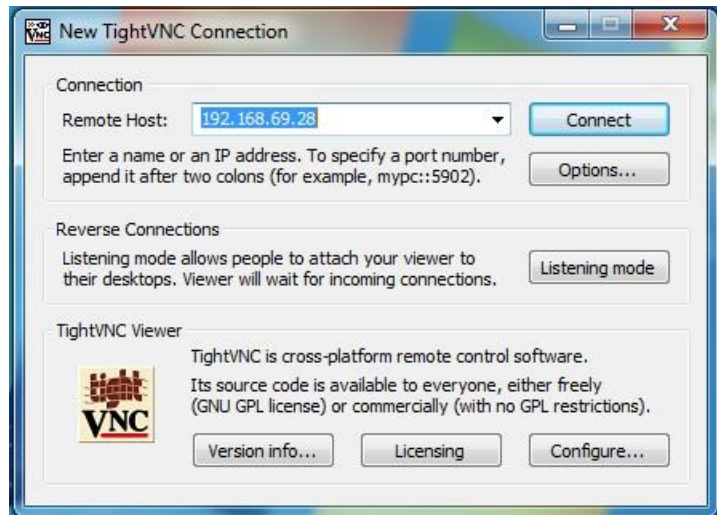
Figure 27: the New TightVNC Connection panel on a Windows computer

45

2.3 CHANGING THE NETWORK SETTINGS THROUGH THE FRONT PANEL

2.3.1 CHECKING THE WI-FI SETTINGS

To check the Wi-Fi settings via the front panel:

- Click on the **menu** button

- Go to the Setup > Network > Wifi page:

- Turn the **Source/Item** selection knob to scroll through the settings.
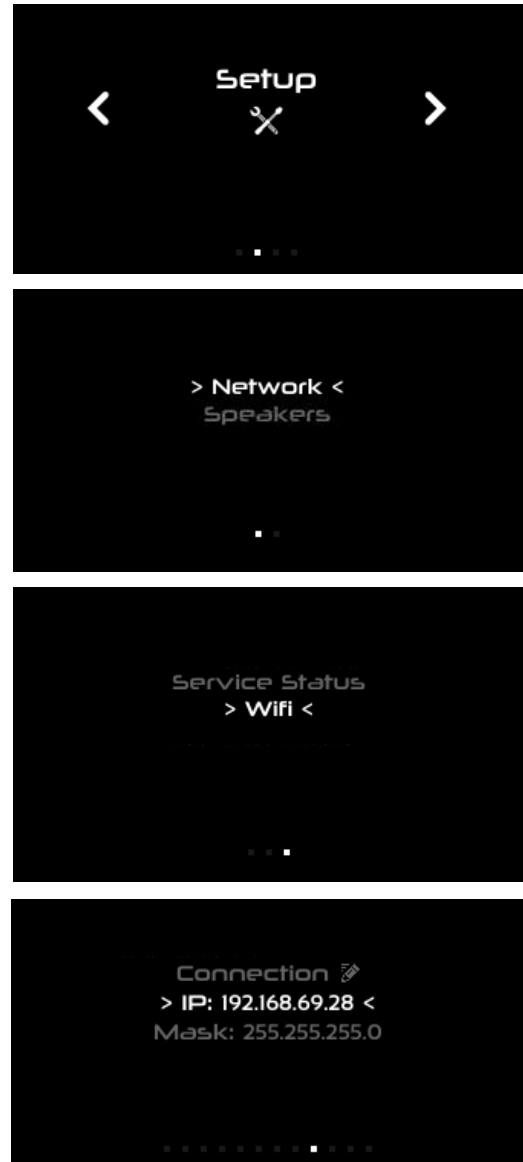
Figure 28:
Setup > Network > Wi-Fi page via the front panel

2.3.2　CHECKING THE ETHERNET SETTINGS

To check the Ethernet settings via the front panel:

- Click on the menu button

- Select the Setup > Network > Ethernet page

- Turn the **Source/Item** selection knob to scroll through the settings.
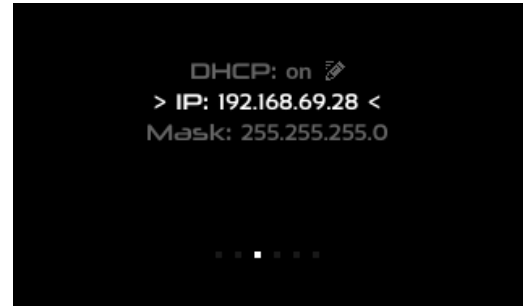
Figure 29:
Setup > Network > Ethernet page via the front panel

2.3.3　CONNECTING THE ALTITUDE³² TO A WI-FI NETWORK

Please refer to *Step 2* of the subchapter above.

2.4 CHANGING THE WI-FI SETTINGS THROUGH THE GUI

This subchapter explains how to change the Wi-Fi settings of the Altitude[32] to meet the requirements of your home theatre's technical environment.

2.4.1 ABOUT THE WI-FI INFORMATION

The following Wi-Fi information is available in the Altitude[32]:

- *Mode:* indicates the current Wi-Fi mode of the Altitude[32].

- *AP SSID:* indicates the name of the Altitude[32]'s Wi-Fi Access Point.

- *AP IP:* indicates the IP address of the Access Point to be used for VNC connection when using the Altitude[32] as Wi-Fi Access Point.

- *AP password:* indicates the password to be used when attempting to join the Altitude[32]'s Wi-Fi Access Point.

- *AP netmask:* indicates the netmask of the Altitude[32]'s Wi-Fi Access Point.

- *Client status :* indicates the status of the Wi-Fi client of the Altitude[32].

- *Client SSD:* indicates the name of the Wi-Fi Network joined by the Altitude[32] as a Wi-Fi client. None displayed if no connection has been established.

- *IP address:* indicates the IP Address of the Wi-Fi client.

- *Netmask:* indicates the netmask of the Wi-Fi Network joined by the Altitude[32] as a Wi-Fi client.

2.4.2 CHECKING THE WI-FI SETTINGS

The Wi-Fi network information can be retrieved from the Graphical User Interface of the Altitude[32]:
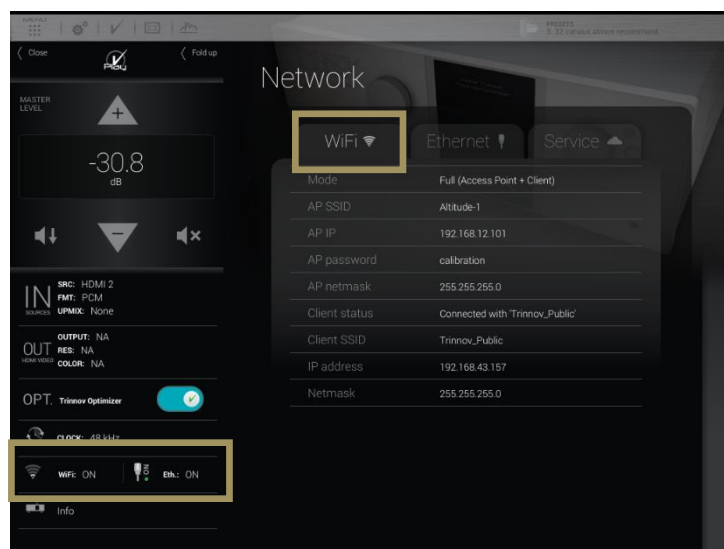
2.4.3 CONNECTING THE ALTITUDE[32] TO A WI-FI NETWORK

The most flexible network option for the final installation of your Altitude[32] is to connect it as a Wi-Fi client to *your existing Wi-Fi network*. This will allow you to connect to the Altitude[32] and to the Internet *simultaneously*, without switching back and forth between two different Wi-Fi networks.

To connect the Altitude[32] to an existing Wi-Fi network:

- Open the **Advanced Settings** user interface.

- Go to the **Setup/Network** page.

- In the Wi-Fi section, click on the **Setup...** button. This opens the **Wi-Fi Status Modes** page.
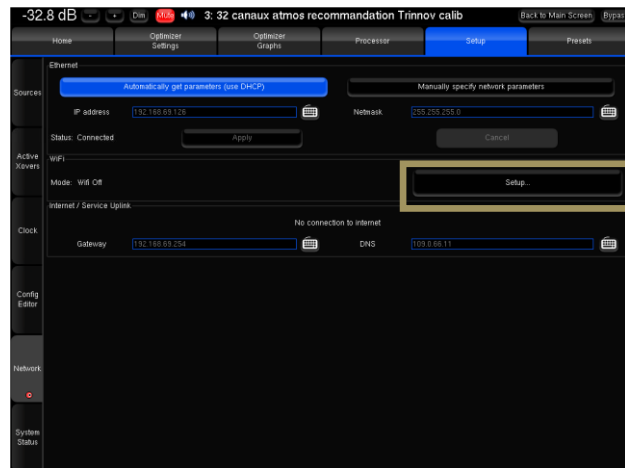
Figure 30: the Setup/Network page

- Click on the **Connect...** button in the bottom left corner of the page. This will display the available Wi-Fi networks. The **encryption** column displays a locker icon when the network is protected by a passphrase and/or encrypted. The **signal** column displays a Wi-Fi signal icon, indicating the strength of the Wi-Fi signal

Figure 31: Wi-Fi status modes page

- Select the Wi-Fi network you want to join, and click on the **Connect** button. If you select an encrypted Access Point, you will be asked for the passphrase.

- Enter the passphrase and press the OK button.

Your Altitude[32] should now be connected to the chosen Wi-Fi network.
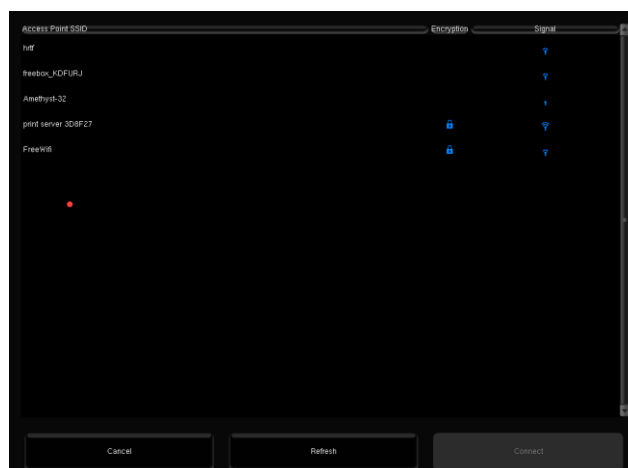
Figure 32: list of available Wi-Fi networks

2.4.4 CHANGING THE WI-FI STATUS MODE OF THE ALTITUDE[32]

The Altitude[32]'s built-in Wi-Fi and Ethernet modules allow it to ***simultaneously*** be part of a network as:

- An Ethernet client connected to an existing Ethernet network through an ISP Box (Internet Service Provider) or a router.

- A Wi-Fi Access Point (AP) to create its own Wi-Fi network.

- A Wi-Fi client to join an existing network wirelessly.
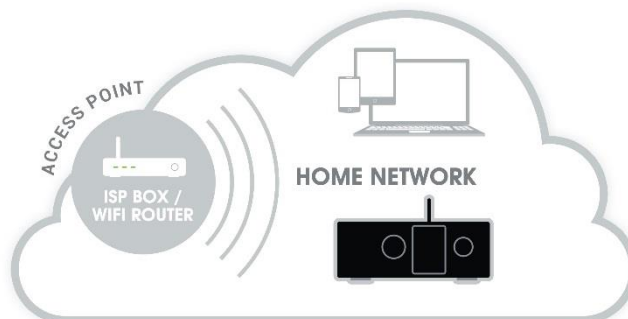
To change the Wi-Fi settings of your Altitude[32] via the graphical user interface:

1. Open the **Advanced Settings** interface;
2. Go to the **Setup/Network** page:
3. Press the **Setup**… button to display the Wi-Fi Status Modes page:
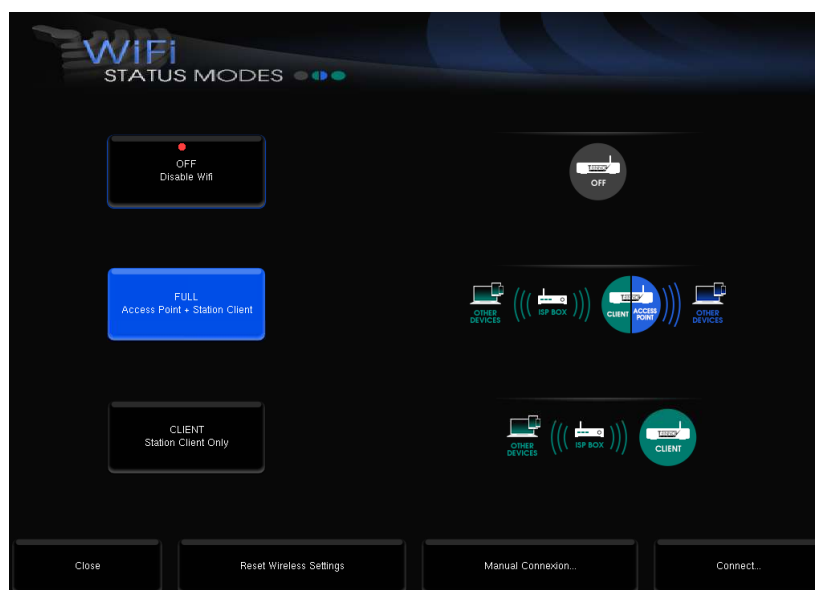
Figure 33: Wi-Fi Status modes

You can choose one of the following Wi-Fi modes:

- **OFF:** the Wi-Fi module of the Altitude[32] is disabled.

- **FULL (default):** the Altitude[32] is used both as an Access Point and as a Client.

- **CLIENT:** the Access Point is disabled but the Altitude[32] still operates as a Wi-Fi client as long as the configuration is valid.

2.5 CHANGING THE ETHERNET SETTINGS THROUGH THE GUI

This subchapter explains how to change the Ethernet settings of the Altitude[32] to meet the requirements of your home theatre's technical environment.

2.5.1 ABOUT THE ETHERNET INFORMATION

The following Ethernet information is available in the Altitude[32]:

- **Status:** indicates the connection status of the Ethernet interface of the Altitude[32]
- **MAC address:** indicates the MAC address of the network interface of the Altitude[32] (required to remotely switch the Altitude[32] on with a Wake-on-Lan command).
- **IP address:** indicates the IP address of the Ethernet interface of the Altitude[32].
- **Netmask:** indicates the netmask of the local area network joined as a DHCP client via Ethernet.
- **Gateway:** indicates the address of the Gateway for network interconnection.

2.5.2 CHECKING THE ETHERNET SETTINGS

The network information can be retrieved from the Graphical User Interface of the Altitude[32]:
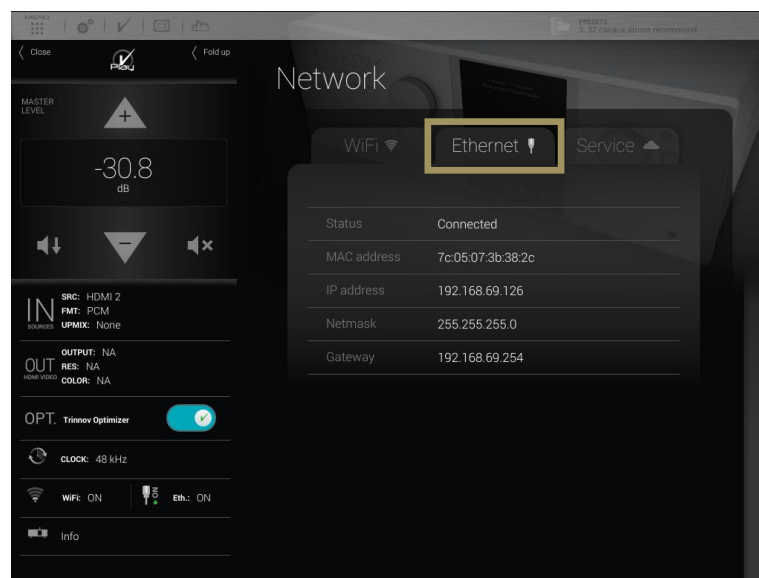
Figure 34: Ethernet Network Interface Information

NOTE: Network settings can only be changed through the **Advanced Settings interface** of the Altitude[32]. Go to the **Setup/Network** page to change the Ethernet and Wi-Fi settings.

2.5.3 CHANGING THE ETHERNET SETTINGS
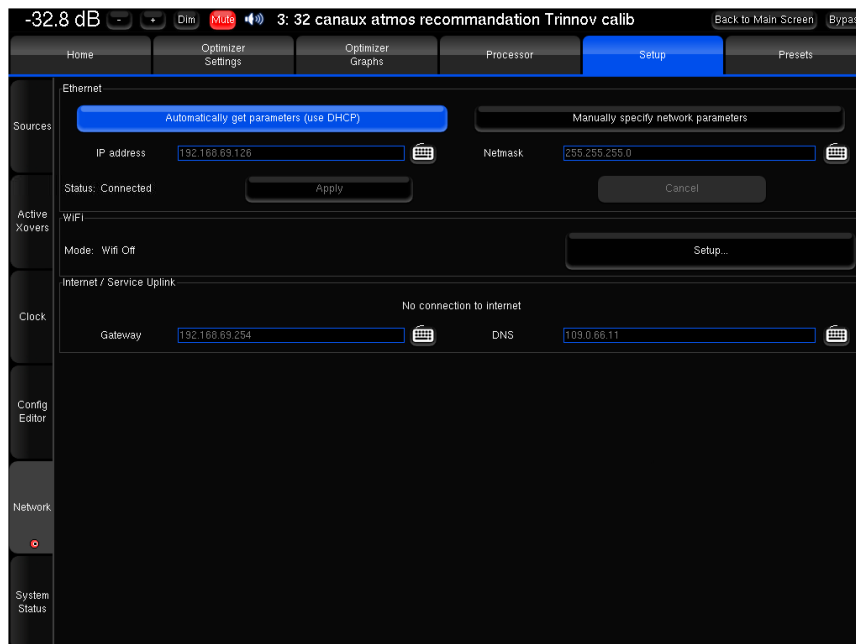
Figure 35: Network Setup in the Advanced Settings menu

The default mode of the Ethernet interface of the Altitude[32] is DHCP, meaning that the Altitude[32] will automatically be detected and configured by the router, provided that the router runs a DHCP server. This is the case in most domestic environments.

To configure the Ethernet connection manually, select the **Manually specify Network parameters** option and hit the **Apply** button.
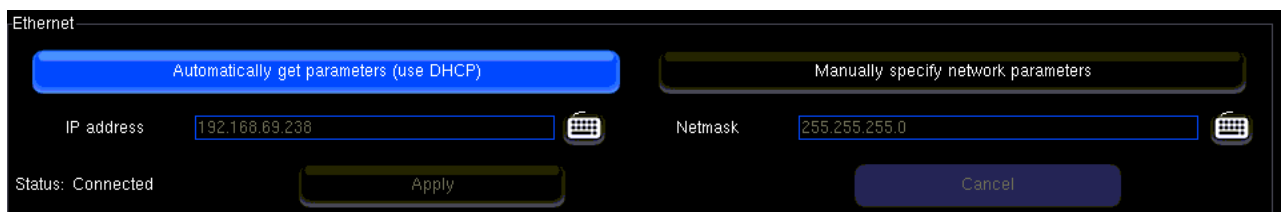
The IP address, Netmask, Gateway and DNS option can then be edited manually.

Applying new settings with the **Apply** button is required for every change.

> **NOTE:** It is recommended to refer to an IT specialist before switching to manual configuration.

2.6 ABOUT VNC AND ZERO-CONF NETWORKING

The Altitude[32] leverages two important networking technologies: VNC and zero-configuration networking, which are explained below.

2.6.1 ABOUT VNC (VIRTUAL NETWORK COMPUTING)

VNC is a graphical desktop sharing system that transmits the keyboard and mouse events from one computer (server) to another (client), relaying the graphical screen updates back in the other direction, over a network.

The Altitude[32] has a *built-in VNC Server* that allows you to access its graphical user interface over the network from any device running a *VNC client*.

In other words, you can control the Altitude[32] from any device, whether it's a computer (PC, Mac or Linux) or a tablet (iOS, Android or Windows), provided that both the Altitude[32] and your device are part of *the same network*.

> **NOTE:** to learn more about *VNC*, please read the following article on Wikipedia:
>
> http://en.wikipedia.org/wiki/Virtual_Network_Computing

2.6.2 ABOUT ZERO-CONFIGURATION NETWORKING

Zero configuration networking (zeroconf) is a networking technology that makes it easy to set up and use devices and services on a network. Because zeroconf-enabled devices and services advertise their availability, it's easy for you (or an app or service) to find devices and services that you want to use.

The Altitude[32]'s *VNC Server* is zeroconf-enabled in order to advertise its availability to the zeroconf-enabled *VNC Client* running on your device (tablet or computer).

The two major implementations used in VNC client apps are:

- *Bonjour*, developed by Apple Inc. It is available in free VNC clients such as *Mocha VNC Light* (for iOS and Android devices) and *Chicken of the VNC* (for Mac OS X).
- *Avahi*, for the Linux operating system.

Microsoft has its own proprietary protocol for remote computing: RDP (Remote Desktop Protocol). This explains why there is no major implementation of the zeroconf technology on the Windows platform.

> **NOTE:** to learn more about *Zero-configuration networking*, please read the following article on Wikipedia: http://en.wikipedia.org/wiki/Zero-configuration_networking

3 NETWORK STREAMING

3.1 THE UPNP PROTOCOLE

The Altitude[32] network streamer feature is based on the Universal Plug and Play (UPnP) set of networking protocols. In the UPnP/DLNA terminology, the Altitude[32] is a UPnP Digital Media Renderer device and is used as a slave equipment to play media content sent through the network.

The Altitude[32] must be used with DLNA/UPnP compatible server and controller devices. The Media Server shares its media library on the network with UPnP clients. The Media Controller is the master device, used to automatically detect servers and play files on slave devices as well as to control them.

Provided that the server supports these formats, the Altitude[32] can decode and play high-resolution 24 bits/192 kHz WAV, AIFF, FLAC and 16 bits/192 kHz OGG music files.

3.2 UPNP NETWORK ARCHITECTURE

This architecture represents the most common and comfortable method to play media files in a domestic environment:

- A Network-Attached Storage (NAS) or a computer is used as UPnP server and shares the media library.

- The library is browsed from a Media Controller, installed on a tablet or smartphone.

- The Altitude[32] is selected as rendering device from the Media Controller.

> **NOTE:** Most NAS are UPnP compatible servers but any computer can be turned into a server provided that a compatible UPnP server software is installed.
>
> Several applications can turn smartphone and tablets into media controllers or servers.
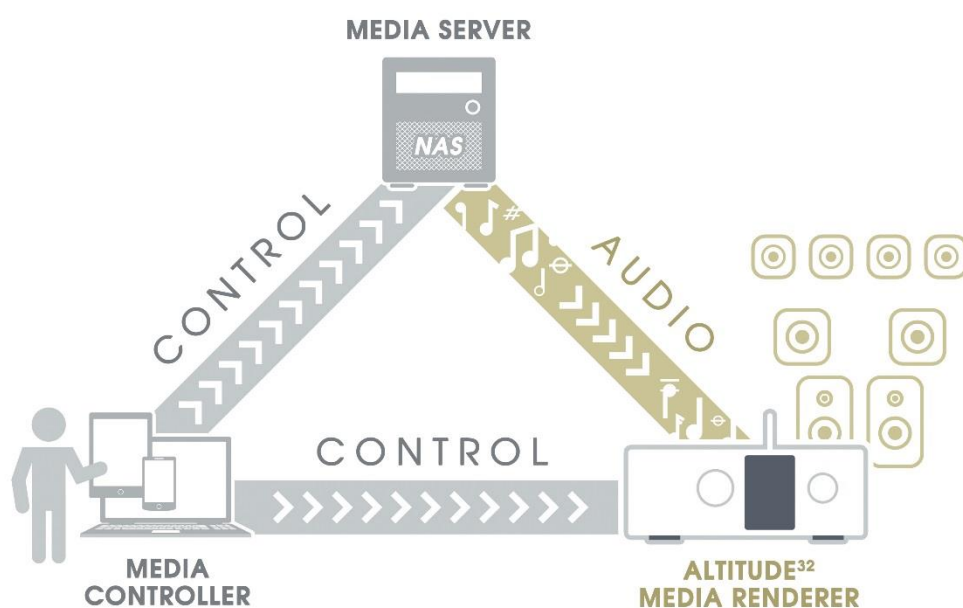
UPnP Network with a Digital Media Controller

3.3 RECOMMENDED UPNP SOFTWARES

The Amethyst is a UPnP renderer. Unlike a UPnP player, the Amethyst cannot be used to browse a library, create playlists and control audio playback.

That's why we have established a shortlist of UPnP third-part software optimized for audio.

JRiver
MediaCenter

PS Audio
eLyric Music Manager

These software has been selected, tested and qualified based on the following requirements.

✔ UPnP server and controller

✔ 24 bits 192 playback

✔ Bit Perfect Streaming

✔ WAVE AIFF FLAC OFF support

✔ Album cover art display

✔ User-friendly graphical user interface

JRiver

MediaCenter (www.jriver.com)

JRiver Media Center is a comprehensive media player and UPnP platform that can be used as both server and controller.

This software is therefore a perfect match for the Altitude.

JRiver Media Center is a commercial software available for PC and Mac.

DOWNLOAD > *www.jriver.com/download.html*
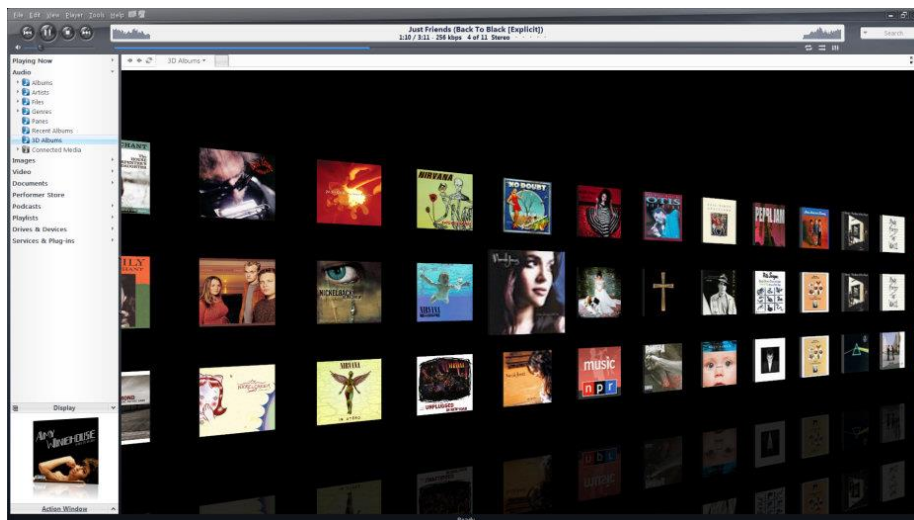
PS Audio

eLyric Music Manager (www.psaudio.com)

eLyric Music Manager is a free alternative media manager developped by PS Audio.

Also available for Windows® and Mac, it can be used as both UPnP server and controller.

DOWNLOAD > *www.psaudio.com/products/audio/elyric-manager*
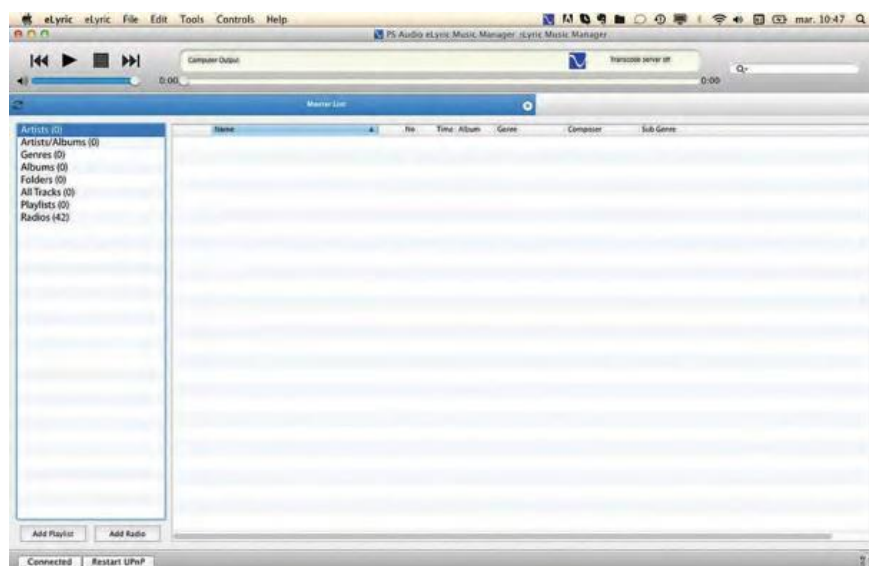
4   DAILY OPERATIONS

This chapter explains how to perform daily operations on the Altitude³² such as:

Volume control   /   Source selection   /   Preset selection…

These operations can be performed:

via the front panel   /   via the IR remote control   /   via the graphical user interface.

4.1   AVAILABLE USER INTERFACES

Simple daily operations on the Altitude³² can be performed:

- On the front panel, by turning the Source/Item selection knob and pushing the Select button to scroll through the menus;
- With the infrared remote control,
- From your tablet or your computer, connected to the same network as the Altitude³²:
  - o   with a *VNC Client* connected to the Altitude³² 's VNC Server,
  - o   with a *web browser* accessing the Altitude³²'s web-based interface,
- With a *display, a mouse and a keyboard* directly connected to the Altitude³²'s back panel.

NOTE:

- For a detailed step-by-step explanation of how to connect with a *VNC Client*, please see the subchapter **First Network Connection to the** Altitude³² in the **Network Setup** chapter.

- Further details about the *web interface* are provided in the **Introduction** chapter of this document.

- For additional details about connecting a *display, a mouse and a keyboard*, please refer to the **Introduction** chapter at the beginning of this document.

4.2   USING THE FRONT PANEL

4.2.1   POWER ON-OFF SEQUENCE

⬦	**IMPORTANT NOTE:** don't forget that the amplifiers should always be powered-on **last**.

Turn On the **main power switch on the rear panel** to supply the Altitude[32] with electricity, then press the **front panel power button** to start the Altitude[32].

⬦	**NOTE:** The system doesn't start instantly and takes about **60 seconds to complete start-up.**

While the system starts, the front panel screen displays the following image.

Figure 36: front panel startup image

To shut the Altitude[32] down, press the front panel power button once. The front panel screen will then display the following image until complete stop.

Figure 37: front panel shut down image

⬦	**NOTE:** It is not recommended to cut the AC Power via the **main power switch on the rear panel**, as the system saves several "last-used" settings while shutting-down.

VOLUME CONTROL

Turning the **Volume Control knob** to the right or left will respectively turn the volume up or down.

Push the **Mute button** to mute the audio outputs of the Altitude[32].

SOURCE SELECTION

There are two methods to select sources from the front-panel on the Altitude[32]:

Turn the **source selection knob** to scroll through sources and push the select button.
Use one of the **direct selection buttons** (also available from the remote control).

> ⚠ **NOTE:** **w**ith factory settings, the last-used source is recalled at start-up.

PRESET SELECTION

In order to select a preset through the front-panel menus:

Push the **Menu** button, scroll until Presets and push the **Select** button.

Select the required preset using the **Source Selection Knob** and push the Select button.

Volume control knob

Source/item selection knob

Back button

Select button

Menu button

Mute button

Direct selection

4.2.2 CHECKING THE FORMAT OF INCOMING AUDIO

The format of the incoming audio of the currently selected source is displayed on the front panel display of the Altitude[32] below the Optimizer status.
The Sampling Rate of the audio being played is indicated on the left side of the front panel display of the Altitude[32].
The current upmixer used is displayed on the front panel display on the Altitude32 below the sampling rate.

Figure 38: Altitude[32] front panel display

4.3   USING THE IR REMOTE CONTROL

4.3.1   VOLUME CONTROL

The following volume control buttons are available on the IR Remote control

Volume Up and Down buttons

Dim and Mute buttons

4.3.2   SOURCE SELECTION

The IR remote control includes 4 buttons for direct source selection, as well as 2 buttons to browse through the sources

Browse through Sources...

Direct Sources selection (instantaneous)

...and confirm with 'OK' button

4.3.3   LISTENING   FORMAT   SELECTION

These allows you to switch between the different listening format, and so between the different Upmixers. This can be done on the fly, you do not need to press OK to validate.

Switch through the listening formats

4.3.4   PRESETS SELECTION

To switch to another preset:

1. Browse through the presets with the **Optimizer Preset arrow** buttons

2. Push the **OK** button.

Browse through Presets…

…and confirm with 'OK' button

4.3.5   ACCESS TO THE FRONT PANEL MENU

To access to the Menu :

1. Press on **Menu** button to access to the Menu

2. Browser with ◀ **Left**, ▶ **Right,** ⋏ **up and** ⋎ **down** arrows

3. Validate with the **OK** button

4. Return with the **Back** button

Access to the Menu…

…Browse with the arrows…

Return with Back Button.

…Validate with OK.

4.3.6   LIGH BUTTON

The **Light** button allows to turn off the backlight of the front panel screen. Pressing on another button will temporary turn on the backlight to let you know the settings you are changing. Pressing the **Light** button will turn back on the backlight.

Turn off or on the backlight

4.3.7   OPTIMIZER BYPASS

The **Bypass** button allows you to toggle on and off the speakers/room Optimizer.

4.4 USING THE GRAPHICAL INTERFACE

4.4.1 VOLUME CONTROL

The following volume control options are available within the graphical user interface.

A **Mute** button also allows you to mute the audio outputs of the Altitude[32].

A **Dim** button also allows you to decrease the volume by 20dB.

> **NOTE:** By default the last used volume is recalled at start-up.

4.4.2 SOURCE SELECTION

Sources can be selected through the graphical user interface by clicking on the icon:
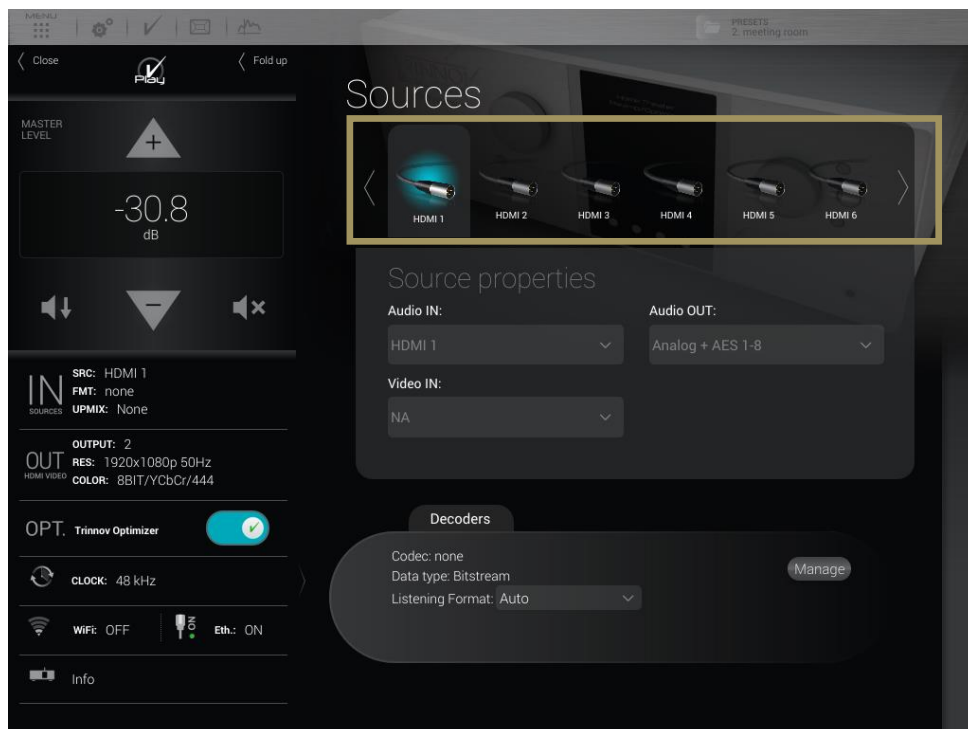
Figure 39: the source selection page in the graphical user interface

4.4.3   PRESET SELECTION

Presets can be selected through the graphical user interface:
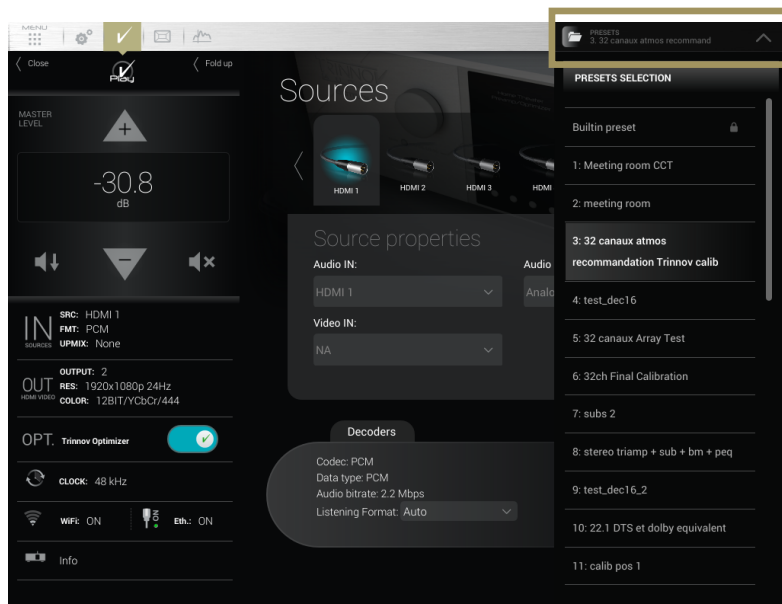
Figure 40: preset selection in the graphical user interface

4.4.4   CHECKING THE FORMAT OF INCOMING AUDIO

The format of incoming audio is displayed in the lateral menu bar and in the **Sources** page of the **Main** user interface:
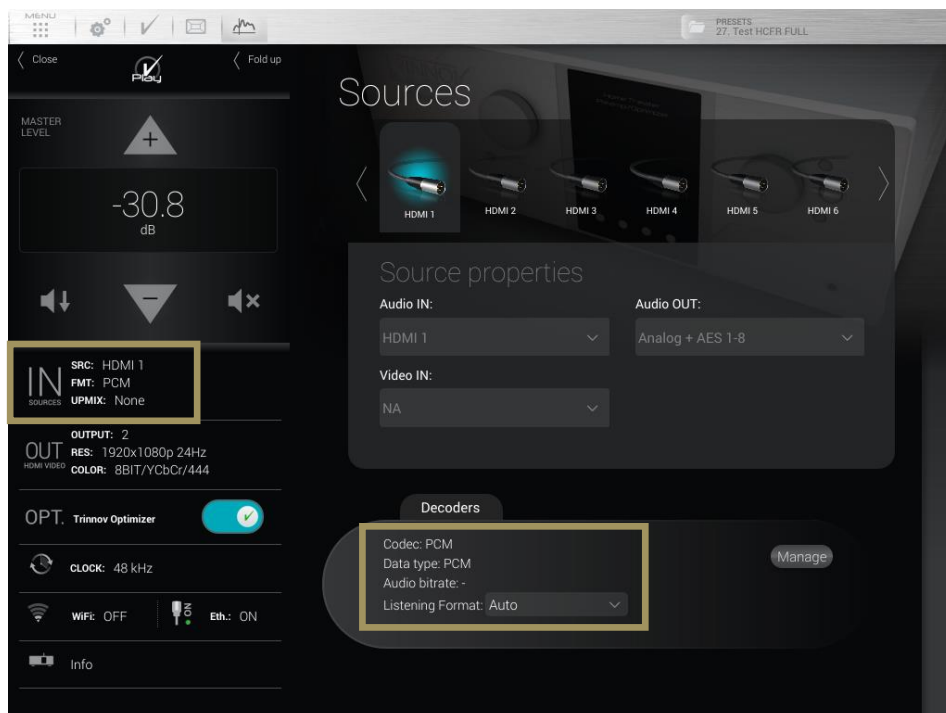
Figure 41: checking the audio format through the user interface

5   BASIC SETTINGS

5.1   NAMING YOUR SOURCES

The Altitude[32] provides a very flexible concept of **Source Configurations**. Each **Source Configuration** can be renamed to reflect the actual source that it corresponds to. By default, the source names correspond to the names of the back panel connectors but can be edited in the **Home/Sources Config** page of the Advanced Settings Interface.

A **Source Configuration** can also includes specific output and processing parameters. Therefore, it can be used to switch between outputs or between different processing settings. For example, it is possible to configure two **Source Configurations** set on the *same inputs* but set with *different names* to recall *different settings*.

The **Home/Source Config** page consists of one vertical tab per source on the left and source-specific parameters on the right.

Figure 42: Source Configurations panel
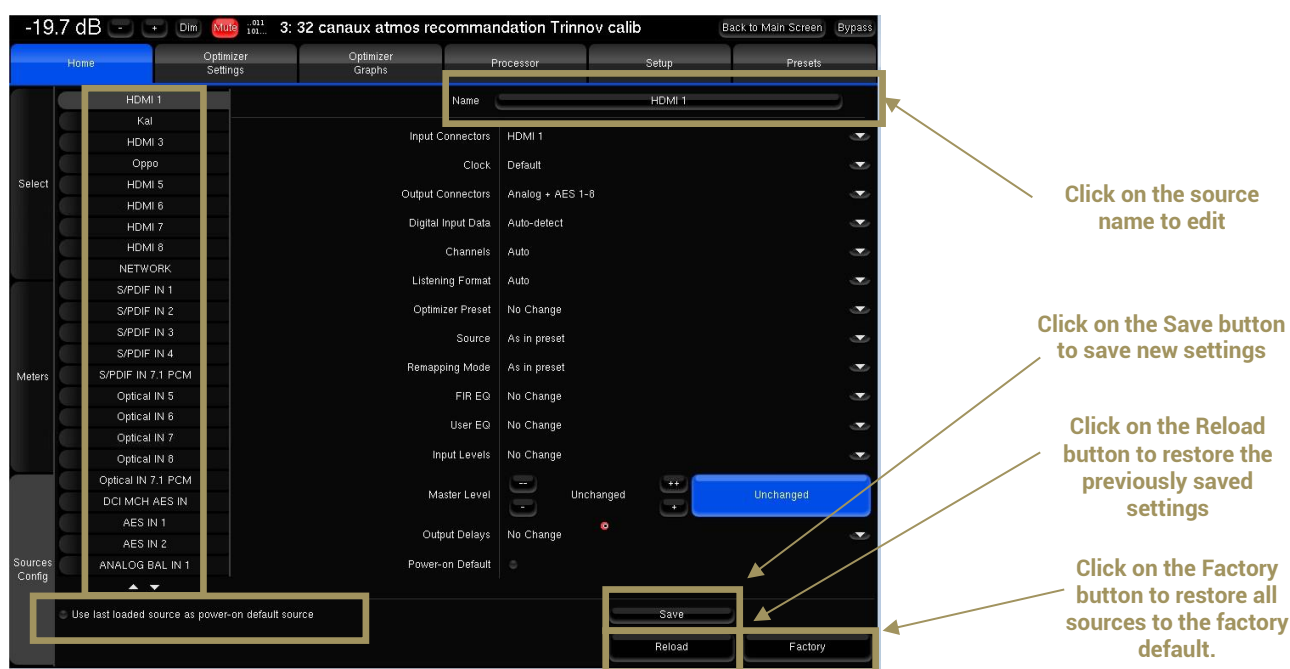
> **IMPORTANT NOTE:** It is particularly important to define user friendly names for the *first 4 sources* because they are displayed on the front panel screen, and can be recalled from the front panel's or from the IR remote control's source selection buttons.
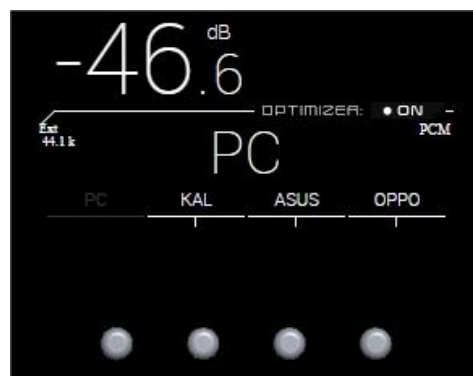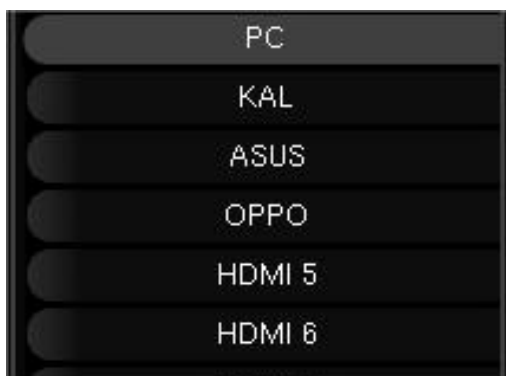
> **IMPORTANT NOTE:** Changes are not applied until saved via the **Save** button in the bottom right corner of the screen.

5.2   CONFIGURING YOUR SOURCES

In addition to an editable name, each **Source Configuration** includes a number of parameters to specify all the settings related to a specific configuration requirement for your system.

Source configurations can be used for different purposes:

- to switch between your different **sources**. For example: one Blu-ray player, one Network player and a Digital TV.
- to switch between different **outputs**. For example: a pair of hi-fi loudspeakers and a 5.1 home cinema setup.
- to switch between **sources and outputs simultaneously**. For example: play a vinyl record on the hi-fi loudspeakers and a blu-ray disc on the 5.1 home cinema system.
- to recall different **processing settings** such as acoustic optimization filters, decoding modes or bass management modes.

In order to change one of the parameters of the selected source configuration, click on the corresponding arrow:
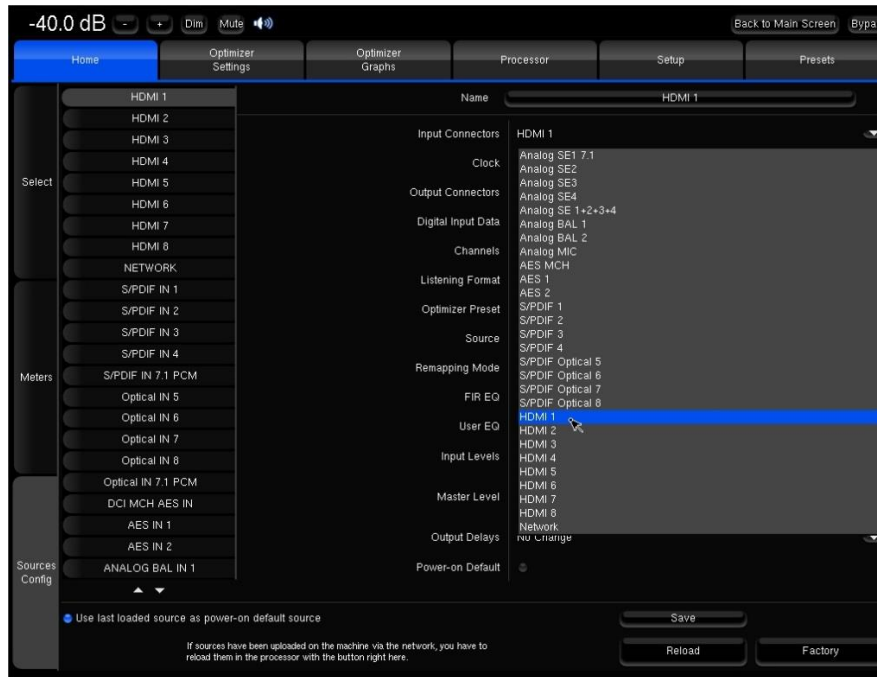
Figure 43: editing a source configuration

The following settings can be configured for each of your **Source Configurations**:

- **Input Connectors**: select the rear panel input(s) to which your source is connected.

- Clock:
    - Default: the clock will run in master mode for analog inputs, in slave mode for digital inputs, and in master mode for the network input.
    - Mast. *X*k: set the clock to different master clock sampling rates (32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz or 96 kHz).
    - Sl. WC: set the clock to slave mode.

- **Output Connectors:** select the outputs that you want to use to play this source:
    - Analog + AES 1-8: analog outputs 1-32 (depends of your configuration) and AES outputs 1-8 are active simultaneously;
    - AES 1-16: AES outputs 1-16 are active; analog outputs are disabled;
    - AML: Audio Multi Link is active;
    - HDMI: HDMI outputs 1 & 2 are active simultaneously;
    - AES OLD 1-16: old routing used in the prerelease models. Do not use.

- Digital Input Data:
    - Auto-detect: automatically detect whether the input is PCM or bit-stream;
    - Force PCM Audio: force the PCM audio format;
    - Force Bitstream Data: force the bitstream format to let the Altitude[32] decode the signal from the player.

- **Channels:** On non-HDMI source, you can select the channels you want to play
    - L,R
    - L,R,C
    - L,R,C,Lfe
    - L,R,C,Lfe,Ls,Rs
    - L,R,C,Lfe,Ls,Rs,Lrs,Rrs

- **Listening Format:** Select the default format you want to use with this source. The Altitude[32] will force to decode and upmix (if possible) in this format.
    - Auto : Will automatically upmix in the corresponding format

- o   Dolby Surround : Will force the Dolby Surround upmix

- o   Neural:X : Will force the DTS Neural:X upmix

- o   Auro-3D: Will force the Auro-3D upmix.

- o   Native : keeps the incoming format from the source

- o   Upmix on native : Will automatically upmix in the corresponding format with the Legacy layout

- o   Legacy : Will only use the bed (5.1 or 7.1)

- **Optimizer Preset:** This parameter allows you to link a source to one of the preset you created.
    - o   No Change: no preset is associated to this source configuration;
    - o   1 to 29: choose one of the 29 presets to load a preset when this source is selected.

- The following parameters are set, by default, to use the settings from the current preset:
    - o   Source (the format of the source)
    - o   Remapping Mode

For the following parameters, it is possible to choose between **No Change**, **As in preset** or to select one of the EQ created and saved in the **Processor/Output** page during the fine tuning:

- **FIR EQ** : Select a FIR EQ that has been saved in the **Processor/Output** page.

- **User EQ** : Select a FIR EQ that has been saved in the **Processor/Output** page.

- Input Levels

- Output Delays

The **Master Level** can be left Unchanged (default setting) or set to a specific level.

Power-on Default: the selected source can be set as the default configuration to be loaded at power-on. Alternatively, you can check the option **Use last loaded source as power-on default source** in order to keep the source that was used before the last shut-down.

5.3   DEFAULT SOURCE CONFIGURATION

With factory preset, the Altitude[32] uses the last loaded source as power-on default source. This can be modified in the **Home/Sources Config** page of the Advanced Settings Interface:

Default Source

Select the vertical tab of the source you want to use as default source. Tick the **Power-on Default** checkbox. Press the **Save** button to apply the new parameter of the source.

5.4   OPTIMIZATION OPTIONS

The Altitude[32]'s optimization of the speaker system can be switched on/off via the Main interface.
To switch on/off the optimization options, click on the **"OPT. Trinnov Optimizer"** menu item of the lateral menu. The following Optimization options are available in this page:

- To activate/deactivate *the whole* Optimizer processing:
    - the **Trinnov Optimizer** switch

- To activate/deactivate specific parts of the processing:
    - the **Acoustic correction** switch
    - the **Level alignment** switch
    - the **Delay alignment** switch
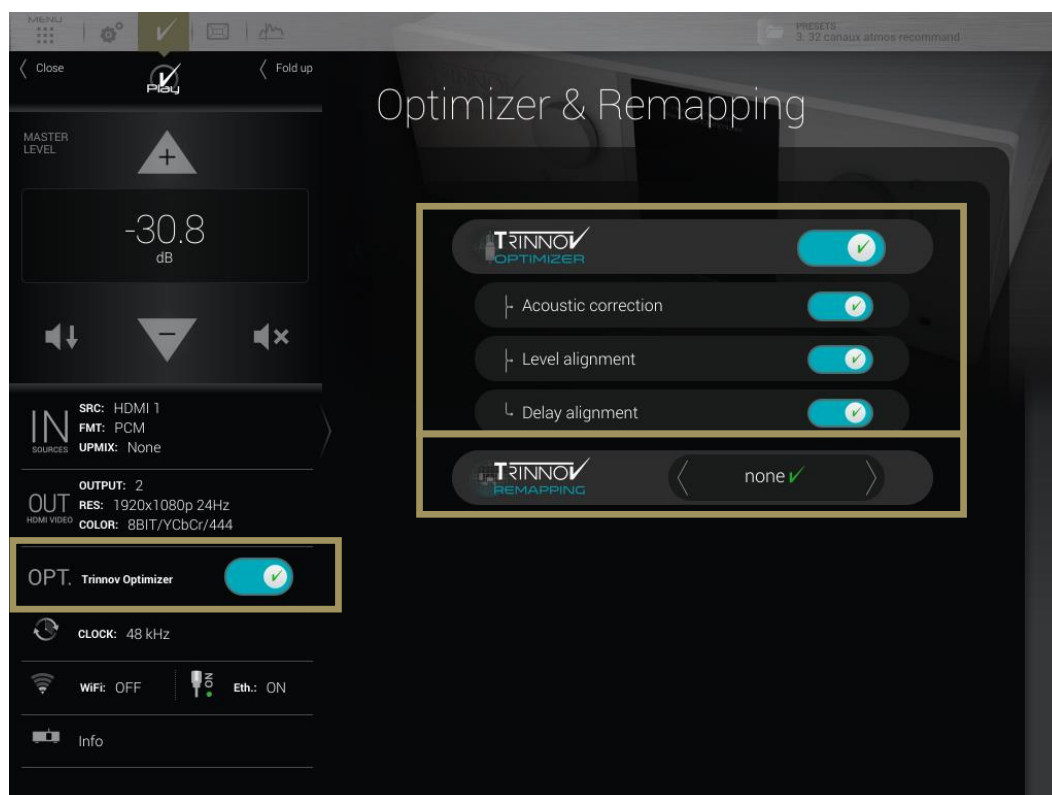
Figure 44: Optimizer & Remapping page

- **Trinnov Optimizer** ON/OFF: switch on/off the automatic correction of the speaker system: the acoustic correction, the automatic delay and level alignment, as well as the remapping options. When the Optimizer is **off**, only the manual settings related to the audio processor are applied:

    - Routing, as defined in **Speaker Configuration Table** in the **3D View** page of the Main interface;

    - The **Active Xovers** frequencies and filters;

    - Levels, as defined in the **Processor** pages of the Advanced interface;

    - Graphic EQs, as defined in the **Processor** pages of the Advanced interface;

    - Bass Management, as defined in the **Fine Tuning** page of the Main interface.

- **Acoustic Correction** ON/OFF: when turned **off**, both the automatic equalization (defined by the target curve) and the FIR EQs (defined in the **Processor/Outputs** page of the Advanced interface) are bypassed;

- **Level Alignment** ON/OFF: disable the automatic alignment of speaker levels, meaning that no automatic gain changes will be applied to the outputs;

- **Delay Alignment** ON/OFF: disable the automatic alignment of speaker distances, meaning that no automatic delays will be applied to the outputs.

5.5   REMAPPING OPTIONS

The Trinnov Remapping selection box provides the following speaker remapping options:
- **Off**: no speaker remapping
- **Matrix** : Manually define the remapping (Advanced user only)
- **Automatic Routing**: the remapping engine automatically routes each channel to the correct speaker
- **2D Remapping**: the remapping is applied in the horizontal plane
- **3D Remapping**: full 3D remapping, including the horizontal plane and elevation

> **NOTE:** the 2D remapping consider every speakers on the same elevation plan. This may result in strange remapping behavior with speakers in elevation.

> **NOTE:** Speaker remapping is independent from surround upmixing.

5.6   NAMING, SAVING AND LOADING PRESETS

The Altitude[32] can store up to 29 memory presets.
Presets can be managed in the **Presets** menu of the Advanced Settings Interface
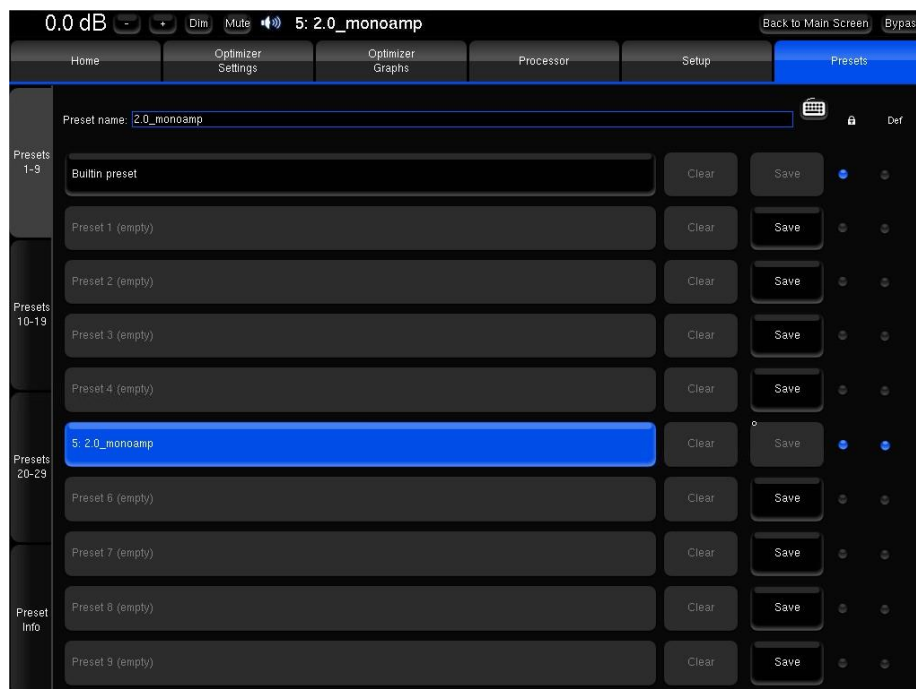
Figure 45: Presets 1-9 page

The most important parameters included in a preset are:

- The acoustic measurements

- The settings of the acoustic filters

- The output configuration and routing

IMPORTANT NOTES:

- Except for sources settings, consider that everything is saved in a preset.
- Any parameter change will be lost if not saved in a preset.
- Please manipulate presets with care since overwriting a preset does not require confirmation.

The Presets page consists of four vertical tabs:

- Presets 1-9: includes the Built-in preset and presets 1 to 9
- Presets 10-19: includes presets 10 to 19
- Presets 20-29: includes presets 20 to 29
- Preset Info: shows the current preset information

Each Preset tab consist of the following items:

- The **Preset name** field: used to enter or modify a preset's name.
- 10 memory slots including from left to right:
- The **Preset name/number**, greyed when the slot is empty, highlighted in blue when the preset is selected.
- A **Clear** button to clear the memory slot. This function irreversibly deletes the preset's parameters.
- A **Save** button to save current parameters as a preset in the memory slot.
- A **Lock** checkbox to protect the preset: disables the Clear & Save buttons.
- A **Def** (for default) checkbox to automatically load the preset as default after start-up.

As an example, the recommended procedure to duplicate a preset and copy it in a different memory slot would be to:

1. Reload the preset to recall the exact configuration you want to duplicate.
2. Use the Save button of an empty preset to copy it.

NOTES:

- The Built-in preset is locked and cannot be overwritten.
- A specific preset can be linked to each source. Please refer to the ***Basic Settings chapter***.
- Presets can be backed-up and restored to/from a USB key. Please refer to the ***Basic Settings chapter***.

5.7   DEFAULT PRESET

The default preset can be selected in the **Startup** option page of the product **information** menu:
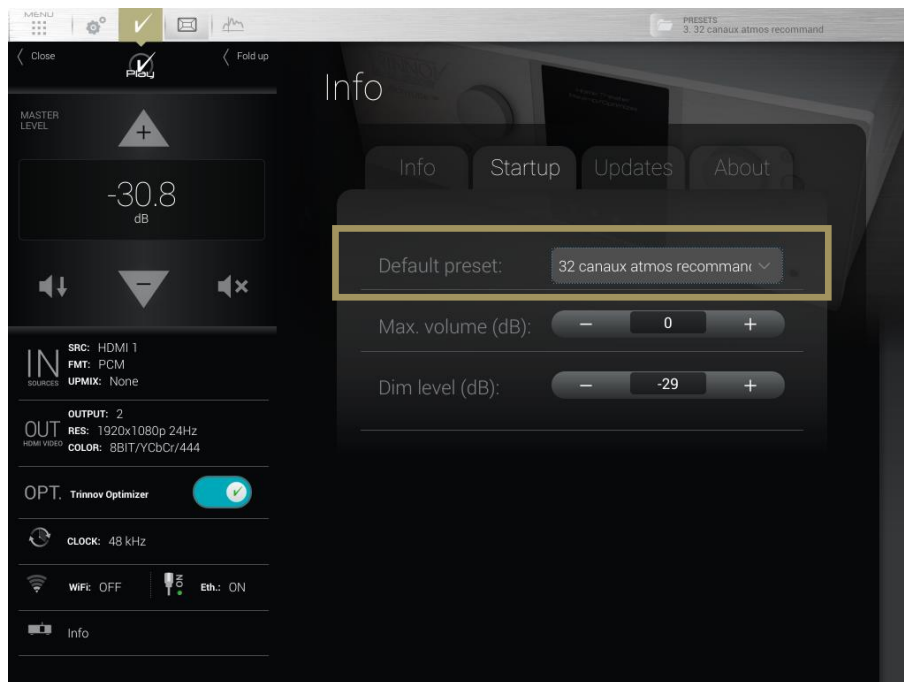
Figure 46: the Info/Startup page, default preset

5.8   SET A MAXIMUM VOLUME

By default, the maximum volume possible with the Altitude[32] is +20dB. The maximum volume can be changed change in the **Info** menu of the main page, **Setup** tab. Here, the parameter **Max. volume (dB)** will define the maximum master volume possible.
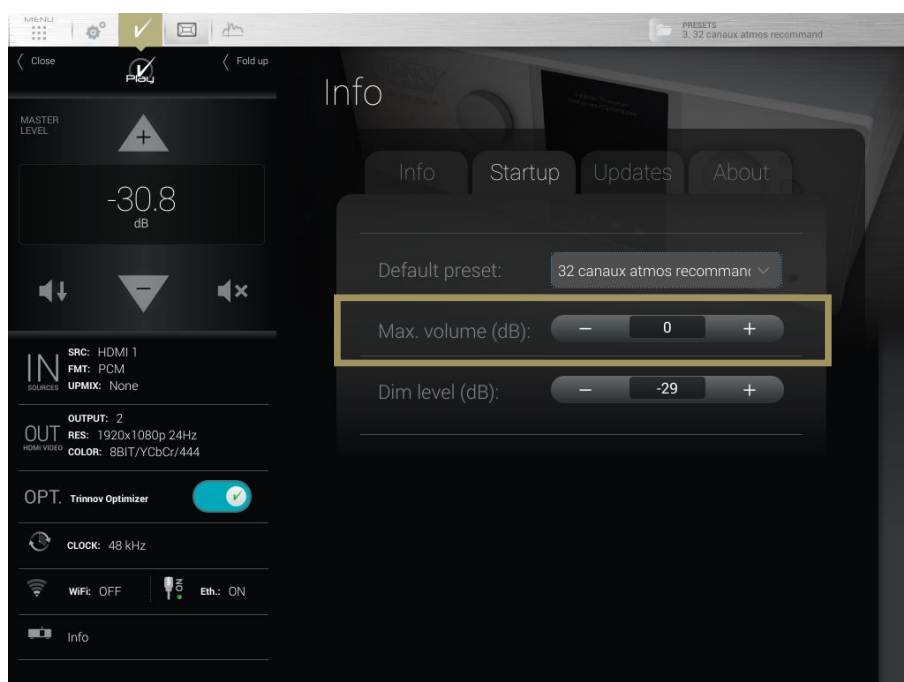
Figure 47: the Info/Startup page, maximum volume

5.9 SET THE DIM LEVEL

By default, the **Dim** is applying a -20dB on the master volume. The value can be change in the **Info** menu of the main page, **Setup** tab. Here, the parameter **Dim level (dB)** will define the amount of **Dim** to apply on the master volume when the **Dim** is engaged.
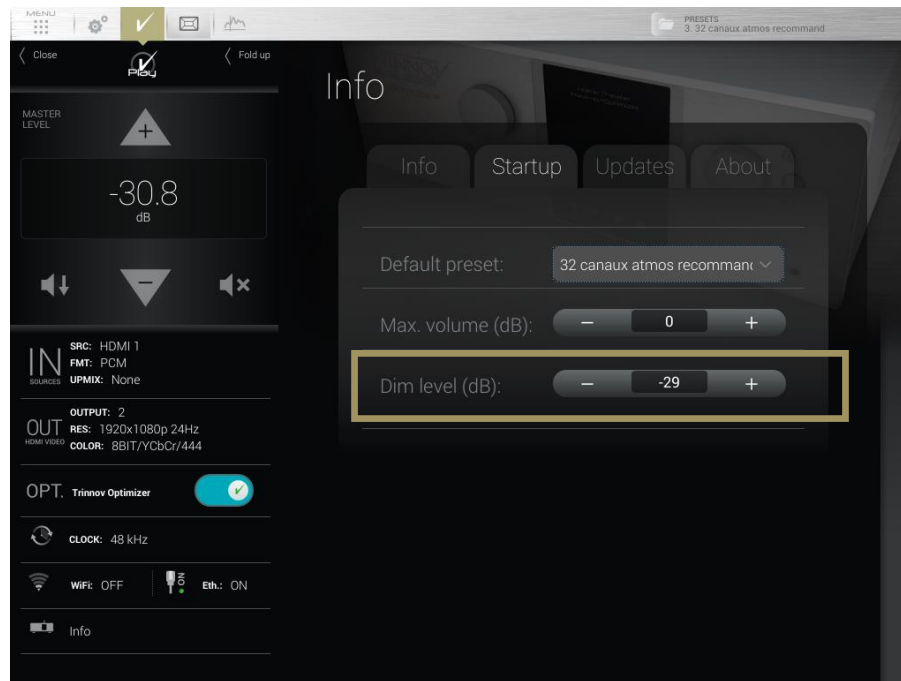
Figure 48: the Info/Startup page, Dim level

5.10 BACKUP/RESTORE OF PRESETS

Altitude³² Rear panel – USB Ports

USB Pop-up menu

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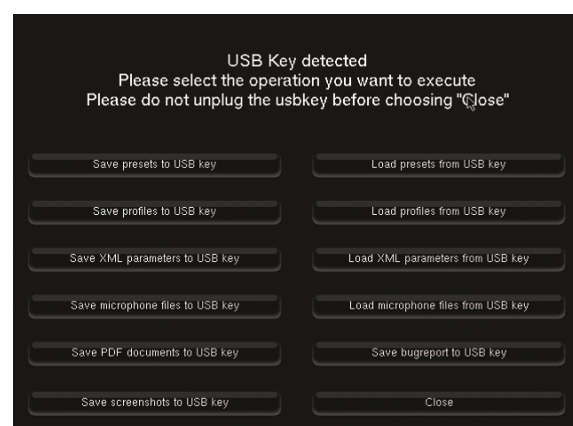
Several parameters can be saved, archived and restored using a USB key:

1. Insert a USB key in one of the USB Port located on the rear panel of the Altitude^{32}.

2. As the USB Pop-up menu displays, select the operation you want to execute:

   o Save or Load **presets** to/from the USB Key

   o Save or Load **profiles** (**sources configurations)** to/from the USB Key

   o Save or Load **microphone compensation files** to/from the USB Key

   o Generate and save a **PDF Report** for each of your presets on the USB Key. This report includes data from the Optimizer including speaker positions, optimizer settings amplitude, phase and impulse response of every speaker, before and after correction.

   o Save a **Bug report** to the USB Key: when an expected error occurred, the system is halted to prevent damage to your system and a bug report is generated. After the restart of the Altitude^{32}, you can save that bug report on the USB Key and send it to Trinnov support at support@trinnov.com for analysis.

   o Save **Screenshots** to the USB Key: you can take screenshots of the Altitude^{32}'s Graphical User Interface by pressing the "print screen" key of a keyboard connected to the Altitude^{32}.

IMPORTANT NOTE: to ensure the data integrity of your USB Key, please press the **Close** button and wait until the USB Pop-up menu has disappeared to remove it.

NOTE: be careful when reloading presets from a USB Key: preset are identified by their memory slot. Therefore, a preset initially saved as preset number 5 would overwrite the preset number 5 stored on the Altitude^{32} without warning.

6 OVERVIEW OF THE SETUP PROCEDURE

The following summary provides an overview of the overall setup procedure that must be followed for a smooth and successful setup of the Altitude[32] in a home theatre system.

A) Get ready for the installation

First of all, before you start, you must **read carefully** two key chapters that provide important information about the Altitude[32]'s tools and settings, as well as very important tips and recommendations to perform the acoustical measurements:

1. Read the whole chapter about the Altitude[32] 's *Essential Tools and Settings*;

2. Read the whole chapter *Getting Ready for Calibration* to get mandatory information on calibration procedure.

B) Perform the installation

Once you've learned the tools & tips, you are ready to follow the setup procedure:

Please note: it is critically important to follow the steps in the specified order, otherwise the system will not perform properly:

1. Specify the speaker layout in the Altitude[32] graphical user interface: choose and configure the speaker layout. Send pink noise to verify that the routing of the speakers is correct.

2. *Optional*: if one or more speakers require multi-amplification: configure, calibrate and verify the Altitude[32]'s intelligent active crossovers.

3. Optimize the speaker system in the room:

    a. Calibrate all the speakers with the Altitude[32]'s automated measurement and optimization tools.

    b. *Optional*: if required, Setup Bass Management for multiple speakers.

    c. Setup Target Curves to reach the required frequency response.

4. Last but not least: verify the sound of the optimized speaker system.

All these steps are explained in detail in the following chapters.

NOTE: the setup procedure of the Altitude[32] can be performed:

- With a *VNC Client* connected to the Altitude[32] through the network,

- With a display, a mouse and a keyboard directly connected to the Altitude[32]'s back panel.

However, the setup procedure *cannot* be performed with a web browser connected to the Altitude[32]'s web-based interface. Further details about the web interface are provided in the *Introduction chapter* at the beginning of this document.

For a detailed step-by-step explanation of how to connect with a *VNC Client*, please see corresponding pages in the *Network Setup chapter*. For additional details about connecting a display, a mouse and a keyboard, please refer to the *Introduction chapter* at the beginning of this document.

7   ESSENTIAL TOOLS AND SETTINGS

This chapter provides important information you need to know before you proceed with the setup procedure and the calibration process.

7.1   AUDIO CLOCK SETTINGS

At various times during the setup procedure, you may need to check the *status* of the audio clock or to manually change its *settings*

By default, the audio clock automatically switches to Slave mode when you select a digital source, or to Master mode when you select an analog source. However, during the calibration procedure, you will select the microphone inputs, and you will later switch to the Blu-ray player source to verify the sound of the system. At some point, the Altitude[32] may be set to slave mode but may not be receiving any clock information if the digital source is not connected. In this situation, the system is not able to produce sound, like pink noise or sine. If this happens to you, please set the clock to Master more, or simply switch to an analog input.

7.1.1   AUDIO CLOCK STATUS INFORMATION

The Word Clock page in the main window provides information about the status of the audio clock:
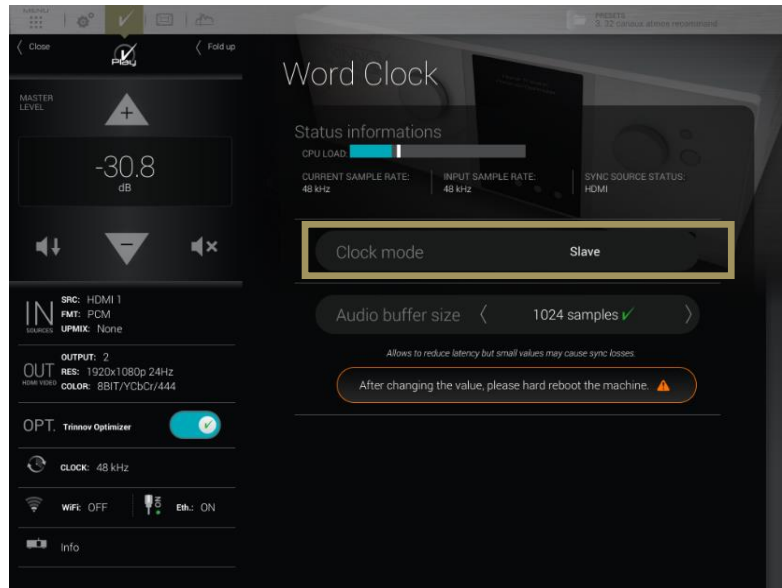
Figure 49: Audio clock status information

The information about the status of the audio clock includes:

- the clock mode: slave or master. This setting can be changed in the **Setup/Clock** page of the Advanced Settings interface (see below).
- the current sample rate: the sample rate currently used by the Altitude[32]. If the clock is in slave mode it corresponds to the input sample rate. If the clock is in master mode, it corresponds to the sample rate selected in the **Setup/Clock** page of the Advanced Settings interface.
- the input sample rate: the detected sample rate of the currently selected input.
- the current sync source: may be internal, if the clock mode is set to master, or related to the currently selected source.

7.1.2   AUDIO CLOCK SETUP

Audio clock setup is available through the Advanced Settings interface of the Altitude[32].

 To access the clock settings page:

1.   Click on the **Gears** button in the top menu to open the Advanced Settings user interface.

2.   Go to the **Setup/Clock** tab of the graphical user interface.

The **Clock** page of the **Setup** tab includes all the clock settings:

Figure 50: Clock settings page in the Advanced Settings

The **Setup/Clock** page includes:

- **Status Information:** the same information provided in the Clock page of the main user interface.

- **Clock Mode:** slave or master modes.

- **Clock Source:** one of the digital inputs or the internal Word Clock of the Altitude[32].

- **Audio Buffer Size:** different buffer sizes, used to reduce latency. Only recommended for advanced users.

NOTE: Default buffer size is 1024 samples. It is recommended to keep this value to avoid any problem.

7.2   METERING THE INPUTS AND OUTPUTS

The Altitude[32] includes an extensive set of audio utilities to perform various tests and manual operations during the setup process.

To access the audio utilities:

Click on the **Gears** button in the top menu to open the Advanced Settings interface.
Go to the **Processor** tab of the graphical user interface.

The main page of the Processor tab displays the input and output meters and a set of lateral tabs:

Input and Output levels can be monitored through the **Processor/Meters** page. Both the peak levels and the RMS levels are displayed:

Figure 51: metering inputs and outputs

You can visualize the peak level of each channel. The highest level registered on each channel can be displayed by pressing the **Mem** button. When the level gets close enough to the saturation level, the name of the channel appears highlighted in red. The Clear button resets the memory and the saturation indicators for every channel of the group.

> **IMPORTANT NOTE:** A digital signal cannot technically exceed 0 dBFS. Therefore the red tag on top of each <u>digital input</u> channel only let you know when the maximum level of 0dBFS is reached and does not necessarily indicate distortion or clipping.

7.3   PLAYING PINK NOISE ON THE SPEAKERS

> **IMPORTANT NOTE:** be careful about the *output level* before playing a test signal, the sine wave and pink noise are both generated at -20dBFS RMS.

> **NOTE:** To be able to produce pink noise, the Altitude[32] needs to have a Word Clock synchronization. Be careful to use an analog source to be in master clock, or that your digital devices plugged to the Altitude[32] is providing a clock signal.

Pink noise can be played:

- from the Speakers/Room setup tool
- in the Advanced Settings interface, from the **Processor/Inputs** page

To play a pink noise from the **Speakers/Room** setup tool, click on the **Pink Noise** button of the corresponding output channel:

Figure 52: playing Pink Noise from the Speakers/Room setup tool

The **Processor/Inputs** tab provides a complete set of processing options for each input channel. It allows you to send a 1000Hz sine wave or a pink noise for every channel.

- To send a 1000Hz sine wave, click on the **Sine** button.
- To send a pink noise, click on the **Pink Noise** button.

For instance, you can use Pink Noise for setting up your equalization, as follows:

- In **the Processor/Inputs** page, press on the **Pink Noise** button for the channel you want to equalize,
- Switch to the **Processor/Outputs** page and open the **Preset EQ** or **User EQ** for that *same* channel,
- Make your EQ adjustments,
- Use the **Previous/Next** buttons: the *pink noise will follow* to the same channel.

The pink noise will only follow if you start the EQ from the same channel where the pink noise has been activated. A typical use of this graphic EQ is ISO X curve compliance verification by a consultant or voluntary small change of the tonal balance.
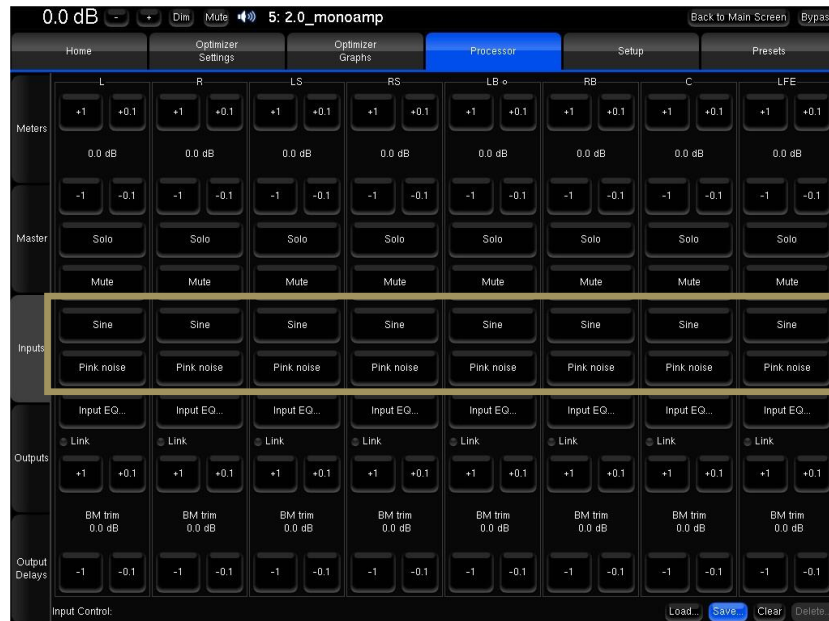
Figure 53: Sine and Pink Noise buttons in the Inputs page of the Processor menu

7.4 SOLO/MUTE AN INPUT OR AN OUTPUT

The Inputs page and the Outputs page include **Mute** and **Solo** buttons that allow you to mute or solo any input or output channel at any time.

To Mute/Solo an input channel, go to the **Inputs** tab and click on the **Mute/Solo** button of the corresponding input channel:
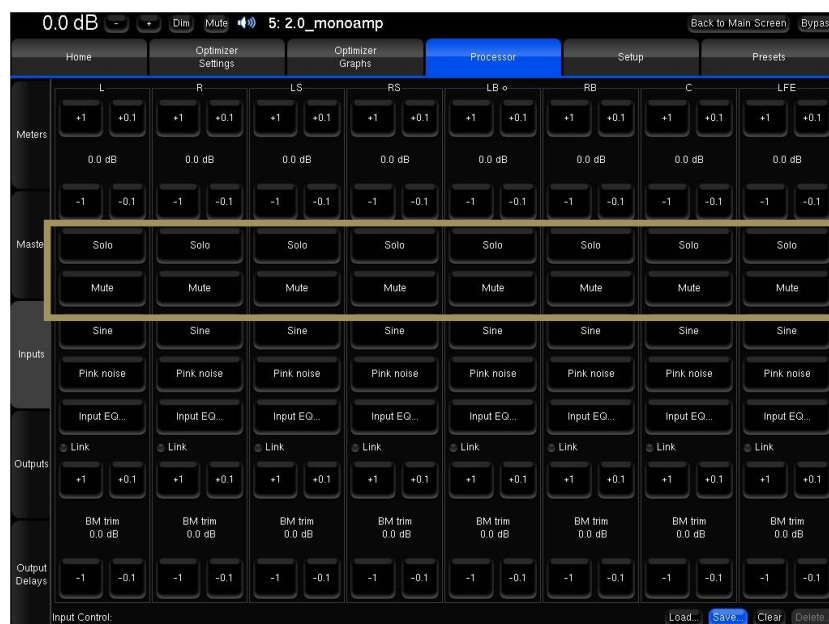
Figure 54: Mute and Solo buttons in the Inputs page of the Processor menu

7.5 SWITCHING OPTIMIZATION ON/OFF

The Altitude[32] offers two different ways to compare the sound of your system with/without optimization:

The **Bypass** button, which is always visible at the top right corner of the Advanced Settings user interface.
The **Optimization On / Optimization Off** buttons in the Optimizer Settings/Runtime page.

Figure 55: switching optimization on/off in the Advanced user interface

Optimization On/Off buttons: the buttons in the **Optimizer Settings/Runtime** page allow the user to selectively enable/disable the different corrections applied by the Optimizer.

These options are also available in the Main user interface in the Optimizer & Remapping page.

Bypass button: the bypass button located at the top right corner of the graphical user interface is equivalent to the **Optimization Off** button.

> **IMPORTANT NOTE:** the **Optimization On/Off** and **Bypass** buttons disable the automatic compensations but manual corrections are still applied :
>
> - FIR and Graphic EQs
> - Inputs and outputs gains
> - Outputs delays
> - Bass Management
> - Active Xovers

Figure 56: switching the optimization on/off in the Main user interface
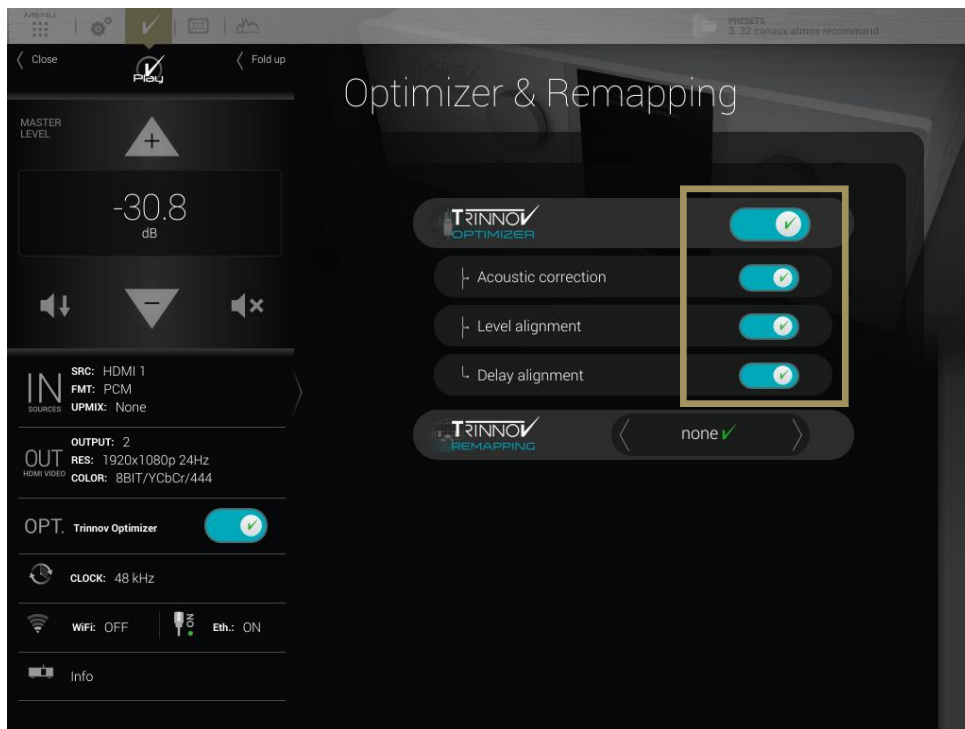
7.6 VIEWING THE ACOUSTICAL GRAPHS

The Altitude[32] provides a complete and flexible tool for displaying the responses of the speakers *before* and *after* the Trinnov optimization, as well as the *correction filters*.

The acoustical graphs are available in the **Optimizer Graphs** page of the Advanced user interface. It is possible to display the acoustic responses of multiple speakers and analyze the information from various points of view: amplitude, phase, group delay, impulse response…

Figure 57: the acoustical graphs page
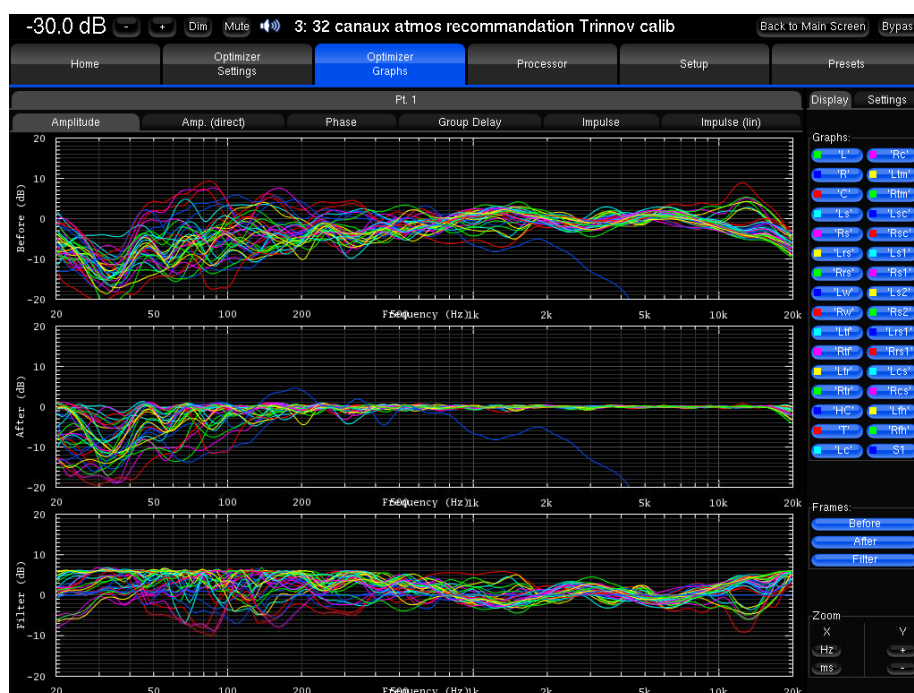
7.6.1   IMPORTANT NOTES

It's important to understand the information available in this graphs, as well as the information that is not available:

- The "after" graphs show the effects of the optimization parameters. These graphs are therefore based on calculations only, not on measurements. However, measurements with external kits have always proved the accuracy of these calculations.

- These graphs only take into account the automatic filters computed according to the **Optimizer Settings** page, not the manual adjustments made in the **Processor** page.

- The display settings will be saved in preset.

7.6.2   GRAPHS DISPLAY OPTIONS

The **Optimizer Graphs** page consist of a Display area, on the left, and a Config area, on the right.
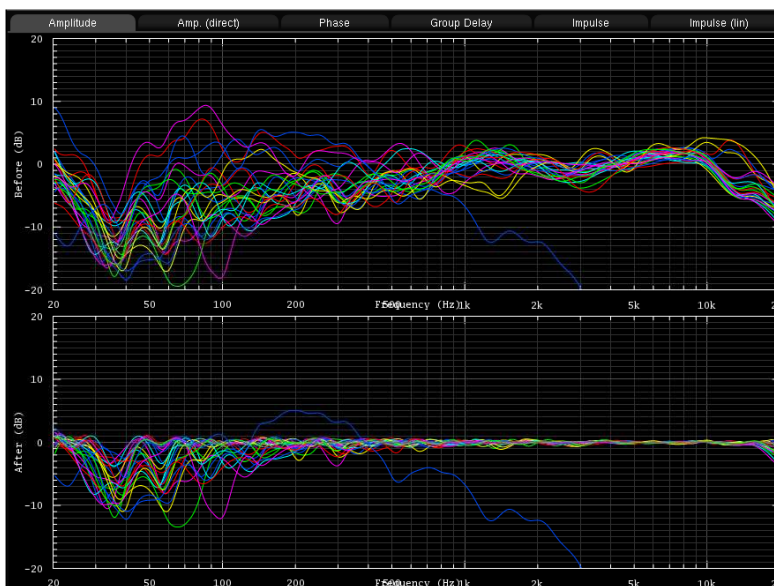
The Display area is organized in:

- Tabs & Subtabs
- Graphs
- Frames

The Configuration area is organized in:

- A Display tab
- A Settings tab

Zoom options allows modifying amplitude, frequency and time scales according to the type of representation.

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7.6.3 CHOSE THE DISPLAY OPTIONS ACCORDING TO YOUR REQUIREMENTS

The flexibility of this feature allows you to visualize on a same screen various type of data, which you can organize as you wish by a few parameters:

- The **Graphs Overlay**: type of data you want to overlay on a same graph (or **Frame**)

- The **Frames**: type of data disposed vertically on a same tab

- The type of data you want to visualize on each **tab** and **subtab**.

Figure 58: comprehensive acoustical graphs

For each level, you have the possibility to order the data through various criteria:

- The **speaker** (L, R, C, Sub, …)

- The **point of measurement**: in the case of a multipoint configuration, you can visualize the response measured on each position, and the effect the optimization has on it

- The **type of response**: speaker response before optimization, speaker response after optimization, or filter response

- The **type of visualization**: amplitude, amplitude of the direct front and early reflections only, phase, group delay, or impulse response.
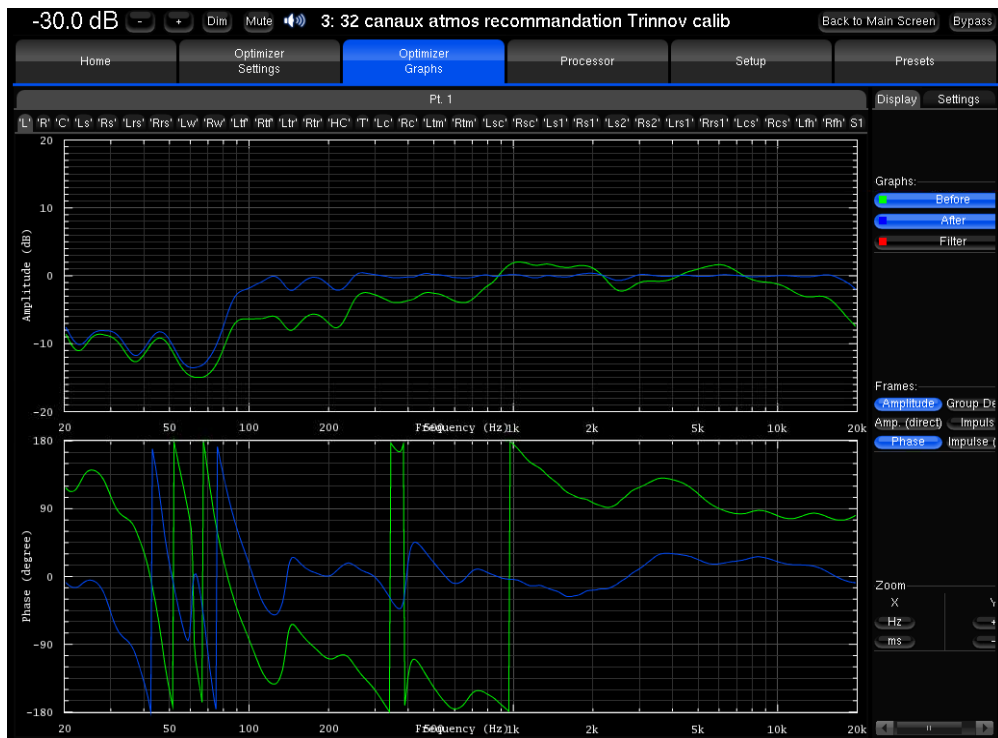
Figure 59: focusing on specific graphs

8 SPECIFY THE SPEAKER LAYOUT

In this chapter we assume that a specific set of speakers has already been defined and installed in the room. In order to support multiple surround and 3D formats, we recommend relying on the expertise of a *Certified Trinnov Installer*. He/she can design a speaker configuration that meets your requirements, and can also recommend optimal speaker placements according to your room's dimensions and acoustics.

For additional information about the Dolby, DTS and Auro-3D recommendations, please see the ***Appendix*** of this document and the related documents from Dolby, DTS and Auro-3D.

8.1 OVERVIEW OF THE SPEAKERS SETUP PROCEDURE

The overall procedure to configure a speaker system is as follows:

- Select an **initial speaker layout** from one of the available templates;
- If necessary, **Add** or **Remove** speakers until your specific layout is defined;
- Configure the settings of each speaker, the channel mapping to Dolby, DTS, Dolby Atmos, DTS:X and Auro-3D formats, and the output routing;
- Verify the routing of the speakers by playing pink noise on each speaker;
- If necessary, set some Parametric Equalizers (PEQ) s on some speakers;
- Set an array of speakers (please see next chapter)
- Save the preset.

Each of these steps is described in detail in the following pages.

8.2 INTRODUCING THE SPEAKER/ROOM SETUP TOOL

The Altitude[32] provides a powerful tool to help you configure the speaker set of your home theatre system. The Speaker/Room setup tool provides the following features:

- a 3D model of your room that you can rotate and zoom in/out;
- a display of the 3D speaker positions in the room;
- a comprehensive set of surround and 3D speaker layouts so you don't start your speaker configuration from scratch;
- add and remove speakers (satellites and subwoofers);
- detailed configuration of each speaker, the channel mapping to Dolby, DTS, Dolby Atmos, DTS:X and Auro-3D formats, and the output routing;
- An easy way to setup speakers arrays;
- a pink noise button to easily verify the routing of the speakers.

<table>
<tr><td>

IMPORTANT NOTE: it is important to understand that, because the Altitude[32]'s automated process measures **all the speakers** (including the subwoofers) during each calibration, you must create in the Altitude[32]'s user interface a speaker configuration that includes **all the speakers** of your installation (including the subwoofers).

</td></tr>
</table>

The **Speaker Configuration** page can be accessed through the Top Menu of the Altitude[32]'s graphical user interface, highlighted below.
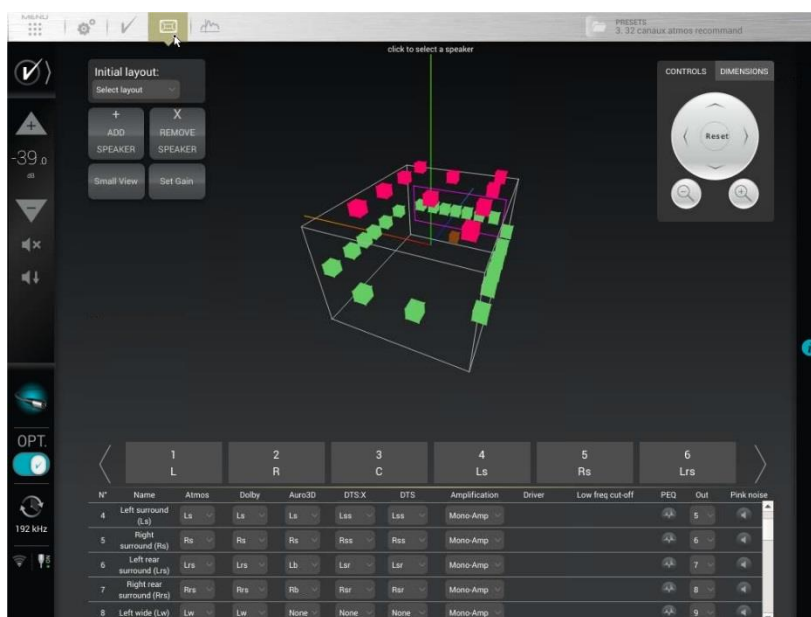
Figure 60: the Speaker/Room setup tool

The **Controls** box located in the top right corner of the window allows you to navigate through the 3D view. You can rotate the view, zoom in and zoom out.
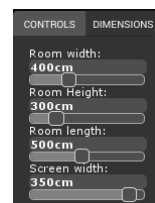
The **Dimensions** tab allows you set your room dimensions and screen size.

<table>
<tr><td>

NOTE: The room visualization is simply a representation showing the theoretical speaker placement of the selected layout. It is not taken into account for the acoustic optimization and does not affect the sound performance of the system. The position of a speaker is not critical but its label will determine which decoded channel it will reproduce (when the 2D/3D speaker remapping is not engaged).

</td></tr>
</table>

8.3   AN EXAMPLE OF A SPECIFIC SPEAKER LAYOUT

The Altitude[32] is designed to support any speaker layout. This includes standard speaker layouts such as those specified by Dolby, DTS and Auro-3D, but also hybrid speaker layouts based on two or more speaker placement recommandation. This allows your installation to support the different surround and 3D formats currently available in DVD, Blu-ray and file-based media.

Below is an example of a specific speaker layout designed to support multiple formats:
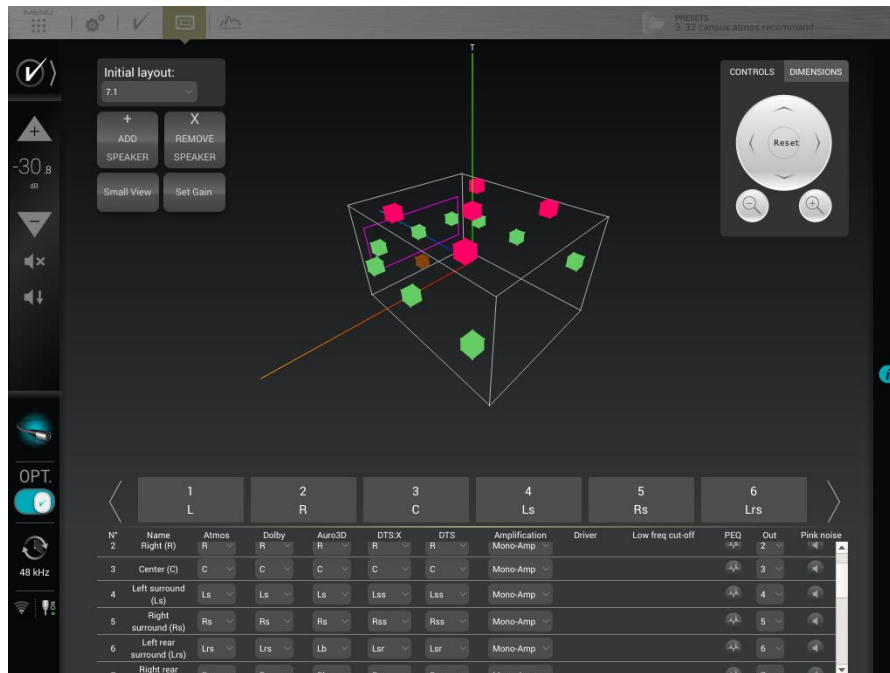
Figure 61: example of a specific configuration with 16 speakers

This configuration of 16 speakers includes :

- 7.1 initial layout (7 full-range speakers + 1 subwoofer)
- 6 additional speakers based on the Dolby Atmos format:
    - 2 additional Lw & Rw speakers (Left wide & Right wide)
    - 4 additional height speakers: Ltf & Rtf (Left & Right top front) and Ltr & Rtr (Left & Right top rear)
- 1 additional ceiling speaker for the Auro-3D Top channel ("Voice of God").
- 1 extra subwoofer.

The following pages describe how to setup such a configuration.

8.4 AVAILABLE INITIAL LAYOUTS

The following layout templates are available to start your setup process with an initial layout as similar as possible to your specific configuration.

> **NOTE:** For detailed information about speaker recommendations, please refer to the appendix of this document and to the related Dolby, DTS and Auro-3D recommendations.

STEREO AND SURROUND LAYOUTS

- Stereo 2.0 (L/R)
- 5.1 (L/R/C/LFE/Ls/Rs)
- 7.1 (L/R/C/LFE/Ls/Rs/Lrs/Rrs)

DOLBY ATMOS LAYOUTS

- Dolby Atmos - 5.1.2 (5.1 + Ltm/Rtm)
- Dolby Atmos - 5.1.4 (5.1 + Ltf/Rtf + Ltr/Rtr)
- Dolby Atmos - 7.1.2 (7.1 + Ltm/Rtm)
- Dolby Atmos - 7.1.4 (7.1 + Ltf/Rtf + Ltr/Rtr)
- Dolby Atmos - 9.1.2 (7.1 + Lw/Rw + Ltm/Trm)
- Dolby Atmos - 9.1.4 (7.1 + Lw/Rw + Ltf/Rtf + Ltr/Rtr)

AURO-3D LAYOUTS

- Auro-3D - 9.1 (5.1 + HL/HR + HLs/HRs)
- Auro-3D - 10.1 (5.1 + HL/HR + HLs/HRs + T)
- Auro-3D - 11.1 (5.1 + HL/HR + HC + HLs/HRs + T)
- Auro-3D - 11.1 (7+4) (7.1 + HL/HR + HLs/HRs)
- Auro-3D - 13.1 (7.1 + HL/HR + HC + HLs/HRs + T)

DTS:X LAYOUTS

- DTS:X - 5.1.2 (5.1 + Lh/Rh)
- DTS:X - 5.1.4 (5.1 + Lh/Rh + Lhr/Rhr)
- DTS:X - 7.1.2 (7.1 + Lh/Rh)
- DTS:X - 7.1.4 Heights (7.1 + Lh/Rh + Lhr/Rhr)
- DTS:X - 7.1.4 Tops (7.1 + Ltf/Rtf + Ltr/Rtr)

TRINNOV HYBRID LAYOUT

In addition to the Dolby, DTS and Auro3D templates, the Altitude[32] includes a set of hybrid layouts designed by Trinnov. These layouts are based on a surround 7.1 layout with additional speakers to support multiple surround and 3D formats such as Dolby Atmos, DTS:X and Auro-3D.

Note that this layout can be modified to support the largest Dolby Atmos configuration.

- The 16 speakers layout :
    - Trinnov 9.1.6 (7.1 + Lw/Rw + Ltf/Rtf + Ltr/Rtr + Hc + T)
        - 8 speakers (7 full-range speakers + 1 subwoofer) for the 7.1 surround layout
        - 6 speakers based on the Dolby Atmos format:
            - 2 additional surround speakers: Lw & Rw (Left wide & Right wide)
            - 4 additional height speakers: Ltf & Rtf (Left & Right top front) and Ltr & Rtr (Left & Right top rear)
            - 1 additional center height speaker for the Center Top Front channel: HC (Auro-3D) or Ch (DTS:X)
            - 1 additional ceiling speaker for the Top channel: T (Auro-3D) or Oh (DTS:X).
- The 20 speakers layout :
    - Trinnov 11.1.8 (7.1 + Lw/Rw + Ltf/Rtf + Ltr/Rtr + Hc + T + Ltm/Rtm + Lc/Rc)
        - based on the Trinnov 9.1.6 layout
        - 2 additional Top Middle channels : Ltm/Rtm used by Dolby Atmos and DTS:X formats
        - 2 additional speakers behind the screen: Lc/Rc used by Dolby Atmos and DTS:X formats.
- The 32 speakers layout :
    - Trinnov 21.1.10 (7.1 + Lw/Rw + Ltf/Rtf + Ltr/Rtr + Hc + T + Ltm/Rtm + Lc/Rc + Lsc/Rsc + Ls1/Rs1 + Ls2/Rs2 + Lrs1/Rrs1 + Lcs/Rcs)
        - based on the Trinnov 11.1.8 layout
        - 2 additional speakers behind the screen : Lsc/Rsc used by the Dolby Atmos format
        - 4 additional surround speakers : Ls1/Rs1 and Ls2/Rs2 used by Dolby Atmos and DTS:X formats
        - 2 addition rear surround speakers Lrs1/Rrs1 used by the Dolby Atmos format
        - 2 additional center surround speakers: Lcs/Rcs used by the Dolby Atmos format.

8.5 SELECT AN INITIAL SPEAKER LAYOUT

We recommend you to start by selecting the initial layout which is most similar to your specific speaker layout, and then add/remove speakers. Alternatively, you could also create a speaker configuration from scratch.

To select an initial speaker layout:

Go to the **Speaker/Room setup** tool and click on the **Initial Layout** drop-down list
Select the layout template which is most similar to your speaker system.
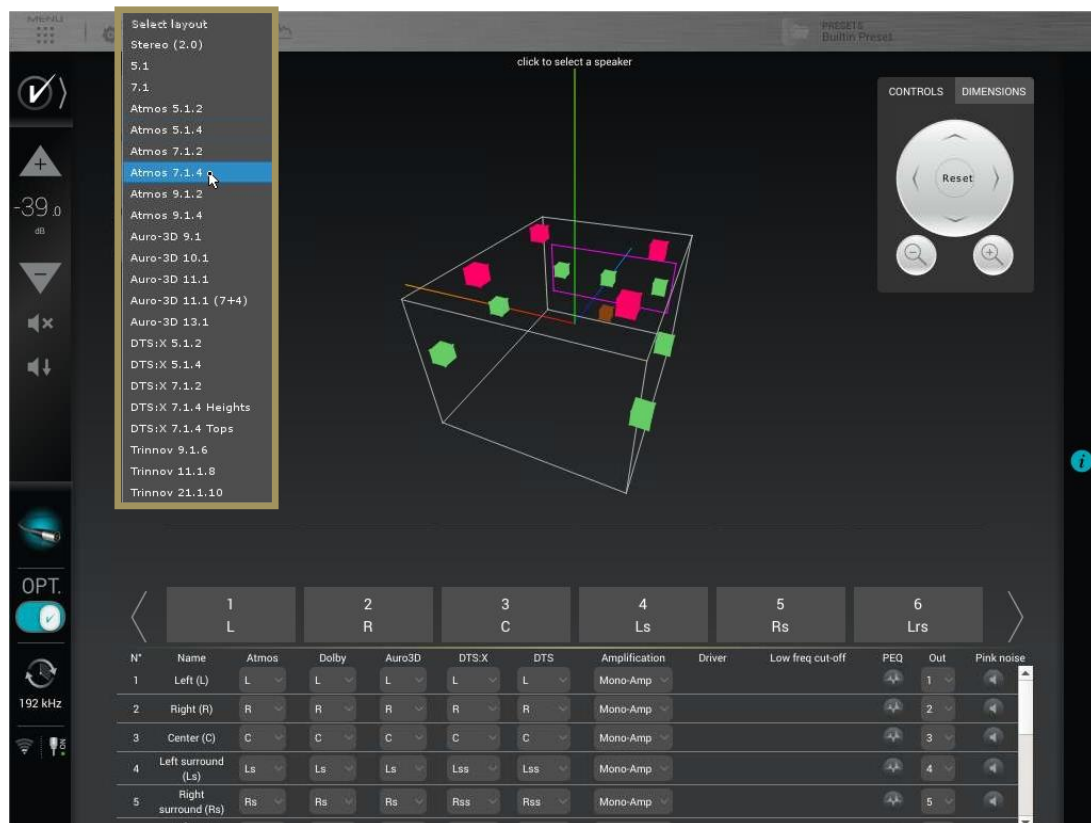
Figure 62: selecting an initial speaker layout

If your system is not in the list, you can either select a smaller system and add the missing speakers, or select a bigger system and remove the extra ones.

> **IMPORTANT NOTE:** it is critical to distinguish *speakers* from *channels* because one speaker may be used to reproduce multiple channels, depending on the audio format which is being played. Therefore, your final speaker configuration on the Altitude[32] must include *the same number of amplification channels as in your audio system*.

> **NOTES:**
> The **Speaker/Room setup** tool can't display more speakers than the total number of available outputs in your Altitude[32] configuration. There are 8 channel, 16 channel, 24 channel and 32 channel Altitude[32] models. For example, if you have an 8 channel Altitude[32] model, the **Speaker/Room setup** tool will display up to 8 speakers.
>
> Channel assignment for each format is one of the next steps.

8.6 ADDING SPEAKERS

8.6.1 ADDING REGULAR SPEAKERS

If required, the next step is to add speakers to achieve a configuration that fits perfectly to your system.

TO ADD ONE OR MORE SPEAKERS FROM THE DROP-DOWN LIST:

- click on the **Add Speaker** button

- in the **From Layout** drop-down list, select the speaker template from which you want to add one or more speakers: all the speakers available in the selected speaker layout are displayed in *grey* color;

- in the **Speaker position** drop-down list, select the specific speaker you want to add to complete your layout;

- click on the **Add** button next to the **Speaker position** drop-down list;

Repeat this process for each additional speaker you want to add.
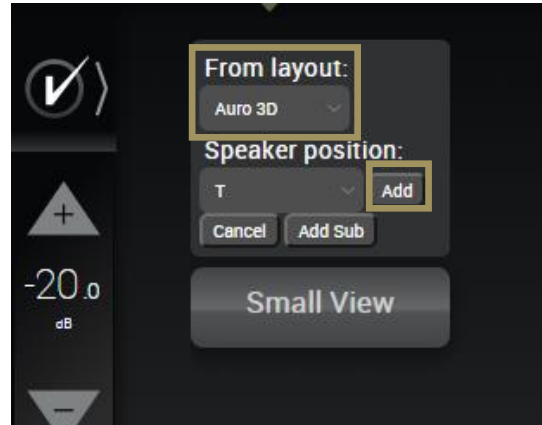
Figure 63: adding a speaker from the drop-down list

TO ADD ONE OR MORE SPEAKERS FROM THE 3D VIEW :

- Click on the **Add Speaker** button;

- in the **From Layout** drop-down list, select the speaker template from which you want to add one or more speakers: all the speakers available in the selected speaker layout are displayed in *grey* color;

- click on the speaker you want to add: it will be displayed in *yellow* color;

- click on the **Add** button next to the **Speaker position** drop-down list;

Repeat this process for each additional speaker you want to add.
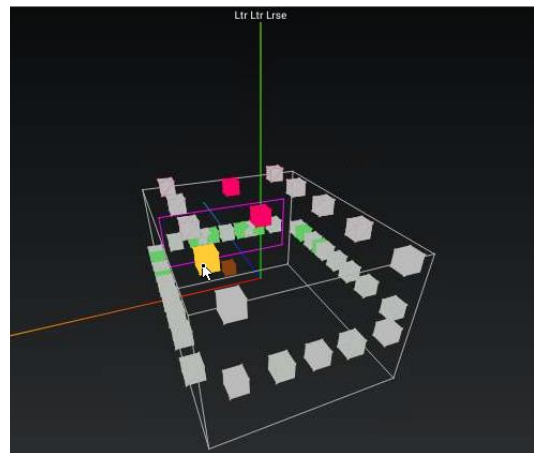
Figure 64: adding a speaker from the drop-down list

> **IMPORTANT NOTE:** Some configuration are not allowed by the decoders. In such case, a red warning will be displayed on the side panel and the relevent speakers will be highlighted in red.
>
> The side panel gives you some informations on the prerequisite conditions for some speakers.

> **NOTE:** If you choose to add a speaker, the Altitude[32] will automatically suggest to add the mandatory associated speaker(s). This will help you to keep the integrity of the recommendations of each decoder.

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To add a subwoofer:

1. Click on the **Add Speaker** button;
2. Click on the **Add Sub** button below the **Speaker position** drop-down list.
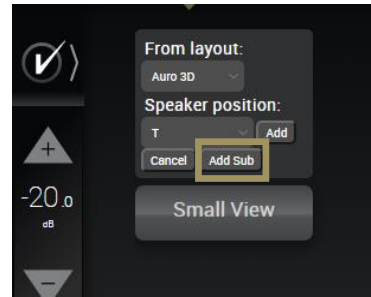
> NOTE: The **Add Sub** button adds subwoofers regardless of formats. The subwoofer positions displayed are not significant and will not affect the sound.

8.6.2 ADDING DOLBY ENABLED UPFIRING SPEAKERS

If you configuration has some Dolby-Enabled up-firing speakers, they appears on the 3D view as ceiling speakers as they are used to reproduce elevation channels. In the drop-down list, those speakers are ending by an "e" which stands for "enabled".

Here are the available Dolby-Enabled speakers:

- **Le**: Left up-firing Dolby-Enabled speaker;
- **Re**: Right up-firing Dolby-Enabled speaker;
- **Lse**: Left Surround up-firing Dolby-Enabled speaker;
- **Rse**: Right Surround up-firing Dolby-Enabled speaker;
- **Lrse**: Left Rear Surround up-firing Dolby-Enabled speaker;
- **Rrse**: Right Rear Surround up-firing Dolby-Enabled speaker;

To add a Dolby-enable speaker from the drop-down list, please use the normal procedure explained above in the *Adding Regular Speakers* sub-chapters.

To add a Dolby-enable speaker from the 3D view, click on one of the Dolby Top Speakers. As explained above, the Dolby enabled speakers are using the signal from Top speakers to recreate the immersion effect. The speakers concerned are

- Left and Right Top Front (Ltf/Rtf);
- Left and Right Top Middle (Ltm/Rtm);
- Left and Right Top Rear (Ltr/Rtr).

Use the procedure explained in the previous chapter to add a speakers from the 3D view. Select of the speakers listed above. When clicking on **Add**, a dialog box will appears asking you to choose between the regular in-ceiling speaker or the associate Dolby-enabled up-firing speaker. Select the desired one.
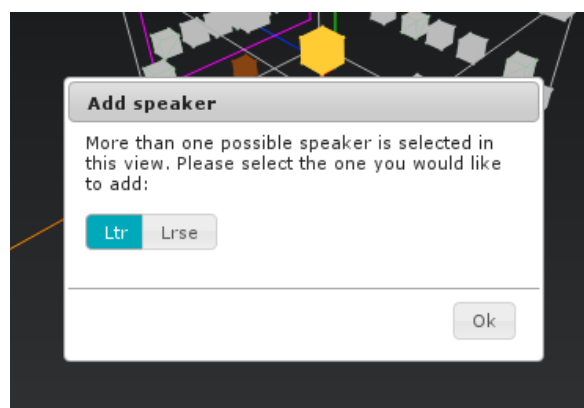
IMPORTANT NOTE: Dolby-Enabled speakers has an included filter designed to enhance the immersion effect. The Optimizer will keep the sound characteristics of the Dolby-Enabled speakers.

Le
Re
Lse
Rse
Lrse
Rrse

8.7 REMOVING SPEAKERS

To remove one or more speakers (including subwoofers):

- Click on the speaker you want to remove, either in the 3D representation or in the list: it will be displayed in *yellow*.

- Click on the **Remove speaker** button.
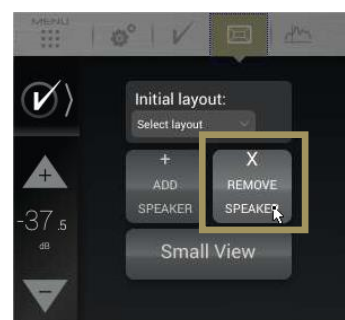
8.8 CONFIGURE THE SETTINGS OF EACH SPEAKER

Once the complete set of speakers in your system is defined, you can configure the settings of each speaker.

The **speaker configuration table** located in the lower part of the Speaker/Room setup tool allows you to:

- Manually map the channels of the Dolby, Dolby Atmos, DTS, DTS:X or Auro-3D formats to each speaker (optional);

- Configure the arrays of speakers for Dolby and DTS legacy format (See **Speakers Arrays** chapter bellow)

- Configure the active crossover settings (optional);

- Specify the physical output for each speaker/driver;

- Send pink noise to the assigned physical output in order to verify that the routing of each channel to each loudspeaker/driver is correct.

The **Small View** button reduces the 3D view and enlarges the speaker configuration table.

Every speaker can be further configured as follows.

Figure 65: the speaker configuration table

You can select speakers:

- by clicking on the speaker in the 3D view,
- by clicking on the corresponding channel number/name in the table's header
- by clicking on one of the lines of the table

The currently selected speaker is displayed in yellow color in the 3D view.

The available settings for each speaker are the following:

- Dolby, Dolby Atmos, Auro3D, DTS and DTS:X **channel mapping**: see below.
- Amplification: see below.

- **Output Channel:** specifies the physical output to be used for the speaker/driver.
- **Pink noise**: plays a -20dBFS pink noise on the specified output.

8.9 CONFIGURE THE CROSSOVER SETTINGS (OPTIONAL)

If you want to use the active crossovers of the Altitude[32], you must use the speaker configuration table to:

Specify the type of amplification: bi-amp, tri-amp or quadri-amp;
Specify the crossover frequency

The parameters related to crossover settings are the following:

- **Amplification**: sets the number of ways of the speaker in case of multi-amplifications

- **Low freq cut-off**: sets the crossover frequencies

- for bi-amp, it is set at 2kHz by default;

- for tri-amp, they are set at 200Hz and 2kHz by default;

- for quadri-amp, they are set at 200Hz, 2kHz and 20kHz by default.

NOTES:

- The Altitude[32] handles up to 4-ways active cross-overs.

- The default crossover filters are Linkwitz Riley 4th order (24dB/Oct).

- Advanced crossover settings are available in the **Setup/ActiveXovers** page of the Advanced Settings user interface. Further information about the active-crossovers can be found in the **Calibrate the Active Crossovers chapter**.

8.10 MAPPING THE CHANNELS OF DIFFERENT FORMATS

The new Immersive Audio Formats (Auro-3D, Dolby Atmos and DTS:X) come with different channel labels and different speaker placement recommendations. This causes incompatibility issues that could make it difficult to play the required content correctly.

In the Altitude[32], each speaker can be assigned to a specific channel for each format in such a way that it will play the required content regardless of the format being decoded.

In the example below, one speaker was set as the "Top" speaker recommendation of Auro Technologies to reproduce the content of the **Auro 3D Top channel** ("voice of god"). This channel also exists in **DTS:X as the Oh channel** but does not exist in the Dolby Atmos format. Therefore, this speaker will not be used during playback of native Dolby Atmos formats.

Figure 66: channel mapping example for the Top channel

In the example below, the Altitude[32] has automatically assigned the **Left top front (Ltf) channel**, initially specified as an Atmos speaker, to play the **Height Left (HL) channel** of Auro3D content.

Figure 67: channel mapping for the Left top front (Ltf) channel

11	Right front height (Rfh)	Rfh	Rfh	None	None	None	Mono-Amp	32	
12	Left top front (Ltf)	Ltf	Ltf	HL	Ltf	Ltf	Mono-Amp	11	
13	Right top front (Rtf)	Rtf	Rtf	HR	Rtf	Rtf	Mono-Amp	12	

NOTE: The channel labels and speaker positions of each format are available in the appendix of this document.

NOTE: To configure an array of speakers, please refer to the next chapter : Speakers Arrays

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8.11 SEND PINK NOISE TO VERIFY THE ROUTING OF THE SPEAKERS

As soon as the detailed configuration for each speaker is completed, it is critically important to verify that the routing of the channels to the speakers is correct, and fix any errors. Otherwise the whole consistency of the sound reproduction will be compromised.

> **IMPORTANT NOTE:** This procedure only helps to verify that the routing is correct *from the* Altitude[32] *to the speakers*. In addition to this procedure, when a new source is connected to the Altitude[32], you should also verify that the routing is correct *from the source to the* Altitude[32].

To verify the routing of each speaker:

- Select the speaker by clicking in the 3D view or by selecting the corresponding line in the speaker table;
- Click on the Pink Noise icon;
- Locate the speaker through which the pink noise is being played
- Verify that the playing speaker matches the selected channel in the Altitude[32]'s Speaker/Room setup tool.
- If there is no match, fix the routing of the speaker by modifying the assigned Output.

Figure 68: sending pink noise to the speakers

> **IMPORTANT NOTE:** The Altitude[32] needs to be synchronized on an audio clock, either external (Slave) or internal (Master) in order to produce the pink noise. If a Digital source is selected with no signal, the pink noise won't be produced. In such case, we simply recommand to select an analog source.

8.12 ADD A PARAMETRIC EQUALIZER

8.12.1 WHAT IS A PARAMETRIC EQUALIZER?

A Parametric Equalizer, or PEQ, is an equalization done by setting parameters, mostly 3: frequency, gain and Q.

There are 3 types of PEQ available:

- **The peak notch**: Parametric equalizers are multi-band variable equalizers which allow users to control the three primary parameters: amplitude (gain), center frequency and bandwidth (Q).

- **The shelving high** (1st or 2nd order): Shelving high filters cut or boost all frequencies equally above a desired cutoff point.

- **The shelving low** (1st or 2nd order): Shelving low filters cut or boost all frequencies equally below a desired cutoff point.
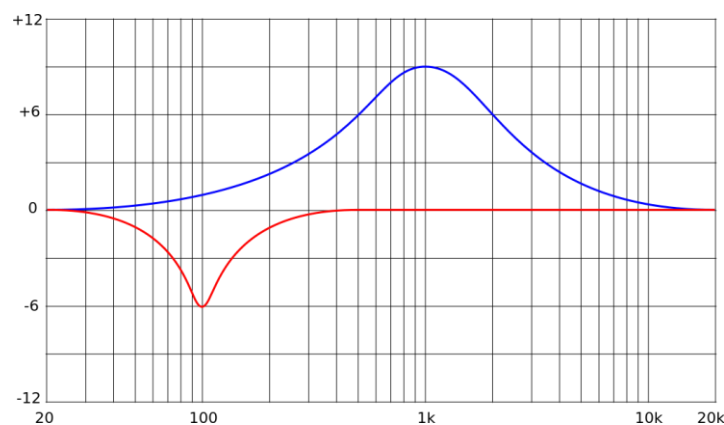
Figure 69: **Peak notch**: with positive gain (blue) and negative gain (red): The red one has a higher Q (the higher the Q, the narrower the bandwidth impacted)
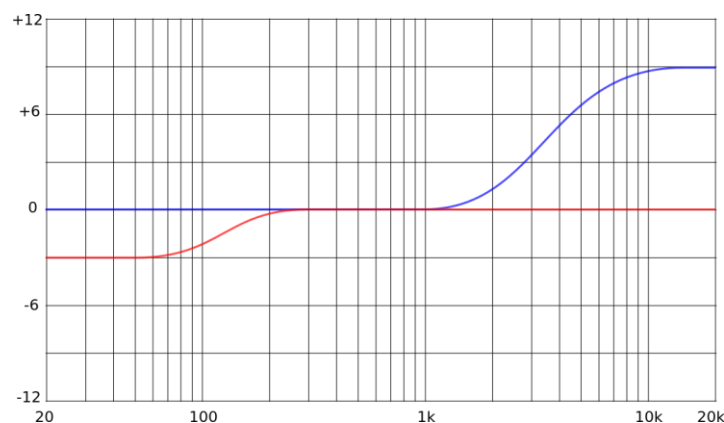
Figure 70: **Shelving**: high in blue (1st order), low in red (2nd order)

Each parametric equalization band will have the following settings:

- Frequency: the center of the frequency range to be cut or boosted

- Gain: the amount of boost or cut

- Q: the "sharpness" of the boost or cut, with higher Q meaning a narrower filter (not available for shelving second order)

- Order (Only available for High and Low shelving filters): The order of a shelving filter is changing the shape of the curve.

All of these settings are saved with the preset.

8.12.2 OPEN THE PARAMETRIC EQUALIZERS EDITOR

The PEQ editor is accessible from the 3D view of the speaker layout editor. One editor is available for each output, which means that in case of active multi-amplification, one PEQ editor is available for each driver of the speaker.

Parametric EQ

To open the PEQ editor, click on the PEQ icon [icon] of the speaker or driver you want to edit. The PEQ editor will be displayed as a pop-up which overlay the 3D view, as followed:

Save on the selected PEQ group
Save as new PEQ group
Delete selected PEQ group
Copy current to other speaker's ways
Add a new band
Load selected PEQ group
Pink Noise Generator
Saved PEQ
Ok to apply
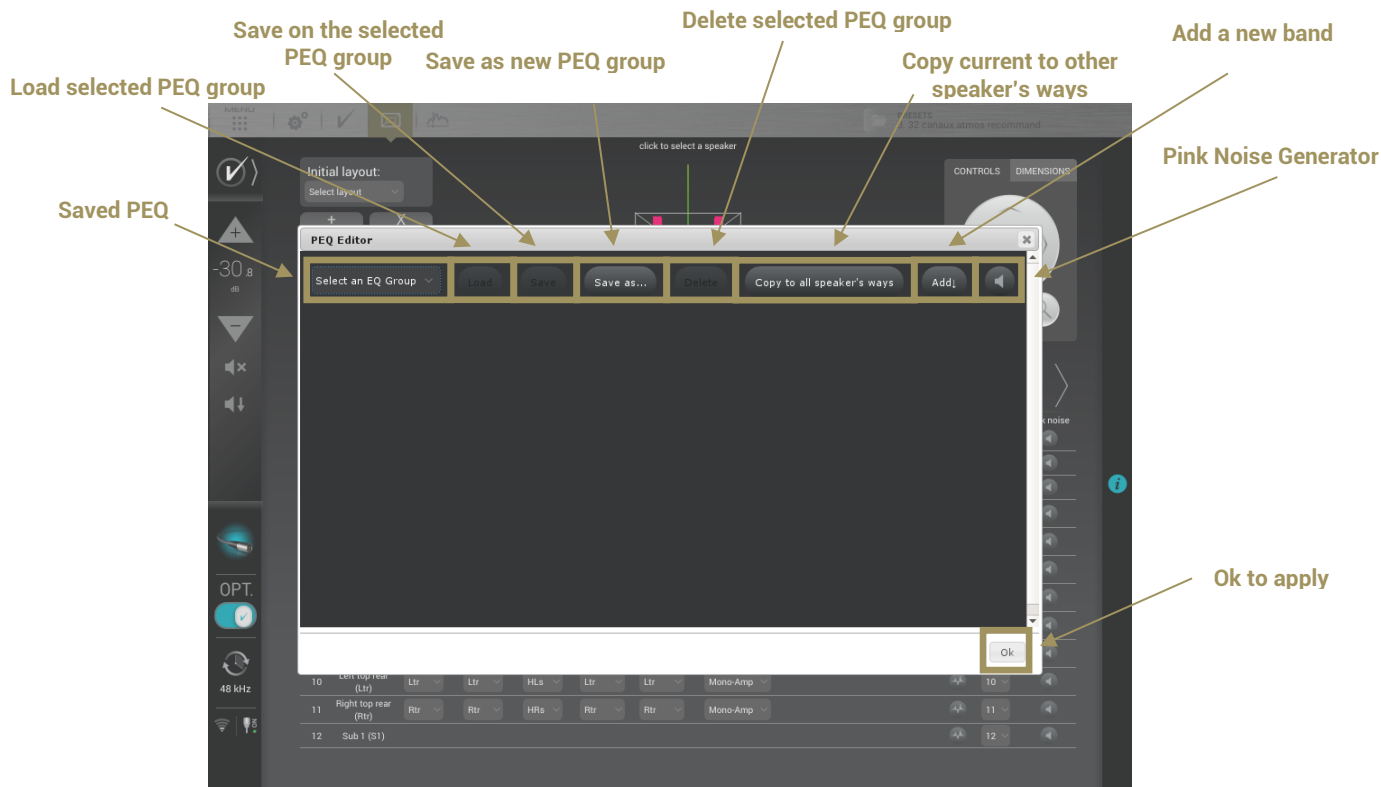
8.12.3 ADD A PEQ

To add a PEQ, click on the **Add↓** button. A new line will appear in the table. This line is a Parametric Equalizer band. You can add as many bands as possible per channel.

The overall procedure to configure a PEQ is as follows:

- Open the PEQ editor of the speaker (or driver) you want to edit;

- Add as many band as needed using the **Add↓**;

- Set the parameters of each band as wanted or as needed by the speaker's manufacturer. The parameters are explained bellow;

- Eventually control the result with the pink noise using the ◀ button ;

- If needed, save the settings as an EQ group, this makes easier to duplicate a setting on several speakers (procedure explained later in this chapter);

- Close the PEQ editor with the **Ok** button at the bottom of the page.

Each PEQ band has the following parameters:

- **Filter Type**:

  - **The peak notch**: Parametric equalizers are multi-band variable equalizers which allow users to control the three primary parameters: amplitude, center frequency and bandwidth.

  - **The shelving high** (1st or 2nd order): Shelving high filters cut or boost all frequencies equally above a desired cutoff point.

  - **The shelving low** (1st or 2nd order): Shelving low filters cut or boost all frequencies equally below a desired cutoff point.

- **Frequency**: the center of the frequency range to be cut or boosted

- **Gain**: the amount of boost or cut (in dB)

- **Q**: the "sharpness" of the boost or cut. Higher Q meaning a narrower filter (not available for shelving second order)

- **Order** (Only available for High and Low shelving filters): The order of a shelving filter is changing the shape of the curve.

The PEQs are saved in a presets.

8.12.4 DELETE A PEQ

To delete a PEQ band, please click on the **Delete** [Delete] button at the end of the line. Delete a band is a definitive action that cannot be undo.

8.12.5 SAVE A NEW PEQ GROUP

In case several similar speakers would need to have the same PEQ settings applied, it is possible to save a PEQ group to have the possibility to load on another channel.

Once the PEQ has been fully edited, to save it as a new PEQ Group click on the **Save as…** button;

A virtual keyboard will appear. Please give a significant name;

Once it is done, click on the green validate ✓ button;

You are now back to the PEQ Editor. This means that the EQ Group has been saved. It is available in the **Select and EQ Group** drop-down list. To load it, check the next chapter *Load a PEQ Group*.
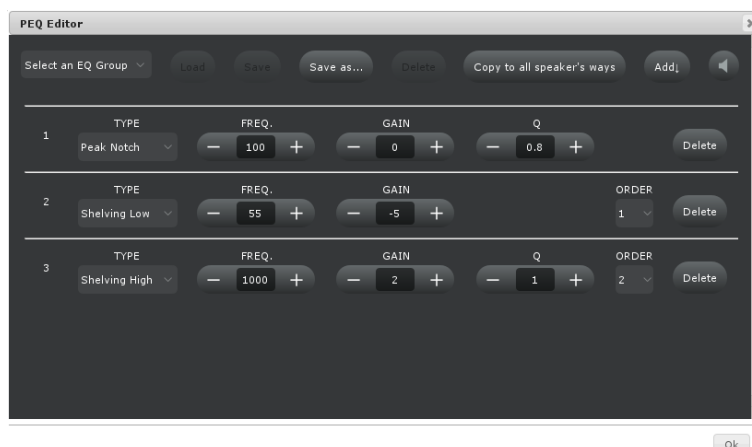
8.12.6 LOAD A PEQ GROUP

Once an EQ group has been saved, it is possible to load it on another channel. Here is the procedure:

Open the PEQ editor of the interested channel. The saved EQ group are available in the drop-down menu of the top left corner called **Select an EQ Group**;
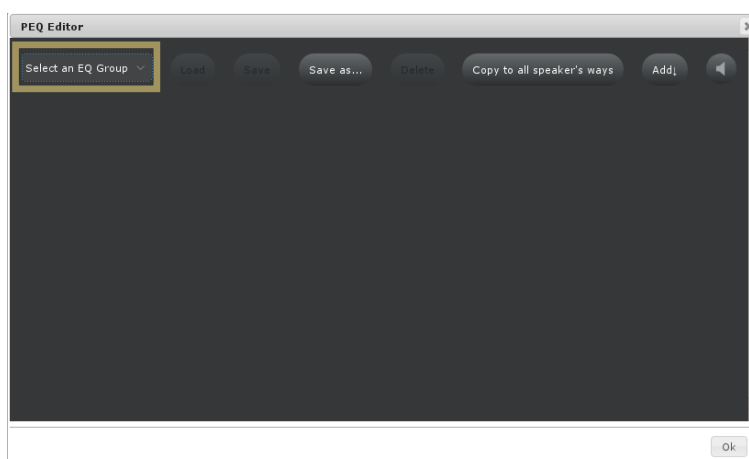
Select the EQ group you would like to load in the drop-down list;

Once the desired EQ group is selected, please click on the **Load** button;

The EQ group is now loaded on this channel. Repeat the procedure on other channel if needed. Close the PEQ editor by clicking on the **Ok** button.

8.12.7 DELETE A PEQ GROUP

If an EQ group is not valuable anymore, it is possible to delete it to keep a clean and effective list of EQ group. To do so, please follow this procedure:
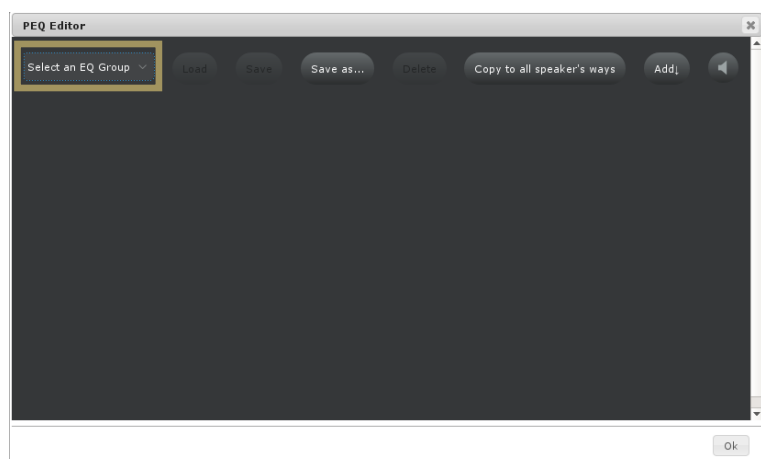
Open any PEQ editor. The saved EQ group are available in the drop-down menu of the top left corner called **Select an EQ Group**;

Select the EQ group you would like to delete in the drop-down list;
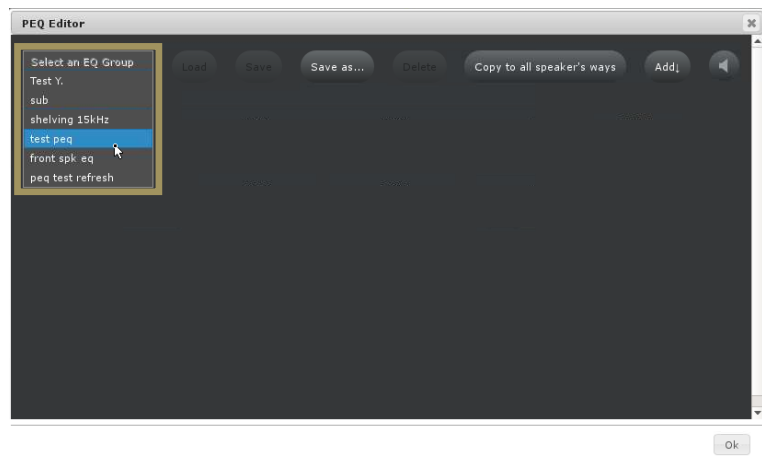
Once the desired EQ group is selected, please click on the **Delete** button;
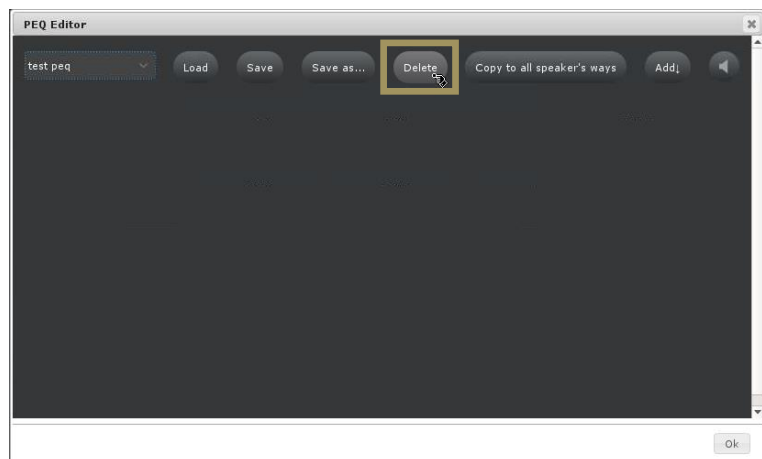
The EQ group is now deleted. Repeat the procedure on other EQ Group if needed. Close the PEQ editor by clicking on the **Ok** button.

8.12.8 <u>SAVE A PEQ GROUP ON AN EXISTING ONE</u>

If an existing EQ group needs modification, it is possible to overwrite it with the new parameters. To do so, please follow this procedure:

Once you are sure the modifications are fine, you can now overwrite this group of EQ on an existing one. The saved EQ group are available in the drop-down menu of the top left corner called **Select an EQ Group**;

Use the drop-down menu to select the group of EQ to overwrite;

Use the **Save** button to overwrite the selected EQ group. It means that the current state of the PEQs will be saved on the selected EQ group. The previous save will be erased.

The EQ group is updated. Close the PEQ editor by clicking on the **Ok** button.

8.12.9 <u>GENERATE PINK NOISE</u>

The PEQ Editor has its own quick access to the pink generator. Click on the *speaker* button to generate pink noise on the selected speaker. Please note that in case of multiway speaker, the pink noise will be generated on the whole speaker.
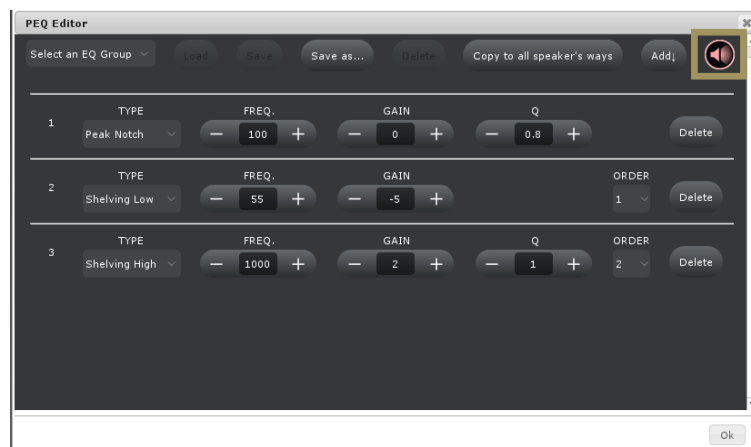
8.13 SAVE THE PRESET

Last but not least, don't forget to **save** the preset to make sure the settings of your speaker layout won't be lost.

9 SPECIFY AN ARRAY OF SPEAKERS

With the release of new 3D audio formats, the number of possible speaker's positions increases considerably. Nevertheless, your video library is surely full of "surround" content (5.1 or 7.1). Furthermore, 3D formats do not all have the same limitation in terms of simultaneous active speakers.
So it seems to be essential to be able to create an array of speakers: use several speakers to play the same channel. It is also possible to adjust the gain of each speaker of the array to perfectly match the needs of the Home-Theater; Thereby, the immersion effect is much more impressive!
Similar configurations has been used in commercial cinemas for years.

9.1 SETTING UP AN ARRAY OF SPEAKERS

Once your speaker's layout has been declared, configured and fully tested, you can now set up your arrays of speakers. The Altitude[32] is able to duplicate the incoming channel from the decoders on several speakers.

The setup of an array has to be done within the **Speaker/Room setup** tool, using the mapping column of each decoders. As explained in the previous chapter **Specify a speaker layout**, **Mapping the channels of different formats** section, each format has its own speaker's assignation, you can easily control the number of speakers used by each decoder. Each column define the channel used by the associated speaker. In this way, you are able to declare the same channel on several speakers.

In the **Speaker/Room setup** tool, you can observe 5 columns giving the details of each decoder's layout:

- **Atmos:** Layout used for native Dolby Atmos content and Dolby Surround Upmixer;
- **Dolby**: Layout used for Legacy Dolby content;
- **Auro 3D**: Layout used for Native Auro 3D content and Auro 3D Upmixer;
- **DTS:X:** Layout used for native DTS:X content and Neural:X Upmixer;
- **DTS:** Layout used for Legacy DTS content.

To specify a speaker layout, please select, in the drop down menu of each speaker, the desired channel that it has to play for each decoder.

> **IMPORTANT NOTE:** DTS:X is limited to <u>11 different</u> channels. Nevertheless, you can use the arrays to duplicate these 11 channels and use more that 11 speakers.

9.2 EXAMPLE OF AN ARRAY OF SPEAKERS

Below is an example of a specific speaker layout designed to array some channels :

In the example above, please pay attention to Left Wide and Right Wide speakers:

- For Dolby Atmos content, Left and Right Wide speakers will play natively as they are natively existing in the codec;

- For Dolby Legacy content, Left and Right Wide speakers will play Ls and Rs channel, simultaneously with Left and Right surround speakers;

- For Auro 3D content, Lw and Rw does not exist natively. In this configuration Left and Right Wide speakers will play Ls and Rs channels simultaneously with Left and Right Surround speakers;

- For DTS:X content, Left and Right Wide speakers will play Lss and Rss channel simultaneously with Left and Right surround speakers;

- For DTS Legacy content, they will play Lss and Rss channel simultaneously with Left and Right surround speakers;

9.3 ADJUST THE GAIN

As you decided to array some speakers, it may be needed to adjust the gain of each speakers accordingly to each decoder. It is possible to do it speaker by speaker, or to select a group of speakers to apply the same gain correction.
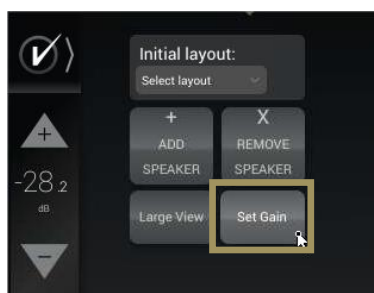
To access to the speaker's gain control panel, click on the Set Gain button in the **Speaker/Room setup** tool. Instead of the channel assignation, the gain control will be displayed.

The screen below displays the **Set Gain** control panel. Each channel assigned from each speakers has a value (default: 0) surrounded by **–** and **+** buttons. Use those buttons to adjust the gain by step of 1 dB.

By clicking onto a value, you also can manually enter a gain. In this case, a virtual numerical keyboard is displayed.

Figure 71: Set gain control panel

The Selected [Selected] speakers can all be modified simultaneously using the control panel in the top left corner.

You can add or decrease gain using **-1dB** or **+1dB** buttons, or by using the **Direct input** and its numerical keyboard.

The **Reset** button clears any modification by default value 0dB.

The **Clear selection** unselect every speakers, keeping the modified values.

IMPORTANT NOTE: High gain values can damage the speaker.

9.4 SAVE THE PRESET

Last but not least, don't forget to **save** the preset to make sure the settings of your arrays of speakers won't be lost.

10 DECODER / UPMIXER SETTINGS

The Altitude[32] allows you to enjoy various kinds of surround and stereo playback modes using the decoders mentioned below. With the 3D codecs option, you also are able to extend your stereo or basic multichannel content (5.1/7.1) to a full 3D sound, and so use most of your speakers declared to the unit: This is the Upmixers.

10.1 SUPPORTED DECODERS/UPMIXERS

A number of surround and 3D decoders are implemented in the Altitude[32]:

Dolby decoders (available as a standard feature of the Altitude[32]):	DTS decoders (available as a standard feature of the Altitude[32]):	3D decoders (ONLY available with the 3D option for the Altitude[32]):
Dolby Digital Dolby Digital Plus Dolby TrueHD	DTS Digital Surround DTS-HD High Resolution Audio DTS-HD Master Audio	Dolby Atmos DTS:X Auro-3D

With the 3D option, the Altitude[32] also supports the following surround Upmixers:

Dolby Surround ®
DTS Neural:X ®
Auro-Matic ®

> **NOTE:** some speakers are not covered by every decoders. In this case, they will remain silent while this decoder is involved. For example, the "Top" speaker is not covered by Dolby Atmos, so this speaker will only be used while playing DTS:X and Auro-3D content, and also if you use their respective upmixer.

10.2 LISTENING FORMATS

The Listening Format dropdown menu provides you several options. Some of them may sounds familiar to you, and the others could be unknown. The list gives you:

- **Auto**: The incoming encoded content will be played with the corresponding upmixer.

- **Dolby Surround**: The incoming content will be played using the Dolby Surround upmixer.

- **Neural:X**: The incoming content will be played using the DTS Neural:X upmixer.

- **Auro-3D**: The incoming content will be played using the Auro-3D upmixer.

- **Native**: The incoming content won't be modified and will be played as it is.

- **Upmix on Native**: The incoming content will played using the corresponding upmixer, but with the Legacy speaker layout (Dolby or DTS column)

- **Legacy**: This listening format will only play the "bed" layout of the content (5.1 or 7.1) and will ignore the 3D layout.

- **Custom**: You are not able to select this mode manually, but it is automatically selected as soon as you change any of the decoder's settings.
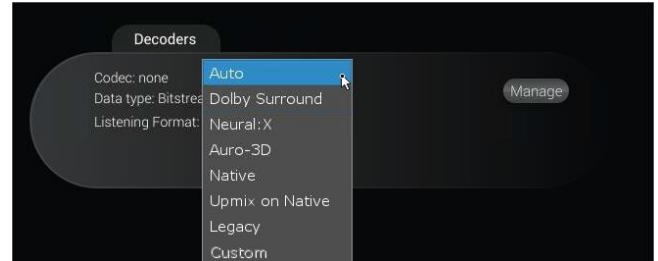
> **NOTE:** Depending of the incoming format decoded by the Altitude[32], the listening format listed above will have some different behavior. Please read carefully the chart below informing you of the behavior of each listening format relatives to the source format.

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Source format / Upmix mode	PCM	Dolby (DD, DD+, TrueHD)	Native Dolby Atmos	DTS (Legacy, HD Master Audio)	DTS:X	Native Auro-3D*
Auto	None (No Upmix) | Layout used : selected in Decoder General settings	Dolby Surround Upmixer | Layout Used : Atmos	Native Dolby Atmos | Layout Used : Atmos	Neural:X Upmixer | Layout Used : DTS:X	Native DTS:X | Layout Used : DTS:X	Native Auro-3D (3) | Layout Used: Auro-3D
Dolby Surround	Dolby Surround Upmixer (1) | Layout Used : Atmos	Dolby Surround Upmixer | Layout Used : Atmos	Native Dolby Atmos | Layout Used : Atmos	Dolby Surround Upmixer | Layout Used : Atmos	Native DTS:X | Layout Used : DTS:X	Dolby Surround Upmixer | Layout Used : Atmos
Neural:X	Neural:X Upmixer | Layout Used : DTS:X	Neural:X Upmixer | Layout Used : DTS:X	Native Dolby Atmos | Layout Used : Atmos	Neural:X Upmixer | Layout Used : DTS:X	Native DTS:X | Layout Used : DTS:X	Neural:X Upmixer | Layout Used : DTS:X
Auro-3D	Auro-3D Upmixer (1) | Layout Used : Auro-3D	Auro-3D Upmixer | Layout Used : Auro-3D	Native Dolby Atmos | Layout Used : Atmos	Auro-3D Upmixer | Layout Used : Auro-3D	Native DTS:X | Layout Used : DTS:X	Native Auro-3D* | Layout Used: Auro-3D
Native	None (No Upmix) | Layout used : selected in Decoder General settings	None (No Upmix) | Layout Used : Dolby	Native Dolby Atmos | Layout Used : Atmos	None (No Upmix) | Layout Used : DTS)	Native DTS:X | Layout Used : DTS:X	Native Auro-3D* | Layout Used: Auro-3D
Upmix on Native	Upmix following the default PCM layout in the Decoder General settings	Dolby Surround Upmixer | Layout Used : Dolby	Native Dolby Atmos | Layout Used : Atmos	Neural:X Upmixer | Layout Used : DTS	Native DTS:X | Layout Used : DTS:X	Native Auro-3D* | Layout Used: Auro-3D
Legacy	None (No Upmix) | Layout used : selected in Decoder General settings	None (No Upmix) | Layout Used: Dolby	Bed (Original 7.1) | Layout Used : Dolby	None (No Upmix) (2) | Layout Used : DTS	Bed (Original 7.1) | Layout Used : DTS	Bed (Original 7.1) | Layout Used : Auro-3D

Figure 72 Chart of the behavior between source format and listening mode

KNOWN ISSUES

(1) Potential issue with stereo PCM sources (typically CD): the HDMI outputs of some Blu-Ray players declare 7.1 channels instead of 2. In such case, surround and rear channels will not be upmixed. This issue comes from the player, not from the Altitude[32]. The only solution is to force the player to deliver 2 channels.

(2) Potential issue with 7.1 material: with the Legacy Upmix mode, the "channel remapping" option of the DTS decoder is set to "off". The Ls and Rs channels may be missing as the decoder may expect Lss and Rss channels. The best solution is to set the "channel remapping" to "auto", or to use the Native listening mode.

(3) Potential issue with Auro-3D content: Auro-3D may not be detected is Listening Format Auto. In such cases, the upmixer of the Bed format will be used. If it is Auto-3D PCM material, the upmixer used will depend of the PCM default layout selected in the Decoders General Settings. If this happen, selecting Auro-3D listening format will play Native Auro-3D content.

CPU LOAD do not forget that upmixers require a lot of CPU resources, especially in 96 kHz with high channel count. Until further software optimization is achieved, please contact Trinnov Audio to set less demanding Loudspeaker/Room optimization parameters.

Auro-Matic: the Auro-3D upmixer does operate up to 96 kHz but not with higher sampling rates.

Neural:X: The Neural:X upmixer does operate up to 48 kHz but not with higher sampling rates.

* Please refer to the important note below.

For detailed information about the surround upmixers, please contact Trinnov's Support team.

IMPORTANT NOTE: Sometimes, in Auto or Native listening format, Auro-3D content may not be correctly detected and decoded at the input. In this situation, only 5.1 or 7.1 content will be considered. If so, please set the **Listening Format** on Auro-3D to ensure the complete Auro-3D decoding. This behavior will be solved in a future software release.

10.3 USING THE FRONT PANEL

10.3.1 LISTENING FORMAT SELECTION

From the front panel of the Altitude[32], press the **Menu** button. Using the **Select** knob, go to "**Listening Format**" menu, validate using the **Enter** button.

Then choose the desire listening format, still using the **Select** knob, and validate using the **Enter** button. The current listening format is underlined.
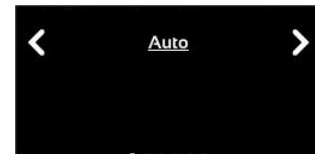
10.3.2 DECODERS CONFIGURATION

To configure the Decoders from the front panel, press the **Menu** button. Using the **Select** knob, go to the **Setup** menu. Validate using the **Enter** button.

Then, using the **Select** knob, go down the list and select **Decoders** with the **Enter** button.
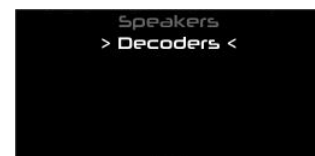
Finally, select the decoder you want to configure.
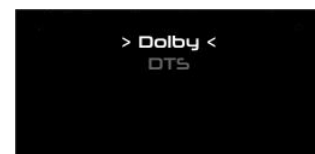
10.4 USING THE GRAPHICAL INTERFACE

10.4.1 LISTENING FORMATS SELECTION

To activate a surround upmixer:

1. Click on the "IN sources" menu item of the lateral menu to go to the **Sources** page;

2. Select a Listening Format in the drop down list available.
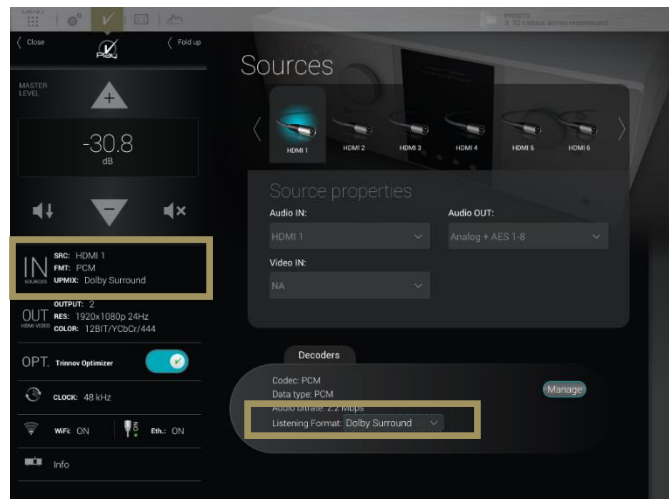
Figure 73: the surround upmixer option

10.4.2 DECODERS CONFIGURATION

To configure the decoder parameters for the Dolby, DTS and Auro-3D decoders:

1. Click on the "IN sources" menu item of the lateral menu to go to the **Sources** page;

2. In the **Sources** page, click on the **Manage** button in the **Decoders** section. This gives you access to the decoders settings described below.
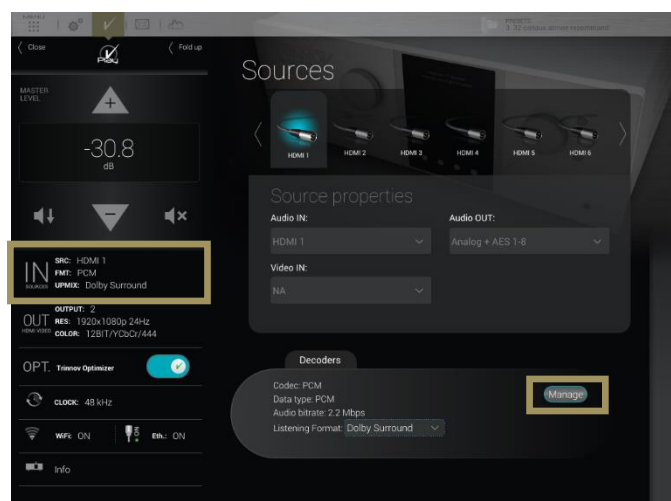
Figure 74: accessing the decoders setup from the Sources page

10.5 DECODERS SETTINGS

The different decoders' settings given bellow are available through the graphical interface or through the front panel screen (see above).

10.5.1 GENERAL SETTINGS
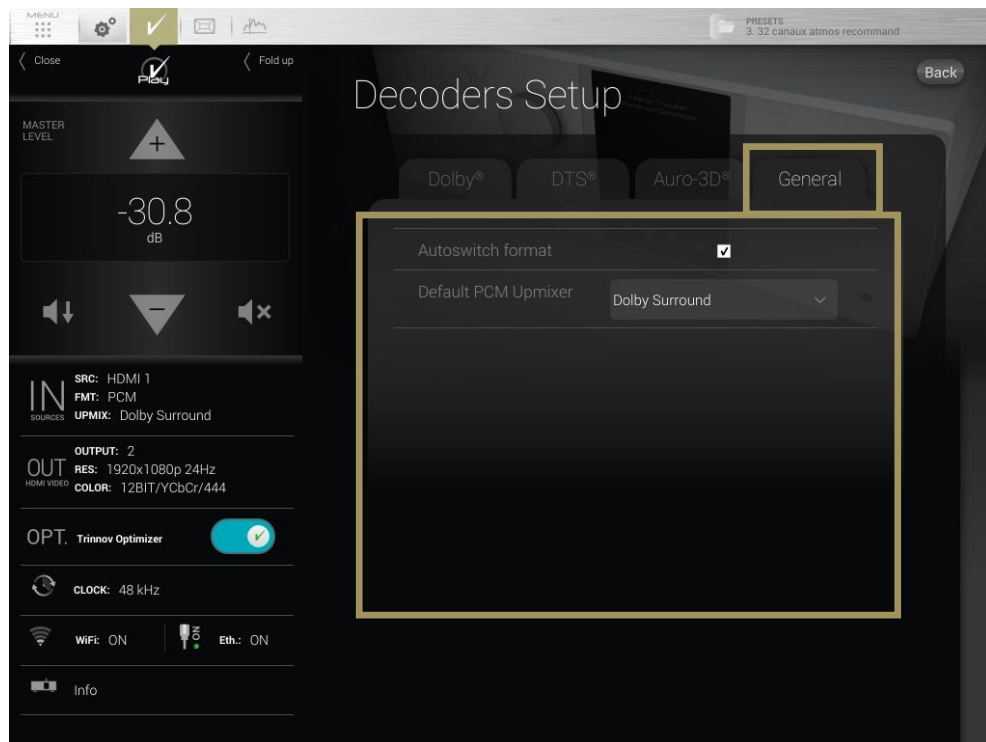
The **General** tab provides you different settings to configure the decoding behavior of the Altitude[32] that does not directly concern the decoders.

- **Autoswitch format** : When this option is activated, the Altitude[32] will automatically switch to the input format of the decoder. Combined with the 3D remapping, the Altitude[32] virtually replaces the speakers at their ideal position recommended by the curent decoder and provides you the best immersion conditions.

  If this setting is not enable, you have to manually select the good source format if the **Setup/Source** menu of the Advanced interface.

- **Default PCM Upmixer** : PCM format has no decoder, so no assign speaker layout. This settings allows to assign a default layout and upmixer for incoming PCM content.

10.5.2 DOLBY DECODER SETTINGS
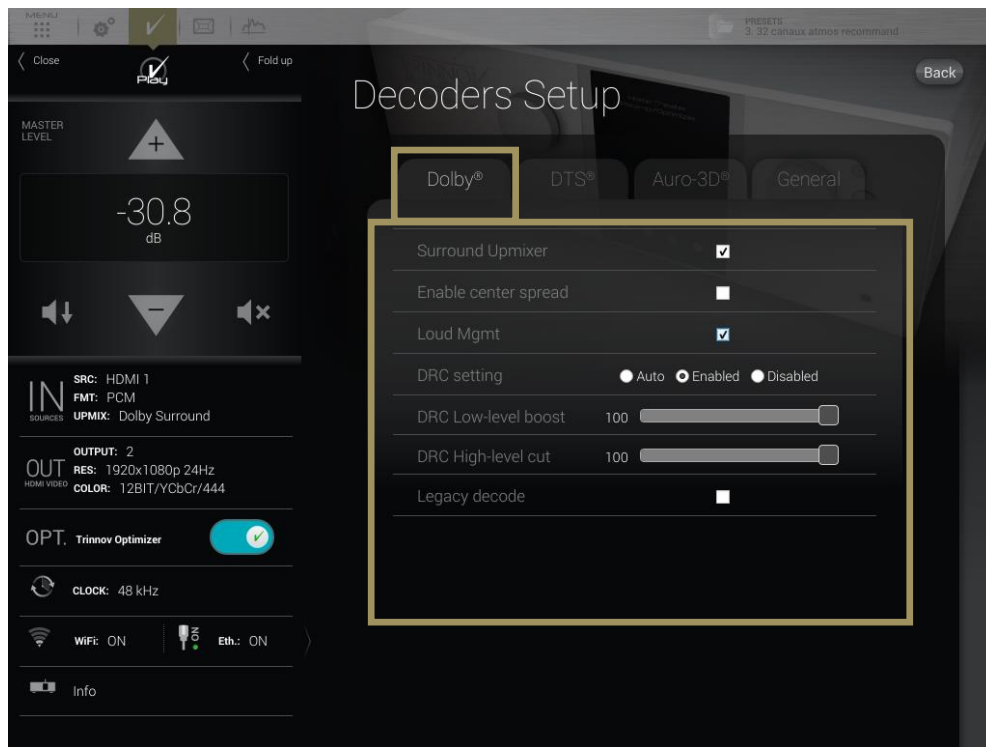
Figure 75: Dolby decoder settings

- **Surround Upmixer**: switch on/off the Dolby surround upmixer;

- **Enable center spread**: spread the Center channel across the Left and Right speakers. Creates a wider sound stage, recommended for playing musical content;

- **Loud Mgmt**: use the loudness management information provided in the incoming signal's metadata;

  o **DRC Settings**:

    - **Auto:** Automatic DRC low level boost and high level cut;

    - **Enabled:** Enable the Dynamic Range Control management;

    - **Disabled:** Disable the Dynamic Range Control management;

  o **DRC Low-Level Boost**: Amount of low-level boost;

  o **DRC High-Level Cut:** Amount of high-level cut;

- **Legacy decode**: extract the legacy content (5.1 or 7.1) from the incoming Dolby Atmos content.

10.5.3 DTS DECODER SETTINGS
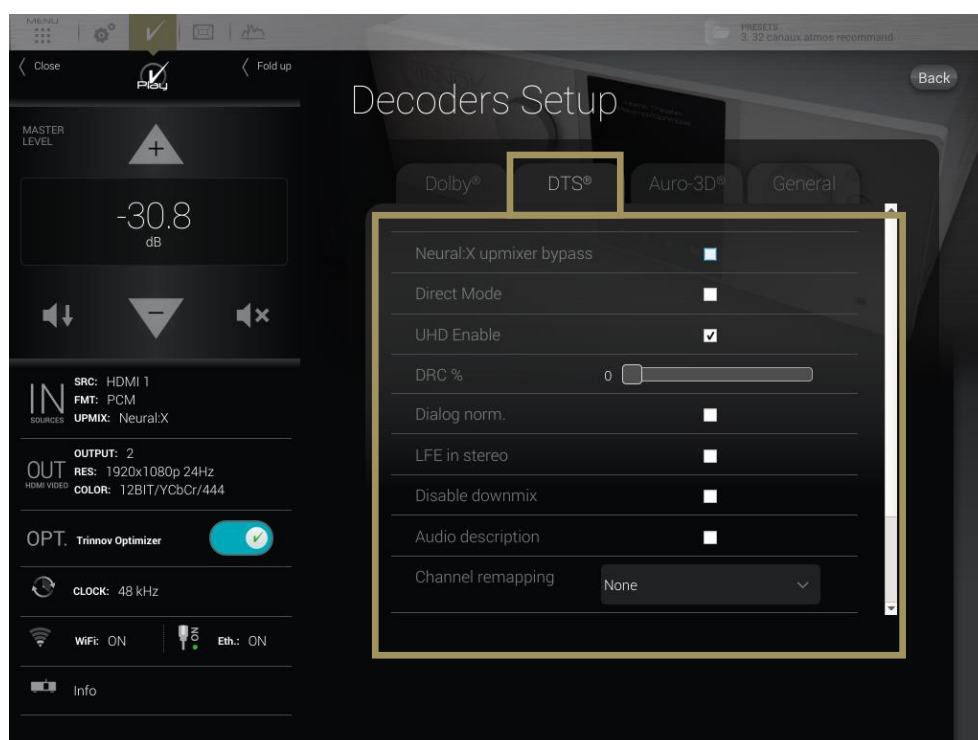
Figure 76 : DTS:X Decoder Settings

- **Neural:X Upmixer Bypass**: disable the Neural:X Upmixer ;

- **Direct Mode**: In "Direct Mode," the audio is extracted and reproduced as closely as possible to what the content creator intended. At a high-level, direct mode attempts to most closely preserve the original speaker layout with no additional processing to take advantage of additional speakers.

- **UHD Enable:** Allows the rendering on the 3D object. If this function is disabled, the decoder will play only on ears-level speakers;

- **DRC%**: sets a percentage of Dynamic Range Control ;

- **Dialog norm**: use the incoming metadata to adjust the level of the center channel;

- **LFE in stereo**: send the LFE to a pair of subwoofers ;

- **Disable downmix**: don't downmix surround formats into stereo;

- **Audio description**: switch **on** the visual description track intended for the blind and visually impaired ;

- **Channel remapping**: this setting is only applicable for surround formats

  - **None** : No channel remapping is applied

  - **Auto**: apply automatic channel remapping that matches the incoming channels to the speaker system;

  - **Auto on DTS configs**: apply automatic channel remapping accordingly to some specifics speakers configurations determined by DTS

  - **2.0 – 7.1** settings: force playback on a specific speaker configuration such as 7.1 independently from the incoming channels;

- **Solo stream**: enable the Primary or Secondary solo stream.

- **Interactive Object**: If interactive objects are available on the played content, a slider will provides a volume control on these interactive objects. The slider is disabled if no interactive object is available. The interactive objects usually are dialogs object, so you are able to adjust the dialogs level.

10.5.4 AURO-3D DECODER SETTINGS
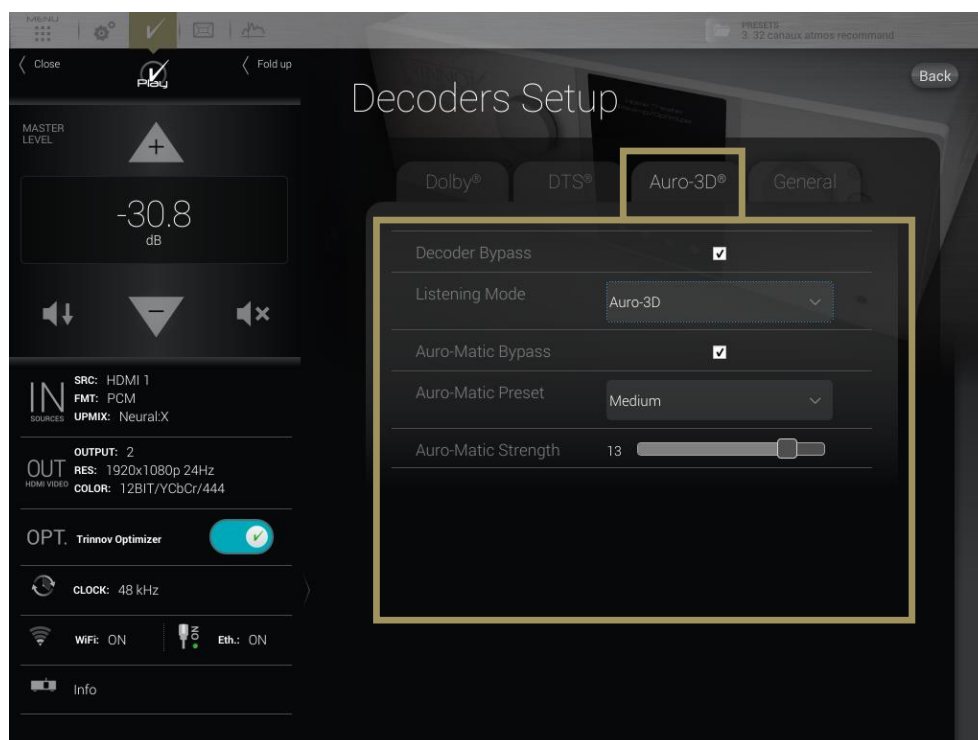
Figure 77: Auro-3D decoder settings

- **Decoder bypass**: bypass the Auro-3D decoder;
- **Listening mode**:
    - o **Auro-3D**: enforce playback on the Auro-3D speaker layout. Incoming surround content is *upmixed* to the Auro-3D format ;
    - o **Surround**: enforce playback on the surround speaker layout, so heights speakers are disabled. Incoming stereo content is *upmixed* to a surround format and incoming Auro-3D content is *downmixed* to a surround format.
    - o **Stereo**: enforce playback in stereo. Incoming surround content is *downmixed* to the stereo format.
- **Auro-matic Bypass**: switch on/off the Auro-matic upmixer;
- **Auro-matic Preset**: choose different settings for the Auro-matic upmixer;
- **Auro-matic Strength**: sets the strength of the Auro-matic upmixer.

11 GETTING READY FOR CALIBRATION

This chapter explains very important tips to ensure a smooth and safe calibration process, as well as important recommendations for **microphone placement** in order to perform high quality acoustic measurements.

11.1 VERY IMPORTANT TIPS

Important Notes:

- Active Crossovers need to be calibrated prior to the speakers set calibration.
- Master 48 kHz clock modes should be used for calibration.

Avoiding feedback loops:

- Always **MUTE** the processor as the first step of the calibration procedure. Muting the outputs does not affect the calibration signal.
- Be careful with feedback issues when you change the routing you could make loops between the microphone and the loudspeakers.

Avoiding warning messages during calibration:

- Disable the subwoofer's built-in filters: a narrow bandwidth can disturb the measurement.
- Adjust levels between amplifier/active speakers before calibration to avoid dangerous level jumps.

11.2 CHECKLIST BEFORE YOU START

Please go through the following checklist to make sure you are ready to start the calibration process:

- You've read carefully the whole chapter about the Altitude32's Essential Tools and Settings that you'll be using throughout the calibration process.
- The speaker layout (including multi-amplified speakers) has been specified in the Altitude[32]'s Speaker/Room Setup Tool.
- The routing of the speakers/drivers has been verified by playing pink noise with the Altitude[32]'s Speaker/Room Setup Tool.
- All the speakers (including the subwoofers) are installed in their final positions and orientations, and connected to their amplifiers.
- The measurement microphone is switched OFF, placed on a mic stand and connected to the Altitude[32]'s MIC/4 XLR input.
- The **MIC** input is selected as a source for a 5 pins XLR microphone, or **ANALOG BAL IN 1+2 (MIC 4 XLR)** for a 4 XLR microphone
- You have access to the Advanced Settings user interface, via a screen directly connected to the Altitude[32], or through a VNC client.

11.3 IMPORTANT RECOMMENDATIONS FOR MICROPHONE PLACEMENT

11.3.1 REQUIREMENTS FOR THE MEASUREMENT ENVIRONMENT

At least a few basic rules should be respected to ensure a robust measurement:

- No obstacle between the speaker and the microphone.
- No highly reflecting surface (leather sofa, glass table…) close to the microphone.
- No background noise during the measurements (Air conditionning, open doors, windows etc…)
- No movement during the calibration (disturbs speaker localisation)

11.3.2 REFERENCE MEASUREMENT POINT

The Altitude[32] supports single-point and multi-point calibrations. In both scenarios, a **reference measurement position** should be chosen carefully since it will be used by the Optimizer for:

- Cross-over drivers alignment
- Loudspeaker 3D localisation
- Loudspeaker 2D/3D remapping
- Loudspeaker relative delay/level alignment
- Master delay/level calculation

11.3.3 POSITION AND ORIENTATION OF THE MICROPHONE FOR THE REFERENCE POINT

The calibration microphone should be placed at the listening position, using the listener's ears as a reference for its height. A **red led** shows the front of the microphone. The red led must be pointed to the **front** of the sound stage, towards the **center speaker**.

During the calibration process the microphone should be screwed on a microphone or camera stand.

Point the front red LED
to the center of the speakers set.
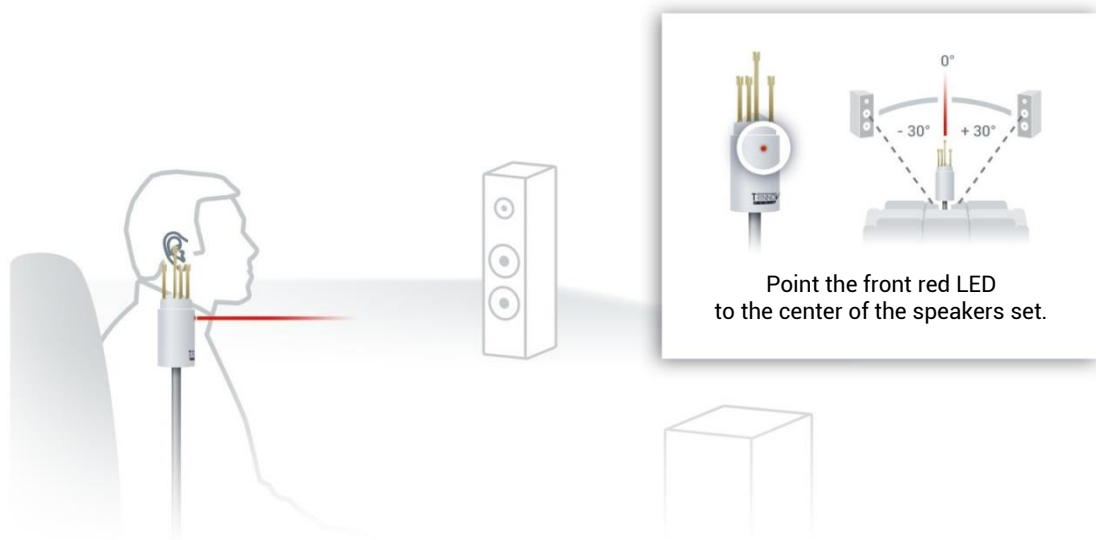
Figure 78: microphone reference position

12 CALIBRATE THE ACTIVE CROSSOVERS (OPTIONAL)

This chapter explains how to calibrate the active crossovers included in the Altitude[32]. It assumes that you are familiar with active crossovers and multi-amplified speakers, and is not intended as a course. If you are not using the active crossover functionality of the Altitude[32], please skip to the next chapter.

> **IMPORTANT NOTE:** Read carefully the whole chapter about the Altitude[32]'s *Essential Tools and Settings* that you'll be using throughout the calibration process.

> **NOTE:** *Master 44.1 kHz* or *48 kHz* clock modes should be used for calibration (*Master 48kHz* highly recommended).
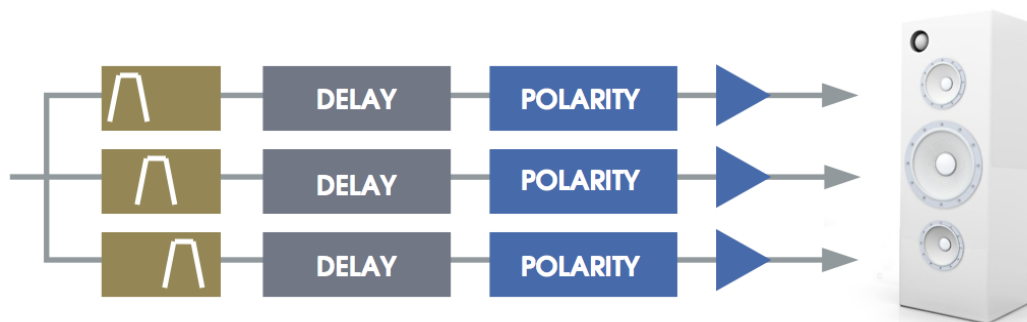
Figure 79: overview of the active crossovers signal flow

12.1 OVERVIEW OF THE CROSSOVER SETUP PROCEDURE

The overall setup and calibration process of the Altitude[32]'s active crossovers performed through 2 different tools:

- Use the Speaker/Room Setup Tool to:
- Configure the number of ways and the crossover frequencies;
- Verify the routing of the Altitude[32]'s outputs to the correct drivers.
- Use the Setup/Active Xovers page of the Advanced Settings interface to:
- Configure the advanced crossover settings such as specific frequencies for each driver and the type of filters (optional);
- Use the Processor/Meters page to adjust the master output level;
- Perform the automated calibration of the active crossover: this will automatically determine the level, delay and polarity of each driver;
- Manually adjust levels, delays and polarities of each driver.

The first 2 steps of this process were explained in the previous chapter. This chapter explains the next steps.

12.2 CONFIGURE THE ADVANCED SETTINGS (OPTIONAL)

The Altitude[32] includes the following advanced crossover settings:

- Types of filters: Bessel order 2, 3 and 4; Linkwitz-Riley order 2 and 4; Butterworth order 2, 3 and 4;

- Specific crossover frequency for each driver;

- Level, Polarity and Delay adjustment on each way (driver);

> **IMPORTANT NOTE:** Setup of the crossover filters can be done simultaneously for multiple speakers thanks to their respective Link button. Linking has to be done *before* changing parameters.
>
> Please refer to the speaker manufacturer's specification to determine the type of filters and crossover frequency.

The **Setup/Active Xovers** page displays one tab for each loudspeaker. The number of loudspeakers displayed depends on the number of loudspeakers specified in the **Speaker/Room Setup** tool.

Figure 80: advanced crossover settings

The following settings are available for each loudspeaker:

- The **type** of high-pass or/and low-pass filters is chosen in the dropdown menu using ▾

- The **cut-off frequency** of each filter is set by using the ◀ arrows ▶ or by manually enter the frequency

- **Level** and **delay** can be adjusted on each way (driver),

- **Mute** and **Invert Polarity** buttons are also available.

- Two additional IIR filters are available under the name of **"Constant-directivity horn" EQ** and **Half "Constant-directivity horn" EQ** . The purpose of such filters is to boost the high frequencies for speaker that use constant-directivity horns. These speakers tend to let the high frequency fall down at the sweet spot. Depending on the horn you are using, you may want to boost the high frequencies by a 3 or 6 dB/oct, from about 3kHhz.
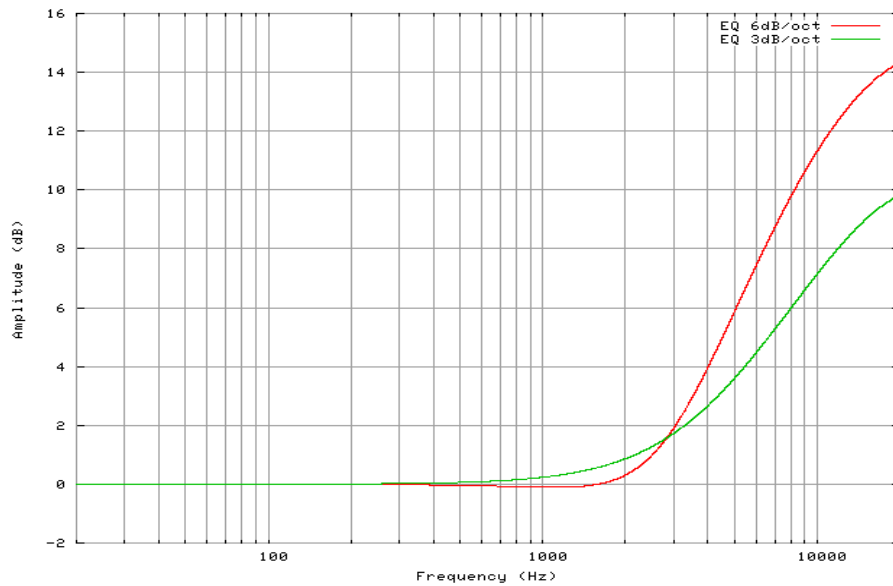
Figure 81: "Constant-directivity horn" EQs

- The **Apply** button is highlighted as soon as a parameter is modified and is used to compute and load the new settings into the processor. Once compute is finished (gears icon disappears from the notification bar), filters are applied to the outputs.

- If change is unwanted, press the **Cancel Changes** button to cancel your modifications

- If change is accepted, press the **Save** button of the preset of your choice in the Presets page to *save the changes*. Otherwise changes will be lost.

The theoretical model of the specified filters is represented as follows:

- The green curve represents the theoretical low-pass filter response

- The red curve represents the theoretical high-pass filter response

- The blue curve represents the theoretical resulting response of the speakers
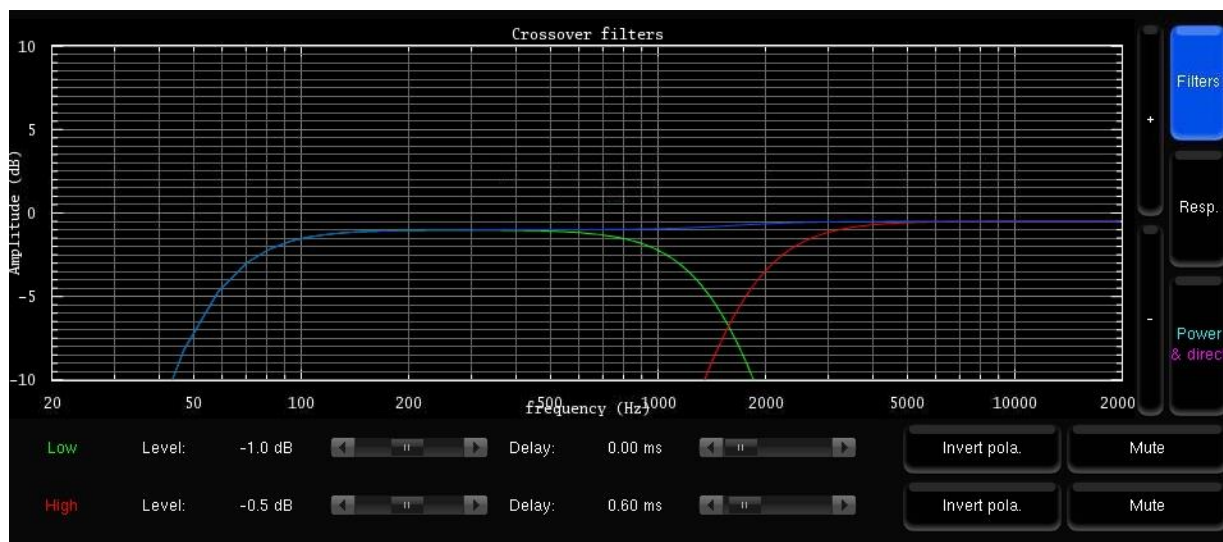
Figure 82: theoretical model of the specified filters

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12.3 ADJUST THE MASTER OUTPUT LEVEL

The Altitude[32] requires a minimum Sound Pressure Level for proper calibration of the active crossovers. Until that minimum SPL is reached, the test signal will keep playing through the same driver. For safety matters, we recommend to perform that first calibration as if it were a test.

First, be sure that you selected the good microphone input:
- MIC IN if you are using a 5-pins XLR microphone;
- ANA BAL IN 1+2 (MIC 4 XLR) if you are using a 4 XLR microphone.

Set a safe output level:
1. Decrease Master Level to -40 dB;
2. Press the **Mute** button to cut the outputs (this step must ALWAYS be performed before pressing on the **Calibrate** button to avoid any feedback loop);
3. Take off the cover and switch on the microphone;
4. Press the **Calibrate** button in the **Setup/ActiveXovers** page of the Advanced Settings interface;

Adjust output level:
1. Increase the master level until the test signal moves to the second driver;
2. Use the Altitude[32]'s metering tools automatically displayed on screen to check the level of the microphone inputs;
3. Use your ears to evaluate the perceived SPL of each driver and, if possible, increase the master output level to ensure that an optimal SPL is reached for all the drivers. This will also improve the quality of your measurements;
4. Use the **Cancel** button to stop the calibration (optional).

Figure 83: crossover calibration page
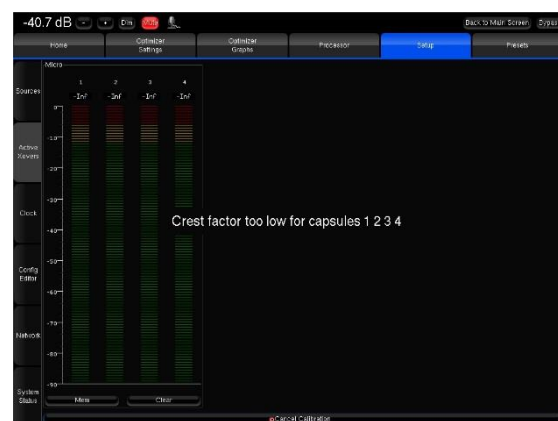
Figure 84: metering page

Once the level is adjusted, you can move to the next step to perform the final calibration of the active crossover.

12.4 CALIBRATE THE ACTIVE CROSSOVERS
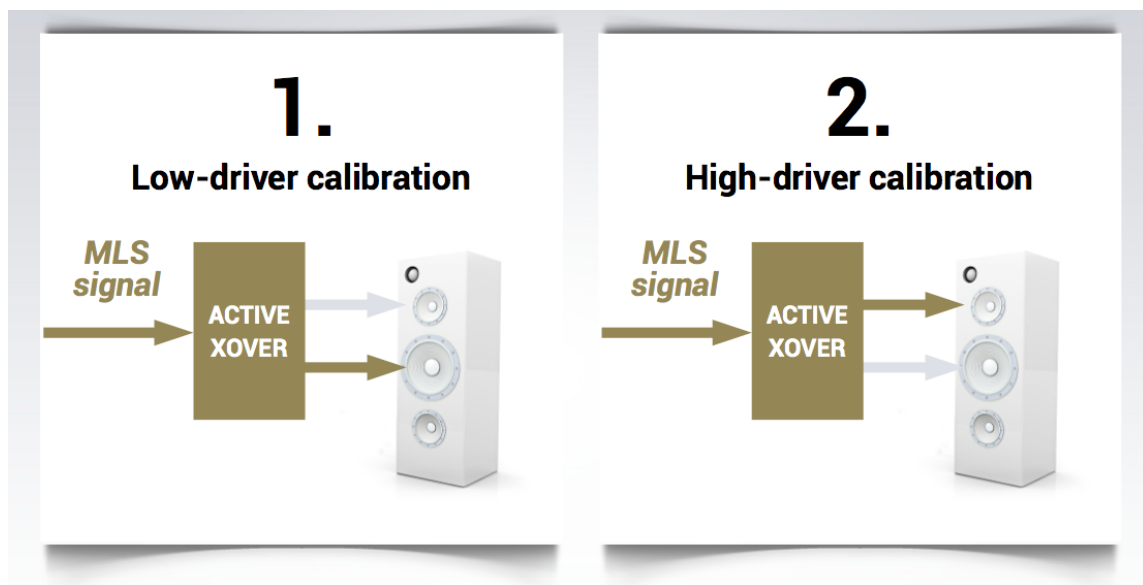
Figure 85: the steps of the calibration process

Once the master output level is set (see previous step), the Altitude[32]'s crossover calibration tool will automatically set up the level, delay and polarity of each driver.

Before calibration, please note:

- The calibration procedure has to be done individually for each speaker;

- An MLS signal is sent to each driver of the selected speaker when the **Calibrate** button is hit.

- At the end of the calibration process, a warning message states that a new calibration of the whole set of speakers is required.

Figure 86: performing the calibration of the active crossovers

Remain in the **Setup/ActiveXovers** page of the Advanced Settings interface to perform the calibration of the active crossovers:

- If two or more speakers are linked, please **unlink** them by turning off the **Link** button.

- Follow the microphone placement instructions (see previous chapter).

- Make sure the measurement environment is silent.

- Press the **Mute** button to cut the outputs (this step must ALWAYS be performed before pressing on the **Calibrate** button)

- Press the **Calibrate** button in the **Setup/ActiveXovers** page of the Advanced Settings interface

- Follow the on-screen instructions regarding the microphone.

12.5 VERIFY THE SOUND OF THE CALIBRATED CROSSOVERS

Once the calibration of the active crossovers is finished, it is *critically important* to verify the sound of the related speakers to identify any possible issues:

Visualize the acoustic graphs of the speakers connected to the active crossover;
Listen to the speakers connected to the active crossover.

12.5.1 VISUALIZE THE ACOUSTICAL GRAPHS FOR EACH SPEAKER

You can visualize the results in two forms:

The measured impulse response of each way: you can see whether the drivers are correctly synchronized.

Figure 87: measured impulse response of both drivers

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The recombined amplitude response of the speaker: you can see whether the combination of the drivers is constructive, and you can observe the effects of level/delay/polarity modification on the combined amplitude of the speaker. Two curves are displayed, one showing the global power of the speaker (including the room), and one showing the amplitude of the direct front and early reflections. Comparing both curves will indicate you whether the crossover conserves the directivity of the speaker: the more alike the two curves look, the more directive the speaker is towards the listening spot.
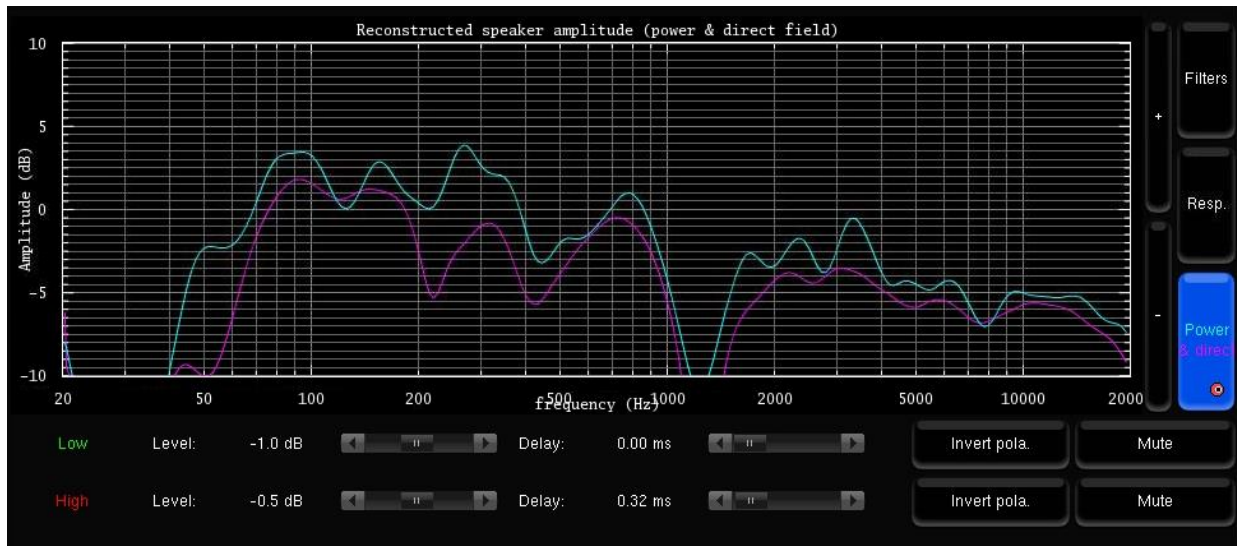
Figure 88: recombined amplitude response of the speaker

NOTE:

- The levels, delays and polarities set previously are ignored during the calibration. In other words, adjusting these parameters before launching the calibration will have *no effect* on the result.

- Under some circumstances, the automatic crossover algorithm may suggest inverted polarities for a driver from one speaker to another. This can be explained by various factors:

  o The physical polarity of one speaker is, indeed, inverted (from a cabling issue, as an example). In this case, the correction suggested by the Optimizer should be applied to improve audio quality

  o Two adjacent drivers (for instance Mid and High) are phase-shifted by an amount of about 90°. In this case, the Optimizer provides more uncertain results, as it gets harder to see whether the drivers are in or out of phase. If you are not comfortable with the results provided by the Optimizer, you can correct them manually afterwards (via the button "Invert polarity").

12.5.2 LISTEN TO EACH SPEAKER CONNECTED TO THE CROSSOVER

Last but not least, listen carefully to each speaker connected to the crossover. You can play pink noise from the Altitude[32] and/or play your favorite music/cinema samples.

12.6 SAVE THE PRESET

Last but not least, don't forget to **save** the preset to make sure the crossover settings won't be lost.

13 CALIBRATE THE SPEAKERS IN THE ROOM

> **IMPORTANT NOTE:** In order to perform a proper calibration it's important to read carefully the whole **chapters** about the *Essential Tools and Settings* and *Getting Ready for Calibration* to learn about the Altitude[32]'s audio clock settings, audio utilities (metering tools, pink noise and solo/mute buttons) and microphone placement recommendations.

13.1 OVERVIEW OF THE CALIBRATION PROCEDURE

If your set of speakers has been specified correctly, the calibration process is a relatively straightforward process:

1. Adjust the master output level to have good quality measurements;
2. Start the automated calibration: the Altitude[32] will measure the acoustical response of each loudspeaker in the room;
3. Compute the optimization filters.
4. Save one or more presets with your preferred optimization settings.

13.2 ADJUST THE MASTER OUTPUT LEVEL

To access the calibration page from the Altitude[32]'s Main page:

Click on the **Flag button** in the top menu to open the Advanced Settings user interface.
Go to the Optimizer Settings/Calibration page.

The Optimizer requires a minimum Sound Pressure Level for proper calibration. Until that minimum SPL is reached, the test signal will keep playing through the same speaker. For safety matters, we recommend to perform that first calibration as if it were a test.

Set a safe output level:
1. Decrease Master Level to -40 dB;
2. Press the **Mute** button to cut the outputs (this step must ALWAYS be performed before pressing on the **Calibrate** button);
3. Press the **Calibrate** button in the **Optimizer Settings/Calibration** page of the Advanced Settings interface;
4. Follow on-screen instructions regarding the microphone: take off the cover and switch it on.

Adjust output level:
1. Increase the master level until the test signal moves on to the second speaker;
2. Use the Altitude[32]'s metering tools in the **Processor/Meters** page to check the level of the microphone inputs;
3. Use your ears to evaluate the perceived SPL of each driver and, if possible, increase the master output level to ensure that an optimal SPL is reached for all the speakers. This will also improve the quality of your measurements;
4. Use the **Cancel** button to stop the calibration (optional).

During this process you will need to *move back and forth* between the calibration page and the metering page:
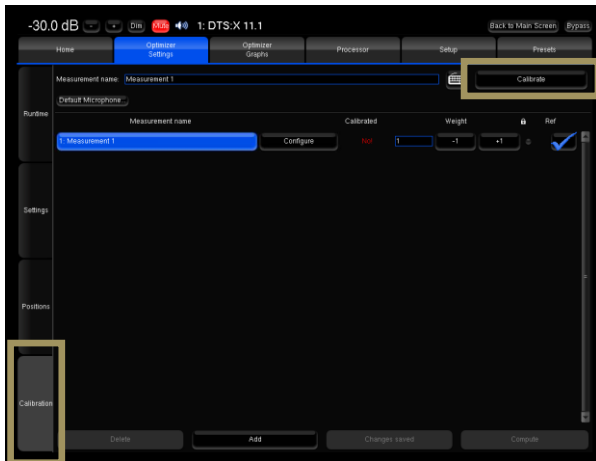
Figure 89: calibration page
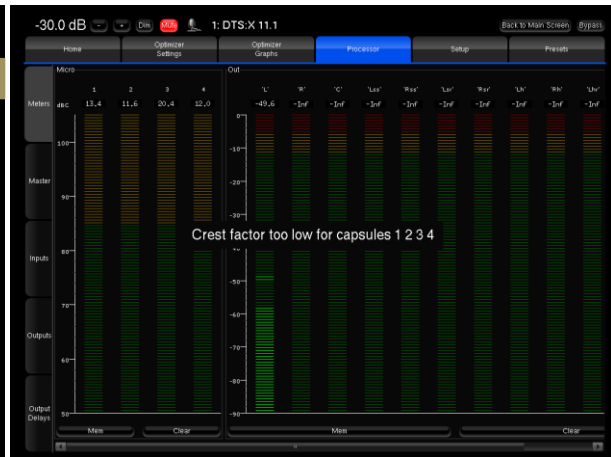
Figure 90: metering page

13.3 NORMAL CALIBRATION SEQUENCE

Remain in the **Optimizer Settings/Calibration** page of the Advanced Settings interface to perform the final calibration:

- Follow the microphone placement instructions (see previous chapter);
- Make sure the measurement environment is silent;
- Press the **Mute** button to cut the outputs (this step must ALWAYS be performed before pressing the **Calibrate** button);
- Press the **Calibrate** button in the top right corner of the page;
- Follow the on-screen instructions regarding the microphone: take off the cover and switch it on.

NOTES:

- The calibration tool plays three MLS bursts for every speakers and subwoofers;
- The calibration page indicates which speaker is being calibrated.
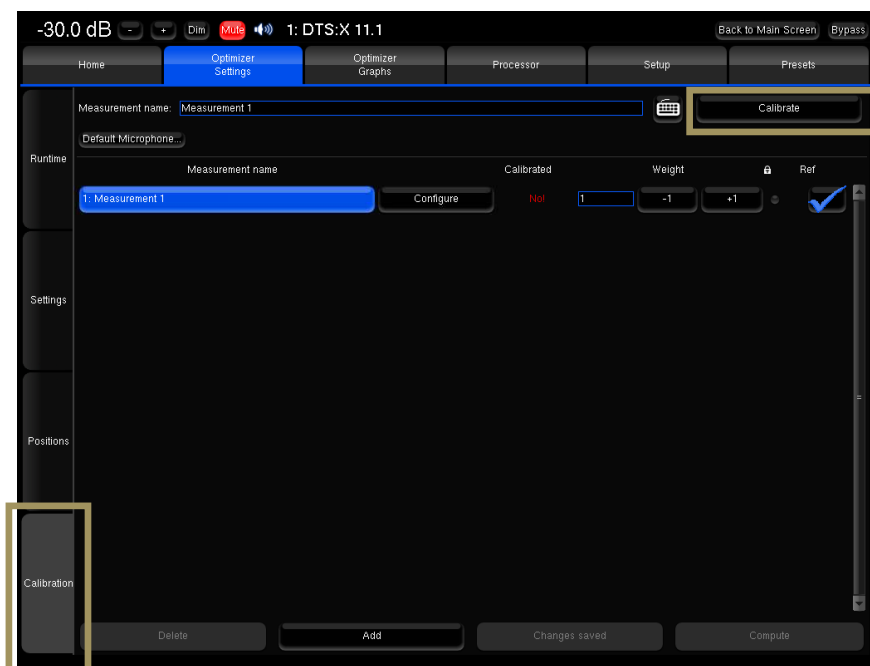
Figure 91: the calibration page

13.4 COMMON   PROBLEMS   DURING CALIBRATION

If the calibration tool plays more than 3 MLS bursts for a speaker, it means that it's finding it difficult to perform a reliable measurement of that speaker.

The most common warning messages are explained below:

- "Crest factor too low for capsules":
- Check the Input Meters in the **Processor/Meters** page.
- If the Input level is null on at least one of the 4 channels, go back to the **Optimizer Settings/Calibration** page and stop the calibration.
- Check that the selected analog physical input is selected in the **Home/Select** page.
- Make sure the microphone routing is correct.
- It can also be the PP3 battery inside the microphone that is out of energy, the red led at the front of the microphone indicates the battery level.
- The microphone or cables could also be damaged.
- "Unstable position for speaker":
- Someone may have moved during the calibration.
- Too many strong reflections around the microphone environment disturb the impulse response measurement.
- An obstacle between the microphone and the speakers disturbs the measurement.
- The bandwidth of one of the speakers is too narrow.
- "Unable to localize speaker" :
- Dipole/bipole speakers providing more than one wave at the same time
- Several speakers chained providing more than one wave at the same time

13.5 CALIBRATION STATUS

The calibration status has 3 possible values:

- **Yes :** If no problem occurred during the measurement. After calibration, the Top Bar indicates **NOT READY**, which means no sound can go through the processor until the optimization filters are computed.
- **Partial** : If the calibration was stopped in the middle of the measurement process.
- **No!** : When no measurement has not been performed.
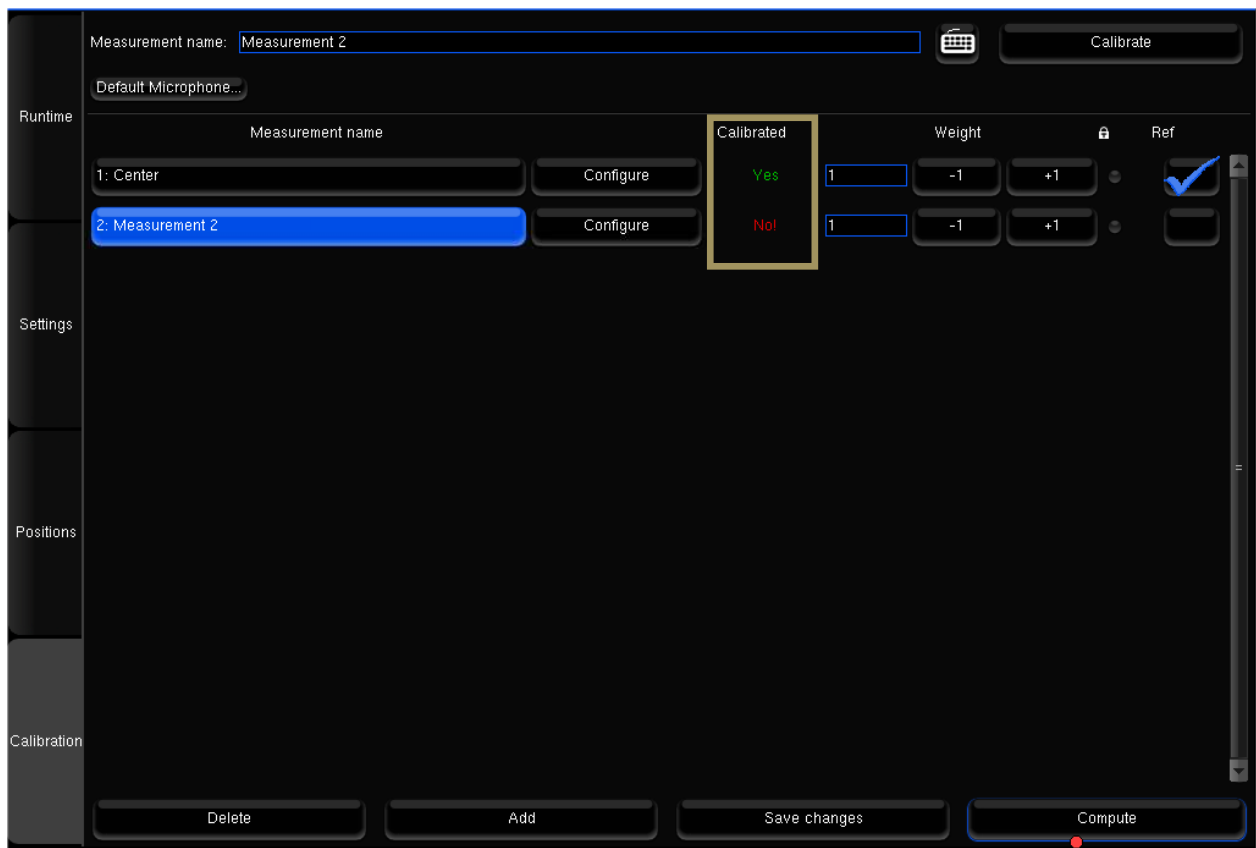
Figure 92: calibration status

13.6 CHECKING THE SPEAKER POSITIONS DURING/AFTER CALIBRATION

The **Optimizer Settings/Positions** page displays the measured speaker locations in real-time during calibration. Three views are provided:

- **Top view**: The speakers are seen from above;

- **Elevation view**: The speakers are seen from the listening point. Relative degrees of elevation and azimuth are displayed;

- **Details view**: A table listing the measured distance, elevation, azimuth, level, delay etc…

By default, the Optimizer page always displays the reference speaker positions in green color. These positions are specified in the template of the initial speaker layout (2.0, 5.1, 7.1 or one of the Atmos, Auro-3D, DTS or Trinnov layouts).
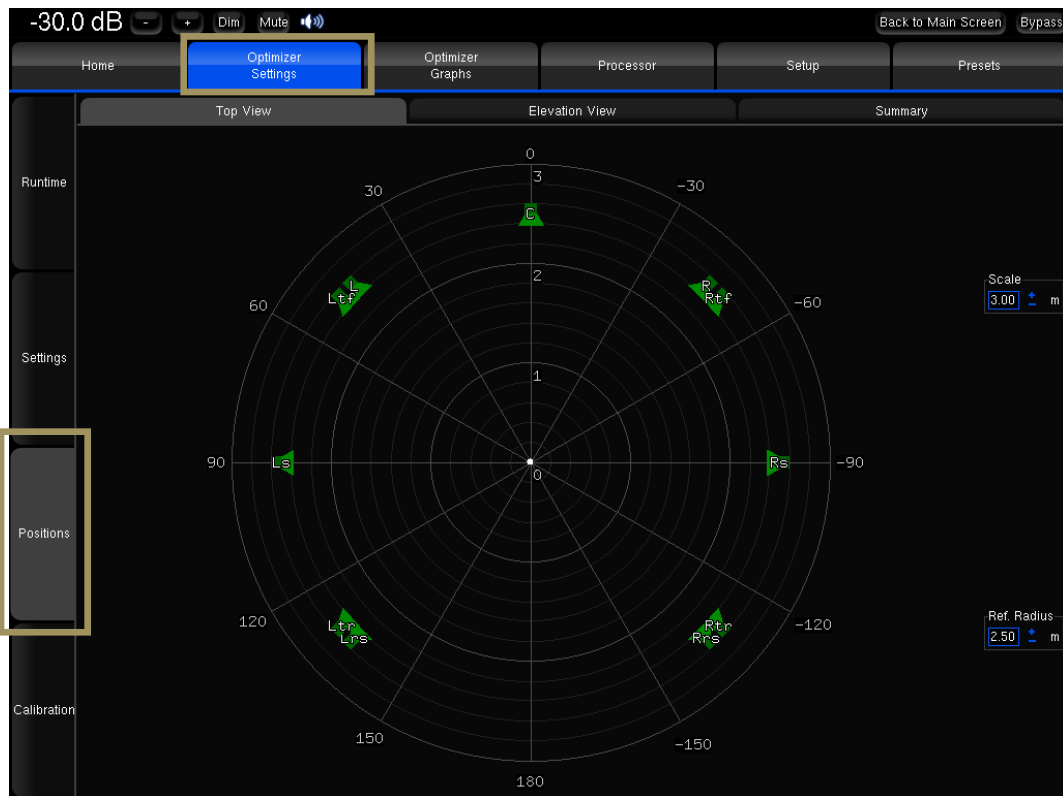
Figure 93: top view of a 7.1.4 layout before calibration

As the calibration is performed, the real position of each speaker is displayed after the 3rd MLS burst.

The **Top View** helps to identify wrong speaker placements. It might be necessary to recalibrate if the microphone is not perfectly pointed towards the center of the front stage, otherwise the remapping option will result in a slightly off-axis rotated sound stage.
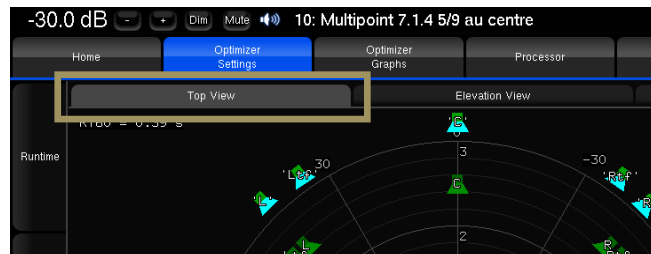
Figure 94: top view of a 7.1.4 after calibration

This view also provides the **RT60** on the top left corner of the page.

- Overlay both representations with the **Scale** and **Ref. Radius** options to verify the compliance with the recommended placements.

- The channel name displayed on each speaker is related to the channel order defined in the **Speakers/Room** setup tool.

- The color of the loudspeakers depends on the Remapping settings.

- The Elevation View uses the same color codes to display the real speaker positions. It indicates whether the microphone was or was not correctly leveled during the calibration:

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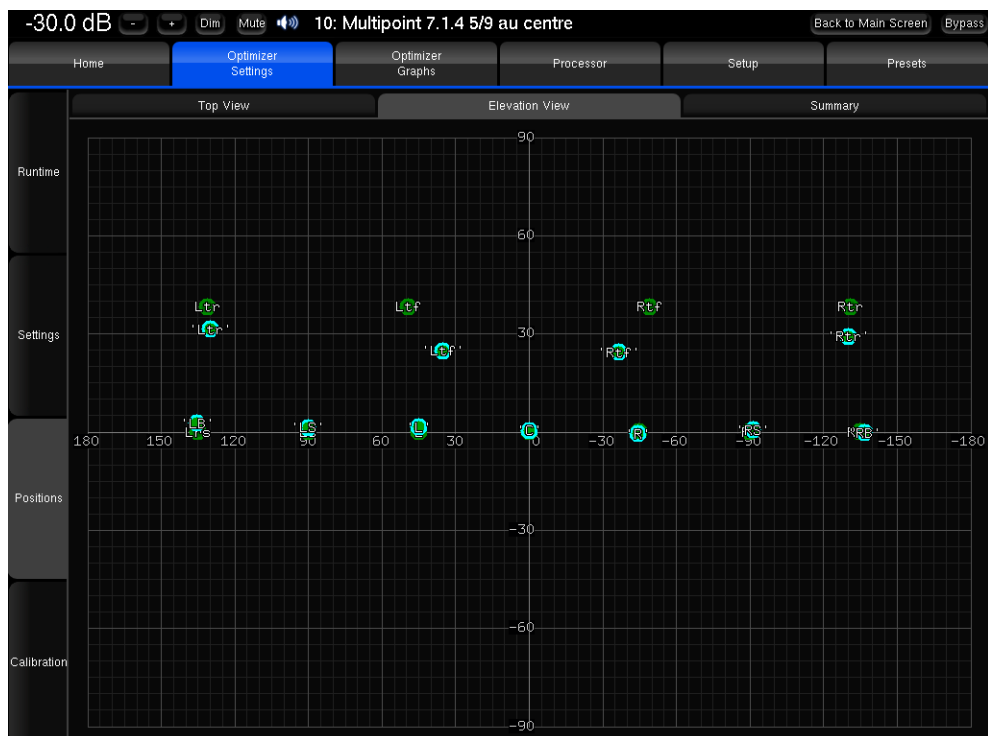
Figure 95: elevation view of a 7.1.4 after calibration

> **NOTE:**
> - If one speaker cannot be located during calibration, it will be displayed in the *center* of the circle.
> - A non located speaker cannot be used for loudspeaker remapping.

The **Summary** page provides additional measurements for each speaker:

Speaker	L	R	C	Ls	Rs	Lrs	Rrs	Ltf	Rtf	Ltr
Distance (m)	3.23	3.17	3.23	2.46	2.46	3.02	3.08	3.51	3.52	2.96
Elevation (°)	0.3	-0.6	1.3	0.5	1.3	-0.4	2.6	24.6	24.2	31.3
Azimuth (°)	-0.2	-44.4	44.7	-91.4	89.9	-136.8	135.3	35.2	-36.6	130.0
Level A (dBFS)	-54.5	-50.8	-53.0	-47.3	-47.9	-52.0	-51.3	-52.2	-51.5	-50.0
Level C (dBSPL)	78.5	78.3	78.2	80.9	80.4	78.5	77.9	77.2	78.1	79.1
Level A compensated (dBSPL)	79.2	78.6	61.0	77.9	77.9	80.1	78.6	78.9	79.1	78.3
Level C compensated (dBSPL)	81.2	80.0	82.1	78.5	79.0	81.8	79.9	80.4	79.9	79.3
Delay (ms)	9.40	9.25	9.42	7.17	7.17	8.81	8.98	10.23	10.27	8.62
BM Delay (ms)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delay compensation (ms)	0.88	1.02	0.85	3.10	3.10	1.46	1.29	0.04	0.00	1.65
Crest factor (dB)	33.9	32.2	33.0	35.4	33.9	33.0	34.2	34.3	34.5	34.9
6dB Bandwidth (Hz)	20.5 - 21.2k	20.5 - 17.6k	20.5 - 18.6k	146 - 18k	20.5 - 17.3k	20.5 - 16.8k	23.4 - 17.5k	20.5 - 21.3k	86.4 - 18.6k	20.5 - 20.7k

Figure 96: speaker measurements summary

Measurement details:

- **Distance** is the distance of the speaker (in meters) to the measurement point;
- **Elevation** is the elevation of the speaker (in degrees) to the measurement point;
- **Azimuth** is the azimuth of the speaker (in degrees) to the measurement point;
- **Level A** corresponds to the A-weighted level of the speaker;
- **Level C** corresponds to the C-weighted level of the speaker;
- **Delay** corresponds to the distance of the speaker;
- **6dB Bandwidth** corresponds to the measured bandwidth of the speaker;

Correction details:

- **Level A Compensated** corresponds to the A-weighted compensated level of the speaker;
- **Level C Compensated** corresponds to the C-weighted compensated level of the speaker;
- **Delay Compensation** is the delay that is added to every speaker to time align the system;
- **BM Delay** may be added to the subwoofer to improve the crossover with the satellites. More rarely, if the subwoofer is in advance, all the satellites are delayed;
- **Polarity** specifies whether the Optimization will invert the polarity of the speaker. Please note this is not the "measured polarity" of the speaker;
- **Crest Factor** helps evaluating the quality of the measurement. It should be higher than 30dB. Low values could indicate background noise problems;

13.7 MULTI-POINT MEASUREMENTS (OPTIONAL)

For multipoint measurements, please see the chapter about performing multi-point measurements later in this manual.

13.8 COMPUTE THE OPTIMIZATION FILTERS

After the calibration is successfully completed, the Top Bar indicates **NOT READY**, which means no sound can go through the processor until the optimization filters are computed.

To compute the optimization filters for your speaker measurements:

- Go to the Optimizer Settings/Calibration page;

- Press the Compute button to start the calculation of the compensation filters. This will also create the Optimizer graphs

Figure 97: computing the optimization filters after calibration

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NOTE:

- The top bar will display a *gear wheel* icon and a *graph icon* during computation.

- An onscreen message notifies the end of the computation.

- The *speaker* icon indicates that the Optimizer is ready.

- Computation time varies depending on the number of speakers in the system and on the Optimizer parameters.

IMPORTANT NOTE:

- Once the speaker system has been calibrated, every change can be applied through recalculation of the filters by pressing the **Compute button**.

- Performing new measurements is not required unless:

  - Speakers/Furniture/listening positions change in the room;

  - the active crossover filters are modified;

  - The number of speakers is modified;

  - The channel order is modified.

13.9 SAVE THE PRESET

Last but not least, don't forget to save the preset to make sure all your preferred measurements and computed filters won't be lost.

14 SETUP BASS MANAGEMENT

This chapter explains how to setup bass management in the Altitude[32].

The Altitude[32] provides very flexible options that help you to configure the bass management of your system in the most relevant way. You can specify how the lower frequencies of each channel will be reproduced by one or more subwoofers.

In other words, individual speakers can be bass managed with any combination of subwoofers and specific crossover frequencies.

NOTE:

- The Altitude[32] supports **any number of subwoofers** as long as enough physical outputs and processing channels are available, therefore allowing for a maximum flexibility in the speaker system design.

- Bass Management can be activated even if the system has not been calibrated. However, the automatic time-alignment of the subwoofers is only performed after a calibration of the whole set of speakers

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IMPORTANT NOTE:

- For optimal results, the bass management should be setup *manually* based on the *acoustic measurements* of the speaker responses in the room.

- The Bass Management results do not impact the Optimizer graphs.

14.1 OVERVIEW OF THE BASS MANAGEMENT SETUP PROCEDURE

The recommended bass management setup procedure is as follows:

- Analyze the acoustical graphs of the speaker measurements in order to understand the low frequency response of each speaker in the room;
- Decide whether bass management is necessary or not;
- If you decide to activate bass management:
  1. Identify the High Pass Frequency that seems appropriate for each channel;
  2. Configure the bass management options (Off, On, On + Lfe to lr);
  3. Configure each channel to be bass-managed by one or more subwoofers.
- Last but not least: Save the preset.

The Bass management is divided in 3 different sections represented as 3 tabs which would be detailed in the following chapter:

- **Quick Setup**: The Quick Setup is the default section of the Bass Management. It allows a global configuration by applying values on several speakers and sub simultaneously (Not enable if Bass-Management is Off);

- **Individual Setup**: The Individual Setup provides the possibility to adjust the settings on each speaker and sub individually (Not enable if Bass-Management is Off);

- **LFE & Misc**: This section gather both the LFE channel settings and various other parameters.

The Bass Management page is accessible through the Top Menu of the Altitude[32] User Interface:
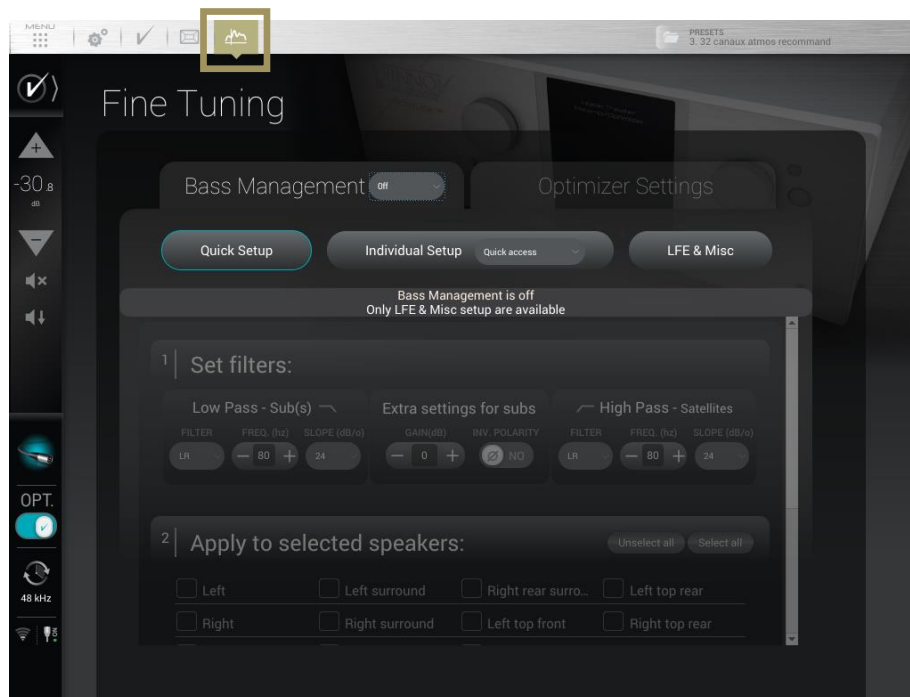
Figure 98: Access to the Bass-Management options

14.2 FULLY CUSTOMIZABLE BASS MANAGEMENT

The Altitude[32] allows you to specify how the lower frequencies of each channel will be reproduced by one or more subwoofers. For each speaker you can:

- Specify High Pass and Low Pass filters for respectively the speaker and the bass-managed signal redirected to the subwoffer(s) (including frequency, filter type and slope);

- Activate one or more subwoofers that will reproduce de lower frequencies from that channel;

- Setup the gain for each subwoofer;

- Invert the polarity for each subwoofer.
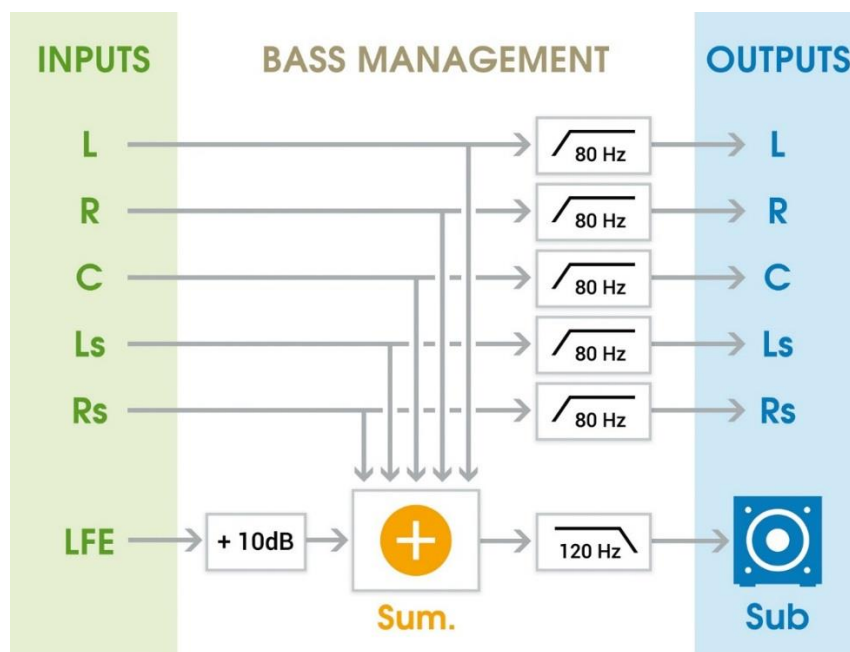
Figure 99: typical bass management in a standard surround preamplifier

14.3 BASS MANAGEMENT MODE

The Altitude[32] offers 3 different bass management modes:

- **Off:** No bass management (default)

- **On:** Standard bass management mode

- **On + LFE to LR:** Distributes the LFE signal to the Left and Right speakers. Can be used when there is no subwoofer in the system. **Note that in this mode, if a subwoofer is declared, the LFE will not be played by this subwoofer.**

Those modes are accessible from dropdown menu as shown below:
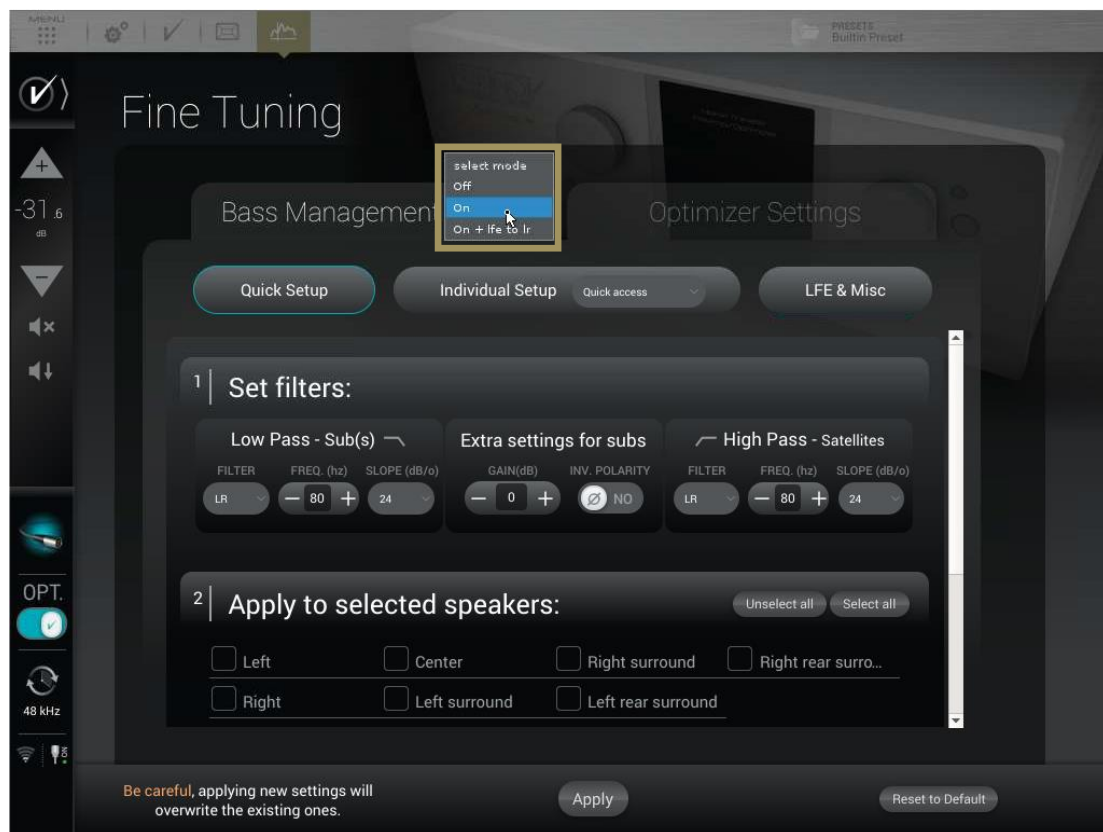
Figure 100: Access to the Bass-Management options

14.4 QUICK SETUP MENU

The Quick Setup menu is a powerful tool allowing to configure the bass management for several speakers in one manipulation.
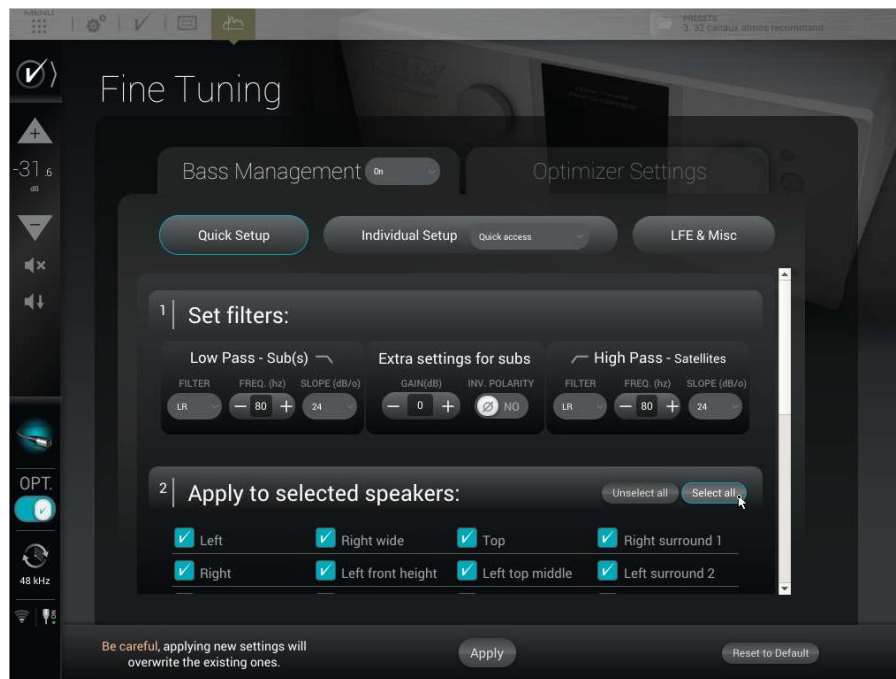
Figure 101: Bass-Management Quick Setup

The Quick Setup menu is divided in 3 main section:

1. **Set Filters:** This section is to specify the filters type and frequencies that will be applied;
2. **Apply to selected speakers:** Here, you can select the speakers on which you can apply the filters set in the first section;
3. **And apply to associated sub(s):** Select the sub(s) associated to the group of speakers and filters.

The 3 sections are detailed in the sub-chapters below.

The configuration steps are the followings:

- Enter the desired settings in the **1| Set filters** table;

- Select the speakers on which you want to applied thoses settings on the **2| Apply to selected speakers** section;

- … and the according sub(s) in the **And apply to associated sub(s)** section;

- Press on the **Apply** button to validate;

- Do the same manipulation for another group of speakers and sub if needed;

- Listen and adjust if needed;

- Save the preset.

NOTE: It is not possible to apply the settings if no subs are selected. This means that you cannot disable bass management on several speakers at the same time with the Quick Setup menu. To do so, please use the **Individual Setup** described in the next sub-chapter.

14.4.1 SET FILTERS

As shown below, this first section is divided in 3 different groups of settings:

- **Low Pass – Sub(s)** : These settings will delimit the cutoff frequency under which the signal from the channel will be redirected and played by the subwoffer(s). You can here select the type of filter (Linkwitz-Riley, Bessel or Butterworth), the cutoff frequency and the slope use by this filter. These settings are only apply to the signal redirected to the subwoofer(s).

- **Extra settings for sub(s)**: These additionnal settings give the possibility to invert the polarity and adjust the gain of the signal redirected to the subwoofer(s). These settings are only apply to the signal redirected to the subwoofer(s).

- **High Pass – Satellites**: This section will delemit the low-end cutoff frequency of the signal send to the satellites. You can here select the type of filter (Linkwitz-Riley, Bessel or Butterworth), the cutoff frequency and the slope use by this filter. These settings are only apply to the signal redirected to the Satellites.
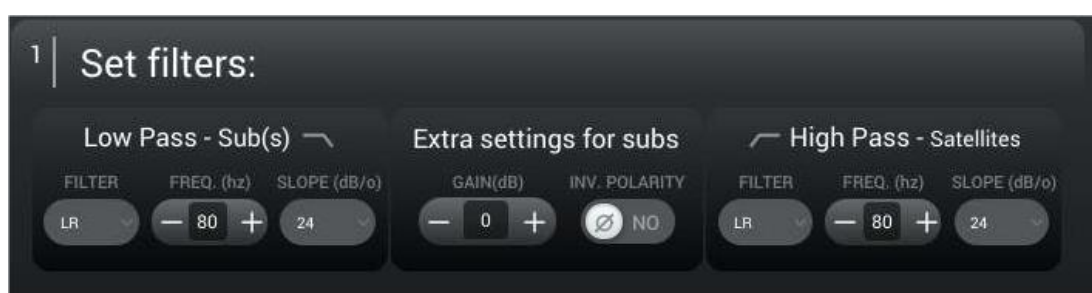
14.4.2 APPLY TO SELECTED SPEAKERS

The second section is here to define the group of speakers concerned by the filters sets in the first section. The speakers, or satellites, are only concerned by the High Pass filter. The speaker selection is done by ticking the box on the left side of each speaker's name.

Two buttons are in the Top right corner of this second section:

- **Unselect all**: Clicking on this button unselect every speakers;

- **Select all**: Clicking on this speaker select every speakers.
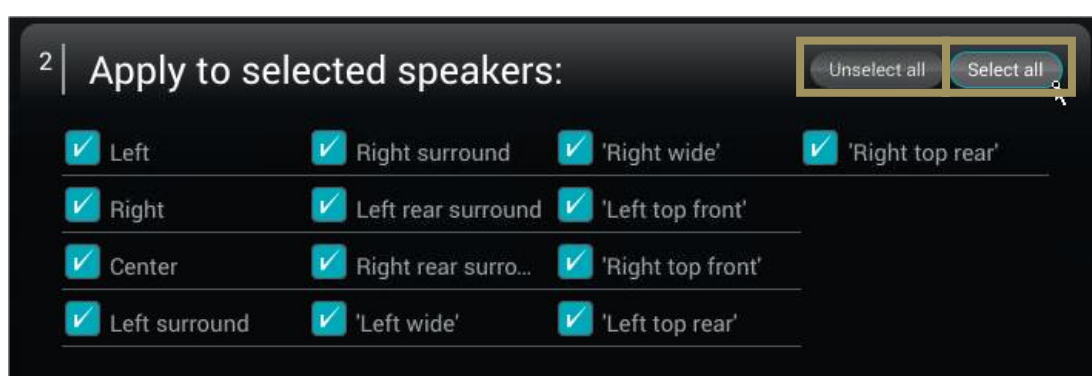
14.5 BASS MANAGEMENT SETTINGS FOR INDIVIDUAL SPEAKER

The settings provided are similar to the **Quick Setup** menu but are adjustable on each speaker individually. Each speaker has the following parameters:

- The activation of each sub by ticking the **Active** box (recalculates the attenuation accordingly): The bass-managed signal will be redirected to the ticked subwoofer(s);

- Gain and Polariry These additionnal settings give the possibility to invert the polarity and adjust the gain of the signal redirected to the subwoofer(s). These settings are only apply to the signal redirected to the subwoofer(s), the signal going to the speaker remain unchanged;

- **Low Pass – Sub(s)** : These settings will delimit the cutoff frequency under which the signal from the channel will be redirected and played by the subwoffer(s). You can here select the type of filter (Linkwitz-Riley, Bessel or Butterworth), the cutoff frequency and the slope use by this filter. These settings are only apply to the signal redirected to the subwoofer(s);

- **High Pass – Satellites**: This section will delemit the low-end cutoff frequency of the signal send to the satellites. You can here select the type of filter (Linkwitz-Riley, Bessel or Butterworth), the cutoff frequency and the slope use by this filter. These settings are only apply to the signal redirected to the Satellites.

NOTE: Bass Management mode must be set to **On** in order for these settings to be taken into account.
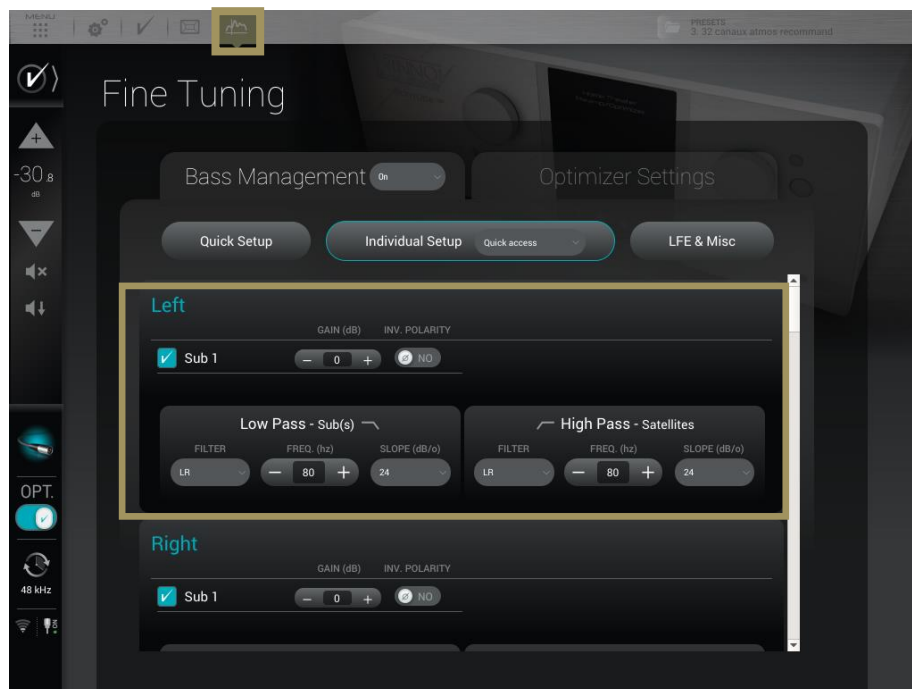
Figure 102: configuring the bass management settings for every speaker

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IMPORTANT NOTE: In the case there is no active sub for one or more speaker, the high-pass frequency is still active. When full-band speaker is needed, please set the **High-Pass** filter type to **None** and it will disable the filter.

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14.6 LFE & MISC

The **LFE & Misc Setup** page is also active even if the Bass Management is Off. These parameters only concerns the subwoofer(s), LFE standing for Low Frequency Effect.

The page is divided as followed:

- A table allowing to assign the LFE channel of the content to one or more subwoofer(s)
- A **Low Pass – LFE** section to set a filter on the LFE channel
- A **Misc**. section with various options
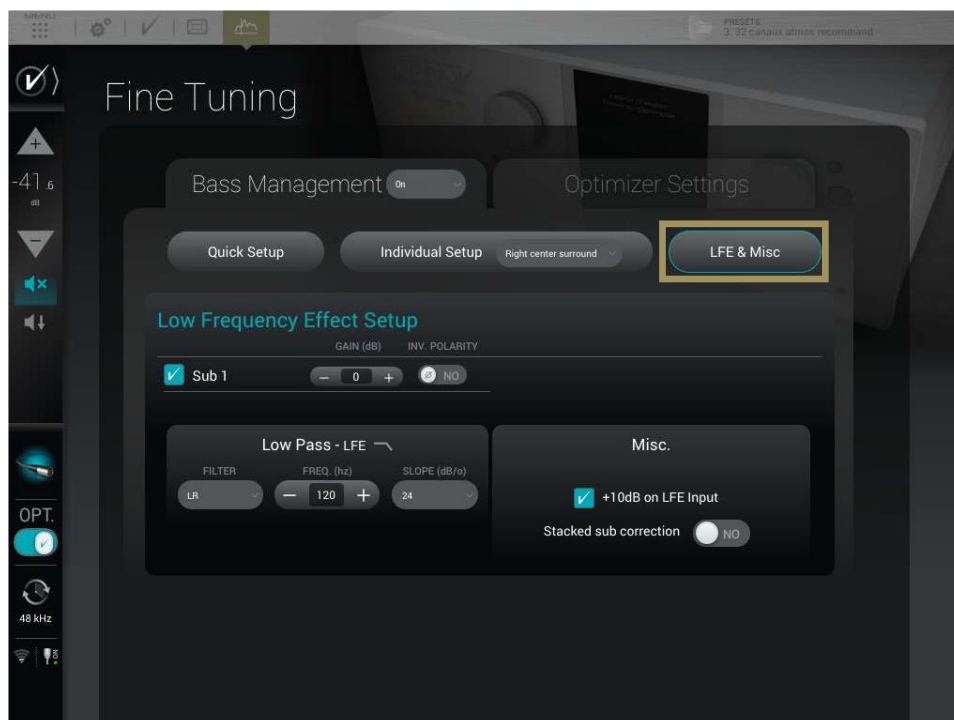
Figure 103: LFE & Misc page

14.6.1 LOW FREQUENCY EFFECT SETUP

This first section is here to choose which subwoofer is assigned to the LFE channel. A subwoofer assigned to the LFE will play the *.1* of the content.

To assign the LFE channel to a subwoofer, please tick the box of the desired subwoofer.

The LFE signal can be filtered. A Low Pass filter is available and only apply on the LFE channel (not on the subwoofer(s) assigned).

Low Pass – LFE: This settings will delimit the cutoff frequency of the LFE channel. You can select the type of filter (Linkwitz-Riley, Bessel or Butterworth), the cutoff frequency and the slope use by this filter.

14.6.2 +10 DB ON LFE

Unless the encoded bitstream signal is decoded upstream by another device, the **+10dB on LFE input** option should be enabled (default). It applies a gain of 10dB on the incoming LFE signal.

14.6.3 STACKED SUB CORRECTION

The **Stacked subs** option is designed for stacked multiple-subwoofers configurations.

When multiple subwoofers are used to reproduce a same signal, the perceived level increases. The Altitude[32] automatically decreases the signal sent to each subwoofer to maintain the same perceived level depending on the number of subwoofers used to reproduce a same signal and the way subwoofers are located across the room.

In such multiple subwoofers configurations, two typical cases are handled by the Altitude[32]:

- If subwoofers are considered as decorrelated (away from each other), their power add up.

- If subwoofers are considered as correlated (positioned next to each other or stacked), their amplitude add up.

Therefore, whether the stacked subs option is disabled (default) or enabled, an automatic attenuation of the signals will be calculated accordingly to maintain a consistent perceived level.

Number of subwoofers in the system	Attenuation if "Stacked subs" disabled	Attenuation if "Stacked subs" enabled
2 subwoofers	-3 dB	-6 dB
3 subwoofers	-4.8 dB	-9.5 dB
4 subwoofers	-6 dB	-12 dB

Figure 104: level of attenuation and the Stacked Subs option

15 SETUP TARGET CURVES

The Altitude[32] implements Target Curves as a powerful tool for achieving the required frequency response from your sound system. For every speaker in the room, a target curve can be defined in terms of:

Amplitude only / Amplitude and Phase / Amplitude and Group Delay

One or more channels can be linked in order to share the same target curve for several speakers.

15.1 OVERVIEW OF THIS PROCEDURE

In the Altitude[32], setting target curves is a very straightforward procedure:

- Decide if you want to apply the same target curve to all the speakers (except subwoofers), or if you want to apply a different target curve depending on the type of speaker.
- Link/unlink the speakers that will share the same target curve.
- Setup the target curve for each group of speakers.
- Press the **Apply Change** button.

15.2 SETTING UP ONE OR MORE TARGET CURVES

To edit the target curve for one or more speakers, go to the **Optimizer Settings/Target Curve** page in the Advanced Settings user interface:

The most usual case is to link all the speakers except the subwoofer(s). Therefore, by default, the Link button is activated for all the speakers except for the subwoofer(s). If this is not the case, you can press the **Link all but Sub** button.

Use the arrow keys of your keyboard or you mouse to edit the target curve:

- The **green dots** correspond to the required values for each frequency,

- The **yellow line** displays the expected result, taking into account the behavior of the filter.

Press the **Apply Changes** button. This button becomes orange as soon as you change some setting that requires a new computation of the optimization filters.

Save a **new** preset. This will allow you to compare the sound with and without the target curve.

Figure 105: example of a Target Curve in the Advanced Settings user interface

> **NOTE:**
>
> - By default, the Optimizer will use both IIR and FIR filters to achieve the target curve.
> - In addition to target curves, several other parameters define the behavior of the automatic equalization.

16 VERIFY THE SOUND OF YOUR OPTIMIZED SPEAKER SYSTEM

Once you have completed all the steps of the system setup procedure, it is *critically important* to verify the sound of your whole system. This should help you to identify any possible issues:

- Visualize the acoustical graphs of all the speakers;
- Listen to the system.

After all possible issues have been corrected, you will be confident that the system is ready to deliver the best home theatre experience available today.

16.1 VISUALIZE THE ACOUSTICAL GRAPHS FOR ALL SPEAKERS

Go to the **Optimizer Graphs** page and visualize the acoustical graphs of one or more speakers.

Depending on your observations, you may decide to change the target curves, the bass management settings, or some of the more advanced optimization settings. See the *next chapter* for a detailed explanation of the comprehensive fine tuning options offered by the Altitude[32].

Figure 106: visualizing the acoustical graphs for the whole system

16.2 LISTEN TO THE SYSTEM

Most importantly, listen carefully to your system by playing your favorite music and cinema samples. As an option, you could also play pink noise from the Altitude[32] to perform additional acoustical measurements with your own acoustical measurements tool.

17 TUNING THE OPTIMIZATION SETTINGS

In order to tune the optimization settings you need to know the basics about the Altitude[32]'s audio tools and settings. You will be using those tools throughout the tuning process for:

- Playing pink noise on the speakers

- Solo/mute inputs or outputs

- Switching optimization on/off

- Viewing the acoustical graphs.

For a detailed explanation of all those tools, please refer to the **Essential Tools and Settings chapter**.

17.1 MAIN OPTIMIZATION SETTINGS

The Optimizer Main Settings are located in the **Optimizer Settings/Settings/Main Settings** page.

> **NOTE:** Changes made in the Optimizer Settings do not require new acoustic measurements. The new compensation filters are recomputed on the fly using the **Apply changes** button.

Figure 107: Main optimization settings

- **Optimize** (Optimization Modes): The Altitude[32] offers 4 different optimization modes with very specific behavior:
    - o **Amplitude + Phase** (default): with this setting, the Optimizer will improve both the loudspeaker amplitude and the phase response of the loudspeaker. This greatly reduces the group delay of the speakers starting from about 150Hz.
    - o **Amplitude only**: this mode tells the Optimizer to work only on the amplitude of the loudspeaker's response. The phase behavior is not modified;
    - o **Low range only**: with this setting the automatic equalization will only use IIR filters up to the frequency defined in the advanced settings (Default: 150Hz). The automatic FIR filter is disabled, but manual FIR EQ can still be applied;
    - o **According to L&R speakers**: this is a special mode that will optimize the other speakers in order to achieve the same response as the averaged Left+Right speakers. The different options available for this mode are explained in the Advanced *Optimization Settings subchapter*.

- Maximum Boost/Attenuation:
    - o **Maximum boost**: defines, in dB, the maximum amount of boost that will be performed by the algorithms. This parameter is used to avoid distortion. Its default value is 6dB.

        This parameter has an important impact on the behavior of the automatic equalization, and is applied to both the time-based and the energetic approach.
    - o **Maximum attenuation**: defines, in dB, the maximum amount of attenuation that will be performed by the algorithms. Its default value is -10dB.

        This parameter also has an important impact on the behavior of the automatic equalization, and is applied to both the time-based and the energetic approach.

    See also the **Limiter Curve** functionality described below.

- Acoustic parameters "Quantity of Early Reflections" and "Resolution of Energy Response": The Altitude[32] uses two different approaches for the Optimization of Loudspeaker/Room Acoustics:
1. A time-based approach for the correction of Early Reflections (ER). The main parameter that defines the behavior of this algorithm is the width of the time-frequency window "Quantity of Early Reflections".
   Quantity of Early Reflections (default is 3 cycles)**:** A simple parameter that characterizes the quantity of early reflections that the Optimizer tries to compensate is the width of the time-frequency window. The size of this window is defined by a number of *cycles*, hence the naming "α/f", where α *(alpha) is the number of cycles and f the frequency (1/f being one cycle).*
   The meaning of the time-frequency window is as follows: for each frequency a different duration (or *width* of the time window) is taken into account. At low frequencies the window typically starts at 150ms for 20Hz, and decreases constantly to be as low as 0.3ms at 10 kHz.

2. An energetic approach for the correction of Late Reverberation (LR), whose main parameter, Resolution of Energy Response is the smoothing applied to the energy response.
   Resolution of Energy Response (default is 1/3 octave)**:** It defines, in number of octaves, how the room's energy response is smoothed, and modifies the behavior of the equalization performed by the Optimizer on the *Late Reverberation*. Its default value is 1/3 octave.
   The behavior of the energy optimization algorithm varies according to the *smoothing* applied to the room's response. If the response is less smoothed, sharp peaks in the response will be more taken into account for the correction, while with more smoothing only the overall tonal balance of the room will be corrected.

17.2 SPEAKER POSITION REMAPPING

This feature is also available through the **Main user interface**. Please see the chapter about the *Basic Settings*.

17.3 TARGET CURVE

Please see the **Setup Target Curves** chapter.

17.4 LIMITER CURVE

Unlike the **Maximum Boost/Attenuation** parameters, the limiter curve allows to setup *frequency-dependent* maximum boosts and attenuations. This curve is not engaged by default.

To define a specific limiter curve, go to **Optimizer Settings/Settings/Limiter Curve**:

- Use the **Add point mode** and your mouse to create editing points around the required frequency range.
- Use the **Move point mode** and your mouse to edit the limiter curve for the required frequency range.
- Use the **Delete point mode** to delete editing points with your mouse.

> **IMPORTANT NOTE:** Very steep curves should be avoided.

> **NOTE:** Editing the maximum boost and maximum attenuation limiter curve disables the global Maximum Boost/Attenuation settings in the Optimizer Main Settings page.

In the example above, the limiter curve will avoid too much attenuation below 100 Hz.
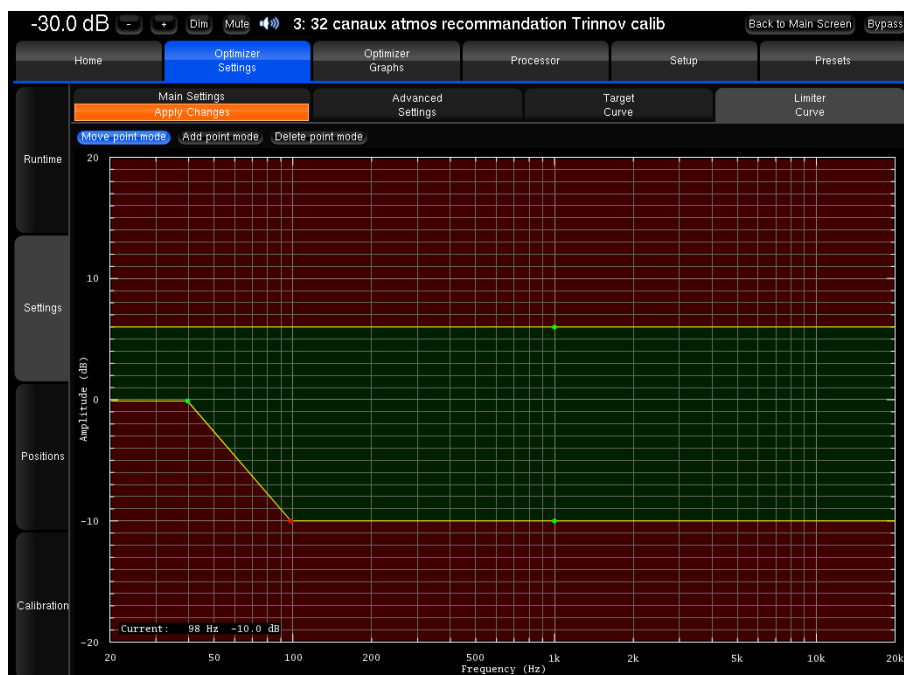
Figure 108: example of a limiter curve for maximum boost/attenuation

17.5 ADVANCED OPTIMIZATION SETTINGS

> ⚠ **IMPORTANT NOTE:** Change these settings only if you know what you're doing. Random changes can lead to unexpected results.

The Altitude[32] provides a large set of advanced settings in the **Optimizer Settings/Settings/Advanced Settings** page:
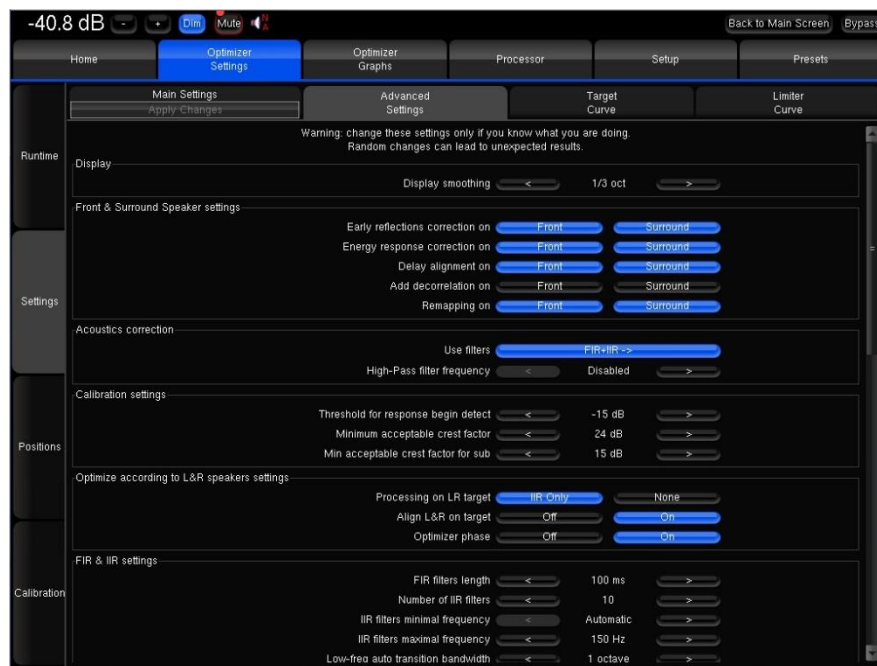
Figure 109: advanced optimization settings

17.5.1 DISPLAY

The **Display smoothing** defines the smoothing value used to display the before an after Amplitude Response in the Optimizer Graphs as well as **in the pdf document** generated while saving preset. Its default value is (1/3 octave). A smaller value, such as 1/12 octave, can be used to display more details in the frequency response.

17.5.2 FRONT & SURROUND SPEAKER SETTINGS

The following features can be separately enabled/disabled for the front speakers and for the surround speakers:

- Early reflections correction;

- Energy response correction;

- Delay alignment, e.g. surround delay alignment may or may not be required depending on the application and recommendations;

- Add decorrelation: the Optimizer can apply a decorrelation algorithm to the surround channels in order to simulate the diffuse field created by a belt of surround speakers;

- Remapping: In the case of several speakers are used with chanel, an so the same amplifier, to create an array of speaker, the remapping won't be the best solution.

> ⚠ **NOTE:** Front speakers are defined as those whose azimuth is below 90 degrees. Conversely, Surround speakers are defined as those whose azimuth is above 90 degrees.

17.5.3 ACOUSTICS CORRECTION

The user can determine the type of filters for the automatic correction:

- **FIR + IIR**: This is the default setting used by the Optimizer: both IIR and FIR filters are used to work on the speaker responses full range;

- **FIR only**: No IIR filters are used, which means that the Optimizer will only work on the mid and high range of the speaker responses. The low range will not be optimized;

- **IIR only**: With this setting, both the automatic FIR and the FIR EQ are disabled. The Optimizer will only use IIR filters to work on the low range. This setting could be used in specific cases where the user wants to be sure that no FIR filters at all are applied.

- **High-pass filter frequency:** Defines the cutoff frequency for the high-pass filter applied to all channels. Can be disabled.

17.5.4 CALIBRATION SETTINGS

- **Threshold for resp begin detect:** The threshold below the peak level of the impulse that is taken into consideration to determine the onset of the response. -15 dB is the default value and works in most cases. However, a lower threshold is recommended in a room with a huge amount of early reflections where the peak might not be detected correctly.

17.5.5 OPTIMIZE ACCORDING TO L&R SPEAKERS SETTINGS

The Optimizer mode "According to L&R speakers" can be configured with specific settings:

- **Processing on L&R target** (default is IIR only): If the optimize mode is set to "Optimize according to L&R speakers" in the main settings tab, the Optimizer only uses IIR filters on the L&R speakers. This can be switched to "None" to make sure the L&R speakers are not optimized at all.

- **Align L&R on target** (default is On): If this setting is on, the Optimizer applies filters on the Left & Right speakers using their average response as target. If this setting is off, only the center and surround channels are optimized.

- **Optimizer Phase** (Default is On): Determines whether the Optimizer should optimize the phase response of the speakers or not when the According to L&R speakers mode is on.

17.5.6 FIR AND IIR SETTINGS

FIR stands for Finite Impulse Response. FIR filters are used to compensate for amplitude and/or phase

IIR stands for Infinite Impulse Response. IIR filters are minimal phase filters used by the automatic compensation in addition to FIR for the low frequencies.

- **FIR filter length** (default is 100ms): Defines the length or number of taps of the FIR filter. The longer the FIR filter, the higher resolution correction.

- **Number of IIR filters** (default is 10): The number of IIR filters that will be used on every channel.

- **IIR filters minimal/maximal frequency** (default is Automatic/150Hz): IIR filters will be positioned from the min frequency up to the max frequency. The Automatic parameter uses the minimum frequency of the speaker bandwidth and the Low-freq auto transition bandwidth parameter to calculate the IIR filter minimal frequency.

- **Low-freq auto transition bandwidth** (default is 1 octave)**:** Determines the bandwidth of the auto transition. The auto transition is the frequency range that separates the Optimized frequency range from the unfiltered frequency range in the low end. The upper boundary of this auto transition bandwidth is the minimal frequency of the bandwidth of the speaker.

- **Room smoothing method** (default is Modulus): For advanced users only.

- **Norm used for level_hp (!= align)** (default is Room): For advanced users only.

17.5.7 LEVEL ALIGNMENT SETTINGS

- **Weighting used for levels** (default is dBA): Sets the type of weighting used by the optimizer for level alignment.

- **Width of level window** (default is 16/f): This time-frequency window is used to compute the perceptual level of every speaker. Its width can be modified to improve the automatic level alignment.

- **Maximum/minimum gain on speakers** (default is 10dB/-20dB): defines the maximum/minimum gain that will be applied for the automatic level alignment.

- **Minimal/maximal bandwidth frequency** (default is 10Hz/Unlimited): defines the high end/ low end of the bandwidth that is used as the starting point for level computations.

- **Bandwidth determination mode** (default is Normal): Defines the speakers automatic bandwidth determination mode from measurements.

17.5.8 SUBWOOFER LOW-PASS FILTER SETTINGS

The Optimizer includes a subwoofer low-pass filter with the following options:

- **Cutoff frequency** (default is "disabled"): defines the cutoff frequency for the low-pass filter that can be applied to the subwoofer.

- **Filter type** (default is Butterworth): defines the type of filter used at the cutoff frequency. The elliptic filter is sharper than the Butterworth but shows ripples in the whole bandwidth.

- **Filter order** (default is 4): defines the steepness of the filter. The slope gets stiffer as you increase the filter order. Please be aware that such changes may result in significant phase shifts

- **Rp value** (for elliptic filter) (default is 0.1 dB): sets a maximum amplitude ripple above the cutoff frequency.

- **Rs value** (for elliptic filter) (default is 80 dB): defines the attenuation below the cutoff frequency.

17.5.9 DECIMATION SETTINGS & ADVANCED FIR SETTINGS

IMPORTANT NOTE: It is strongly recommended not to change these settings unless you have been requested to do so by your Trinnov Distributor.

17.5.10   ADVANCED FIR SETTINGS

IMPORTANT NOTE: It is strongly recommended not to change these settings unless you have been requested to do so by your Trinnov Distributor.

18 PERFORMING MEASUREMENTS MULTI-POINT

One of the most advanced features of the Altitude[32] is its unique multi-point measurement technology. Instead of using an averaged response out of multiple measurement points, the Trinnov Multi-point Algorithm is able to take every single measurement point into account.

The purpose of multi-point measurement is not only to optimize a wider listening area but also to get more information from measurements and increase reliability by taking into account important variations in the listening area.

> **NOTE:** The multi-point approach ensures a more reliable calibration but choosing relevant microphone positions is highly critical.

18.1 RELEVANT MEASUREMENT POSITIONS

There are no fixed rules about choosing multi-point measurement positions. However, making measurement outside of the area covered by the speakers can be considered as irrelevant.
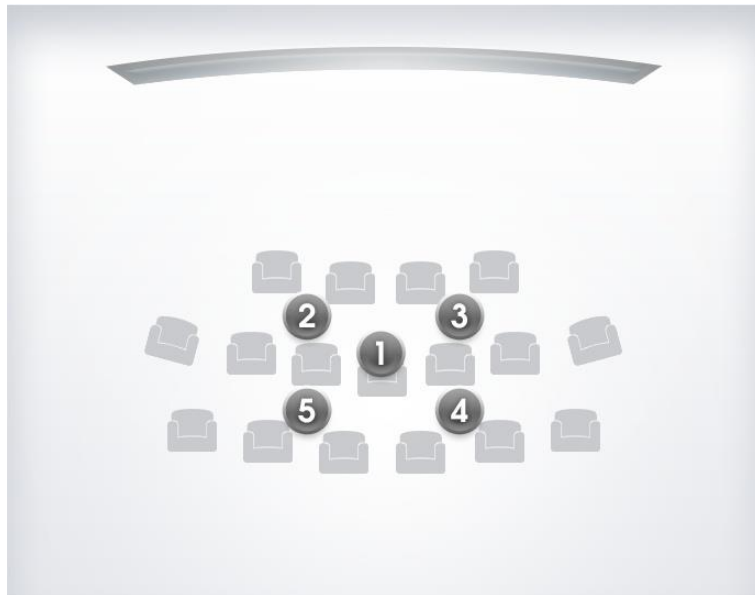

Figure 110: relevant multi-point measurement positions

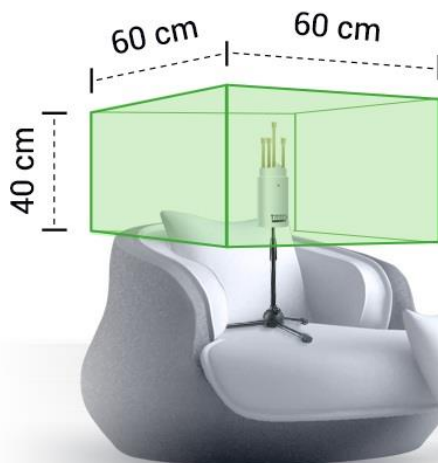As an example, multi-point measurements can be performed for a single listening position:

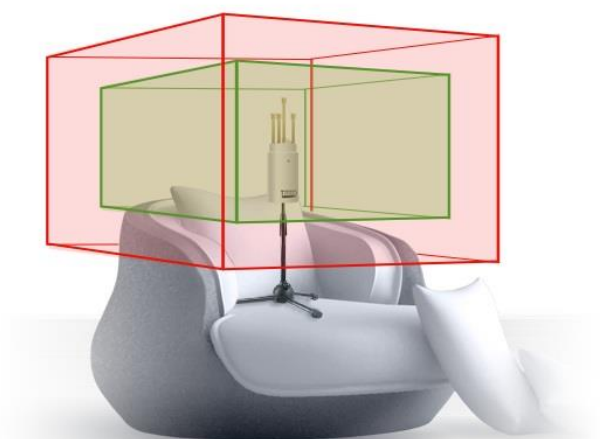Figure 111: relevant multi-point measurement area for a single listening position

Figure 112: relevant (green) / irrelevant (red) multi-point measurement area for a single listening position

18.2 MULTI-POINT CALIBRATION PROCEDURE

Multi-point measurements can be performed sequentially using the same microphone.

You can add a new measurement by pressing the "**Add**" button at the bottom of the page, or delete the selected measurement by pressing "**Delete**". You can also rename a measurement by editing the text box "Measurement name".

For each measurement, the "**Calibrated**" column indicates "Yes" if the measurement has been correctly performed, "No" if it has not, and "Partial" if the calibration was interrupted before completion.

Each measurement contains the responses recorded during the calibration sound sequence.

Select the required measurement and press the "**Calibrate**" button to launch the calibration sequence.

Once every measurement has been calibrated, you can compute the acoustic correction filter that will best fit every point, accordingly to their weight.

Figure 113: list of measurements

18.3 WEIGHTING MULTIPLE MEASUREMENTS

The "**Weight**" column allows you to set a weight to each measurement, from 0 to 100, to emphasis for example some central points. You can bypass some points by setting their weight to 0, what can be useful in case one of the points have failed the calibration but you don't want to perform a calibration again.

The weight can be adjusted after a calibration; you don't have to run a complete calibration to take weight changes into account, just to press once the "Compute" button.

You can adjust the weight of the measurements with your mouse clicking on +1 or -1, or with your keyboard, with the up (+1) and down (-1) arrows, or the page up (+10) and page down (-10) keys.

- All the measurements with non-null weight should be fully calibrated before computing the acoustic correction filters by pressing the "**Compute**" button. If some are partially or not calibrated at all, you will have to remove the bad points or their entire measurements, for example by setting their weight to 0, before being able to compute the acoustic filters.

- The **lock** disables measurement settings edition.

- The "**ref**" column indicates which measurement is the reference point. The reference point is unique, it can be modified after the calibration. Taking a new measurement into account as reference point requires to recompute the compensation filters.

- Before saving your preset in the "Presets" page, you have to save the multipoint parameters by pressing the "**Save changes**" button. These parameters are automatically saved (and the button disabled) when you leave the point list, and when you run a calibration or a computation.

19 APPENDIX

19.1 INSERT AN EXTERNAL STEREO DAC

As the Altitude[32] has a flexible and complete range of output connectors, you can use your own high-end DAC to feed a stereo Hi-Fi system for example.

The analog outputs 1-8 are duplicated on the AES outputs 1-8.

The analog outputs 1-2 are duplicated on the stereo analog SE outputs, AES outputs 1-2, as well as they can go to the SPDIF RCA and optical stereo outputs.

Make sure that the routing is correct.

It's up to you to choose the best way to feed you Hi-Fi external DAC.

Figure 114: Duplicated Outputs

19.2 REMOTE START AND STOP

The Altitude[32] can be remotely switched on via a **Wake-on-LAN** network message. Please ask a certified installer or an experienced IT technician for technical support.

It can also be switched off remotely over the network using the command provided within our **automation protocol** for that purpose, available for download on Trinnov website.

The trigger input can also be used to switch the Altitude[32] on and off from another device.

More information can be provided upon request.

19.3 AUTOMATION

The Altitude[32] can be remotely controlled from an automation system through RS232 or Ethernet. As an example, it is possible to create a Crestron® module to remotely control the Altitude[32] via RS232.

The specifications of the protocol are publicly available and can be downloaded from the **Support / Download** section of Trinnov Audio's website: *http://www.trinnov.com*

19.4 SIGNAL FLOW OF THE ALTITUDE[32]

19.4.1 SIGNAL FLOW OF THE ALTITUDE[32]

```
┌─────────────────────────┐
│        DECODERS         │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│      INPUTS LEVELS      │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│     BASS MANAGEMENT     │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│    SPEAKERS REMAPPING   │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│        OPTIMIZER        │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│      OUTPUTS LEVELS     │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│    ACTIVE CROSSOVERS    │
└─────────────────────────┘
             ▼
┌─────────────────────────┐
│      PARAMETRIC EQ      │
└─────────────────────────┘
```

Not mentioned:

- Inputs & outputs routing / Physical inputs & outputs
- Manual input & output EQs

19.4.2 SETUP PROCESS AND FILTERS CALCULATION

Active-Crossovers are set up first following a semi-automatic calibration procedure.

The Optimizer's filters calculation is made from the speaker's measurement.

Remapping filters are applied based on the source's input format and loudspeaker's position measured during the Optimizer Calibration, as soon as one of the remapping mode is enabled manually.

Bass management crossover filters are applied after and regardless of the loudspeakers calibration. The crossover frequencies and bass management mode can therefore be modified after calibration.

19.5 3D SPEAKER PLACEMENT RECOMMENDATIONS

For detailed information about speaker placement recommendations, please refer to the following documents:

- Auro-3D Home Theatre Setup Installation Guidelines, available from Auro Technologies.

  http://www.auro-3d.com/wp-content/uploads/documents/Auro-3D-Home-Theater-Setup-Guidelines_lores.pdf

- Dolby Atmos Home Theatre Installation Guidelines, available from Dolby:

  http://www.dolby.com/us/en/technologies/dolby-atmos/dolby-atmos-home-theater-installation-guidelines.pdf

> **NOTE:** As of January 2016, the DTS X Home Theatre Installation Guidelines are not yet available.

19.6 DB25 CONNECTOR: ANALOG PINOUT

The Altitude[32] uses DB25 connectors for Analog output connections. We use the widely spread **Tascam** DB25 scheme described below.
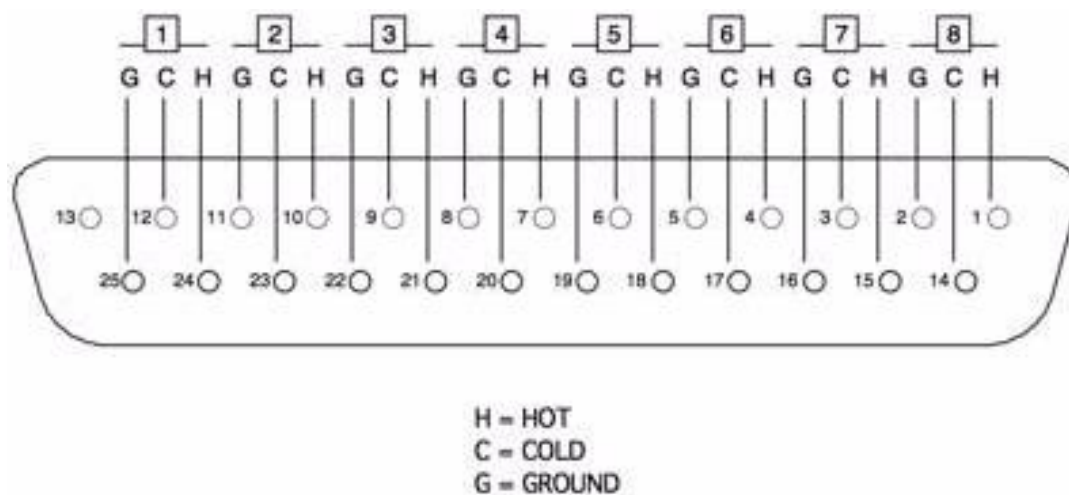

Figure 115: Tascam pinout for the AES DB25 output connector

> **NOTE:** Another quite popular pinout is the one from Yamaha. You should check which pinout your equipment is using before connecting it to the Altitude[32]. Unbalanced connections must connect signal to SubD-Hot and shield to SubD-Cold.

19.7 DB25 CONNECTOR : AES PINOUT

The Altitude[32] uses DB25 connectors for AES connections, input as well as output. We use the widely spread **Tascam** DB25 scheme described below.
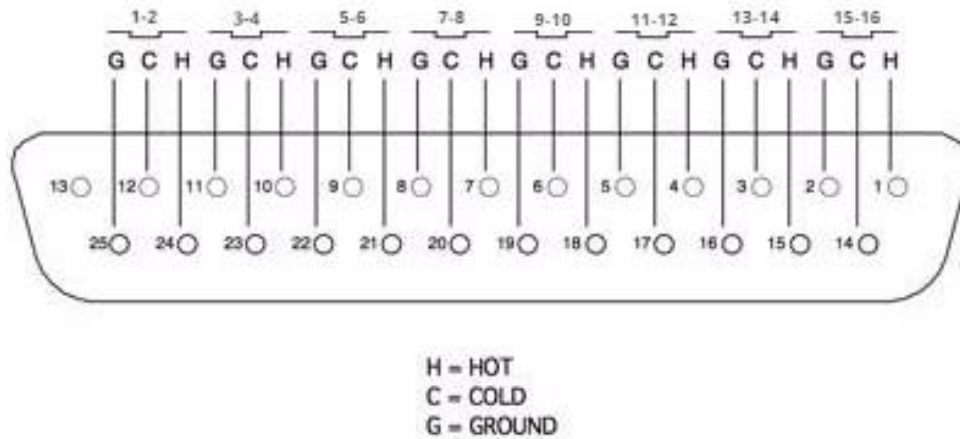

Figure 116: Tascam pinout for the AES DB25 output connector

> ⚠️ **NOTE:** Another quite popular pinout is the one from Yamaha. You should check which pinout your equipment is using before connecting it to the Altitude[32]. Unbalanced connections must connect signal to SubD-Hot and shield to SubD-Cold.

19.8 3D MEASUREMENT MICROPHONE

The purpose of the calibration microphone is to measure the characteristics of the loudspeaker and their layout in the room.

For each loudspeaker, the Optimizer gathers the following information:

- full 3D position
- amplitude response
- phase response

19.8.1 MICROPHONE SPECIFICATIONS

- 4 capsules in tetrahedron configuration.

- Individual compensation filters

- Frequency response within +/- 0.1dB across the 20Hz-24kHz frequency range

- Spatial resolution below +/-2°

- Built-in preamp

- A 9V PP3 LR61 battery powers capsules and electronic

- Camera / Microphone thread.

Bottom of the microphone
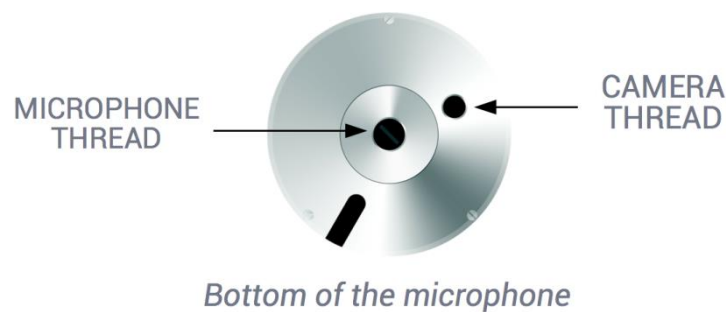
19.8.2 POWER SUPPLY

The power supply located in the base of the microphone uses a standard 9V PP3 LR61 battery. Le red led indicates the battery Level. Replacing the battery requires to take off the 3 screws at the bottom of the microphone.

19.8.3 INDIVIDUAL COMPENSATION FILE

The individual compensation file of the microphone used by the Altitude[32] can be modified in the **Optimizer Settings/Calibration** page.
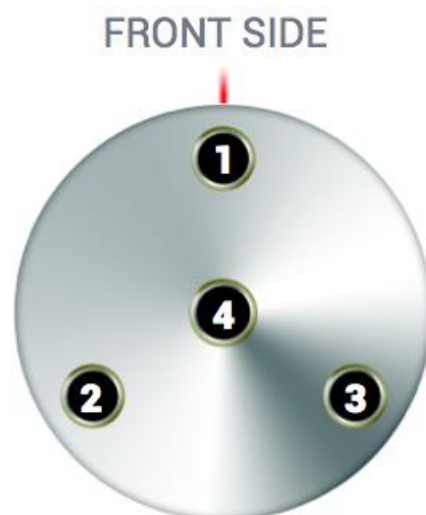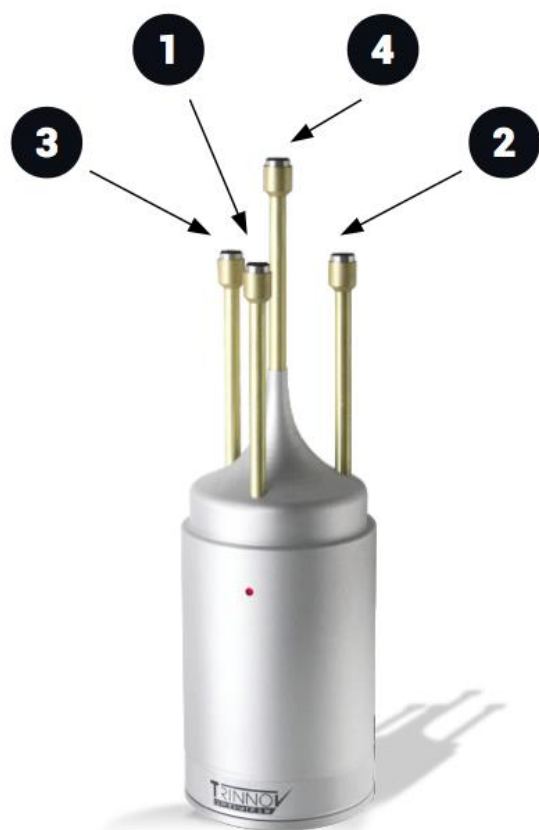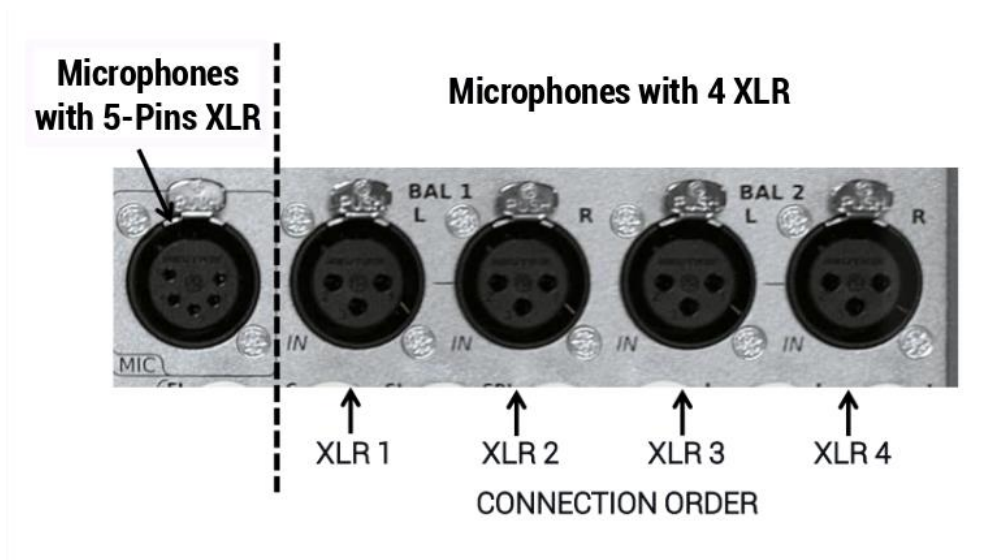
Calibration page

Always make sure the microphone's serial number indicated in the **Configure** page matches the label at the bottom of your microphone. If not, use the **Configure** button of the required Measurement to select the correct compensation file.

For future measurements, use the **Default Microphone** button to make the required compensation file automatically selected in the Factory preset.

The 3D localization of the speakers can only be performed if the connection order of the capsules is respected.

19.8.4 CONNECTION ORDER

Microphones with 5-Pins XLR

Microphones with 4 XLR

BAL 1
L   R

BAL 2
L   R

XLR 1   XLR 2   XLR 3   XLR 4

CONNECTION ORDER

FRONT SIDE

Thank you for your attention.
Please enjoy your Sound.

TRINNOV
AUDIO

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(FRANCE)

✉ **EMAIL**
support@trinnov.com

ʷʷw **WEB SITE**
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