STORM|AUDIO

ISP MK2

ISP.16/24/32 Analog
ISP.32 Digital AES



IMMERSIVE SOUND PREAMP/PROCESSOR

OWNER'S MANUAL

firmware 4.1r1 and onward

Revision 2.0

Important Safety Instructions

The lightning flash with 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.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. The apparatus weight exceeds 13 kg, could drop and causes serious injuries. Move the apparatus with care.
14. Unplug this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
16. Do not open. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.
17. For safety and electrical shock reasons, it is recommended to use this device in a non-tropical environment with temperature not exceeding 45°C and altitude not exceeding 2000m.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, ARE PLACED ON THE EQUIPMENT.
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE.
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE.

StormAudio Limited Warranty

All StormAudio products are covered by warranty drawn up by the official StormAudio distributor in your country. Your distributor can provide all details concerning the conditions of warranty. Warranty cover extends at least to that granted by the legal warranty in force in the country where the original purchase invoice was issued. Warranty is valid only in the country the product was originally sold. StormAudio reserves the right to refuse the free application of the warranty if a copy of the invoice stating purchase date, model and serial number is not presented.

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, using the Backup Configuration feature available in the System page.

Transport cost to mainland France or other official technical center is at the expense of the customer. The device is transported at the risk of the customer. We strongly recommend to store the original packaging for any transportation. In the event of any damage observed upon its return, all the reservations must be made by the recipient with the carriers.

The legal guarantees of conformity under no circumstances covers any damage arising from accidents, misuse or an assembly error, negligence or considerable modification of the appearance or functioning of the product. Immersive Audio Technologies reserves its right to refuse any return for a damaged product on account of misuse.

STORMAUDIO SUPPORT in USA

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E-mail: support.usa@stormaudio.com

STORMAUDIO REPAIR SERVICE in USA

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PHONE: (310) 820-1113
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E-mail: service@georgemeyer-av.com

STORMAUDIO SUPPORT in ASIA:

E-mail: support.asia@stormaudio.com

STORMAUDIO SUPPORT & REPAIR SERVICES outside USA and ASIA:

contact your local distributor or

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USE OUR SERVICE DESK: Service Desk
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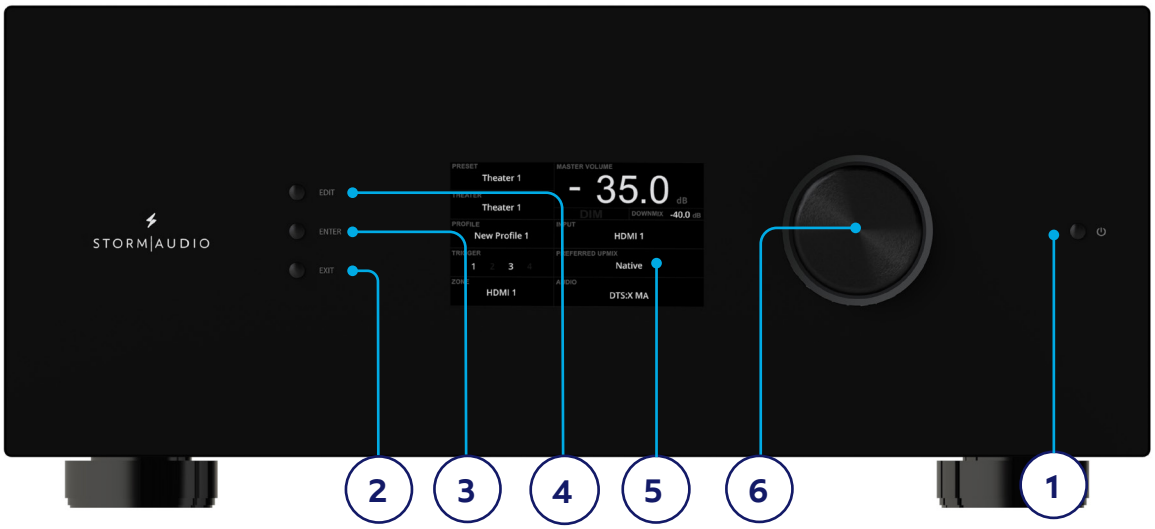
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Our policy of continual product improvement means that StormAudio reserves the right to modify the technical specifications of its products without notice.
Product may vary from images.



Front panel

1. Power Button

Use this button to toggle the ISP between ON and STANDBY. Note that the rear panel switch must be ON for the unit to operate.

2. Exit

When navigating the front panel menu, press Exit to go back.

3. Enter

When navigating the front panel menu, press Enter to confirm a selection.

4. Edit

Press Edit from the home screen to enable state changes in the ISP. Use the Volume combo knob to navigate.

5. Display

The front panel display shows various information about the unit. It is not a touch screen. Various parameters can be set according to instructions "Front Panel" on page 31. An InfraRed receiver is located next to the display for programmable IR remote control usage.

6. Volume

The default state for the knob is to control volume in the selected theater. Press the knob to mute audio. When in Edit Mode, you can use the knob to navigate between fields.

Rear panel

7. HDMI

7 HDMI inputs and 2 outputs are available, with full support of HDCP 2.2 / HDMI 2.0 requirements up to 18 Gbps speed.

Outputs are mirrored, with HDMI Output 1 supporting eARC and ARC audio return channel from compatible TVs as well as CEC pass-through.

Support of High Dynamic Range modes with HDR10, HLG and Dolby Vision® compatibility.

Finally an OSD for on screen information feedback is available.

See detailed "Specifications" on page 37.

8. Power Inlet / Fuse Socket / Mains Switch

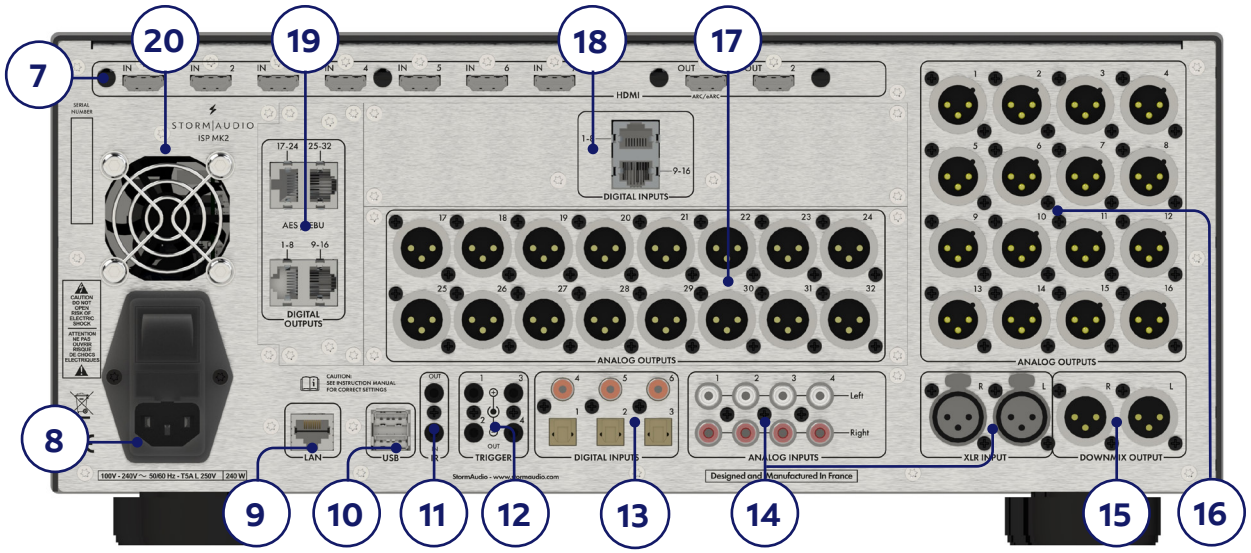
Mains power is applied to the ISP here. Ensure the fuse installed matches requirements of your locality. The rear panel switch must be ON for the unit to operate.

9. Network

The ISP must be connected to a network for setup. It is recommended to be connected for operation. Speed is 100 Mbps. Use CAT5e or better cable.

10. USB

Two USB ports are provided to which a USB microphone may be optionally connected for RTA function. Or, the USB ports may be used for service.



11. IR

IR input and output are provided via 3.5mm jacks for optional control via IR remote.

12. Trigger Out

Four separate trigger outputs are provided to control power of certain connected devices. See "Triggers" on page 30 for configuration information. Each trigger is 12V / 150mA max. and must not be used for passive daisy chaining.

13. Digital Inputs

Three Coaxial and 3 TOSLINK Optical digital inputs are provided for connection of legacy digital sources.

14. Analog Inputs

Eight RCA inputs and one XLR balanced input are provided and can be used as following depending on the "Input Settings" on page 12:

- 4x stereo pairs,
- 1x 7.1 input,
- 3x stereo pairs with XLR input,
- 1x 5.1 input with XLR input.

When connected as a 7.1 input, the channel assignment is as follows, clockwise from top left: LF, CF, LS, LB, RB, RS, SUB, RF.

15. Downmix Output

A stereo pair of XLR outputs is provided as a dedicated 2 channel downmix output. of whatever audio is playing in the selected theater or Zone2 source activated. To configure, see "Parameters" on page 30. Downmix may be enabled for selected presets. See "Presets" on page 32.

16. Analog Outputs

Sixteen XLR analog audio outputs are provided by default and fully assignable to theaters or zones. See instructions starting with "Building a Theater - Defining Channels" on page 14. Outputs may also be remapped. See "Output Mapping" on page 23. Pin 2 hot.

17. Optional Analog Outputs

One optional module is available to allow for up to 16ch additional analog audio outputs, offering total 32ch XLR outputs to the ISP.

18. Optional Digital Inputs

One optional module is available to allow for up to 16ch of AES/EBU audio streams to be provided through 2x RJ45 connectors. See "Settings" on page 30.

19. Optional Digital Outputs

Two optional modules are available to support various digital audio interfaces. One module with 32ch digital outputs in AES/EBU format over 4x RJ45 connector and one module supporting the Audio Video Bridging (AVB) Audio over IP transmission over 1x RJ45 connector.

20. Rear Panel Fan

From time to time, the ISP may automatically turn on the fan to draw cool air through the ISP and out the back. Do not obstruct the fan or any airflow vents on the chassis.

General

Welcome

Thank you for your purchase of a StormAudio ISP Immersive Sound Preamp Processor. The ISP has been designed to provide state of the art audio performance with immersive surround formats and legacy surround formats alike. Innovative hardware and software make it possible to customize theaters of up to 32 channels. Its modular nature allows for matching any inputs / outputs requirements as well as an upgrade capability for many years to come.

Included In The Box

- Quick Installer Guide
- Power cable for your locality
- Rack mount ears (requires T20 Torx screwdriver to mount)

Features

StormAudio ISP includes the following features:

- 7 Input / 2 Output HDMI switch, 3 TOSLINK and 3 RCA S/PDIF legacy digital inputs plus software configurable analog input (amongst 7.1, 5.1, 4x RCA Stereo or 3x RCA and XLR Stereo)
- Up to 32 software configurable outputs (analog or digital) + Downmix L/R XLR pair
- Up to 16 configurable digital inputs
- Mandatory network connectivity for control, firmware updates and Roon streaming.
- 4 programmable trigger outputs
- IR control from front panel sensor or back panel connection
- Available control system driver modules for 3rd party automation systems available on the Client Portal at http://www.stormaudio.com

Shipping Box and Packing Material

Please keep the original shipping box and all packing material. In the unlikely event you have a problem and must return it for service, you must use the proper packing material as the unit is not insurable by carriers otherwise. Replacement packing materials is available from StormAudio for a small fee.

Installation

Prepare your installation site by following the steps below: consult page "Rear panel" on page 4 for rear panel diagram indicating location of key connections.

1. For models delivered with a fuse attached to the AC cord, install the fuse before plugging the unit into mains power.
2. Ensure your electrical circuit has a good ground connection with all audio equipment connected to the same ground node to avoid noise or hum due to a ground loop.
3. Prepare all your devices (sources, projectors, amplifiers...) and keep them all powered down while interconnecting them to the ISP to avoid electrical discharges and damages, especially for HDMI interfaces.
4. Network should be running a DHCP server to enable the ISP to obtain an IP address.

Ventilation

The ISP is a cool-running line level component. It generates far less heat than amplifiers and many other components. It can be safely placed inside furniture or an equipment rack. However, it should not be tightly enclosed. Some airflow is desired. Note that the rear panel fan needs to be able to circulate air especially when the ISP is under heavy load.

Connecting to A/C Power

If necessary, install the included fuse into the fuse socket. Plug the IEC-320 C14 end of the power cord into the ISP, then plug the other end into an approved and grounded A/C receptacle.

Connecting to Network

Using a CAT5e or better cable, connect the ISP to your local area network. See "Get Network Access" on page 7 to identify IP address.

Connect IR Interface (Optional)

Should you place the unit in a closed cabinet and still control it through IR, you can connect an IR receiver to the IR Input of the ISP.

Connect Source Components

Legacy digital sources can be connected to the

digital inputs 1-6. Stereo or surround analog sources can be connected to the Analog Inputs section. Analog input configuration is defined at "4. Main Audio In" on page 12. HDMI sources can be connected as well.

Connect to Display

Connect your displays using HDMI outputs. Note that outputs are mirrored (same content). For long distance we recommend usage of optical fiber and interface dongles.
eARC/ARC audio return channel is only supported in HDMI OUT 1, being the recommended output to interface with a TV receiver. HDMI OUT 2 is recommended for Projector interface.

Note: when eARC/ARC is not used, it might be preferable to connect the screen to HDMI OUT 2 due to CEC commands on HDMI OUT 1 that some screen cannot override.

Connect Audio Outputs

If you choose to connect your outputs at this step, take note of which output number is routed to each channel so that you can map them appropriately in a later step. Otherwise, when you setup the theater using the web UI, the default outputs will be defined for you. At that point, you can connect your amplifiers based on the default output channel mapping. We recommend XLR cables with length <3m.

First Run

Upon first run, you must configure the ISP according to your specifications using the web based user interface. There is no on-screen display or provision to configure the unit using the front panel.

Power On

Turn the main switch on the rear panel to the ON position.

The front panel display will show the StormAudio logo for a few seconds, then will go blank as the ISP enters sleep mode. The power LED will show steady red.

Once in sleep mode, press the front panel POWER button. The ISP will begin the startup sequence. During the Initialization process (about 30s) the LED will blink green until the unit is ready with a steady green LED. Initialization process can be shorten at the cost of more standby power consumption. See ""Settings"" on page 30 to adjust this.

Get Network Access

Press and hold the EDIT button for about 3 seconds.

The display will show a list of information including the IP address at the top which was assigned by DHCP. Note this address.

Note: In case the unit is not in DHCP mode, and you need to restore DHCP mode from the front panel, follow the above steps, then press and hold EDIT for a few seconds more until a message appears asking for confirmation of this action. Confirm by pressing the ENTER button

Using a web browser on a device (laptop preferred) on the same network, enter this IP address in the address bar of your web browser.

Note: Only one instance of control via web UI can be opened at a time. If a window is already accessing the ISP web UI, a message will ask you to close one. Browsers supported: Edge (Windows), Safari (macOS) and FireFox, Chrome (Windows, macOS et Ubuntu). Others might show issues.

The ISP home page will be shown.

Selecting Remote Control will give access to the end user remote control functions. No setup parameters can be changed here.

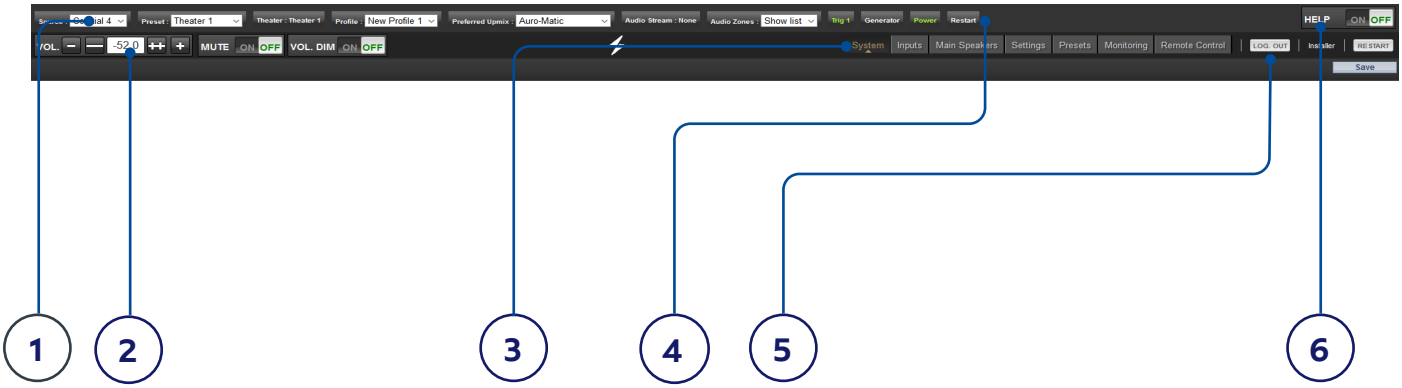
Select Expert Setup to gain access to the setup portion of the web UI.

Default Passwords

Note: In case you have forgotten the Expert User or Installer password, it is possible to reset them to the default values by first accessing the Info screen (see "Get Network Access" on page 7above). Then press and hold EDIT and EXIT buttons together. Press ENTER to confirm when prompted.

The Expert Setup area has two levels of access: Expert User and Installer. Expert user gets access to portions of the menu defined by the installer. Installer gets full access to setup. Use this level to perform the configuration.

The default password for full access to the setup menu is **installer**. Enter the password and press connection to enter the setup menu. Default password for Expert User is **expert**.



Web UI Header Diagram

1. Persistent Remote Control Bar

This area provides access to change some settings without having to access the remote control page. Change Source, Preset, Theater, Profiles within each theater, and Surround modes.

2. Volume Control

Volume control is provided without having to access the Remote Control page. The + / - buttons adjust volume in 1dB increments. The ++/-- adjust volume in 3dB increments. Mute cuts all sound. Dim attenuates the volume by the amount specified in "Parameters" on page 30.

3. Configuration Section

- **System:** indicates information about the product such as firmware version, any installed licenses, network parameters. System configuration backups and firmware updates are also done here.
- **Inputs:** Configure input names, map physical inputs to source components, and make input dependent settings.
- **Main Speakers:** Configure primary theater, child theaters, audio/video and audio only zones. This is where you map analog outputs to physical channels.
- **Settings:** Configure triggers behavior, HDMI, IR, and other system wide parameters.
- **Presets:** Build presets that easily recall combinations of Theaters, downmix zones, EQ profiles, triggers and surround upmix behavior. Presets offer customers the easiest way to place their system into modes for different types of listening including Dirac Live profiles.
- **Monitoring:** This StormMonitoring page gives real time and logged statistics on the health and performance of the ISP which can be accessed via the local network or via remote network access which makes system diagnostic endeavors less speculative and much more concrete.
- **Remote Control:** A copy of the page available to anyone logging into the web UI regardless of their credentials level. The only difference between this page and the one available without logging in is that the Persistent Remote Control Bar remains at the top.

4. Trigger / Generator / Power / Restart

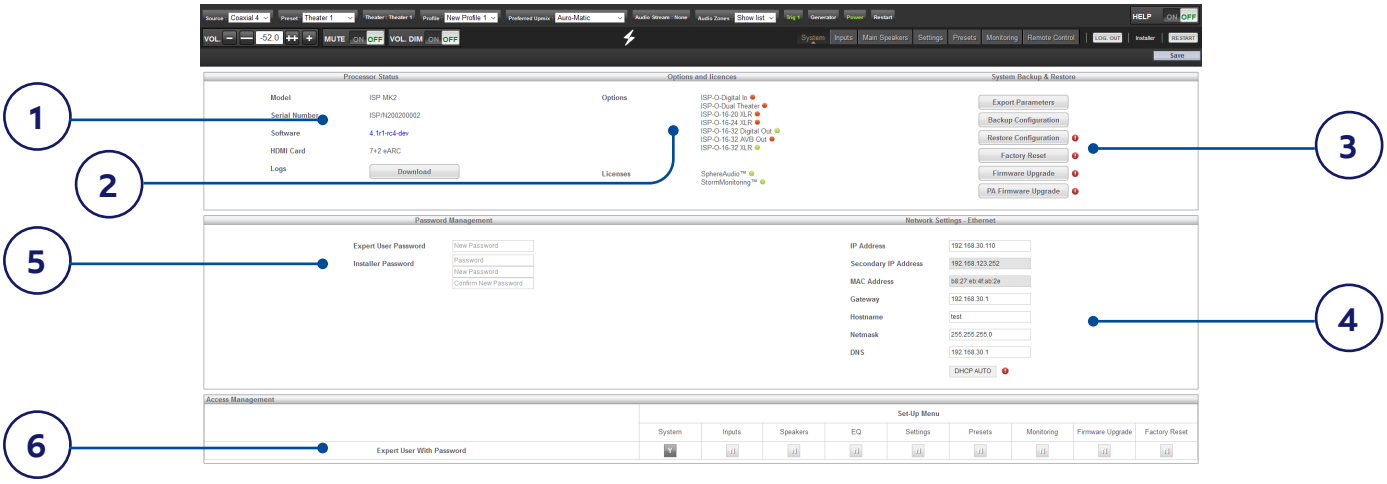
- **Trigger:** Any trigger configured in "Settings" on page 30 for Manual Switching appear here giving you easy access to activate or deactivate these triggers with a click. Green indicates that the trigger is in the active state. White indicates that it is not.
- **Generator:** When white, the ISP built in noise generator is not active. When green, it is active. This is an indicator. The generator cannot be switched on from here.
- **Power:** Switch the unit from standby to on status from here. Green indicates that the unit is powered on. White indicates standby.
- **Restart:** Should you need to restart the ISP, you can do so from this switch.

5. Log Out

Pressing Log Out will return you to the web UI home page. To access the installer menu or expert user menu, you must log in with the appropriate password again. Otherwise, you only have access to the remote control.

6. Help

A unique feature of the ISP web UI is the comprehensive built in help function. With this switched to ON, every function on the web UI features a which can be hovered over with a mouse to reveal a description of that specific function. Some functions have a which indicates important information. These warning indicators are present regardless of whether Help is engaged or not.



System Settings

1. Processor Status

This area indicates the model number, serial number, firmware revision and HDMI card version. You can also download logs which can be sent to StormAudio support team for diagnostic purposes.

2. Options and Licenses

This area indicates which of the Optional Modules and Software Features are currently installed (shown in Green).

3. System Backup & Restore

- **Export Parameters:** Generates a spreadsheet indicating the mapping of the output channels.
- **Backup Configuration:** Generates a backup file of the entire current configuration of the ISP making restoring settings easy after replacing a unit or recovering from a system reset event. As a dealer, you are advised to perform this step after completing setup and archive the settings on behalf of your customer.
- **Restore Configuration:** Permits uploading of the file generated by the step above. This overwrites all current settings with the data contained within the backup file, including the Dirac filters.
- **Factory Reset:** Resets the ISP to default configuration but retains current firmware version.
- **Firmware Upgrade:** Use this tool to update the firmware of the ISP. New firmware is made available from time to time and can be found on the Client Portal at http://www.stormaudio.com. Firmware upgrades are never required and should be considered optional unless advised otherwise by StormAudio support staff.
- **PA Firmware Upgrade:** Use this tool to update the firmware of the PA (Power Amplifiers) that are accessible in the network. This will open the PA update user interface. Follow similar process as for ISP to access the firmware package.

4. Network Settings

Displays current settings. By default, this is populated by the network DHCP server. DHCP Auto button is dark grey. To use a static IP address, click DHCP Auto to disable (turns light grey) and populate IP Address, Gateway, Netmask, and DNS fields manually. If an ISP has been set to static IP mode and will no longer connect to the network, see "Get Network Access" on page 7 for instructions on resetting the network settings to default DHCP mode.

5. Password Management

The ISP has 3 levels of access. Remote Control requires no password and give no access to settings. Installer has access to all settings. Expert is an intermediate level that has access to settings assigned by Installer. Those settings are defined in the Access Management area at the bottom of this page. The default passwords are:

Installer: installer
Expert User: expert

If you are a dealer or custom installer, you are advised to change these passwords and document them. Similarly, if you are a client and wish to lock other users out of settings, you may wish to change default passwords

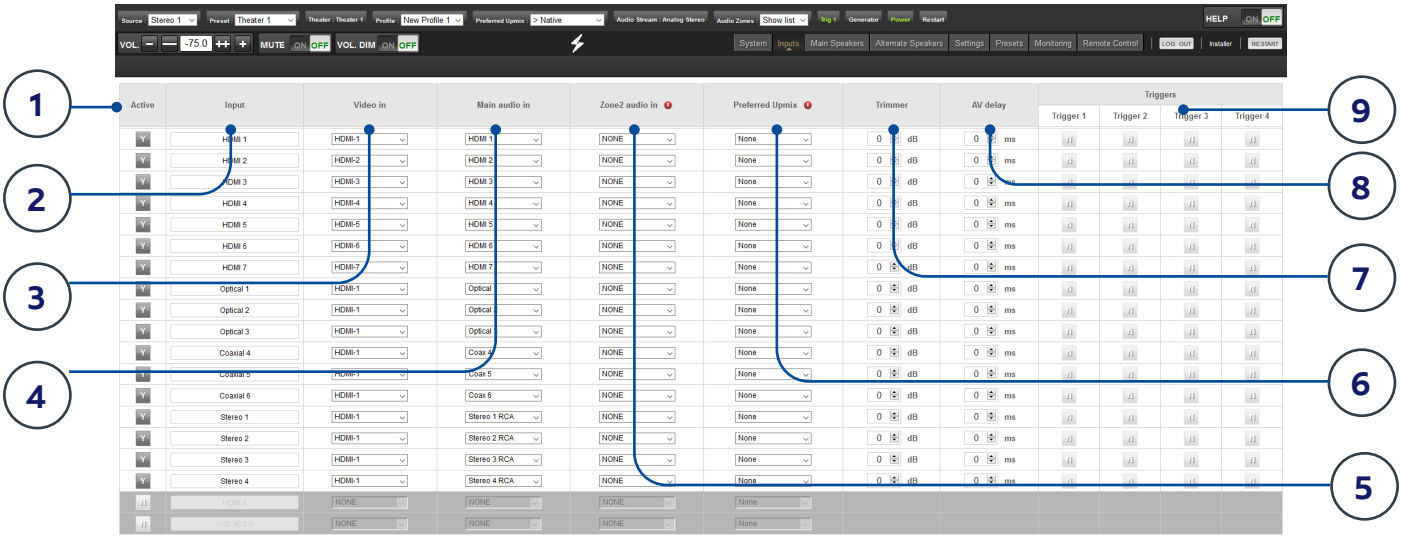
as well.

If you have forgotten your passwords and have locked yourself out of the ISP, you can reset them back to default by following the procedure “Default Passwords” on page 7.

6. Access Management

This area permits a user logged in as installer to assign access to specific setup functions to the Expert User. For example, if the ISP is installed at property with technical staff, the installer may wish to permit the Expert User to make changes to the inputs for the purposes of installing a new source, but restrict their ability to make changes to speaker EQ, apply firmware updates, etc. Any setup menu marked Y in grayed is accessible to a user with the Expert User password.

Note that after making any changes, you must press the SAVE button near the top right of the screen or you will loose your changes.



Input Settings

The ISP permits the installer to create access to sources in a very intuitive way for the end user. The installer is advised to title inputs thoughtfully and without ambiguity. No longer must an end user remember which physical input is attached to a particular source component. Further, only inputs specifically configured as ACTIVE will be available from the remote control. Finally, multiple inputs can be created from a single source component for the purposes of loading separate settings. For example, you may have an input titled 'CD Music' that accesses a Blu-Ray player attached to HDMI 7 that by default downmixes everything to stereo and another input titled 'Blu-Ray Movie' that accesses the same source component but upmixes all audio to Dolby Surround.

1. Active

Any input with a grayed Y is accessible from remote controls. To disable access to an input, click the Y and it will change to a N and gray out the entire row thereby disabling access to this input. You are advised to disable any input with no source component attached.

2. Input

This is the name of the input that will appear in remote control applications. By default, the name is the same as the default audio input. You may type in this box and change the name to something more intuitive. Supports a maximum of 10 characters Latin-1 table.

3. Video In

For any given input, you can map separate video and audio inputs except that when the audio input is an HDMI input, the video input must be the same HDMI input. None may also be chosen when no video is desired.

4. Main Audio In

For any given input, you can map separate video and audio inputs for the Main Theater audio path, except that when the audio input is an HDMI input, video must be the same HDMI input. Note that the analog input matrix may be selected as: 4x Stereo RCA, 3x Stereo RCA + 1x Stereo XLR, 5.1 RCA + 1x Stereo RCA, 5.1 RCA + 1x Stereo XLR or as a 7.1 RCA input.

5. Zone2 Audio In

The ISP offers a dual source selection so that you can have one source playing in the Main Theater defined in point 4 above and another source playing in the other defined Audio Zones (see "Building a Theater - Defining Channels" in page 14 for the Theater and Audio Zones creation). The Zone2 Audio input cannot include HDMI selection. For device with HDMI connection, It is recommended to connect and define an Input with two physical connections to the ISP such as HDMI for Main Audio In and SPDIF/RCA for the Zone2 Audio In. Doing so, selecting this Input will take the correct physical connection automatically depending on the Theater or Zone playback.

6. Preferred Upmix

On a per input level, you may choose to engage a particular upmixer, or leave the option set to none. This setting overrides any preferred upmix defined as part of a preset. So, if a preset is to be used in conjunction with this input, and that preset includes specifying an upmix, leave this setting to None.

7. Trimmer

Each input may have the audio attenuated by a specific value in an effort to level match source components and yield an expected volume level in the room regardless of source selected. No gain can be applied, only attenuation. The range is -30dB to 0dB with 0.1dB step.

8. AV Delay

Each input may have a synchronization delay set between video and audio. This range is 0-100ms in 1ms increments.

9. Triggers

The ISP can trigger connected devices ON using the 4 DC trigger output jacks on the back when a specific input is selected. Most commonly, this is used to power on the source component connected to a specific input. To enable this feature, the desired trigger must be set to "Auto Switching: Enabled on Input" in the Settings menu. See "Triggers" on page 30. To engage a trigger based on input, click the light gray N. It will turn into a dark grayed Y when the trigger will be activated upon selection of that input.

Roon Ready

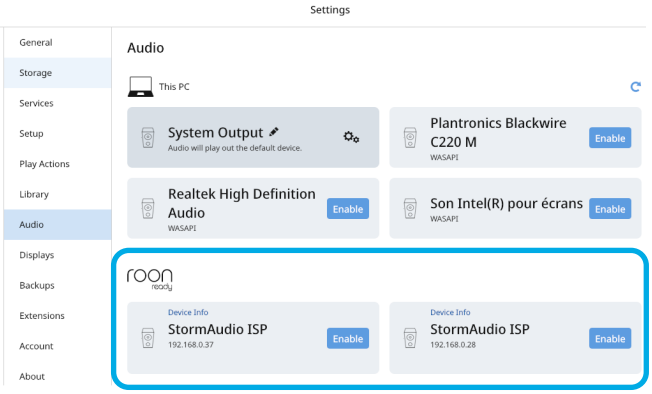
The ISP is a Roon Ready certified product and can therefore be part of a Roon streaming ecosystem. Only few steps are required, as described below.

1. Roon input definition

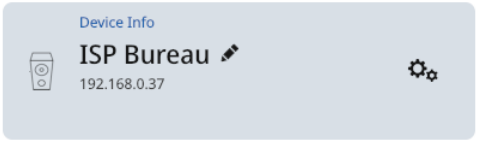
For the ISP to be visible in the Roon ecosystem it is first required to create an input that would select the Roon audio path. Following the steps 1 to 4 of "Input Settings" on page 12, create a new input and select "Roon Ready" as Main Audio input. It will then be available on all remotes and discoverable by the Roon core.

2. Roon core settings

In your Roon core, whether embedded in your favorite NAS or a Roon Nucleus product, access the Settings page and the Audio section.

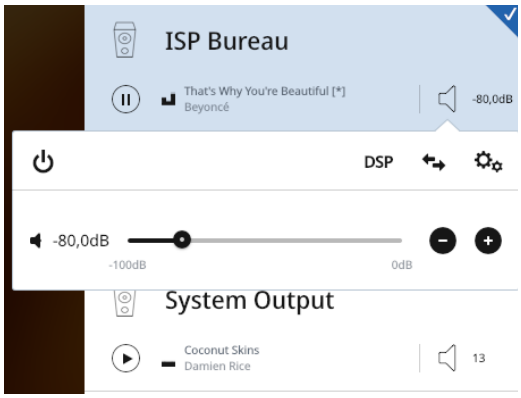


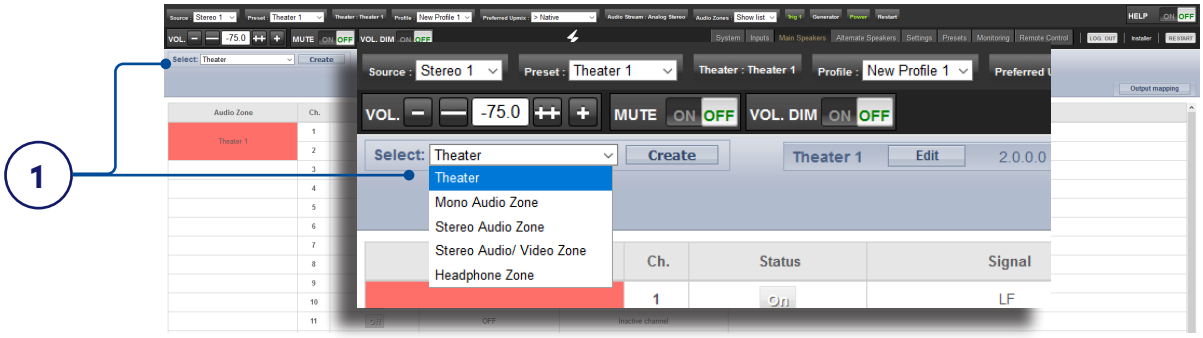
In the Roon ready area, Enable the StormAudio ISP. Once enabled, you can customize it (name, audio settings), as shown below.



ISP Control via Roon app

Roon control, whether through the desktop or phone app, allows for multiple actions: ISP power up and down, automatic Roon input switch at playback launch and volume control, as shown below.

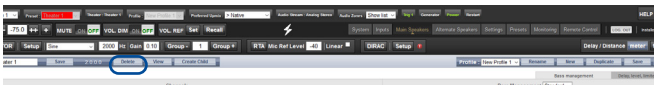




Building a Theater - Defining Channels

To assign analog outputs to particular channels, you must build a theater. A theater may occupy as few as 2 channels or as many as 16, 24 or 32 depending on the Optional module assembled. There are close to 400 possible combinations of speakers for theaters. Any channels left over may be assigned to secondary multi-channel theaters, 2 channel A/V zones, audio only zones, mono zones or headphone zones. A physical output can only be assigned to one theater or zone.

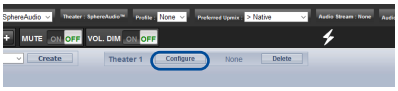
To assign channel outputs, you must first create a Theater or Zone. Theaters are multi-channel systems. Zones are either 1 or 2 channel audio or audio/video zones. Any theaters or zones created appear to the right and are listed by their names which you assign. By default, the ISP ships with a 2 channel theater configured. To build your own, delete this theater and create a new one.



Click EDIT, then DELETE. Click OK to confirm. You will be returned to the Main Speakers page.

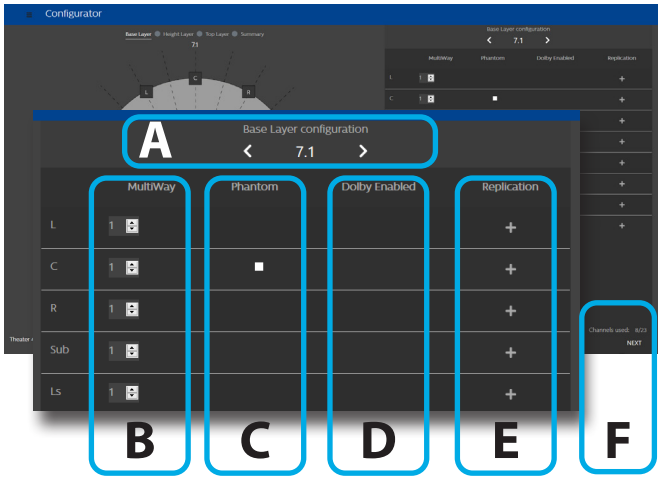
1. Create Theater

Select Theater in the drop down list and click Create Theater to build your new theater. Theater 1 will appear to the right of the Create Theater button. Click Configure to proceed.



2. Configure the theater

When in the Theater Configurator, you will be able to define each layer of the speaker installation: base, height and top layers.



A. Choose using the left and right arrows which speaker combination you expect for the layer amongst predefined options populated automatically depending on the channels decoding capability of the ISP version.

B. For each speaker, you can define whether it is a full bandwidth or an active multiway one, with up to 4 ways definable. At this stage, only the number of ways is requested: filters details will be defined in the specific "Multi-way Loudspeaker Setup" in page 18.

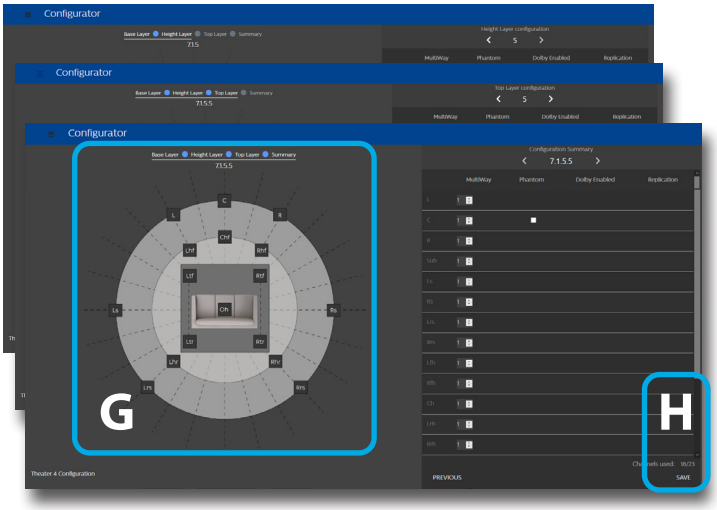
C. The Center channel can be turned to Phantom mode, the signal being played in Left and Right channels, removing the need to have a physical center channel in the installation.

D. Top channels can be defined as Dolby Atmos Enabled for the case up-firing speakers are used. In such case, select the base speaker location which can be either the "Front", "Side" or "Back" speakers

position, depending on the base layer definition. Keep «None» for normal down-firing in ceilings speakers.

E. For each speaker, you can define whether replication is required. Use this feature for multiple subwoofers or multiple rows of surround speakers declaration or any speaker you wish to replicate. In case there is no subwoofer in the system, please select "0" in the subwoofer field.

F. Press Next to reach the next layer and follow again steps A to E until all three layers are defined.



G. At the end, a summary of the Speakers Configuration is shown. A four digits description is given following this order:, "Base Layer . LFE . Height Layer . Top Layer".

H. Save to exit and reach the Speakers edition page loaded with the default audio profile "New profile 1".

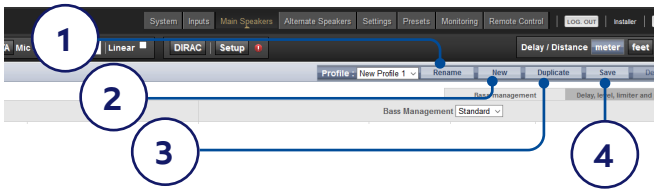
Zones

Zones are mono or stereo, and with or without video output or can be dedicated to headphone playback when used with an external headphone amplifier. Stereo Audio/Video and Headphone Zones include provisions for adjusting lip sync. Audio only zones do not. Zones occupy unused channels and can play concurrently with a theater or without one. Note that system wide, you can select one input for the main theater (Main Source) and one Zone 2 input used by all the audio zones (Secondary source). You can choose the Zone to play either the Zone2 source or follow the Main Theater source. Zones have all the same features of a main theater except that channels are always "Large", they cannot include subwoofer channels, and they are limited to mono or stereo. In order to control a zone, it must be included in the preset that is currently selected in the remote control. See "Presets" on page 32 for more details.

Profiles

For each Theater, Sub-Theater, and Zone, there is a default profile created. You can save multiple profiles for different listening preferences with specific speakers settings (such as different EQ profiles based on content type).

Profiles can be recalled as part of Presets (see "Presets", page 32). A profile includes: Speaker definition (multi-way, levels, delays), bass management, manual EQ, and Dirac filter design if applied.



1. Rename

You can rename a profile using Latin-1 table characters. No special character allowed.

2. New

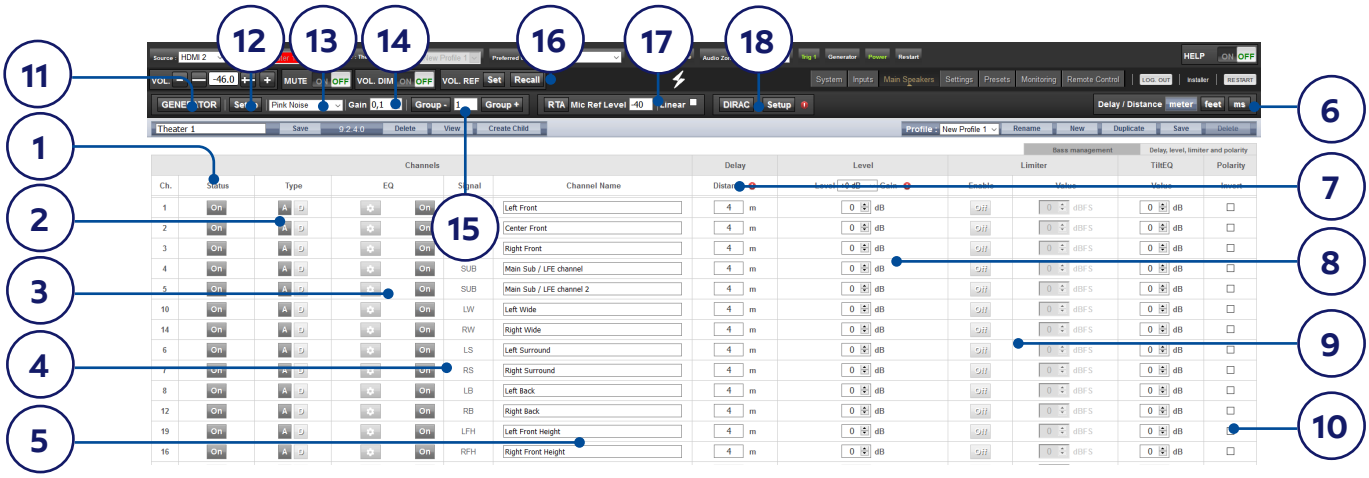
Click New to build a new fresh profile.

3. Duplicate

Build a variation of a saved profile. For instance, you cannot edit Dirac reference profiles directly although it can be useful to tune levels of replicated speakers. In such case, create a duplicate of the reference profile and edit it to adjust the needed parameters.

4. Save

After any changes to a profile are made or creation of a new one, you must SAVE your changes.



Individual Channel Adjustments

Once your theater is defined, each channel can be individually adjusted. Child theater can also be created, see page 24.

1. Channel Status

Each channel is enabled by default. If for some reason this channel needs to be disabled, click the ON button. It will turn to OFF and audio will no longer be routed to that channel. Note that audio will not be re-routed to other channels. Channel status is set per Theater / Zone and is not stored as part of a profile.

2. Channel Type

When equiped with a Digital Output module, each channel can be assigned to an Analog or Digital output.

3. Channel EQ

Each channel can have up to 20 filters cells configured selecting the wheel icon. Channel EQ can be bypassed by selecting ON/OFF. See “Channel EQ” on page 18 for detailed EQ options. EQ settings are stored as part of profiles.

4. Signal

Indicates which signal is routed to this output. Should you desire to remap signal routing, you can do so with Output Mapping. See “Output Mapping” on page 23 for details.

5. Channel Name

Name can be customized with up to 24 characters from Latin-1 table. No special character allowed.

6. Delay units

Choose whether to measure channel delays in meters (default), feet, or milliseconds.

7. Delay per Channel

Each channel should have distance/delay set between that loudspeaker and the sweetspot. You can define this in meters (default), feet, or ms depending on your setting in point 6 above.

8. Level

Set the level of each channel in between -100dB and +12dB in 1dB increments. Best practice is to set other channels to a negative figure relative to the loudest channel to avoid clipping when possible. Global gain makeup can be applied to the theater when the relative level of the theater is too low (usually a result of a high degree of correction due to Dirac Live’s mixed phase filters). Use global gain makeup judiciously to avoid clipping.

9. Limiter

To prevent distortion due to loudspeaker overdriving or amplifier clipping, you may wish to engage a limiter on a channel. When enabled, a compressor will attenuate audio above the threshold set by the Limiter Value for that channel back down to that value. For instance, if the limiter is enabled and set to -3dBfs, any audio that exceeds -3dBfs will be reproduced at -3dBfs. By their nature, limiters are not ideal acoustic solutions, but this feature can prevent subjectively worse sounding distortion, or in extreme cases, damage to loudspeakers or amplifiers. If you find that you are aggressively using the limiter

function, you are encouraged to upgrade loudspeakers and/or amplification.

10. Tilt EQ

For speakers behind a motorized screen for example, you might need to change their "audio brightness" depending on the screen position up or down. TiltEQ allows the sound to be darker or brighter.

11. Polarity

Check the box for any channel in which you wish to invert signal polarity.

Test Tone Generator

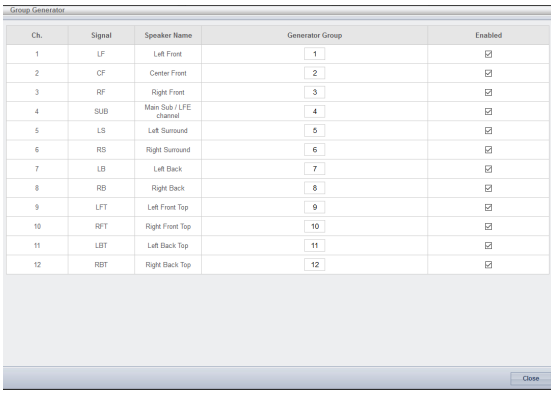
The ISP includes a highly configurable test tone generator which can be used to help manually calibrate channels.

12. Generator

Click this button to turn on the tone generator. It will automatically start with Group 1 with green highlight on the active channels.

13. Setup

Unlike traditional generators, the ISP plays tones per channel group. Click Setup to define the groups and the channels they contain. For example, if you have 2-way active loudspeakers, you may wish to group the high frequency and low frequency component of each into one group.



14. Noise Selection

Choose the type of noise or tone created by the generator.

- **Sine**: Generates a sine wave at the frequency specified.
- **Pink Noise**: Generates full bandwidth pink noise.
- **Pink Noise 400Hz-4kHz**: Generates pink noise band limited to one decade. This is particularly useful when setting relative levels between channels with dramatically different useful bandwidths. Remember SPL meters measure not only sound pressure but also bandwidth.
- **External**: it is possible to use an external noise generator connected to one of the ISP input. This is usually required when using an external tool providing its own stimuli (Room EQ Wizard is one of them, see "REW integration", page 19).

15. Gain

The gain figure can be set so that the noise generator operates at a level at or below that of a normal source playing at 0dBFS. Default is 0.1 (-20dBFS).

16. Group -/+

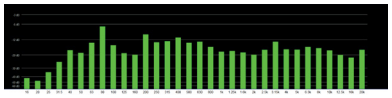
When the noise generator is active, use this function to play the noise through different groups defined in "13. Setup".

17. Volume Reference

It is good practice when calibrating systems to always work at a reference level such as 85dB C-weighted. Before activating the noise generator, make sure the master volume is at a low level. Set and recall a reference master volume value. Click SET once you have dialed the value you'd like to store. Click RECALL to quickly return to that value.

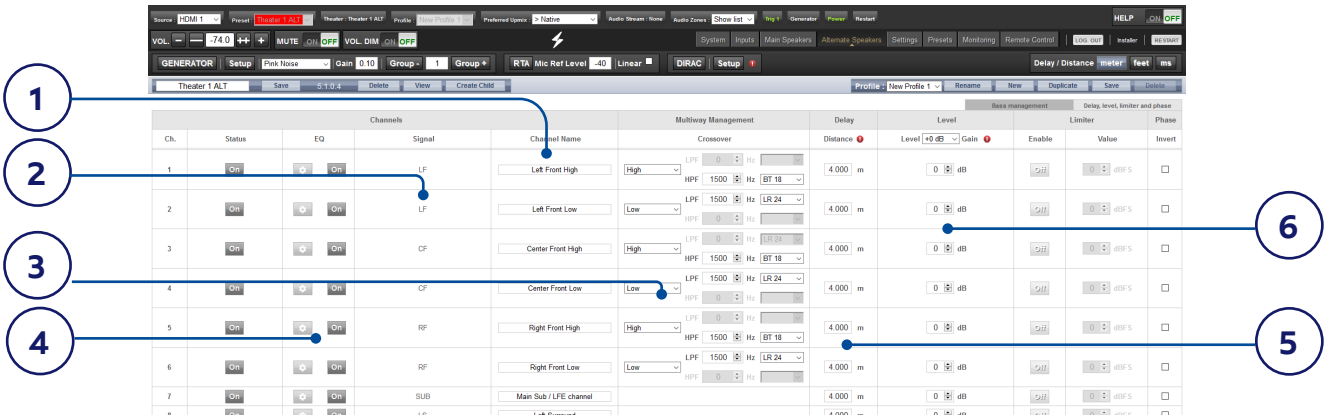
18. RTA

When a USB microphone (such as the optional Microphone Mini Kit) is connected to the ISP, you can use the Real Time Analyzer to visualize the response of loudspeaker groups in the room. Note that the built in RTA is not accurate enough to use for calibration, but is useful for getting a good idea of the approximate response of the system. Maximum level of the capture can be set by adjusting Mic Ref Level. Graph vertical scale can be changed from Logarithmic (default) to Linear.



19. DIRAC

See "Dirac Live" on page 25 for use of Dirac Live® Calibration Tool.



Multi-way Loudspeaker Setup

During the initial Theater Definition setup, you have the option of defining any speaker as multi-way. Doing so will assign 2 to 4 output channels to each speaker instead of 1. In this configuration, more than 1 amplifier channel will be used per loudspeaker, and the ISP will perform the crossover function for each loudspeaker.

All settings detailed in section "Individual Channel Adjustments" on page 16 also apply and will not be covered again here. This section only describes the differences notable for multi-way loudspeaker configuration.

1. Channel Name

By default, the channel names are named by the signal they receive. For clarity, you may wish to rename these according to the signal they reproduce e.g. Left Front High, Left Front Mid, Left Front Low. Use Latin-1 character table with no special character.

2. Signal

Note that in this example (Left Front is a 2-way active loudspeaker), Each of the first 2 channels receives the same Left Front signal.

3. Multi-way Management

Use this section to filter the signal for each section.

- **Section**: Choose whether each channel reproduces Full Range, Low Pass Filtered, Middle (band pass), or High Pass Filtered audio. Two-way speakers will not have Middle option.
- **Crossover Frequency**: When the section is chosen as anything other than Full Range, set the crossover frequency for the Low and High Pass filters for each section.
- **Slope**: For each filter, select a slope. Options are Butterworth (6dB / oct, 12dB / oct, 18dB / oct, 24dB / oct and 48dB / oct), Linkwitz Riley (12dB / oct, 24dB / oct, 36dB / oct and 48dB / oct).

4. Channel EQ

For each channel, you can adjust EQ by selecting the Wheel. EQ can be bypassed to compare with and without equalization selecting On or Off.

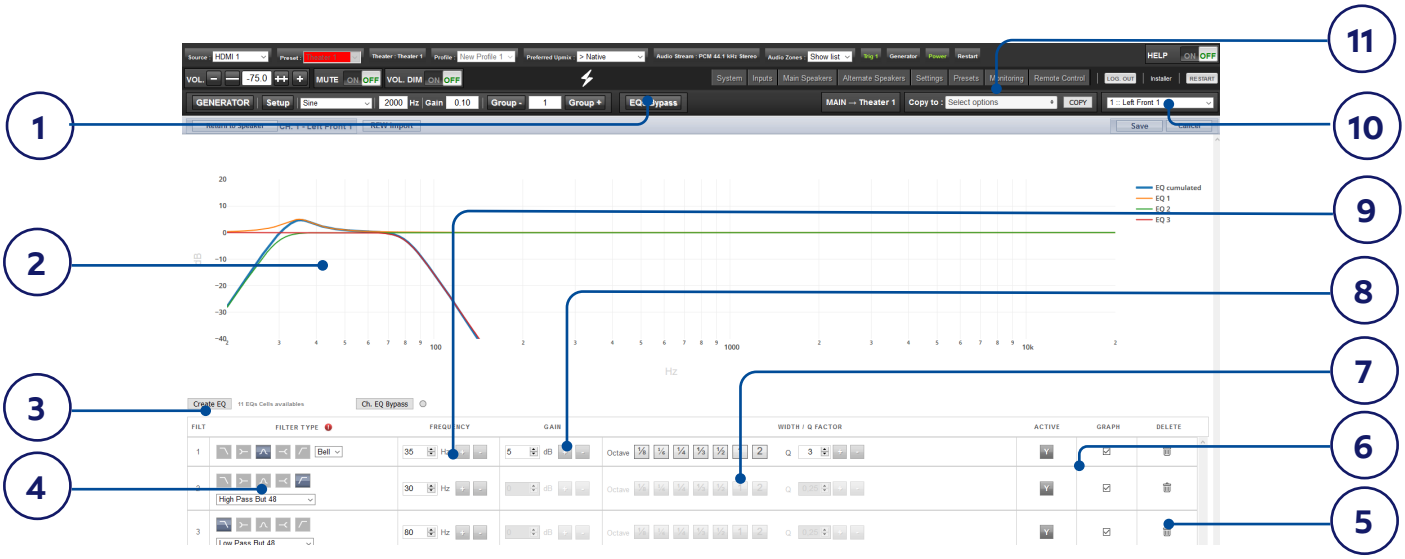
5. Delay

Set the delay of each section. For active multi-way loudspeakers, it may be helpful to do this in milliseconds and measure time-of-arrival differences at the crossover point when using LR or BT6 filters to time align each section of a multi-way loudspeaker.

6. Level

Active multi-way loudspeakers almost certainly have different sensitivities per module. Set the relative level of each here. When possible, use 0 as the maximum figure and attenuate other channels to match the loudest channel. You can also set global makeup gain for the entire theater as described in "8. Level" on page 16.

Note that after making any changes, you must press the SAVE button near the top right of the screen or you will loose your changes.



Channel EQ

Each channel can have up to 20 filters cells for equalization, including additional crossover capabilities.

1. EQ Bypass

When developing a custom set of EQ per channel, it is sometimes helpful to bypass the entire group of EQ to check your progress against the starting point.

2. Graphical UI

The EQs defined are visualised in a graphical window. Individual and combined EQ curves are shown, providing an instant understanding of EQ impact on the correction curve.

3. Create EQ

To design EQ curves for any channel, you need to add EQ definition line using the Create EQ button.

4. Filter Shape

Each filter must begin with a variation of one of 5 types.

- **Low Pass**: Continuously declining output above a cutoff frequency at a defined rate.
- **High Pass**: Continuously declining output below a cutoff frequency at a defined rate.
- **Bell**: Band pass or cut filter with a defined center frequency, boost or cut amount, and Q.
- **Low Shelf**: Boost or cut frequencies below a cutoff frequency by a fixed amount.
- **High Shelf**: Boost or cut frequencies above a cutoff frequency by a fixed amount.

For LPF and HPF choose a type and slope amongst Butterworth (6dB / oct, 12dB / oct, 18dB / oct, 24dB / oct and 48dB / oct), Linkwitz Riley (12dB / oct, 24dB / oct, 36dB / oct and 48dB / oct).

5. Delete

Unused EQ line can be removed using the Bin button.

6. Status

In the course of designing your filter, you may wish to measure or listen to progress compared to the absence of that filter. Click Active "No" to temporarily omit that filter from the aggregate curve. Click "Yes" to activate it back. You can also decide here whether it is shown in the visualization curve by checking the Graph item.

7. Quality Factor / Bandwidth

Bell filters require that you specify a Q. High Q affects a narrow bandwidth, and low Q affects a wide bandwidth. You can enter this number directly in the text box or increment/decrement by the amount chosen in the header row using the +/- buttons to the right. Or, click a fractional or multiple octave button to automatically calculate Q.

8. Gain

Bell and shelving filters require that you set the amount of boost or cut. You can enter this number directly in the text box or increment/decrement by the amount chosen in the header row using the +/- buttons to the right.

9. Frequency

Each filter requires that a center or cutoff frequency be specified. You can enter this number directly in the text box or increment/decrement by the amount chosen in the header row using the +/- buttons to the right.

10. Channel Select

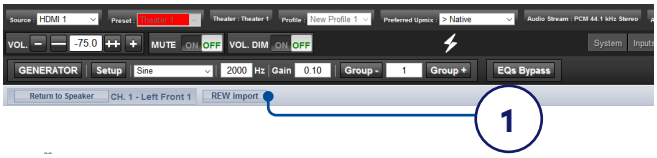
Select the desired channel to equalize here.

11. Copy to Channel

You may wish to duplicate your filter set to another channel without manually rebuilding it for each identical channel. Select one or more channel(s) to copy the current filters to and click COPY.

Note that after making any changes, you must press the SAVE button near the top right of the screen or you will loose your changes.

Room EQ Wizard integration



1. REW import

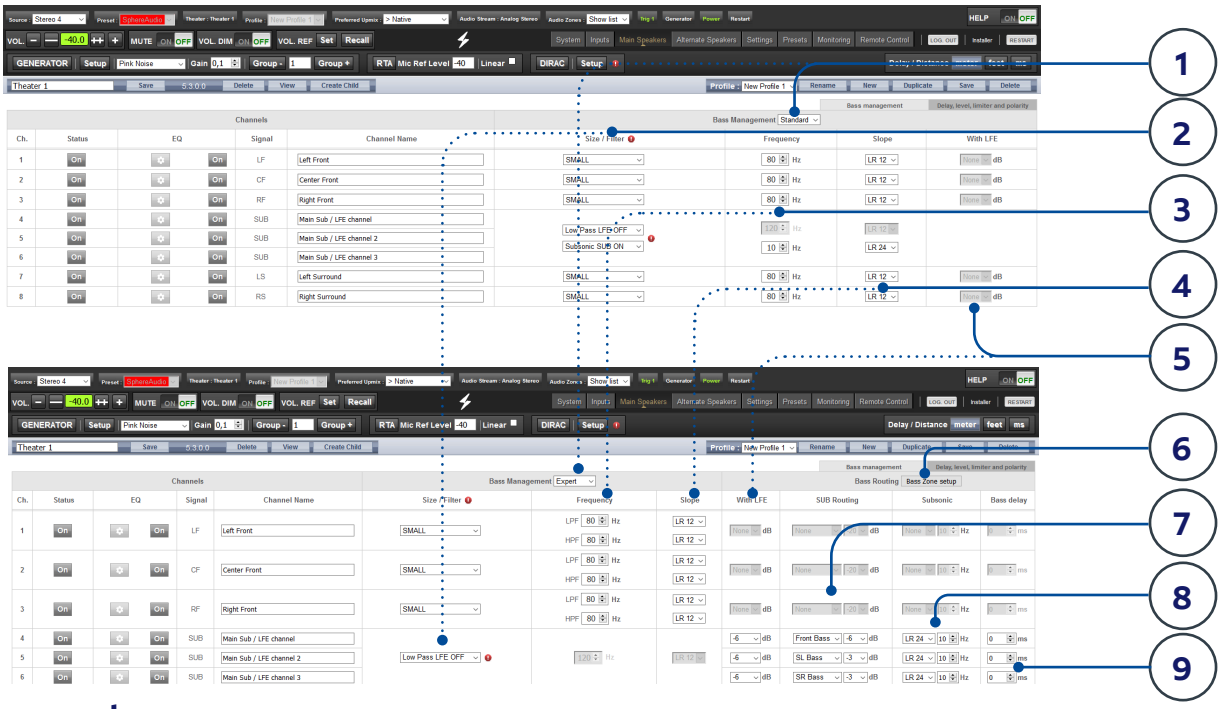
The ISP offers the possibility to use external Room Correction tool such as the Room EQ Wizard (REW). REW offers very advanced measurements and filtering capabilities where you can define equalization and measure the effect in both time and frequency domain. This gives a total flexibility for ISP users to go from a fully automated approach with Dirac Live to a fully manual approach that REW offers.

To allow for importing filters defined in the REW tool, you must make sure that you first set the REW tool for StormAudio ISP compatibility and select "Export filter settings as Texts" in the tool.

Once done, you can then do your EQ for each channel and export the equalization as a "*.txt" file.

In the ISP, select "REW Import" and load the file corresponding to the selected channel. You will prompted for choosing between adding to or replacing existing EQs. Once selected, the EQ page will then be loaded with the REW defined filters.

Note that you can define up to 12x Parametric EQ and 2x High Pass or Low Pass filters (up to 48dB slope) in the REW tool with the StormAudio compatibility mode.



Bass Management

Bass Management is one of the most important and critical part to adjust in the ISP in order to achieve the best bass response of your system depending on the speakers and subwoofers used but also on their integration in the room.

There are various use cases. Whether your installation is built around a traditional THX® type speakers system for which all the low frequencies below 80 Hz shall be reproduced by subwoofers or it includes speakers capable to reproduce very low frequencies, the adjustments in the ISP will be very different. In the first case, you can decide to go for a fully automated adjustment going through the Dirac Live Room Correction, making this delicate phase an easy going process with extremely good acoustical results when combined with the Bass Control add on module.

1. Modes

The ISP offers three different modes:

- **Standard:** This mode is the basic mode, usually suitable for most of the use cases where the low frequencies are reproduced by subwoofers and with the need of a single crossover adjustment between each speaker and the subwoofers.
- **Expert:** This mode allows for more advanced adjustments such as the definition of Bass Zones that can be flexibly routed to any Bass reproducer in the system, independant crossover adjustment between subwoofer and speakers or when speakers have to be used as Bass reproducer. While it can help achieve greater subwoofer integration and low frequencies reproduction, it should only be used by calibrators with sufficient skill otherwise comparably poor results may be inevitable.
- **Dirac:** The Dirac mode is only accessible when applying the Dirac Live Room Correction process and selecting either the Upmix or Bass Control modes of the Dirac Live® Control Tool. In this Dirac mode, the Bass Management crossovers will be set in the Dirac tool with no possibility to override them in the ISP UI (all adjustments will be grayed out). See Dirac specific part page 25.

2. Size/filter

When in Standard or Expert modes, the system offers the possibility to define how the bass are exctracted from the speakers and redirected to the bass reproducers, whether they are subwoofers or speakers.

- **Small:** When a channel is set to Small, bass in this channel is redirected to the Bass reproducers. The channel is high pass filtered according to the HPF frequency and slope. Low frequencies are routed to the bass SUB channel according to LPF frequency and slope. Individual HPF and LPF definitions are only available in Expert mode. Small speakers cannot have SUB bass channel or LFE bass mixed in.
- **Large:** Channel is not band limited. When a channel is set to Large, no bass is redirected from this channel to the bass SUB channel. Use this setting when the loudspeaker has sufficient bandwidth and output capability to reproduce low frequencies. Channel can have SUB bass channel and/or LFE bass mixed in.

- **Large and Sub:** Channel is not band limited, but a copy of the bass for this channel is routed to the bass SUB channel as well. Set the frequency below which bass should be sent to the bass SUB channel and the slope at which the crossover occurs.
- **Large with Sub:** This special case is only available in the Expert mode. It enables you to effectively split a full range loudspeaker into a "small speaker" plus a "subwoofer". The HPF frequency and slope define the characteristic of the "small speaker" portion. LPF frequency and slope define the virtual "subwoofer" characteristic. Both are mixed before being routed to the speaker, thus making it a Large one from an acoustical stand point.

Subwoofer channels have specific settings. By definition, subwoofers have limited bandwidth and some are more limited than others.

- **Low Pass LFE:** When this is set to ON, the subwoofer channel has a low pass filter applied according to that channel's Frequency and Slope. This is designed to limit the channel's ability to reproduce the upper portion of the bass spectrum. This is usually done to prevent the subwoofer from contributing midrange distortion.
- **Subsonic SUB:** When this is set to ON, a high pass filter is applied to the channel which restricts the subwoofer's ability to reproduce very deep bass according to the frequency and slope defined for that channel. Many subwoofers, especially smaller models do not have the amplifier power or driver displacement required to accurately reproduce very deep bass. By actively filtering very deep bass away from the subwoofer, it is better able to reproduce bass within it's useful bandwidth.

3. Frequency

When the channel is set to Small, Large and Sub or Large with Sub, the crossover Frequency defines the point below which bass in this channel is routed to the bass SUB channel in standard mode. In Expert mode HPF to the speaker and LPF to the bass SUB channel can be adjusted individually. Note that the frequency is the -3dB point along the slope defined in the next column and is not an absolute cutoff point.

4. Slope

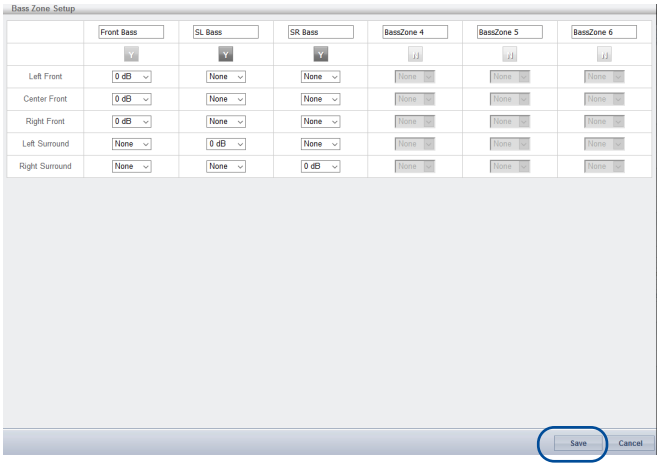
The rate at which bass is 'crossed over' into the subwoofer when the channel is set to Small or Large and Sub. Both Linkwitz-Riley and Butterworth type filters are available with 12dB to 48dB / octave slope (8th order).

5. With LFE

When a channel is set to Large, Large and Sub or Large with Sub, this channel can optionally reproduce LFE bass which would normally be the sole responsibility of the subwoofer channels. When set to None, no LFE will be mixed into this channel. When set to a figure between 0dB and -20dB, LFE bass attenuated by that figure will be mixed into this channel. This feature is useful when the main channels have sufficient bandwidth AND dynamic range to support the subwoofers in creating an appropriate amount of bass sound pressure in the room.

6. Bass Routing

In Expert mode, it is possible to define multiple bass SUB channels, Bass Zones, made of the bass redirection of chosen speakers.



Selecting Bass Zone Setup will give access to a definition popup.

Up to 6 Bass Zones can be defined. There is always one by default receiving all the redirected bass. More can be activated by toggling the button to Y. Then adjust the redirection level expected for a certain channel in the desired Bass Zone. Once fully defined, you can SAVE to exit the popup.

7. SUB Routing

For each Bass reproducer (Large, Large and Sub and Large with Sub channels), you can define which Bass Zone it should reproduce. When set to None, no Bass Zone will be

mixed into this channel. When a Bass Zone is set, define the mixing level to apply between 0dB and -20dB. This level should be adjusted considering the overall acoustical response of the system.

This feature is useful in multiple use cases:

- When the room is big enough, it is a common practice to have one or two subwoofers below the screen reproducing the LCR redirected bass and the LFE channel, one or more subwoofers in each side of the room reproducing their respective side speakers bass and finally one or more subwoofers in the back of the room handling the surround rear speakers low frequencies. You can even add one or two subwoofers for the Ceiling speakers bass reproduction.
- When speakers are capable enough in the low frequency to reproduce the bass of the system, you can emulate the same system response as with a speaker and subwoofer combination, by carefully creating the Bass Zones and routing them to the appropriate speakers.

The Expert Bass management is a highly flexible tool that can bring ultimate bass performance. Nevertheless, one must keep in mind that such approach require to monitor the adjustments by careful measurements to ensure the right balance of bass reproduction is achieved. Also, using speakers as bass reproducer require heavy power handling capability to allow for reasonable acoustical pressure in the room in the low frequency region without reaching their limit.

8. Subsonic filter

In Exper mode, there is the possibility to adjust a Subsonic filter for each Bass reproducer, whether being a speaker or a subwoofer channel. Change the setting from None to any desired slope (from 12 to 48 dB) and adjust the crossover frequency.

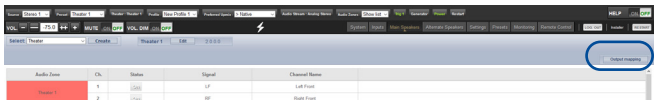
9. Bass delay

Each Bass Zone and LFE reproduced channel has an individual delay adjustment, useful to carefully align the phase response of the system

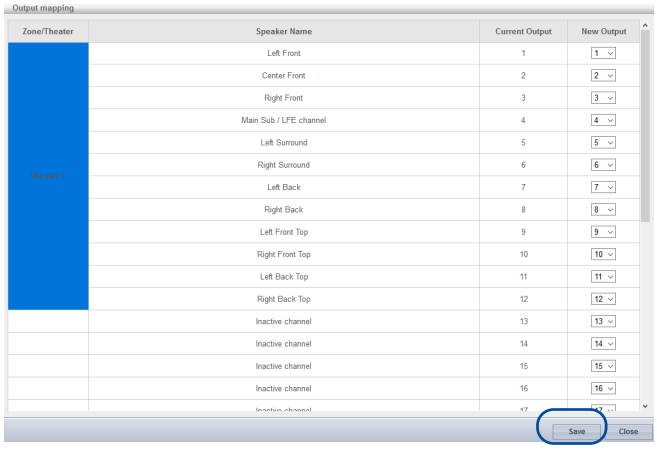
Note that after making any changes, you must press the SAVE button near the top right of the screen or you will loose your changes.

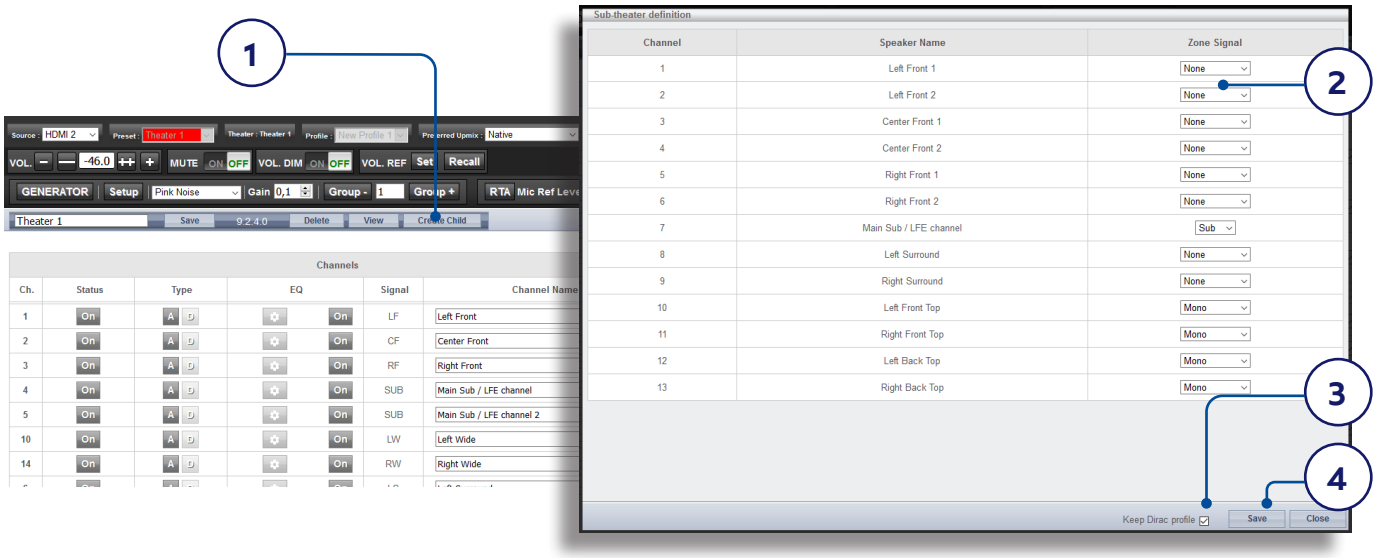
Output Mapping

Should you wish to map a physical analog output channel to a loudspeaker other than the default assignment, you may do so from the Main Speakers page. Click Output Mapping.



Using the New Output column on the right of the pop-up menu, select a new output channel assignment. If you choose a currently occupied new output channel, that channel will be automatically reassigned (swapped). Save to exit and go back to Main Speakers summary page.





Child Theater / Sub Theater

You may optionally create alternate speaker definitions in your theater with some restrictions. For example, if you wish to have music playing before the movie plays before everyone is seated and quiet, you might only want that music playing from the overhead speakers so as not to interfere with conversation. In this case, you can define a child theater so that stereo left/right audio is played only through the top speakers (as in the example illustrated above).

Child theaters behave just like zones or main theaters in that they can be selected as outputs, programmed into presets and can have multiple profiles, including with specific Dirac filters.

Note that although multiple Child theaters can be designed per main theater, signal assignment is common to all.

1. Create Child

From the Main Speakers page, Edit your theater. Click Create Child. A window will appear with a list of loudspeaker names and their channel ID.

2. Zone Signal

For each loudspeaker, select the signal to be played. You may choose between Stereo Left, Stereo Right, Mono, or None. Subwoofer channels can play Subwoofer signal or None.

3. Keep Dirac Profile

If you have created a Dirac profile for the parent theater, you have the option to retain that calibration for the child theater. Note that it might be recommended to run a new Dirac calibration in case the listening area of the Child Theater is different from the Theater mode. To do so, follow the same process as defined in the next page.

4. Save/Close

Save when done, or Close to cancel.

5. Bass Management / Delay Level Phase

Child theaters have comparably limited options compared to full theaters. If a child theater includes a subwoofer channel, the full range channels are forced to small. In this case, you can adjust the crossover frequency, slope and subwoofer subsonic filter. If no subwoofer channel is enabled for the child theater, the main channels are forced to large. No Expert Bass Management is available for Child Theaters.

Dirac Live®

Dirac Live is a highly advanced calibration tool which uses sophisticated mixed-phase filters to compensate for loudspeaker and room deficiencies in order to provide optimal acoustic performance of your theater.

The Dirac Live® tool (3.0.8 and onward) is free of charge and available on Dirac Website after registering (https://live.dirac.com/register/) and the calibration kit is usually purchased by the installer through their dealer. Stormaudio ISP comes by default with the activation of both Dirac Live® and the Bass Control add on module which adds to the standard Dirac Live room correction suite the ability to also include the bass management with any number of subwoofers used in the installation. This is enabled automatically in the tool once the ISP connection is confirmed.

All Theaters, zones, and child theaters can be calibrated with Dirac Live.® Presuming you have a calibration kit, prepare your ISP for calibration by following the steps below.

1. Define Speakers

For each theater or zone you will calibrate using Dirac Live® (except Headphones and Downmix), ensure that you have correctly defined each speaker's Size/Filter, multi-way parameters or manual equalization (refer to "Channel EQ" on page 19).

In case you decide to calibrate the subwoofers manually, you also have to define the Bass Management parameters such as Frequency and Slope (see "Individual Channel Adjustments" on page 16) as this won't be possible to do so after the Dirac calibration process unless you duplicate the Profile.

In case you want to use the bass management capabilities of the Dirac Live tool, being the Upmix mode or the Full Bass Optimisation mode that will be described in the next pages, you can skip the bass management adjustments and move to the next step.

2. Download and install Dirac Live® 3.x Calibration Tool Software

You can download a Mac or PC version of the software at https://live.dirac.com/my-account-download/ or on the StormAudio Client Portal (www.stormaudio.com).

Install the software on the laptop you will use to calibrate the ISP. Use the Dirac account credentials to log in the tool.

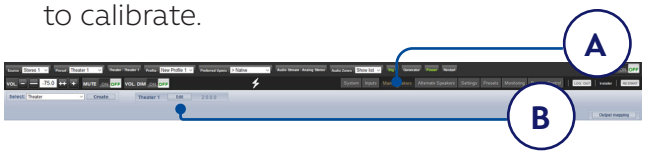
3. Prepare Calibration Hardware

StormAudio recommends using the UMIK-1 USB microphone that is part of the Microphone Mini Kit available in StormAudio's catalog, other hardware may be compatible with the Dirac Live® Calibration Tool. This guide will only cover UMIK-1 use case.

Connect the UMIK-1 to your laptop. Note the serial number on the microphone and navigate to https://www.minidsp.com/products/acoustic-measurement/umik-1. Enter the serial number to obtain your unique calibration files.

4. Choose Theater or Zone to Calibrate

From the Main Speakers (A) menu in the ISP web UI, EDIT (B) the theater or zone you wish to calibrate.



5. Select Base Profile

Select the profile which will serve as the basis for your Dirac Live® calibration from the dropdown menu.

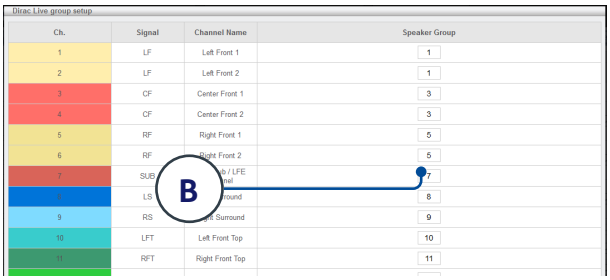
6. Setup Dirac Groups

Group separate elements of a single active loudspeaker together e.g. Low, Mid, and High components should be in a single Speaker group with the same index.

Depending on your bass management preference between fully automated through Dirac or manually adjusted with your own tool, the declaration of the subwoofers will be different. For manual bass management It

is recommended that if your theater includes multiple subwoofers, you manually correct levels, EQ, and delay for each and then group all of them together for the purposes of Dirac Live calibration. Click the SETUP button (A) beside the Dirac button.





Channels that should play together during calibration should share a group number (B).

7. Initiate Calibration

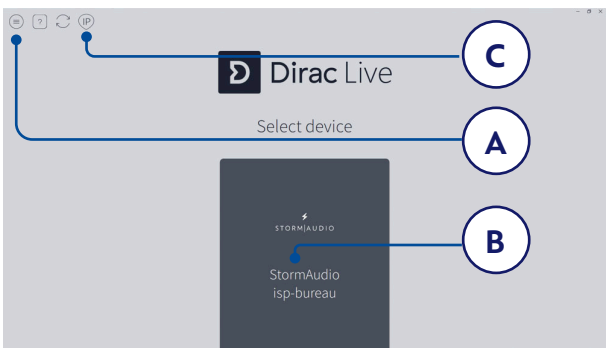
Press DIRAC (A) to ready the ISP for calibration.



A popup describing the process will be shown in the web UI. Verify that you are calibrating the correct theater or zone based on the correct profile. If not, cancel and return to step 4. Once verified, click Start New Calibration.

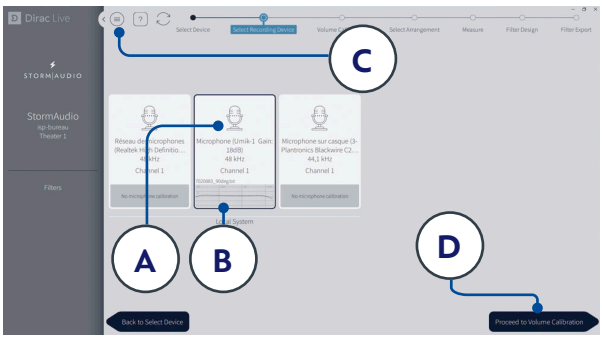
8. Return to / Open Dirac Live® Calibration Tool Software

Open the Dirac Live® software on your laptop and enter your Dirac Account credentials (A). It will scan the network and automatically find the ISP ready for calibration (B). If it does not, manually enter the IP address of the ISP (C). Select the device to calibrate (B).

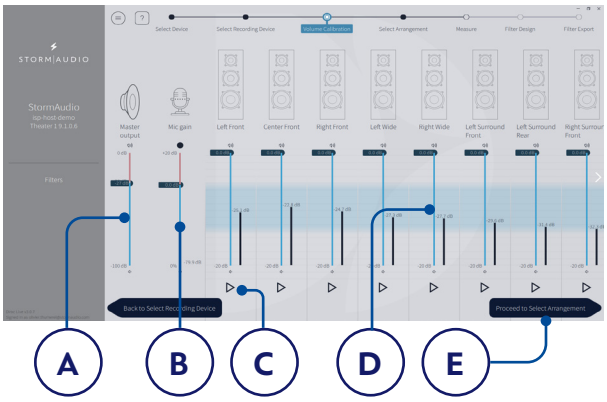


9. Configure Microphone

Choose the Recording Device UMIK-1 (A). Load the microphone calibration file (B) downloaded in step "3. Prepare Calibration Hardware" on page 25. Use "...90degree.txt" when placing the microphone in an upward facing direction. It is wise to save the project (C) along each step of the calibration in order to make recovery from interruptions easier. Also, measurements can be reused in order to regenerate a new filter design following adjustments to the target curve. Click Proceed to Volume adjustments (D).



10. Set Levels



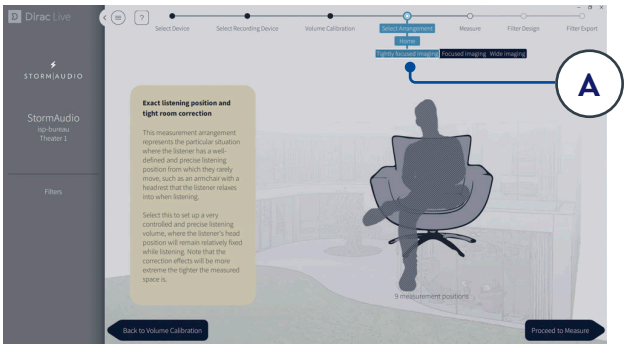
Now that the microphone is connected, ensure that the room is quiet. Adjust the Mic gain to 100% (B). Set the output volume (A) to a low level (-40dB for example). Start the test noise by pressing the PLAY button (C) on the first channel and adjust the Master volume to reach the blueish area in the channel's meter. For each channel, activate the test noise and correct the channel volume using the corresponding slider (D) so that the meter reaches the blueish area. All channels are automatically listed and subwoofers are automatically identified. Note that you should visualize here the Speakers Groups defined in

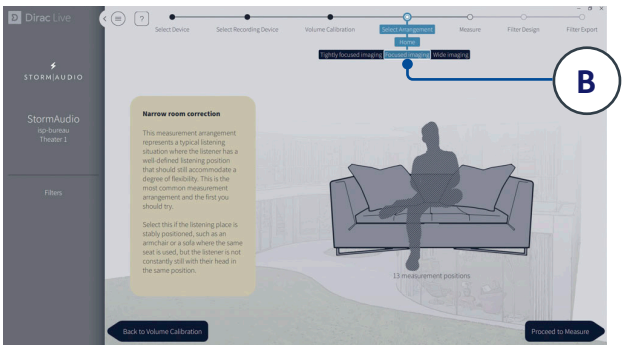
step 6. Click Proceed to Select Arrangement (E).

11. Measure Acoustic Response of Sweet Spot

Place the microphone in the exact sweet spot of the room at ear level to begin. It must be in the left-to-right center of the room since it will be used for loudspeaker distance and level calculations.

Select the arrangement you wish to define between tightly focused imaging (A), Focused imaging (B) and Wide Imaging (C) as illustrated below and described in the tool.



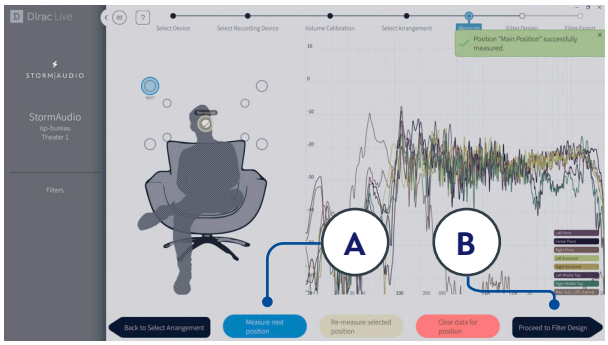




Start the measurement by pressing Proceed to Measure button (D). Keep the room silent during the process, the measurement waveform graphic is updated in real time.

12. Measure Acoustic Response of Remaining Positions

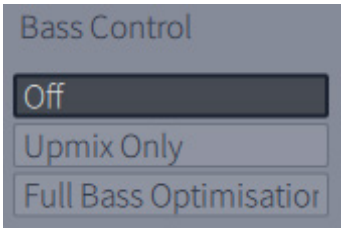
Once the first measurement is taken, that position will be checked indicating successful capture. Move the microphone to the next position of the diagram that you wish to measure. Repeat measurements for all listening positions (A). With each measurement, the waveform graphic will update.



Click Proceed to filter design (B) when done with all 9 or 16 additional measurements.

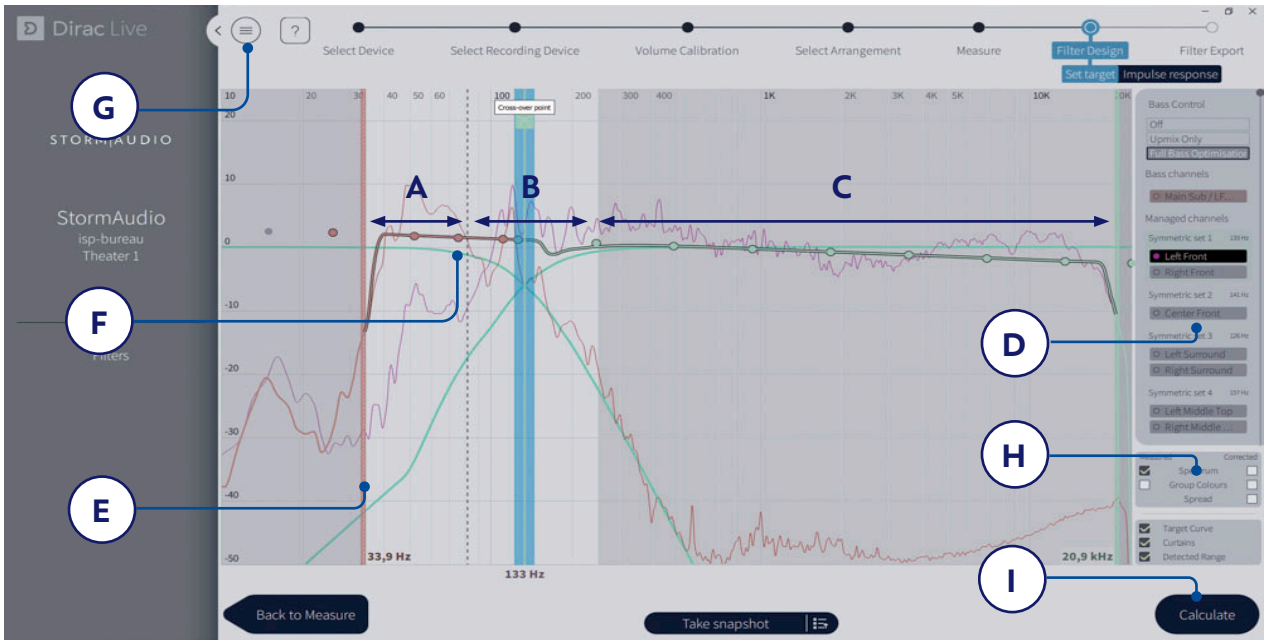
13. Filter Design

Dirac Live® 3.0.x offers the standard Dirac Live® 2.0 approach and the Bass Control module with two modes.



- **Off:** This mode provides the regular Dirac Live® design with per speaker target curve and standard Dirac Live® filters calculation, so without bass management. (so called Dirac Live® 2.0 mode)
- **Upmix Only:** This mode provides regular bass management filters with standard Dirac Live® filters design and calculation including each sub-woofer gain being scaled by 1/(numbers of sub woofers) to match the target curve.
- **Full Bass Optimisation:** Selecting this mode, the filter design will harmonise the sub-woofers and non-sub-woofers speakers in the lower frequencies using tailor made phase filters, delay and gains.

In the next parts, we will focus on the Full Bass Optimisation mode.



14. Crossover setting

Several magnitude response plots will be shown in the graph. These plots present the average magnitude response of the selected speaker(s) and sub-woofer(s). Select a crossover-frequency where both the high-range speaker and the subs-woofer(s) have energy. The cross-over frequency can be adjusted by dragging the cross-over bar.

- The crossover filters are highlighted when hovering over the cross-over bar. Illustrated above, the lower section (A) of the cross-over filter describes which frequencies are passed down to the sub-woofers. Section (B) describes which frequencies that are passed to both the sub-woofers and the high-range speaker, and the upper part (C) describes which frequencies that are passed to the high-range speaker.
- Note that each speaker group (D) can have an individual crossover frequency.

15. Target Curve

In Dirac Live® Bass Control, just as in standard Dirac Live® 2.0, the color of the sound is set through a target curve.

In standard mode the target curve is set per speaker, where the user can change the coloration of each speaker. When using Dirac Bass Control, however, the lower frequency material is often highly correlated between the speakers, and therefore it is more convenient to set the target per input-channel. This new concept of target curve is described below:

- The input target curve shows the coloration for the complex summation of the sub-woofer(s) and high-range speaker from the lower sub-woofer(s) cut-off frequency to the upper cut-off frequency for that chosen input channel. The lower section (A) mainly describes the coloration of how the sub-woofer(s) sums up together, where section (B) shows how the sub-woofer(s) and high-range speaker sums over the cross-over region. Section (C) describes the desired coloration for higher frequencies for the chosen speaker. Note that you can adjust the correction window by moving the curtain (E)
- The target curve defaults to a flat correction, which is the audio uncoloured and as close to the source sound as possible, which may not be what you prefer. Drag the target-points (F) on the target curve to change to coloration to your preferred taste. You can always add more points by right-clicking on the target curve and select "Add control point to".
- Dragging the curve upward above the 0dB level on the Y-axis boost the affected frequencies. Correspondingly, dragging the curve downward under the 0dB level attenuates them.
- Increasing the volume of the sub-woofers can be achieved by raising the part of the target curve under 100 Hz by a few dB. This is often wanted when watching movies.

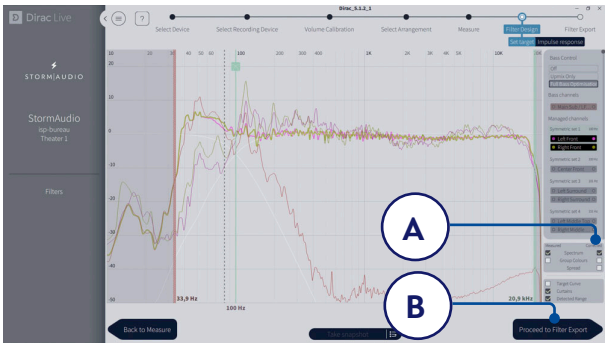
It is possible to save or load target curve through the menu (G). Good target curve design is beyond the scope of this document, but there are some key points to remember.

- Do not attempt to boost bass of a loudspeaker below its low frequency limit as this will only lead to high distortion and likely damage
- High quality speakers usually benefit from limiting the correction window to low frequencies.
- Ideal curves usually have a slightly downward slope. A loudspeaker may have a flat amplitude response on axis, but will rarely be flat off axis.

There are different possible viewing options available (H). Save the Target Curve through the Menu (G) for use in another channel or for other future use. Repeat for all speakers groups and then press Calculate (I) so the bass control filters got calculated.

16. Corrected response

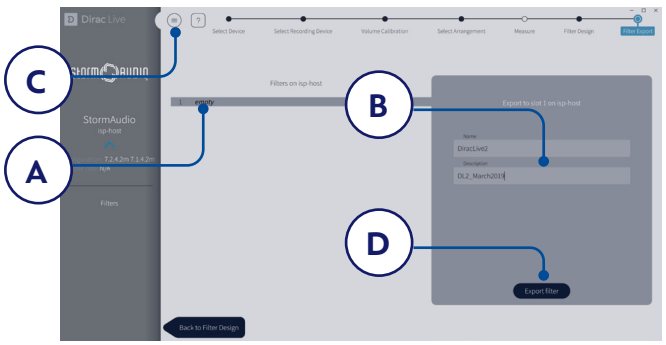
After the Bass Control calculation is done, select the "Corrected" check-box in the plot options (A) to show the resulting input magnitude response for the selected channel. The corrected curve should conform to the target curve, as illustrated below.



If satisfied by the result, press "Process to filter export" (B).

17. Export Filters to ISP

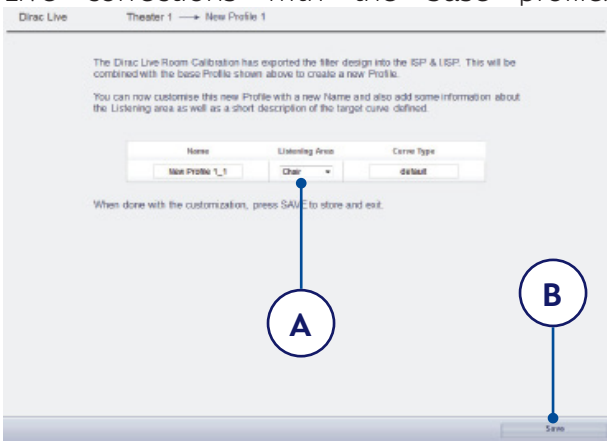
In this last step, filters created in previous steps are exported to the ISP and combined into the new profile selected "5. Select Base Profile" on page 25.



Select the "empty" slot 1 (A), give a name and a description to your new Dirac profile (B). Save your project for future use (C) before selecting Export filter (D) and return to the ISP Web UI.

18. Return to ISP web UI

A popup has been updated to confirm that you wish to combine the Dirac Live corrections with the base profile.



The Name and Description Target curve can be changed using Latin-1 table characters. We also recommend to select the correct listening area that you used to make the Dirac Live® corrections (A). Click save (B) to continue. For corrections made to a zone, options are not available. Simply click save.

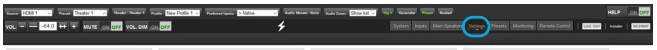
Note that each time you go through the Dirac Live® process, the former filter design gets replaced. Each time the calibration is run, a new profile is created with the new Dirac Live correction.

19. Return to Speakers Page

Now that you are back at the page where individual speakers can be edited, you will notice the new Dirac reference profile you named in the previous step is selected. New columns created indicate the calculated Dirac Delay and Dirac Level. No changes can be made to this reference profile. Should you wish to make changes, duplicate the profile, make desired changes to the duplicate, save changes to the profile and the theater. See "Profiles" on page 15.

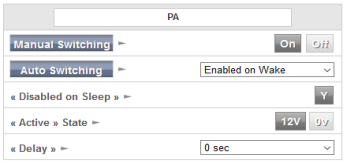
Settings

The ISP includes a variety of system wise settings that are set in this menu that govern behavior of the unit. Ensure these are set as required for easy operation of the ISP and any attached devices. These are only accessible to those with Installer level access or Expert User if assigned by the Installer.



Triggers

The ISP has 4 independent DC voltage triggers which can be configured to modulate the power/standby status of connected equipment such as projectors, source components, or amplifiers.



You may keep the default name for each trigger, or rename them to something more descriptive. Each trigger has the following options available:

- **Manual Switching:** Turn on to enable a button on the remote control interfaces that allows a user to toggle the trigger manually.
- **Auto Switching:** "Enabled on Wake" activates the trigger when the ISP is powered on from standby. It will not automatically deactivate the trigger when the ISP is placed into standby. "Enabled on Input" makes the trigger available in the Input Menu. When set to Y for an input, the trigger activates when that input is selected from a remote interface. See "9. Triggers" on page 13. "Enabled on Preset" makes the trigger available in the Preset menu. When a preset is selected in which a trigger is marked Y, the trigger is activated. Note that Auto Switching trigger behavior will override any Manual Switching behavior.
- **Disabled on Sleep:** Select Y if the trigger should deactivate when the ISP is placed into standby.
- **Active State:** Select whether the active state for the trigger is 12V or 0V.
- **Delay:** You may wish to set a delay of up to 8 seconds. Usually this is done if you are using triggers to activate multiple amplifiers. If all amplifiers power on at once, the inrush current could trip a circuit breaker. StormAudio amplifier triggers may be daisy chained so that only once the preceding amplifier is fully powered does the following amplifier initiate it's power up sequence thereby obviating the need for a delay (or multiple triggers) when using modern StormAudio amplifiers.

Parameters

- **Downmix zone**: define whether the dedicated downmix outputs feed an audio only zone or an audio video zone. When A/V, lipsync adjustment is available in that zone's remote control functions, and that zone's general delay can be set using the setting below in this page.
- **Audio Control Range MAX**: Set the maximum allowable level. +6dB (default), +3dB, 0dB.
- **Volume Dim Level**: To quickly attenuate the Master volume (but not mute it), a user can click Volume Dim. Set the level of attenuation here. Default is -20dB
- **Default Volume Level**: To ensure the ISP always starts up with a known Master volume level, it is possible to define a default volume level to which the unit should refer to at power up. You must select "On" to enable this feature. When "Off", the volume will be loaded with the Last volume level. Note that the Default level is common to all Theaters and Zones defined in the system.

HDMI

The HDMI outputs can be adjusted with two parameters.

- **HDMI output audio**: it is possible to provide the two channels downmixed version of the Main Theater audio stream to the screen(s) connected to the ISP output(s). By default it is turned to "Off".
- **On Screen Display (OSD)**: In the case the remote control doesn't provide feedback to the user such as for volume control adjustment, it is possible to enable the On Screen Display function of the ISP which will show status information in the screens. There are two active modes offering different on screen positions to fit the best way 16:9 or 21:9 screens ratio.

Audio/Video General Delay per AV Zone

Set the global lip sync delay for each theater, A/V, and Headphone zone here. Max value is 250 ms.

System Setup

To control the ISP using the iPad StormRemote App or Control Systems via TCP/IP, the Network should remain active at all times. Enable the Network Standby (On) to allow for such control. Note that the standby consumption will be higher.

Enable fast boot to substantially decrease power on time of the ISP at the expense of greater standby power consumption.

Input/Output Setup

With the Optional Module 16ch AES/EBU Digital Input installed, define whether the upmixing capability is enabled (<8ch input) or bypassed (>16ch), so Processed/Upmixed with your Preferred Upmix or only post-processed respectively. In case of Processed enabled, the channel mapping is fixed: L, R, C, LFE, Ls, Rs, Lb, Rb. In case of bypass mode, it is possible to adjust the routing of the incoming signals using the Input Mapping "EDIT" button. Note that Lb/Rb are equivalent to Lrs/Rrs of DCI specifications.

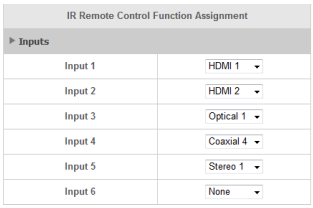
Front Panel

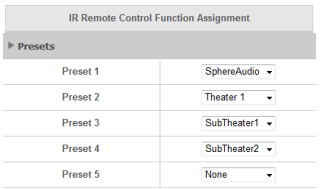
Settings that govern behavior of the front panel screen.

- **Active Brightness:** Brightness of the screen when the screen is actively being used.
- **Standby Brightness:** Brightness of the screen when not actively being used.
- **Standby Timeout:** Length of time elapsed between active use of screen and reduction of brightness to standby level.
- **Color:** Change the color of the display amongst white, magenta, orange, blue, red and green.
- **Zoom on Changes:** When ON, changes made via remote control (input, volume, etc.) will temporarily be shown in a large type so these changes can easily be read from across the room.

IR Function Assignment & Commands

Expand Inputs and/or Presets to assign up to 6 inputs and 5 presets to discrete buttons on an IR remote control. Note that many "universal" remotes also have the ability to cycle through all available inputs or presets so even if you have more than 6 or 5 respectively setup, they can still be accessed via IR.





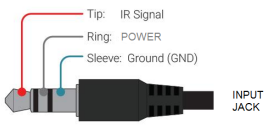
The ISP offers a front panel remote sensor. In case of a rack mount usage, it is also possible to use the back panel IR jack 3.5mm input to connect to remote IR sensor. It is also possible to daisy chain the input to the output jack to connect a IR blaster.

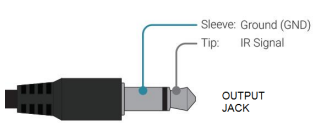
Group	Command name	Sytem	Command
POWER	POWER ON/OFF	16	12
	POWER ON	16	29
	POWER OFF	16	30
VOLUME	VOL UP	16	16
	VOL DOWN	16	17
	AUDIO MUTE	16	13
MAIN INPUT	INPUT NEXT	16	32
	INPUT NEXT	16	33
	INPUT 1	16	1
	INPUT 2	16	2
	INPUT 3	16	3
	INPUT 4	16	4
	INPUT 5	16	5
	INPUT 6	16	6
PRESET	PRESET +	16	47
	PRESET 1	16	67
	PRESET 2	16	68
	PRESET 3	16	69
	PRESET 4	16	70
	PRESET 5	16	71
PREFERRED UPMIX	Dolby Surround	16	91
	DTS Neural:X	16	92
	Auro-Matic	16	93
	Native	16	94
	Stereo Downmix	16	95

The ISP IR code table has been added to Harmony Logitech database. It is therefore possible to create Activities involving the ISP as the audio reproduction device. Check for **StormAudio** and **ISP Elite,** brand and device names respectively in the MyHarmony app. See MyHarmony website for more information.

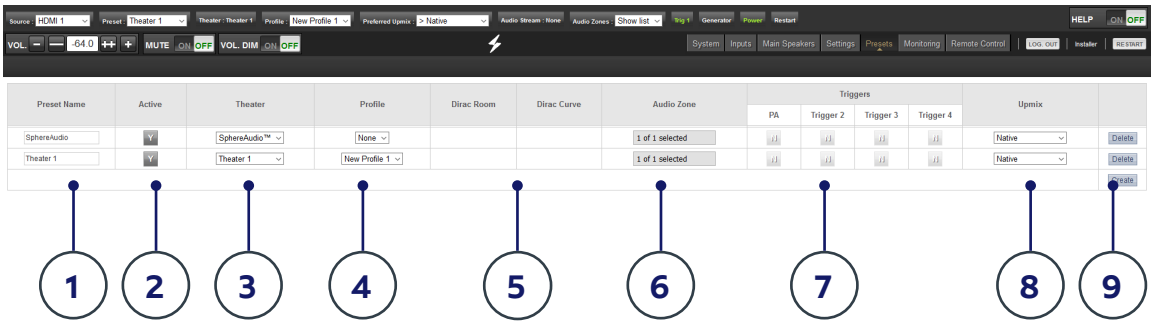
Do not connect directly to the Harmony Hub using a jack to jack cable as this can harm the ISP IR internal circuitry, use only IR receiver/transmitter.

For any other device interface, please verify carefully the pin-out of the jack receiver/transmitter below.





When using IR to control the ISP, we recommend activating the "Fast boot mode" defined in previous page to ensure there is no loss of IR commands while the ISP powers up, especially when using Logitech Harmony and the IR sequences it may generate.



Presets

Presets provide the installer with a way to group specific settings together into a scene which can be easily recalled by the end user from a remote control interface. By using presets, the installer can make use of the ISP - a highly complex and capable theater controller - extremely simple and enjoyable to operate.

Each preset includes the following settings:

1. Preset Name

Title the preset according to the usage case. For instance, if the entire family gathers together to watch movies, Movie Night. Max of 12 characters from Latin-1 table, no special character allowed.

2. Active

When Y, the preset shows up in the list of selectable presets on the remote control. When N, the preset information is retained, but not available to select from the remote control.

3. Theater

The preset must include which theater to play. The list includes Theaters, Child Theaters, and SphereAudio. It does not include zones.

4. Profile

Each theater can have multiple profiles to choose from. Select the profile which will be loaded by default when the preset is chosen.

5. Dirac Room / Dirac Curve

If the theater is calibrated with Dirac Live®, the listening area and curve description you entered in "18. Return to ISP web UI" on page 29 will be indicated.

6. Audio Zone

You may choose to route audio to 0 or more zones as well. When zones are checked, they are accessible and controllable from the remote control when this preset is selected.

7. Triggers

When triggers are set to "Auto Switching: On Preset" as described in "Triggers" on page 30, they can be assigned to presets here.

8. Upmix

Though the upmixing behavior is accessible from the remote control at all times, you may set the default upmix for the preset here.

9. Delete / Create

Delete any unused presets by clicking Delete in the correct row. Create a new preset by clicking Create.



Monitoring

Accessing the Monitoring page powered by StormMonitoring, you will get detailed information about the operation of the ISP.

1. Product Information

Model, serial number, IP address and firmware version information are listed.

2. Basic Status

Indicator and control over On/Standby, Mute, and system restart as well as malfunction indicator.

3. Temperature / Fan Speed

Two indicators show the current temperature (black line) and rear fan speed. Orange markers indicate current settings for system warning and critical high temperature.

To view items 4-6, click the VUMeter button to expand the page.

4. Decoder

Visualize the realtime level of audio channels being received by the decoder. For example, if 2 channel PCM is being received, you will see activity on LF and RF.

5. Outputs

Visualize real time audio output of each output channel on the rear panel. For instance, if 5.1 audio is being received and the current upmix is Native, you will see activity on LF, CF, RF, SUB, LS and RS channels. Useful for verifying if audio should be present on an output.

6. HDMI/DOWNMIX

Visualize audio output on the HDMI outputs and XLR downmix outputs.

7. Logging

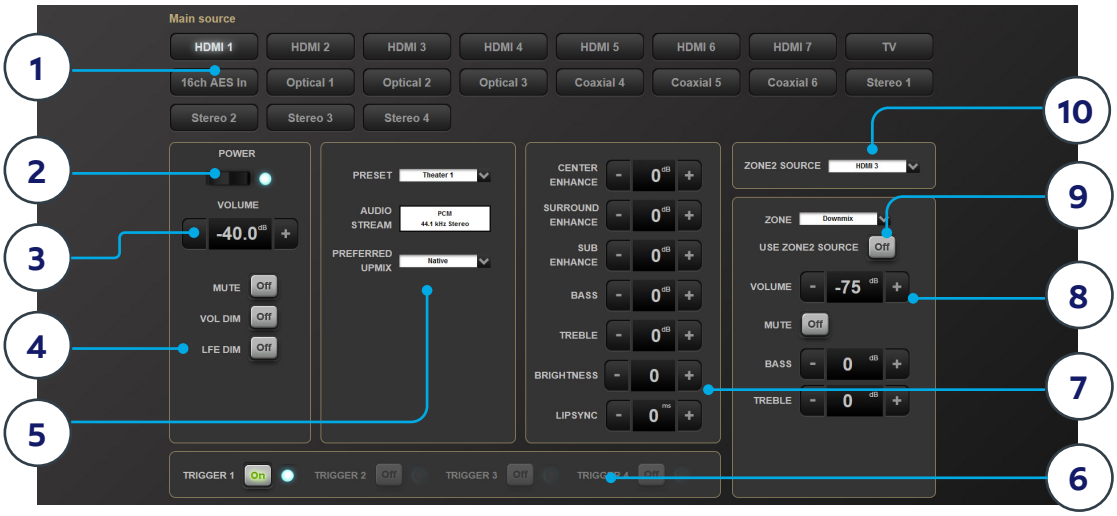
Logging is a useful feature to help identify strange behavior with potential problems caused by heat. Click the graph button to show a line chart of either temperature or fan speed over time. Use the options in the popup to choose timeframe, zoom or move around the plot or export the image.

8. Details

Click to expand a window showing detailed information about audio and video coming into the player including format, resolution, color space, copy protection and more. Important information about the video transmission is also detailed. Compare this information against the compatibilities of connected hardware to diagnose errors in picture or sound. Further, it shows real time health of various power supplies in the unit which power specific modules. This can be a useful tool to diagnose features that are malfunctioning.

9. Thresholds settings

It is possible to define your own alert threshold for the temperature of the unit. Click on the Gear icon and adjust these thresholds. Default is 55°C and 60°C. When the temperatures are reached, messages will be shown in the various interfaces.



Web UI Remote Control

Using the recommended web browser on your laptop, one can access the remote control. When not logged in as an expert user or installer, the remote is accessible as well, but the header (above Main Source) is not visible. The web UI remote control is best used with a computer or tablet. It can be used with a mobile phone, but items do not properly fit the screen. iPad users can also download the iPad app from the App Store (see next page).

1. Input Select

Any inputs enabled on the Inputs setup page will appear here titled according to your setup. See "Input Settings" on page 12. The currently selected input will be highlighted in gray. Tap any input to select it.

2. Power

Toggle the standby/ON status by pressing this button.

3. Main Volume

Adjust the volume in the currently selected theater by pressing the +/- buttons. One press is a 1dB increment.

4. Mute / Dim / LFE Dim

This section contains easy access to select features.

- **Mute**: Cuts sound to the currently selected theater.
- **Vol Dim:** Immediately attenuates volume by the amount specified in "Parameters" on page 30.
- **LFE Dim:** In some cases, movies encoded with Dolby may have bass that appears to be too loud. Use LFE Dim to attenuate the LFE channel by -10dB.

5. Preset & Audio Decoder Options

- **Preset:** Use the Preset dropdown menu to select the desired preset. Remember that Preset includes activating a specific theater, so if your ISP includes multiple theaters, you should have presets available for each. See "Presets" on page 32.
- **Audio Stream:** Indicates real time information about the incoming audio of the selected source.
- **Preferred Upmix:**
  - Native plays audio back in the recorded format and/or channel count according to the source material.
  - Stereo Downmix will downmix surround material to 2 channel played through front left and right (and sub if loudspeakers are configured as Small or Large and Sub) loudspeakers only.
  - Dolby Surround, DTS Neural:X and Auro-Matic will force any legacy surround audio into one of these 3 formats. Immsersive source audio will be rendered natively and this selection will be grayed out.
- **DRC:** Dynamic range control for Dolby and DTS streams. On will reduce the range of volume levels on the soundtrack by compressing the loudest sounds. Auto will engage DRC when directed to by the soundtrack.

6. Triggers

Any triggers configured for Manual Switching (see "Triggers" on page 30) will have a button available here. Clicking one of these buttons will toggle the trigger and therefore the connected device.

7. Temporary Audio Adjustments

Even though you may have meticulously calibrated the theater in Main Speakers settings, some material may sound best with slight adjustments. Adjustments here are temporary and reset to 0 with each change of Preset.

- **Center Enhance**: Adjust the level of the center channel between -6 and +6dB in 1dB increments.
- **Surround Enhance**: Adjust the level of the surround channels between -6 and +6dB in 1dB increments.
- **Sub Enhance**: Adjust the level of the subwoofer channels between -6 and +6dB in 1dB increments.
- **Bass**: Tone control to adjust the bass level in the entire theater using both the subwoofer and main channels between -6 and +6dB in 1dB increments.
- **Treble**: Tone control to adjust the treble level in the entire theater between -6 and +6dB in 1dB increments.
- **Brightness**: Tilt the tonal balance of the presentation towards darker timbre (negative figures) or brighter timbre (positive figures).
- **Lipsync**: Temporarily adjust lip sync delay to accommodate some sources. Note that this is also reset every time a new input is selected, so if you find yourself regularly setting this to the same figure, adjust the delay either per source ("8. AV Delay" on page 13) or for the entire theater ("Audio/Video General Delay per AV Zone" on page 30).

8. Zone2 Control

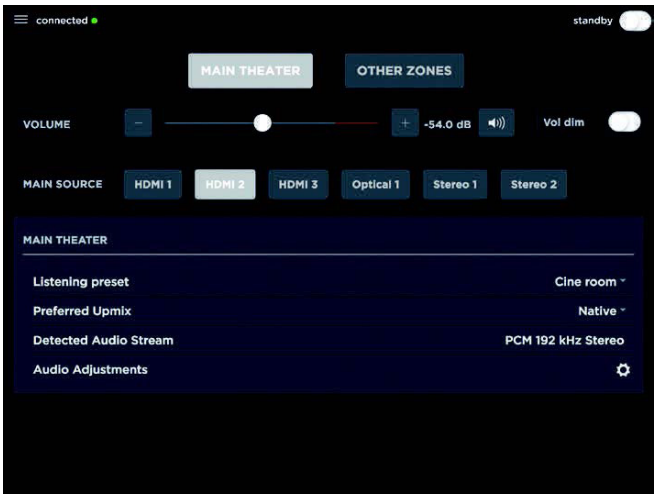
Within the configuration for each preset, you may select auxillary zones which may be enabled. If zones are enabled for the currently selected preset, you may choose them from the dropdown menu and individually adjust volume, bass, treble, EQ (except for Downmix zone), mute for each A/V and Headphone zones, also include a temporary lipsync adjustment. A secondary input can be selected for the Zone2 auxiliary audio zones (10), different from the Main Theater input. For each Zone it is possible to then select either the Secondary Zone2 source or the source currently playing in the Main Theater (9).

iPad App

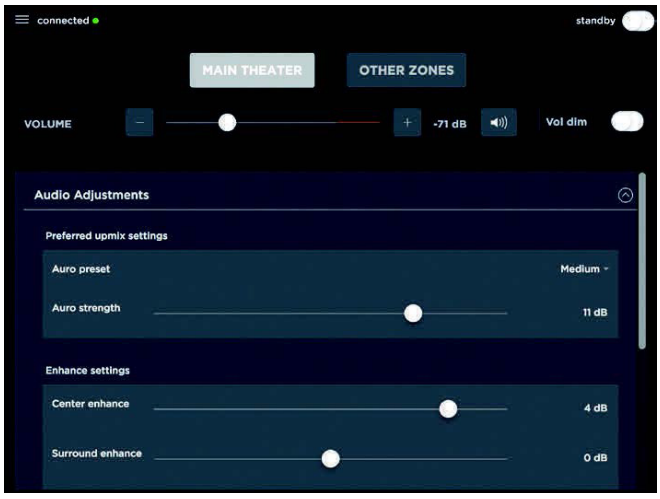
Apple iPad users can download the app called StormRemote from the App Store and control their ISP using features identical to those found in the web UI remote control.
https://itunes.apple.com/us/app/stormremote/id1216593433?mt=8

Once the app is downloaded, enter the IP address of the player in the setup screen and press Connect.

The MAIN THEATER control is the default view. Selecting OTHER ZONES icon will propose all control options for the Zones.



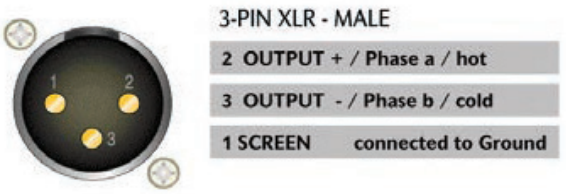
In each view mode, you can open up related Audio Adjustments.



Wiring Recommendations

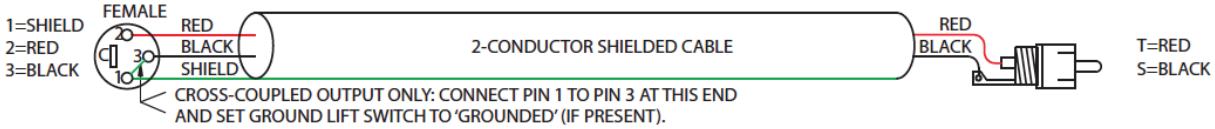
1. XLR pin out

To connect the ISP to an amplier, you must use male to female XLR cables. The connector in the ISP is a Male XLR. We recommend up to 3m cables.



2. XLR to RCA unbalancing cable

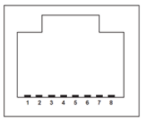
In some cases, it might be required to connect to ampliers with unbalanced inputs. In such case, the wiring should be done as shown.



3. AES/EBU RJ45 connector pin out

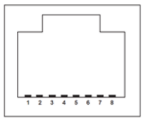
The Multichannel Digital Inputs and Outputs options use RJ45 cables to carry the AES/EBU signals. The pinout of the RJ45 connectors on the ISP is described herewith.

Ch1 to 8



Pin	Signal	Description
1	+	Pair 1
2	-	Pair 1
3	+	Pair 2
4	+	Pair 3
5	-	Pair 3
6	-	Pair 2
7	+	Pair 4
8	-	Pair 4

Ch9 to 16



Pin	Signal	Description
1	+	Pair 5
2	-	Pair 5
3	+	Pair 6
4	+	Pair 7
5	-	Pair 7
6	-	Pair 6
7	+	Pair 8
8	-	Pair 8

4. USB ports

There are two USB ports available used for StormMonitoring microphone connection and USB upgrade when no network access is available. The 2x ports can be used to provide 5V power supply in the limit of 500mA maximum total consumption for the two ports.

Specifications

Audio

Audio Formats	up to 24ch (13.1.10), 192 kHz Dolby Atmos with Enabled Speakers, DTS:X Pro, IMAX Enhanced*, Auro3D All Legacy codecs SphereAudio for headphones
Audio Inputs	16ch (AES/EBU) optional 4x RCA analog (7.1 or 2.0) 1x XLR analog (stereo) 3x Coaxial (SPDIF) 3x Optical (Toslink)
Streaming	ROON Ready
Post-Processed Outputs	up to 32ch, 48 kHz
Audio outputs	16ch analog (XLR) default 24ch or 32ch analog (XLR) optional 32ch digital (AES/EBU or AVB) optional 1x XLR Stereo (Downmix)
Bass Management	Multiple subwoofers Per channel crossover Standard and Expert Up to 6 Bass Zones
Multi-way speaker XO	Up to 4-Way speakers 6, 12, 18, 24, 36, 48 dB/Octave, Linkwitz-Riley and Butterworth
Equalization per Channel	up to 20 band PEQ REW plugin
Calibration	Dirac Live with Bass Control module

*via firmware upgrade Q2 2021

HDMI

Inputs / Outputs	7 / 2, matrix*
Input Specs	7 ea. HDCP2.2 / HDMI2.0
Output Specs	2 ea. HDCP2.2 / HDMI2.0 ARC/eARC on HDMI Out1 On Screen Display
Max Resolution	UHD, 4K 60fps 4:4:4 8bpc 18 Gpbs all ports
HDR	HDR10, HLG & Dolby Vision
Deep Color Support	12bpc
CEC	Pass-through*

*via firmware upgrade end Q2 2021

Power Supply

Type	Universal
Range	100 to 240V

Control

Control Modules	Crestron Control4 RTI Savant ELAN
IR	Front panel sensor Rear panel I/O, jack 3.5mm
DC Trigger	x4, jack 3.5mm Software assignable to inputs, presets, on/standby or manual operation
Applications	WebUI: Setup & remote control iOS App: remote control
Network	100 Mbps Ethernet

Options

UMIK-1 Microphone	USB microphone. Allows for Monitoring, Calibration and RTA function.
16 to 24ch XLR Output	Extra 8 channel XLR output module (24ch total)
24 to 32ch XLR Output	Extra 8 channel XLR output module (32ch total)
16 to 32ch XLR Output	Extra 16 channel XLR output module (32ch total)
32ch Digital AES Output	32 channel AES/EBU output module (4x RJ45)
32ch Digital AVB Output	32 channel AVB output module (1x RJ45)
16ch Digital AES Input	16 channel AES/EBU input module (2x RJ45) DCI compatible

Weight and Dimensions

(net product)

L x W x H (cm / inches)	49,00 x 47,90 x 19,10 19.29 x 18.86 x 7.52
Weight	13,10 KG | 28.80 LBS

Installation Notes

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Revision 2.0 *12-11-2020*