

# OWNER'S MANUAL



ISP CORE, ELITE MK3 & EVO  
Immersive Sound Preamp/Processors

ISR FUSION 20  
Immersive Sound Receiver



STORM|AUDIO

VERSION 7.0

firmware 4.7r0 and onward

## Important Safety Instructions

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The book with exclamation mark symbol is intended to alert user that it is recommended to read this owner manual before installing and powering up the product.



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.


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



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.



The wave symbol next to the voltage information (100V-240V 50/60Hz) is intended to alert the user that the unit should be powered by an alternating current (AC) source, so called mains power outlet, of the electrical installation.

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. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. The apparatus weight exceeds 13 kg, could drop and causes serious injuries. Move the apparatus with care.
14. 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. 
15. The apparatus weight exceeds 13 kg, could drop and causes serious injuries. Move the apparatus with care.
16. 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.
17. Do not open. No user serviceable parts inside. Refer servicing to qualified service personnel.
18. To completely disconnect this equipment from the AC mains, disconnect the power supply cord plug from the AC receptacle.
19. The mains plug of the power supply cord shall remain readily operable.
20. 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.
21. 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.

## Regulations

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### FCC and IC compliance notice

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

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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

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

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

### CE declaration

Immersive Audio Technologies hereby declares that this equipment is in compliance with the EMC 2014/30/UE Directive, LVD 2014/35/UE Directive, ErP 2009/125/CE Directive and RoHS 2011/65/CE Directive.



### WEEE Notice

The Directive on Waste Electrical and Electronic Equipment (WEEE, DEEE 2012/19/UE) resulted in a major change in the treatment of electrical equipment at end-of-life.

The purpose of this Directive is, as a first priority, the prevention of WEEE, and in addition, to promote the reuse, recycling and other forms of recovery of such wastes so as to reduce disposal.

The WEEE logo on the product or on its box indicating collection for electrical and electronic equipment consists of the crossed-out wheeled bin, as shown here.



This product must not be disposed of or dumped with your other household waste. You are liable to dispose of all your electronic or electrical waste equipment by relocating over to the specified collection point for recycling of such hazardous waste. Isolated collection and proper recovery of your electronic and electrical waste equipment at the time of disposal will allow us to help conserving natural resources. Moreover, proper recycling of the electronic and electrical waste equipment will ensure safety of human health and environment. For more information about electronic and electrical waste equipment disposal, recovery, and collection points, please contact your local city center, household waste disposal service, shop from where you purchased the equipment, or manufacturer of the equipment.

## RoHS Compliance

This product is in compliance with Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## StormAudio Limited Warranty

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### Liability

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

### Terms of 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 Settings" on page 14.

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 and to make sure to add means to protect the front panel if you are unable to use the original lens protective film, such as with a cotton cloth or any soft material. In the event of any damage observed upon its return, all the reservations must be made by the recipient with the carriers.

## Technical Support

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### Check resources on our website

In case you need support, please consult our website <https://www.stormaudio.com/technical-support> to check our Download, FAQ, Tutorial and Webinar sections. You will find manuals, explanatory videos and more resources that could help you. You can also check our interactive Knowledge Base Center: <https://www.stormaudio.com/knowledge-base>.

### Ask your reseller

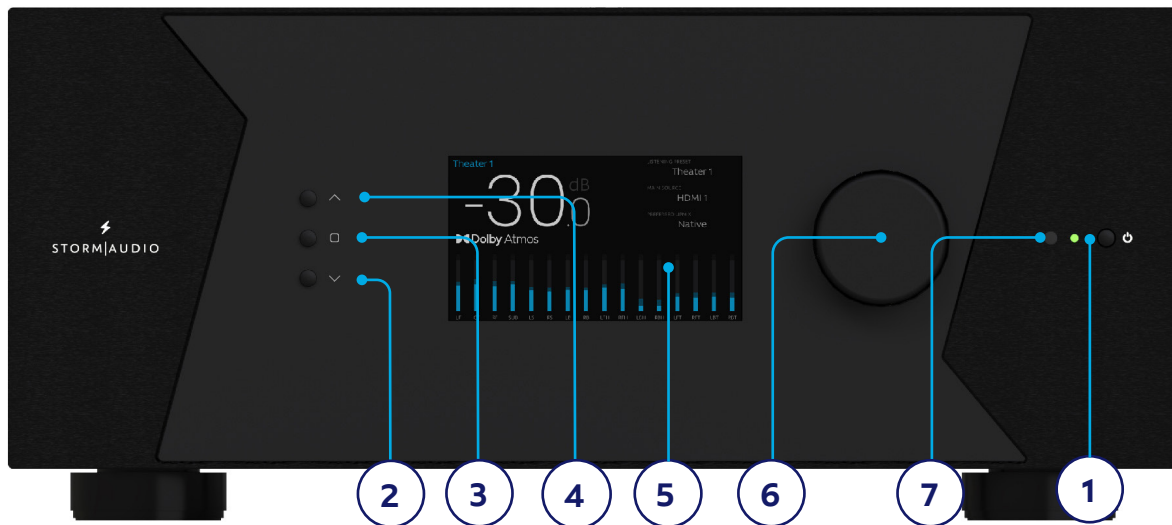
If you require technical support on your StormAudio products, or if you have any product related questions, please first contact your reseller.

### Open a ticket on our Help Desk

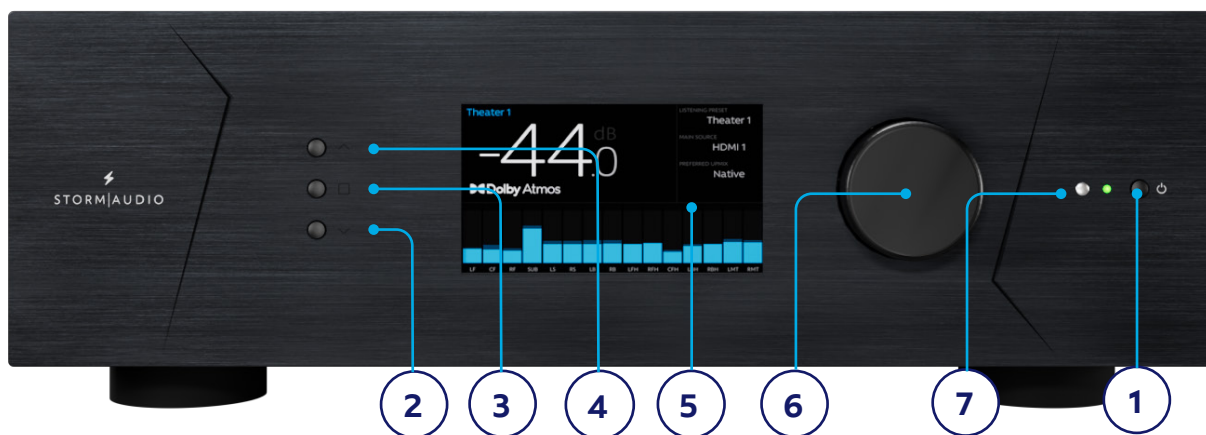
If your reseller or the resources cannot help you, please open a ticket on our Help desk: <https://www.stormaudio.com/help-desk>. Provide as many information as possible about your product, your setup, the devices used as well as steps to reproduce the problem. Ideally when possible, download the Configuration and Logs files from the System page and add them to the ticket.

## Table of Contents

Important Safety Instructions .....	2	Multi-way Speaker/Subwoofer Setup.....	24
Regulations .....	3	Channel EQ .....	25
StormAudio Limited Warranty.....	4	Room EQ Wizard integration .....	26
Technical Support.....	4	Bass Management.....	27
Front panel.....	6	Child Theater / Sub Theater .....	30
Rear panel.....	8	Flexible Signal Routing.....	31
General.....	10	Dirac Live® .....	32
Welcome.....	10	Presets .....	37
Included In The Box.....	10	Settings .....	38
Features .....	10	HDMI.....	38
Shipping Box and Packing Material.....	10	IR Function Assignment & Commands .....	39
Installation .....	10	Input/Output Setup .....	40
Ventilation.....	10	Parameters .....	40
Connecting to A/C Power.....	10	System Setup.....	41
Connecting to Network.....	10	Front Panel.....	41
Connect IR Interface (Optional).....	10	Triggers .....	41
Connect Source Components.....	11	Zone Settings .....	42
Connect to Display .....	11	Monitoring.....	43
Connect Audio Outputs .....	11	Web UI Remote Control.....	44
First Run.....	11	Independent Remote Control .....	46
Power On.....	11	Disposal Of Used Batteries .....	46
Access the Home Page via Hostname .....	11	StormRemote App.....	46
Access the Home via direct IP address.....	11	Front panel display control .....	47
Home Page and configuration modes.....	12	Theater / Zone playback info .....	47
Default Passwords .....	12	Adjustment panel .....	47
Web UI Header .....	13	Widgets .....	47
System Settings .....	14	Settings.....	47
Input Settings.....	16	Wiring Recommendations.....	49
Room Ready.....	17	Acknowledgements.....	50
Building a Theater - Defining Channels.....	18	Specifications - ISP ELITE .....	51
Audio Profiles .....	20	Specifications - ISP EVO.....	52
Output Mapping.....	20	Specifications - ISP CORE 16 .....	53
Individual Channel Adjustments.....	21	Specifications - ISR FUSION 20 .....	54
Test Tone Generator.....	23	Specifications - HDMI outputs - all modes.....	55



ELITE FUSION



CORE EVO

## Front panel

### 1. Power Button

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

### 2. Down

Use this button to change from Theater/Zone page or navigate through the Menus.

### 3. Home / Access

Use this button to access or exit the Adjustments area and go back to Home page.

### 4. Up

Use this button to change from Theater/Zone page or navigate through the Menus.

### 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 41.

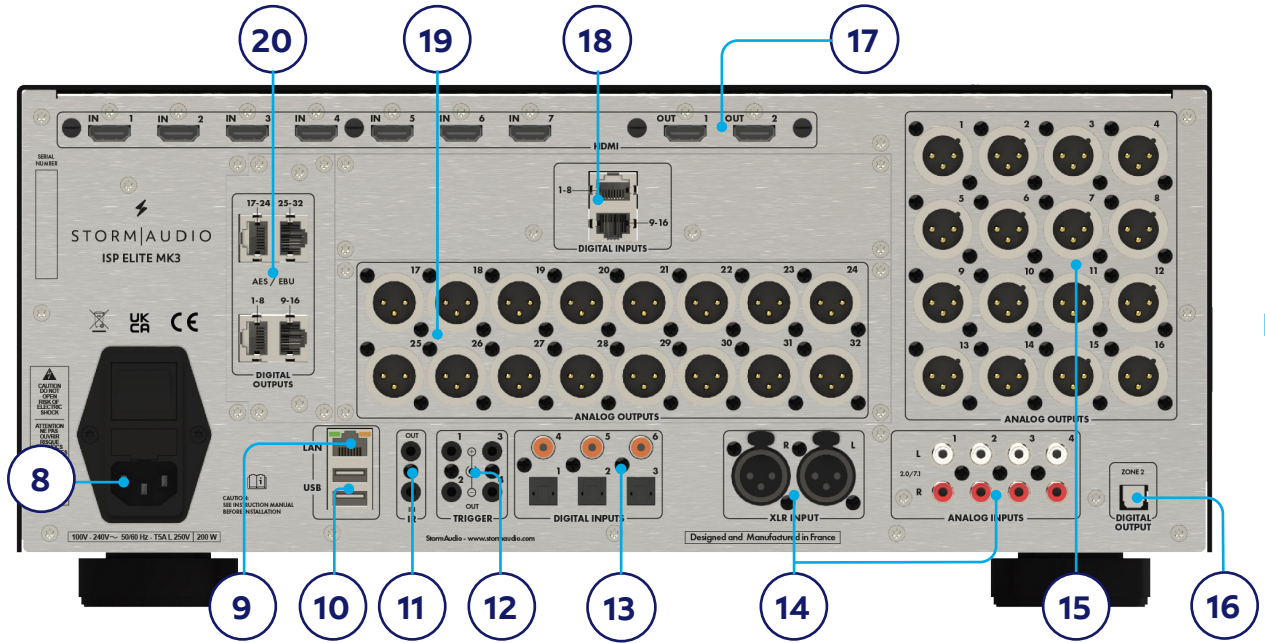
### 6. Volume

The default state for the knob is to control volume in the selected theater. Press the knob to mute audio. When in the Adjustments area, you can use the knob to change its value. Press to validate.

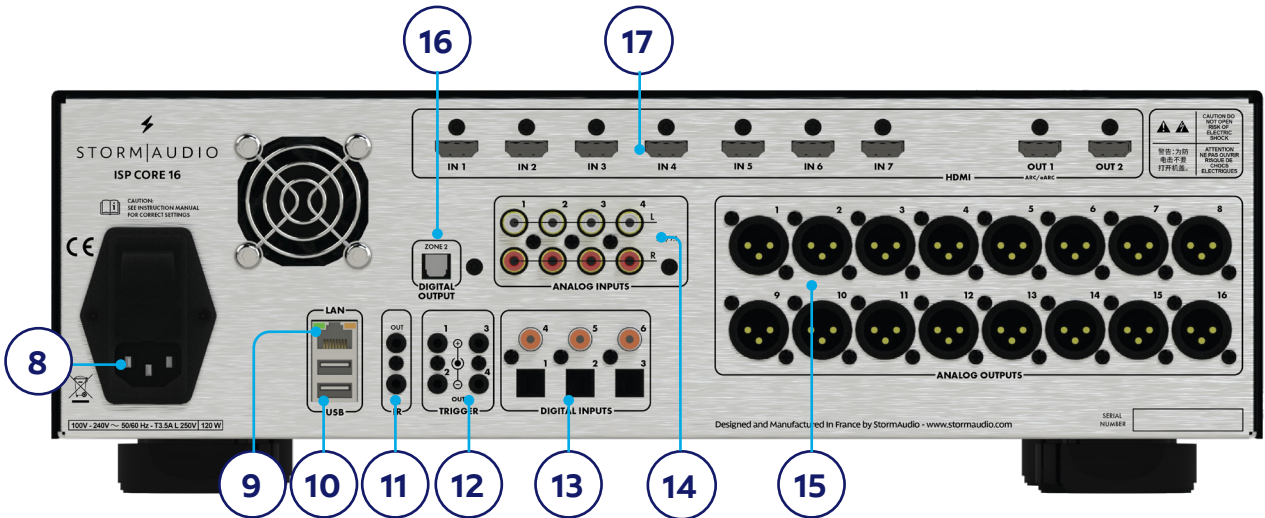
### 7. IR Receiver

An InfraRed receiver is located next to the power button for IR remote control usage.

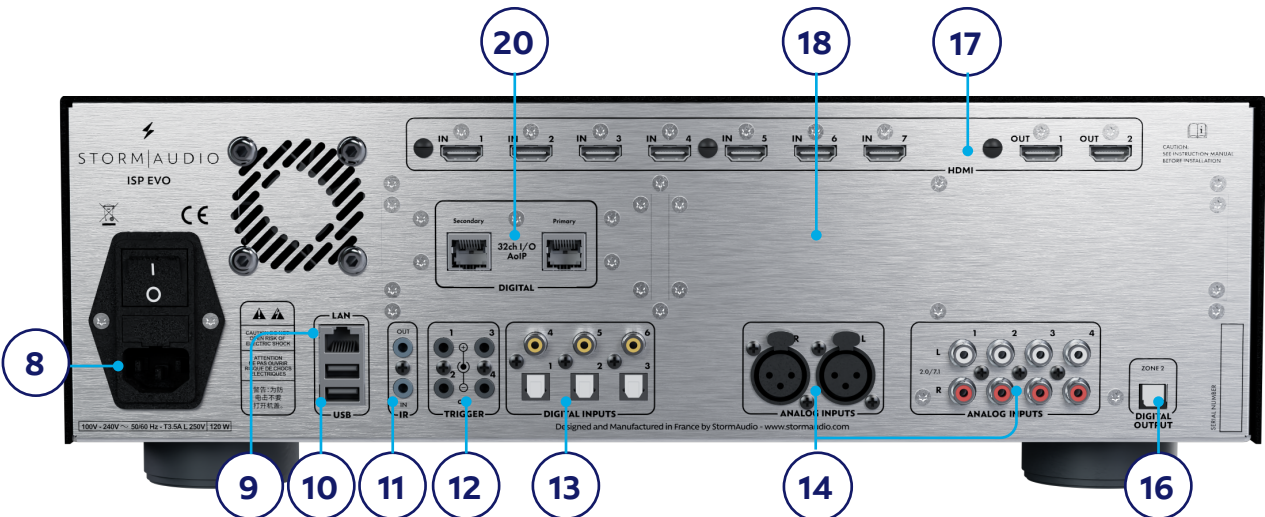
# ISP Immersive Sound Processor



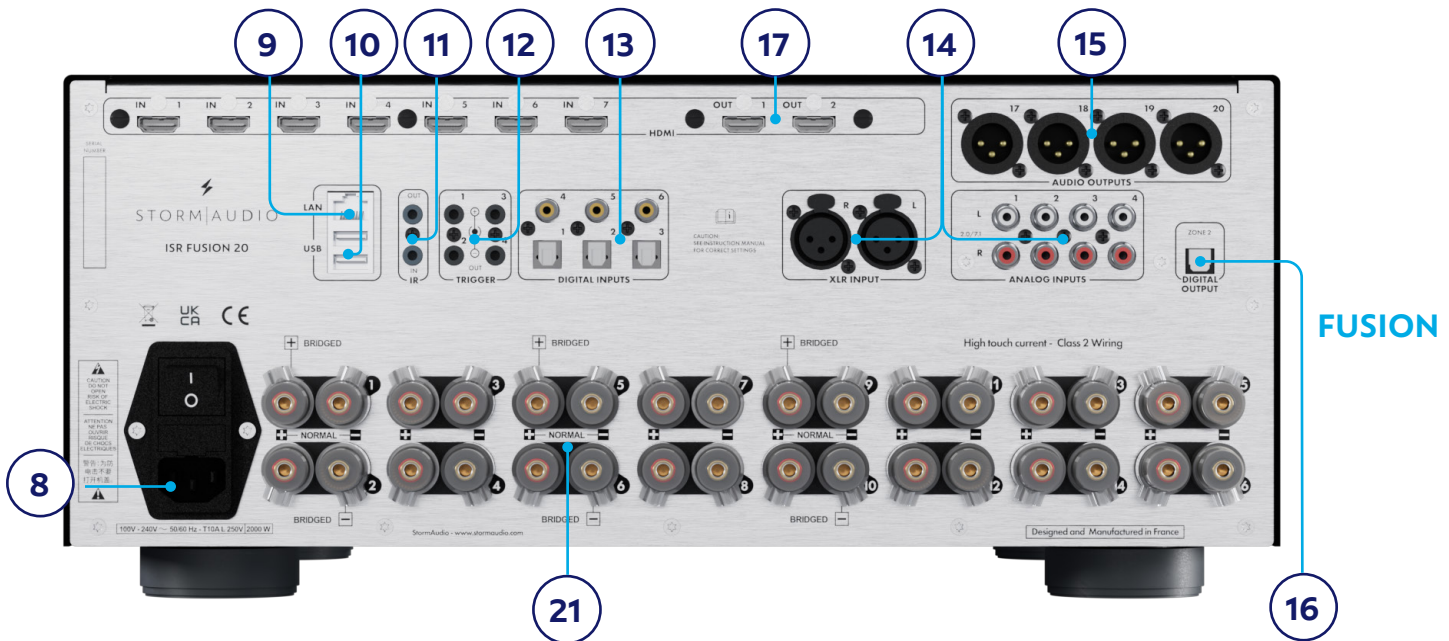
ELITE



CORE



EVO



## Rear panel

### 8. Power Inlet / Fuse Socket / Mains Switch

AC Mains power is applied to the ISP/ISR here. Ensure the fuse installed matches requirements of your locality. The rear panel switch must be ON for the unit to operate. We recommend turn OFF from Standby mode to avoid any plop in your speakers.

### 9. Network

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

### 10. USB

Two USB ports are provided for USB microphone (RTA function) or for service (5V/500mA max).

### 11. IR

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

### 12. Trigger Out

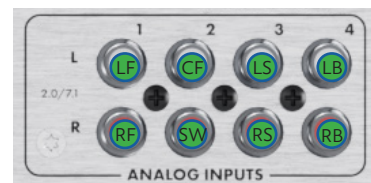
Four separate trigger outputs are provided. See "Triggers" on page 41 for configuration information. Each trigger is 12V / 150mA max. and must not be used for passive daisy chaining.

### 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 input (ISP Elite and Evo, and ISR Fusion models) are provided and adjusted on the "Input Settings" on page 16 as 4x stereo pairs, 3x stereo pairs with XLR input or 1x 7.1 input. When connected as a 7.1 input, the channel assignment is as follows, clockwise from top left: LF, CF, LS, LB, RB, RS, SW, RF.



### 15. Analog Outputs

XLR Analog Outputs are provided by default: sixteen on ISP Elite and Core models, four on ISR Fusion model. They are fully assignable to theaters or zones. See instructions starting with "Building a Theater - Defining Channels" on page 18. Outputs may also be remapped ("Output Mapping" on page 20) and refer to "1. XLR pin out" on page 49 for the connector type.

# ISP Immersive Sound Processor

## 16. Zone2 Optical Output

An optical Toslink output is available providing either 2 channel downmix output (Zone2 source), main Theater downmix or 2 additional channels for the Main Theater (CORE 16+ and ELITE 16 for up to 18ch Theater). To configure, see "Parameters" on page 40. Downmix may be enabled for selected presets. See "Presets" on page 37.

## 17. HDMI

7 HDMI inputs and 2 outputs are available, with full support of HDCP 2.3 / HDMI 2.1 requirements up to 40 Gbps speed.

Depending on the mode chosen in the "Settings" on page 38, Outputs can be mirrored, independant with HDMI 2 Output linked to an Audio Video Zone or independant Pass-Through. HDMI Output 1 supports eARC and ARC audio return channel from compatible TVs. HDMI Output 2 supports ARC only.

Support of Dynamic HDR modes with HDR10, HDR10+, HLG and Dolby Vision® compatibility.

Finally OSD for on screen information feedback is available on both outputs. See "HDMI" on page 38.

*Note: do not use USB embedded 5V to supply optical fiber cables.*

## 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 on Elite and Evo models. See "Settings" on page 38.

## 19. 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 Elite.

## 20. Optional Digital Inputs/Outputs

Two optional modules are available to support various digital audio interfaces on Elite and Evo models. One module with 32ch outputs in AES/EBU format over 4x

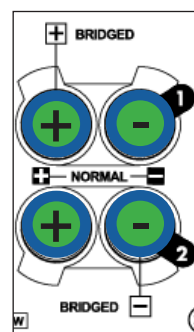
RJ45 connector and one with 32ch Inputs/Outputs in AES67/Dante Audio over IP format over 2x RJ45. See "Settings" on page 38.

## 21. Amplified Outputs

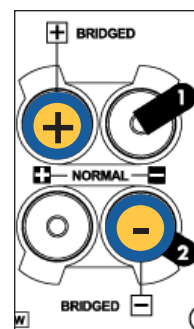
The ISR Fusion 20 offers 16ch of amplification with 150W (8ohm) in Single Ended (SE) mode and 500W (8ohm) in Bridge Tied Load (BTL) mode. The latter offers more power at the cost of reducing the number of channels available, as using two SE channels per BTL output. Up to three BTL channels (1/2, 5/6 and 9/10) can be defined during the Speakers layout configuration in section "Building a Theater - Defining Channels" on page 18.

Single Ended mode and Bridge Tied Load require different wiring schemes. Please refer to below illustrations to correctly wire your system. Channels 1/2 are shown, but it is applicable to 5/6 and 9/10 too.

*Note: make sure to know the nominal impedance of your speakers as this will be needed during the Speakers Configuration phase. See "Building a Theater - Defining Channels" on page 18. In BTL mode, the minimum impedance is 4 ohms. If lower impedance are used, the current limitors may be triggered, cutting the sound for few seconds and protected the amplifier from damage.*



Single Ended wiring



Bridged Tied Load wiring

## General

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### Welcome

Thank you for your purchase of a StormAudio ISP or ISR product. It 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 16, 18, 20, 24 or 32 channels depending on the model. Modular nature of ISP Elite and Evo models 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 with Safety information
- Power cable for your locality
- Rack mount ears (T20 Torx screwdriver to mount)

### Features

StormAudio ISP or ISR includes the following features:

- 7 Input / 2 Output HDMI switch, 3 TOSLINK and 3 RCA S/PDIF digital inputs plus software configurable analog inputs (4x RCA and 1x XLR Stereo on Evo/Elite/Fusion models)
- 16, 18, 20 or 32 software configurable outputs (analog or digital) + 2ch Optical Zone2 output
- 16 amplified outputs (ISR Fusion)
- Up to 32 configurable digital inputs (ISP)
- Mandatory network connectivity for control, firmware updates and Roon streaming.
- 4 programmable trigger outputs
- IR control (front sensor or back panel jack)
- Available control system driver modules for 3rd party automation systems (Download Center at <http://www.stormaudio.com>)

### Shipping Box and Packing Material

Please keep the original shipping box and all packing material. To protect the front panel, wait for installation completion to remove the protection film and keep it for further repacking. 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.

## Installation

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Prepare your installation site by following the steps below: consult page "Rear panel" on page 8 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/ISR to avoid electrical discharges and damages, especially for HDMI interfaces.
4. Network should be running a DHCP server to enable the ISP/ISR to obtain an IP address.

### Ventilation

The ISP/ISR products generate heat that must be dissipated to ensure proper and reliable function. It can be safely placed inside furniture or an equipment rack. However, it should not be tightly enclosed. Some airflow is required on the sides and at the back so fans can circulate air especially when the product is under heavy load. Keep at least 1" space on each side and back panel, with good air flow within the rack. Products may be stacked safely without interspace.

### Connecting to A/C Power

Plug the IEC-320 C14 end of the power cord into the product, 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/ISR to your local area network. See "First Run" on page 11 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 product (available from StormAudio on demand).

# Immersive Sound Processor and Receiver

## 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 16. HDMI sources can be connected as well.

## Connect to Display

Connect your displays using HDMI outputs. Note that outputs can be mirrored (same content) or independant (different content). For long distance we recommend usage of optical fiber and interface dongles.

eARC audio return channel is only supported in HDMI OUT 1, while ARC is supported on both HDMI OUT 1 and 2 ports. HDMI Out 1 is linked to the Main audio path while HDMI Out 2 can be linked to an Audio Video Zone.

## 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 speakers or amplifiers based on the default output channel mapping. Using XLR cables, we recommend length <3m.

## First Run

Upon first run, you must configure the product 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/ISR enters sleep mode. The power LED will show steady red.

Once in sleep mode, press the front panel POWER button. The product will begin the startup

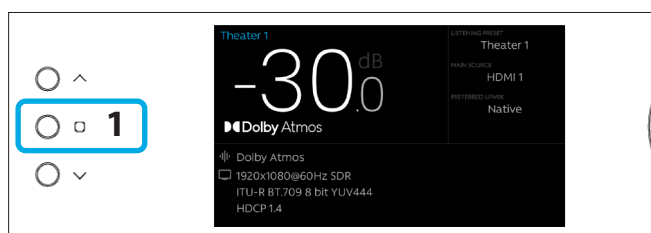
sequence. During the Initialization process (about 30s) the LED will blink green until the unit is ready with a steady green LED. Initialization process can be shorten at the cost of more standby power consumption. See “Settings” on page 38 to adjust this.

## Access the Home Page via Hostname

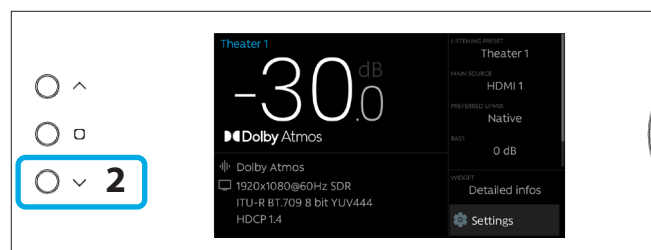
Open your Web Browser in a laptop and enter **stormaudio.local** in the URL area (unit shall be loaded with 4.6r2 firmware or onward version). You will reach the Web User Interface Home Page that is described in section “Home Page and configuration modes” on page 12.

## Access the Home via direct IP address

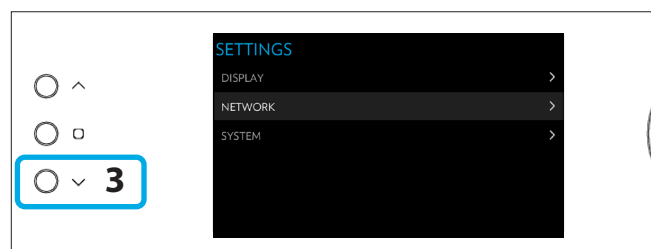
1. When the Home display screen is shown, press the Home/Access button (rounded square) to access the Adjustment Menu.

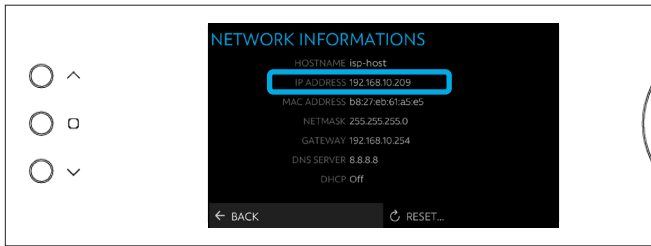


2. Using the Arrow button, access the Settings and press the Volume knob to Validate.



3. Select the Network item and press the Volume knob to validate. This will give access to the Network info where you can take note of the IP address and also reset the network parameters. Select Back to exit.

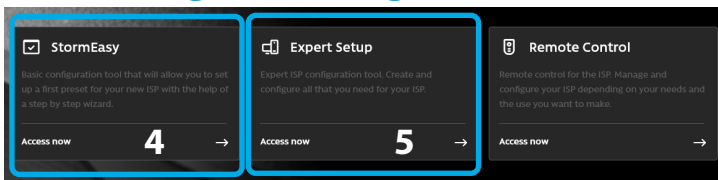




Open your Web Browser in a laptop and enter the IP address in the URL area to access the Home Page.

*Note: alternatively, IP scanner tools can be used to identify ISP IP address on the network. Look for the hostnames ISP-host or stormaudio and take note of the corresponding IP address. Then follow same above points..*

## Home Page and configuration modes



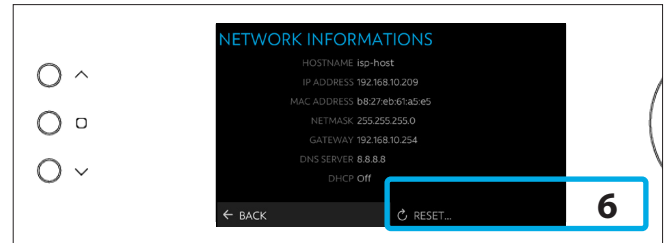
4. For standard installations, select StormEasy.

- StormEasy is a first-run step-by-step guided product configuration that will help define all needed parameters of the product in a logical and easy way.
- As a “from scratch” configuration tool, it will deactivate existing inputs and propose to reset the previous speakers configuration. If you already have a configuration defined, we recommend you to use the Expert setup.
- StormEasy will allow for the complete configuration, including launching the Dirac calibration. Note that while StormEasy can run on any browser and device, Dirac will require the use of the Laptop application.
- Use installer as password when prompted.

5. For advanced installations, select Expert Setup and follow this owner manual instructions to configure the product so to meet your installation requirements. Use **installer** as password when prompted.

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

6. In case the unit is not in DHCP mode, and you need to restore DHCP mode from the front panel, follow the above steps 1, 2 and 3, then select RESET. A message will appear asking for confirmation of this action. Confirm by selecting Yes.

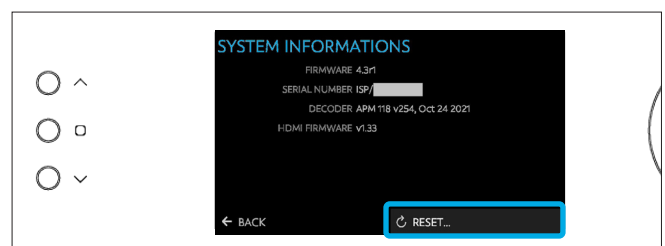


## Default Passwords

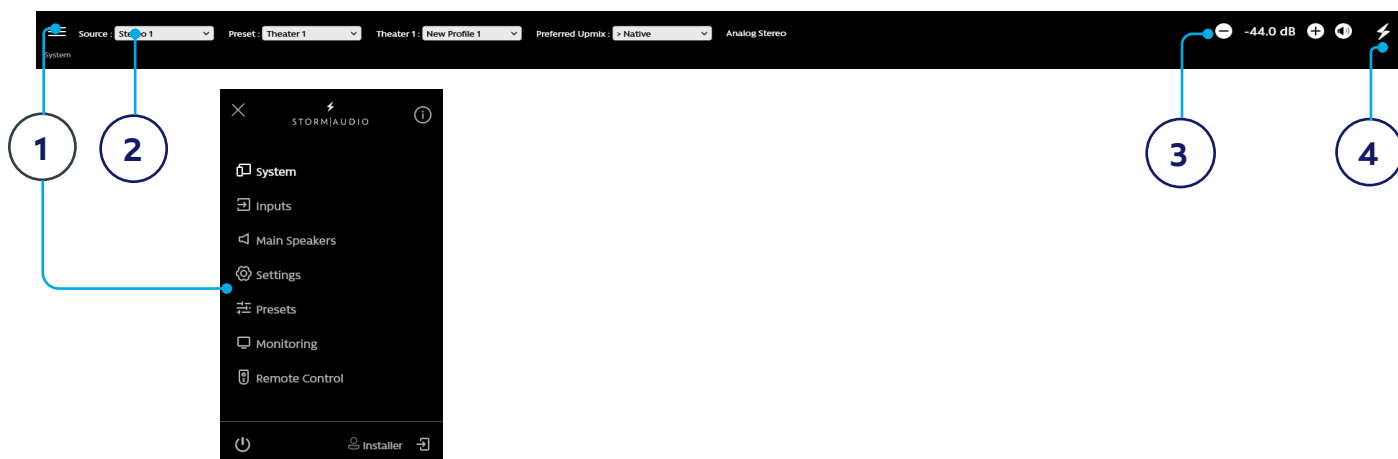
The Expert Setup area has two levels of access: Expert User and Installer. Expert user gets access to portions of the menu defined by the installer. Installer gets full access to setup. Use this level to perform the configuration.

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**.

*Note: In case you have forgotten the Expert User or Installer password, it is possible to reset them to the default values by following step 1 and 2 and selecting the item SYSTEM. Then select “RESET...” and confirm Yes when prompted. The WebUI will go back to the Home Page and you will need to enter the default password described earlier in this section.*



# Immersive Sound Processor and Receiver



## Web UI Header

### 1. Configuration menu access

- **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.
- **Power:** Switch the unit from standby to on status from here. Green indicates that the unit is powered on. White indicates standby. You can select Restart to simply reboot the ISP.
- **Logout:** 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.
- **Help:** On the top right, selecting the "i" will activate the comprehensive built in help function. When activated, 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. Note that the Settings page works differently: there is no sign visible, simply hover over the field you need information on and wait for a second to have it shown.

### 2. Persistent Remote Control Bar

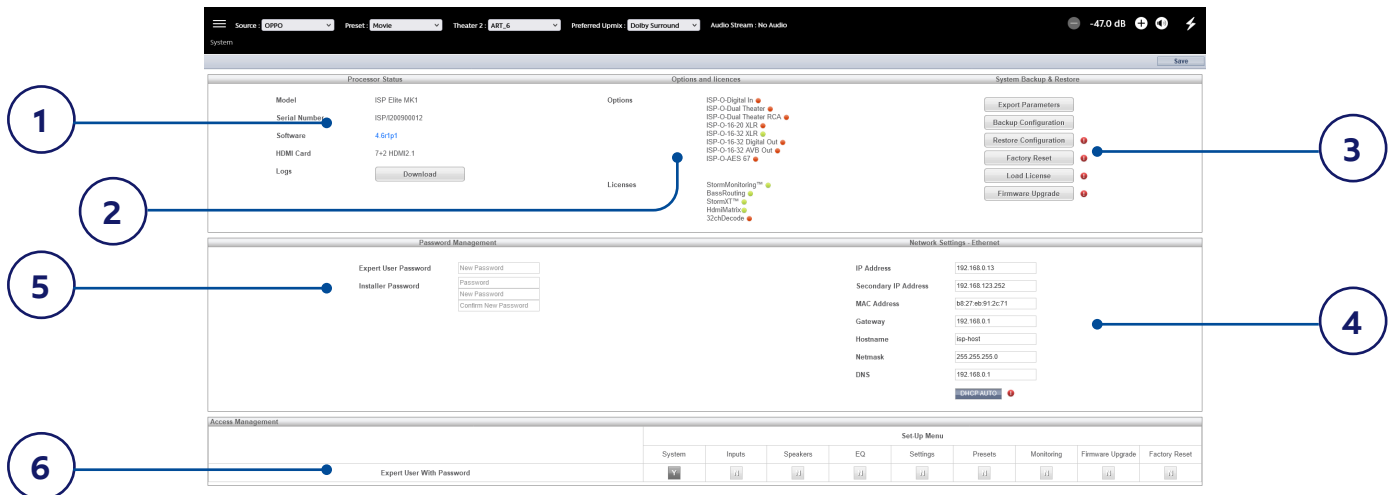
This area provides access to change some settings without having to access the remote control page. Change Source, Preset, Theater, Profiles within each theater, and Surround modes.

### 3. Volume Control

Volume control is provided without having to access the Remote Control page. The + / - buttons adjust volume in 1dB increments. Mute cuts all sound.

### 4. Home Page access

Selecting the StormAudio lightning icon will return you back to the Home page of the Web User Interface.



## System Settings

### 1. Product 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/ISR 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. Note that it is not recommended to import a configuration file from an ISP/ISR model to another one as they might exhibit differences that would not permit the full configuration to work properly (different channel count, options installed....).
- **Factory Reset:** Resets the product to default configuration but retains current firmware version.

- **Firmware Upgrade:** Use this tool to update the firmware of the product. 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/ISR 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/ISR has been set to static IP mode and will no longer connect to the network, see "First Run" on page 11 for instructions on resetting the network settings to default DHCP mode.

### 5. Password Management

The product 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:

# Immersive Sound Processor and Receiver

**Installer:** installer

**Expert User:** expert

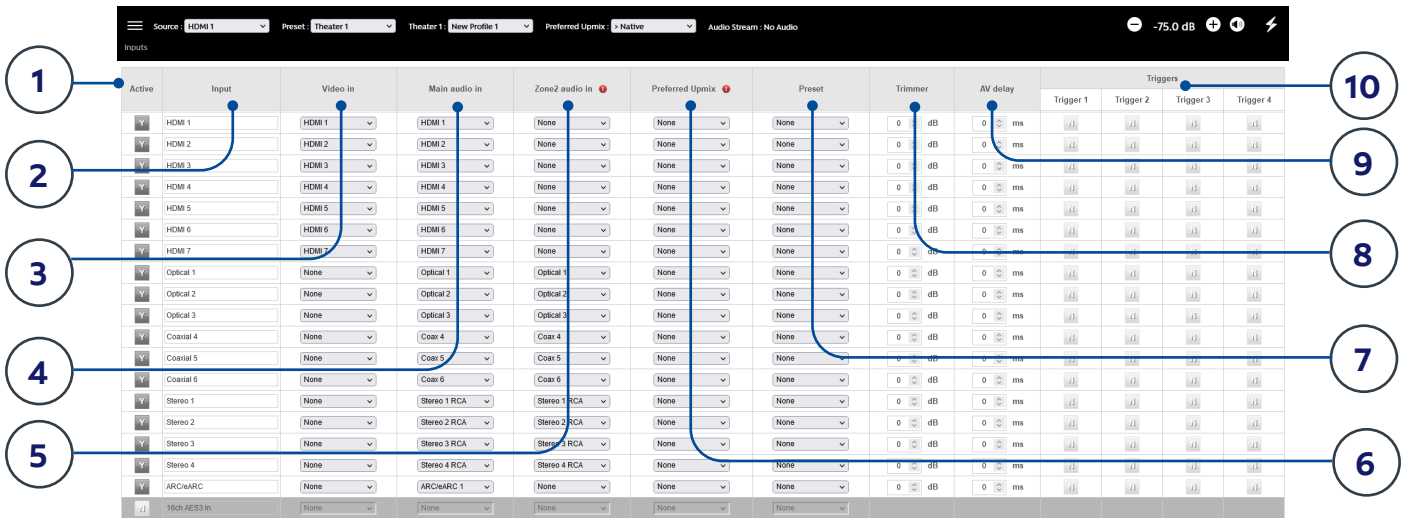
If you are a dealer or custom installer, you are advised to change these passwords and document them. Similarly, if you are a client and wish to lock other users out of settings, you may wish to change default passwords as well.

If you have forgotten your passwords and have locked yourself out of the ISP/ISR, you can reset them back to default by following the procedure "Default Passwords" on page 12.

## 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/ISR 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 lose your changes.*



## Input Settings

The ISP/ISR 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 up to 10 characters in this box and change the name to something

more intuitive.

### 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 (ISP Elite and Evo, and ISR Fusion models), 5.1 RCA + 1x Stereo RCA or as a 7.1 RCA input.

### 5. Zone2 Audio In

The ISP/ISR 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" on page 18 for the Theater and Audio Zones creation). The Zone2 Audio input path definition will vary depending on the Matrix mode defined in the "Settings" on page 38 (optional on Core). Make sure to first select the appropriate mode for your overall audio video system. When selected, adjust the "Zone2 in" path according to below recommendations.

# Immersive Sound Processor and Receiver

- **Mirror Mode:** It is not possible to define the HDMI audio path as the Zone2 audio path. For source device with HDMI connection, It is recommended to connect and define an Input with two physical connections to the ISP/ISR 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. For other inputs (digital/analog), you can define the same audio path, such as Stereo 1 for both the Main and Zone2 audio path.
- **Zone2 AV Mode:** In this mode, with HDMI sources, we recommend to define HDMI as the Zone2 audio in path. When selected as a Zone2 source, the player will automatically provide the needed 2ch version of the content played to the Zone2 path. Other sources can follow same rules as in Mirror Mode, so same input for both paths.
- **Pass Through Mode:** In this mode, the inputs should be define as in the Mirror mode, so HDMI sources should have a second path. These inputs would be routed to the Audio Zones when selected, while the HDMI Out 2 would provide a "pass-through" of the HDMI input selected in a specific source selection in the remote control.

In any case, selecting a source will automatically take the correct physical connection depending on the Theater or Zone playback.

*Note that ROON can only be selected as a source for the Main Theater. Zones can access ROON playback only when USE ZONE2 SOURCE is OFF in a given Audio Zone., thus getting the same content as the Main Theater.*

## 6. Preferred Upmix

This setting forces an upmix at input selection and overrides any preferred upmix defined as part of a preset.

## 7. Preset

This setting allows to select a certain preset at input selection. It will override current selected preset.

## 8. 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.

## 9. AV Delay

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

## 10. Triggers

The ISP/ISR 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 41. 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

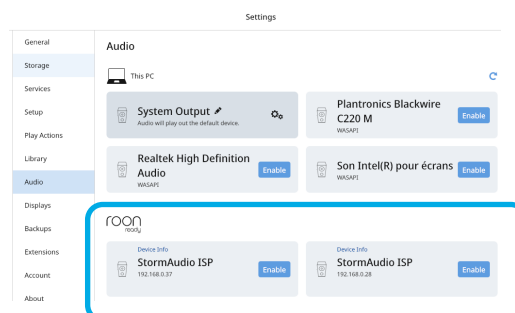
The ISP/ISR is a Roon Ready certified product and can therefore be part of a Roon streaming ecosystem. Only few steps are required, as described below.

### 1. Roon input definition

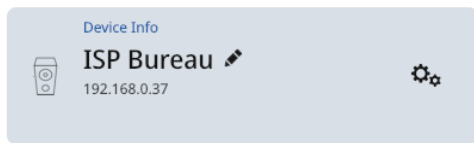
For the ISP/ISR to be visible in the Roon ecosystem it is first required to create an input that would select the Roon audio path. Following the steps 1 to 4 of "Input Settings" on page 16, create a new input and select "Roon Ready" as Main Audio input. It will then be available on all remotes and discoverable 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.

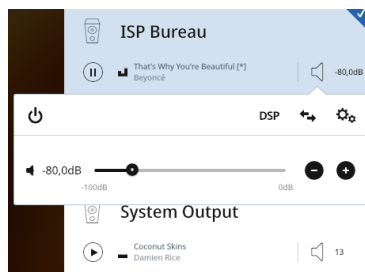


In the Roon ready area, Enable the StormAudio ISP/ISR. Once enabled, you can customize it (name, audio settings), as shown below.

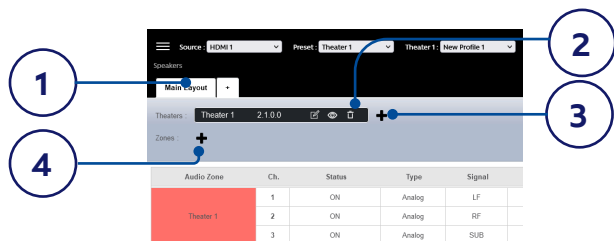


## ISP/ISR Control via Roon app

Roon control, whether through the desktop or phone app, allows for multiple actions: ISP/ISR 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, 20, 24 or 32 depending on the ISP/ISR model or optional module assembled. 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 per Layout.

### 1. Layouts

If it is planned to have different usage of a speaker in an installation, the Layout function should be used. It is possible to create up to 6 different Layouts, providing total flexibility

in how speakers are used on each of them. A layout is a new set of speaker assignments, up to the limit of what is supported by the ISP/ISR (from 16 to 32ch per layout). By default, a Main layout is created that will allow you to define a first set of speakers assignments, whether Theater and/or Audio Zones.

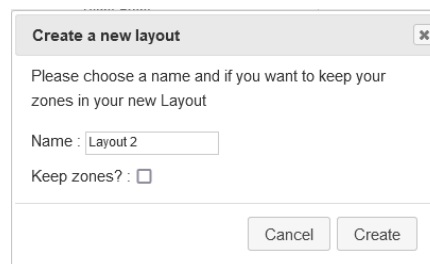
Creating a new Layout resets the output mapping in this Layout. Thus, you may need to remap the outputs to ensure a speaker gets the appropriate signal defined in the Theater and/or Audio Zones.

Example of Layout usage:

- creation of subset of a Theater, for example, defining a 13.1.10 constellation in the Main Layout and define 7.1.4 in a different Layout using replicated speakers instead of discrete feeds
- multi-purpose room that can be used in "projection mode" in one direction and "TV mode" in another direction

In case Audio Zones are created in the Main Layout, it might be recommended to maintain them in all Layouts, so that when changing from Theater usage (by the change of Layout), the Audio Zones keep working seamlessly.

This choice is made at the creation of a new Layout as shown below ("Keep Zones?") following selection of "+" in the Layout tab area.




You can rename the Layout and then select create. This will open the new Layout to configure. Note that a Layout can be deleted, except the Main Layout that is the default one.

### 2. Delete Theater

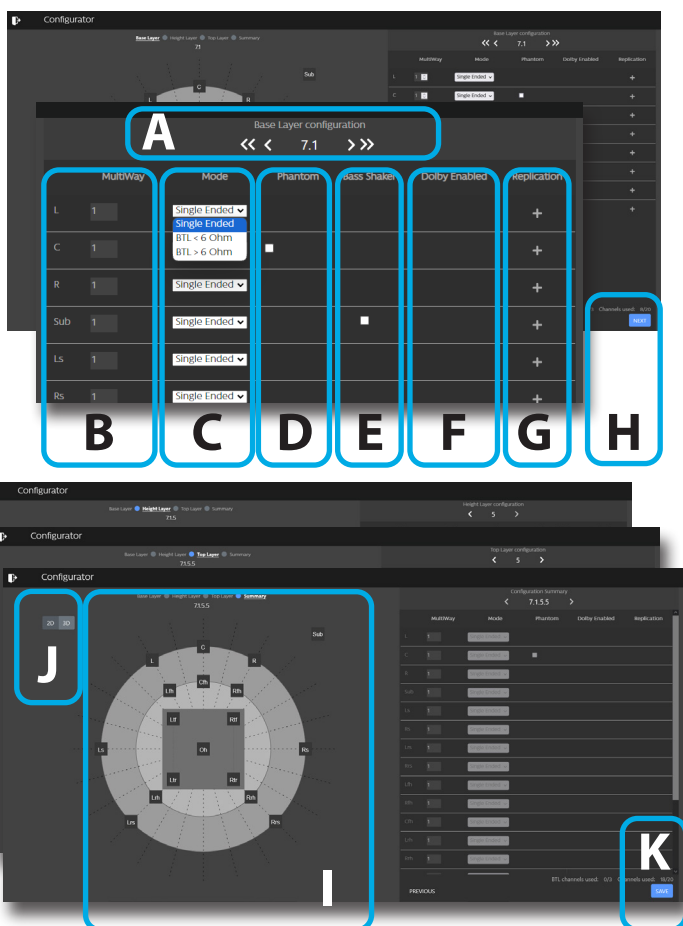
By default, the ISP/ISR ships with a 2.1 channel theater configured. To build your own, delete this theater and create a new one. Select the

## Immersive Sound Processor and Receiver

Trashcan  and validate the removal when prompted.

### 3. Create and Configure the Theater

Select **+** to create a new Theater. You will reach the Speakers configurator where you will be able to define each layer of the speaker installation: base, height and top layers.



- Using the left and right arrows, choose the speaker combination you expect for the layer amongst predefined options available for your ISP/ISR.
- For each speaker, you can define whether it is a full bandwidth or a multiway one. This can also be used for subwoofers when several subs are expected to be seen as one by Dirac, playing the same signal with same or different adjustments. In case there is no subwoofer in the system, please select "0" in the multi-way subwoofer field. Multi-way filters details will be defined in "Multi-way Speaker/Subwoofer Setup" on page 24.

- For ISR Fusion, select the output mode between Single Ended (SE) or Bridge Tied Load (BTL) with < 6 ohms or > 6 ohms, based on your speakers' nominal impedance. Up to 3 channels can be set in BTL mode, including subwoofers, but not multi-way speaker/sub. See "21. Amplified Outputs" on page 9 for more details.
- 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.
- When using bass shaker devices, check the corresponding subwoofer box. It will then be disregarded during Dirac calibration process, but become available as an LFE transducer afterwards.
- 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.
- For each speaker, you can define whether replication is required. Use this feature for multiple rows of surround speakers declaration or any speaker you wish to replicate. For multiple subwoofers, use the multi-way function in B above.
- Press Next to reach the next layer and follow again steps A to E until all three layers are defined.
- 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".
- It is possible to get a 3D view of the Theater, toggling between 2D and 3D.
- Save to exit and reach the Speakers edition page loaded with the default audio profile "New profile 1".

## 4. Audio Zones

Audio Zones are created in the same way as Theater, with the option of mono zone, headphone or stereo zone with the support of multi-way speakers and subwoofers. Follow the same steps as in “3. Create and Configure the Theater” above to define the Audio Zones. Zones have the same features of a main theater except that they are limited to mono or stereo.

Zones are automatically activated in the Presets. It can be deactivated as you wish, see “Presets” on page 37 for more details. By default, it will be defined as Audio/Video zone with provisions for adjusting lip sync. If not needed, change the AV mode in the “Settings” on page 38.

Zones occupy unused channels and can play concurrently with a theater or without one. There are two input selectors : you can select one input for the main theater (Main Source) and one Zone 2 input used by all the audio zones (Zone2 source). You can also choose the Zone to play either the Zone2 source or follow the Main Theater source. This is done via the remote controls or the TCP/IP commands.

## Audio Profiles

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

For a Theater, Audio Profiles can be recalled as part of Presets (see “Presets” on page 37). A profile includes: Speaker definition (multi-way, levels, delays), bass management, manual EQ, and Dirac filter design if applied.

For Audio Zones, Profiles are directly selectable via the remote controls or TCP/IP commands.

### 1. Rename

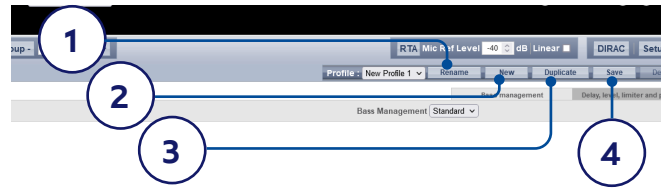
You can rename a profile using Latin-1 table characters. No special character allowed.

### 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.

## Output Mapping

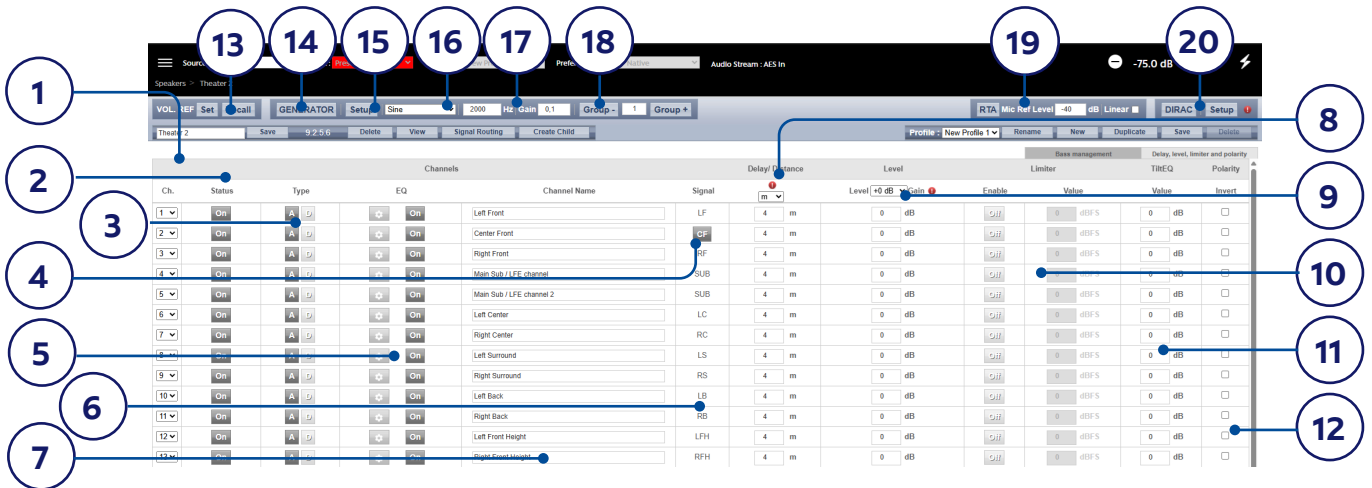
Should you wish to map a physical analog output channel to a loudspeaker other than the default assignment, you may do so from the Main Speakers page. Each Layout has its own Output Mapping. It is therefore possible to define different usage of a given connected speaker. Click Output Mapping.



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.

Zone/Theater	Speaker Name	Current Output	New Output
Theater 1	Left Front	1	1
	Center Front	2	2
	Right Front	3	3
	Main Sub / LFE channel	4	4
	Left Surround	5	5
	Right Surround	6	6
	Left Back	7	7
	Right Back	8	8
	Left Front Top	9	9
	Right Front Top	10	10
	Left Back Top	11	11
	Right Back Top	12	12
	Inactive channel	13	13
	Inactive channel	14	14
	Inactive channel	15	15
	Inactive channel	16	16
	Inactive channel	17	17

# Immersive Sound Processor and Receiver



## Individual Channel Adjustments

Once your theater/zone is defined, each channel can be individually adjusted. For Theater, SubTheater can also be created, see "Child Theater / Sub Theater" on page 30.

### 1. Channel Mapping

Output assignment can be changed here.

### 2. Channel Status

Each channel is enabled by default. To disable a channel, 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.

### 3. Channel Type

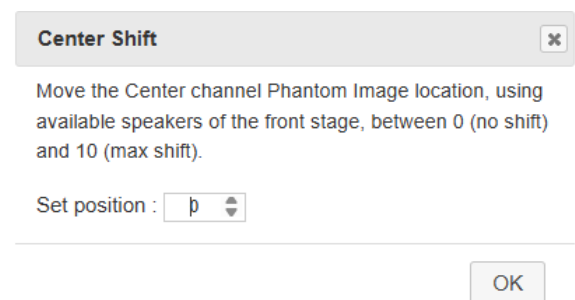
When an ISP Elite or Evo is equipped with a Digital Output module, each channel can be assigned to an Analog or Digital output.

### 4. Center Shift

In Home Cinema sound reproduction, the sound to picture coherence is an important appreciation factor. While we are able to tolerate shift between sound and picture perception location, there is a limit to the ventriloc effect. With the adoption of LED panels or even walls in more and more designs, the location of the center channel is often not ideal anymore, degrading this sound to picture coherence. To compensate for it, there are several designs recommendation, one of them being the inclusion of a replicated Center channel positioned above the screen while placing the other Center channel under the screen.

Main issue with this proposal is that the upper center channel will only play Center signal and with no further adjustment ; the dialog will be perceived as coming from the mid position of these speakers, not for sure aligned with the Left and Right acoustical centers.

With the Center Shift feature, you can create for example a configuration with a Center Height channel that would be used to render both the Center Height signal and the Center signal. To perfectly align the Center signal phantom image position, an adjustment is available by selecting the CF button (3) that will open a window with an adjustment from 0 to 9.



In this specific use case, 0 keeps full signal to the Center channel, while 9 will shift the Center signal phantom image to the Center Height channel. But the system can actually adapt to other speakers configuration, making use of the most appropriate speakers in place to provide the best sound to picture coherence for the center signal phantom image. If no Center Height is placed, then we'll make use of CF, LF and RF speakers. If Front Height speakers are in place, then we'll use CF, LFH and RFH speakers to shift the Center signal phantom image.

## 5. 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 25 for detailed EQ options. EQ settings are stored as part of profiles.

## 6. 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 20 for details.

## 7. Channel Name

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

## 8. Delay per Channel

Choose whether to measure channel delays in meters (default), feet, or milliseconds. Each channel should have distance/delay set between that loudspeaker and the reference seating position. You can define this in meters (default), feet, or ms depending on your setting in point 6 above.

## 9. Level

Set the level of each channel in between -100dB and +12dB in 0.1dB 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.

## 10. 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.

## 11. 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.

## 12. Polarity

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

## 13. Volume Reference

For the Adaptive Loudness feature to work properly, it is recommended to set the reference volume to the level at which you made your calibration, usually between 75 to 85 dBc. When the volume control is adjusted at this Reference level, there is no loudness compensation. It will start gradually when the level is decreased to follow our ear sensitivity curve, thus emphasizing more the low frequencies the lower we go. Calibrating the room at 75 to 85 dBc SPL is critical as this is usually the level that is used by the sound engineer in his studio, thus ensuring your system has same reference. Set the reference master volume value by clicking on SET once you have dialed the correct sound pressure level using a SPL meter and the noise generator. Click RECALL to quickly return to that value. Note that by default, the reference level is set to -30 dB.

# Immersive Sound Processor and Receiver

## Test Tone Generator

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

### 14. Generator

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

### 15. Setup

Unlike traditional generators, the ISP/ISR 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.

Ch.	Signal	Speaker Name	Generator Group	Enabled
1	LF	Left Front	1	<input checked="" type="checkbox"/>
2	CF	Center Front	2	<input checked="" type="checkbox"/>
3	RF	Right Front	3	<input checked="" type="checkbox"/>
4	SUB	Main Sub / LFE channel	4	<input checked="" type="checkbox"/>
5	LS	Left Surround	5	<input checked="" type="checkbox"/>
6	RS	Right Surround	6	<input checked="" type="checkbox"/>
7	LB	Left Back	7	<input checked="" type="checkbox"/>
8	RB	Right Back	8	<input checked="" type="checkbox"/>
9	LFT	Left Front Top	9	<input checked="" type="checkbox"/>
10	RFT	Right Front Top	10	<input checked="" type="checkbox"/>
11	LBT	Left Back Top	11	<input checked="" type="checkbox"/>
12	RBT	Right Back Top	12	<input checked="" type="checkbox"/>

### 16. 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/ISR input. This is usually required when using an external tool providing its own stimuli (Room EQ Wizard is one of them, see "1. REW import" on page 26).

### 17. Gain

The gain figure can be set so that the noise

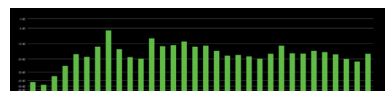
generator operates at a level at or below that of a normal source playing at 0dBFS. Default is 0.1 (-20dBFS).

### 18. Group +/-

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

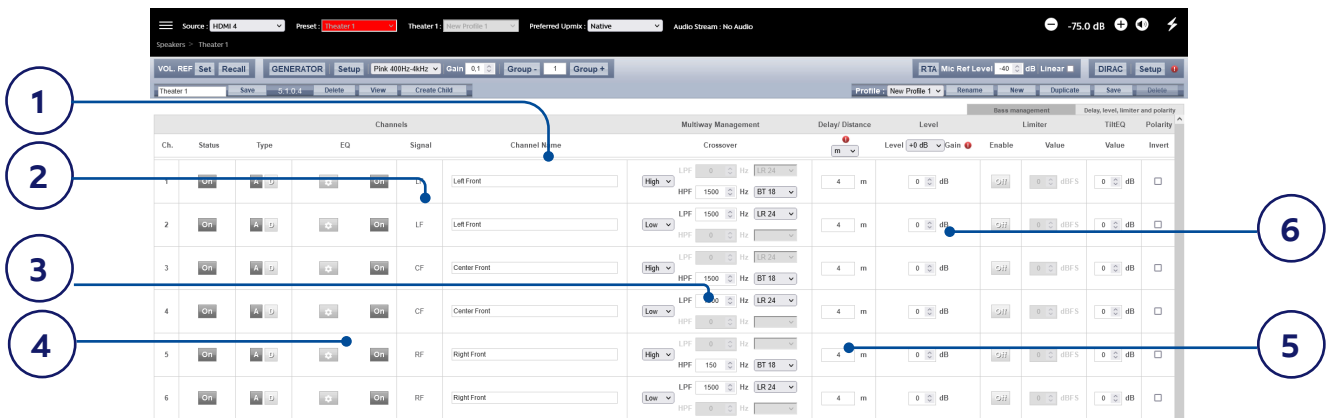
### 19. RTA

When a USB microphone (such as the optional Microphone Mini Kit) is connected to the ISP/ISR, you can use the Real Time Analyzer together with the Noise Generator 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.



### 20. DIRAC

See "Dirac Live®" on page 32 for use of Dirac Live® Calibration Tool.



## Multi-way Speaker/Subwoofer Setup

During the initial Theater/Zones Definition setup, you have the option of defining any speaker/subwoofer as multi-way. Doing so will assign 2 to 4 output channels (up to 8 for subwoofers) to each speaker/subwoofer instead of 1. In this configuration, more than 1 amplifier channel will be used per loudspeaker, and the ISP/ISR will perform the crossover function for each loudspeaker.

All settings detailed in section "Individual Channel Adjustments" on page 21 also apply and will not be covered again here. This section only describes the differences notable for multi-way loudspeaker/subwoofer 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, Sub Left. 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 (12dB / oct, 24dB / oct, 36dB / oct and 48dB / oct), Linkwitz Riley (6dB / oct, 12dB / oct, 18dB / oct, 24dB / oct, 36dB / oct and 48dB / oct) and Bessel (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

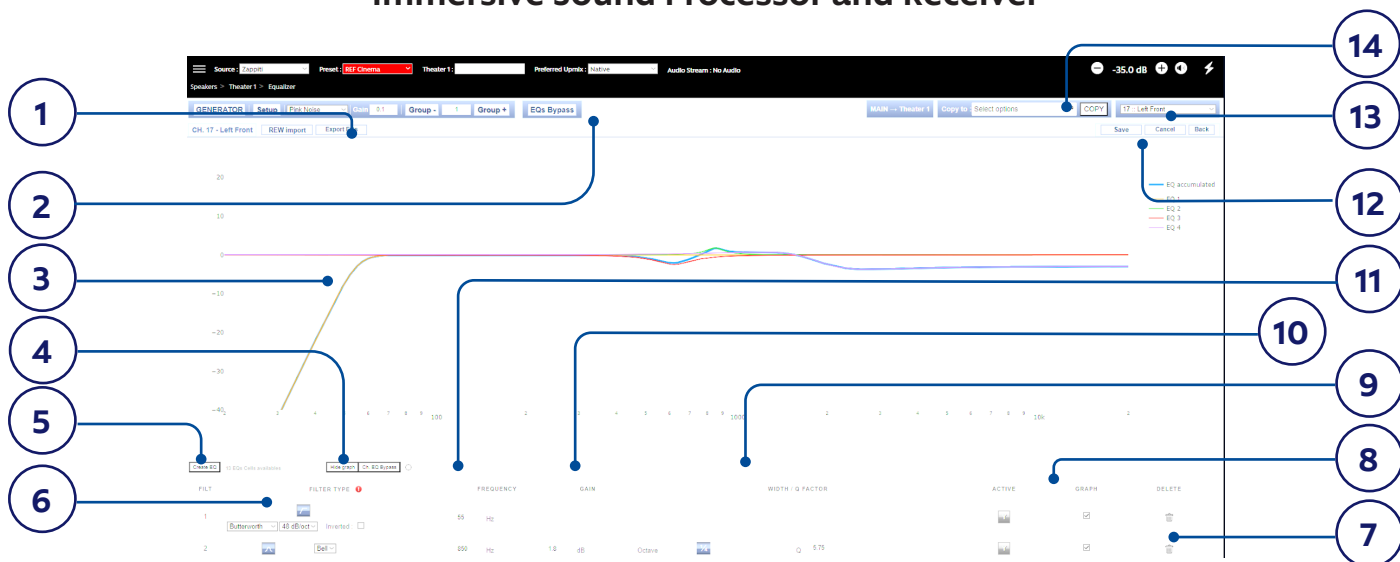
Set the delay of each section. For active multi-way loudspeakers, it may be helpful to do this in milliseconds and measure time-of-arrival differences at the crossover point when using LR or BT6 filters to time align each section of a multi-way loudspeaker.

### 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 "9. Level" on page 22.

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

# Immersive Sound Processor and Receiver



## Channel EQ

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

### 1. EQ Export

The complete EQ settings can be exported into a file with .txt extension that can be reloaded in any ISP/ISR using the REW import function (see "1. REW import" on page 26).

### 2. 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.

### 3. Graphical View

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.

### 4. Show / Hide Graphical View

To free screen space to visualize the complete EQ list, it is possible to Hide the graphical view using the "Show graph" button.

### 5. Create EQ

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

### 6. Filter Shape

Each filter must begin with a variation of one of 6 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 and adjust the Q.
- **High Shelf:** Boost / cut frequencies above a cutoff frequency by a fixed amount and adjust the Q.
- **All Pass:** Up to 4th order filters creating phase shift at a given frequency without changing magnitude.

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

### 7. Delete

Unused EQ line can be removed using the Bin button.

### 8. 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.

### 9. Quality Factor / Bandwidth

Bell and Shelf filters require that you specify

a Q (from 0.05 to 32). 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.

## 10. 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.

## 11. 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.

## 12. Save

Make sure you SAVE the EQ settings before changing from channel or leaving the page.

## 13. Channel Select

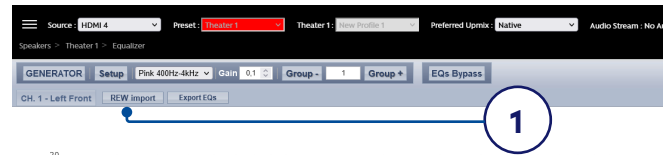
Select the desired channel to equalize here.

## 14. 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 lose your changes.*

## Room EQ Wizard integration



### 1. REW import

The ISP/ISR 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/ISR 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/ISR compatibility and select "Export filter settings as Texts" in the tool.

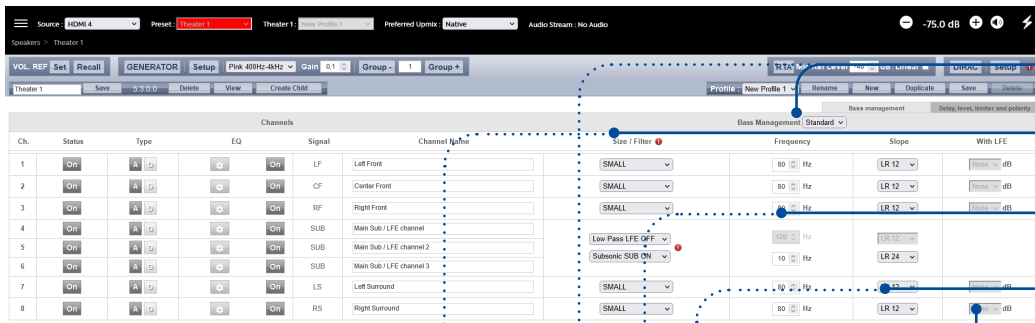
Once done, you can then do your EQ for each channel and export the equalization as a "\*.txt" file.

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

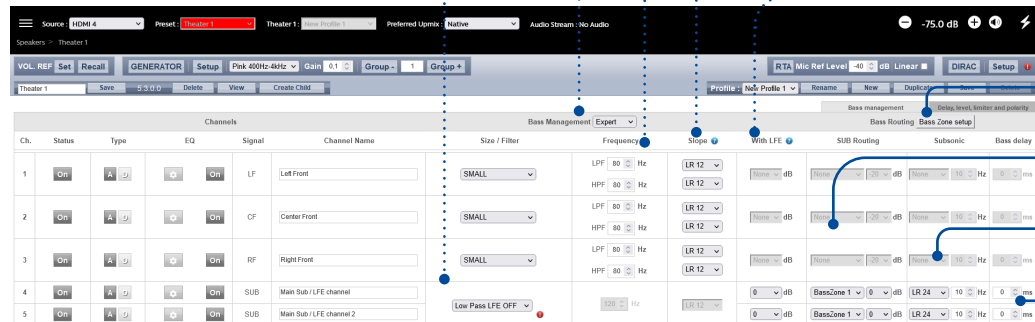
*Note that you can define up to 12x Parametric EQ and 2x High Pass or Low Pass filters (up to 48dB slope) in the REW tool with the StormAudio compatibility mode.*

# Immersive Sound Processor and Receiver

Standard



Expert



## Bass Management

Bass Management is one of the most important and critical part to adjust in the ISP/ISR 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 and this will mainly depend on whether you want to manage this manually with the Standard or Expert modes or you go fully automated using the options Dirac Live Room Correction offer between Bass Control and Active Room Treatment. Bass Control will adjust your multiple subwoofers and speakers automatically but will not allow wide bandwidth speakers to reproduce the Bass. Active Room Treatment will consider all capable speakers to reproduce the Bass and provide a well controlled bass reproduction in any room.

### 1. Modes

The ISP/ISR 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, independent 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 between Dirac Live®, Bass Control or Active Room Treatment modes. In this Dirac mode, the Bass Management or bass routing will be set in the Dirac tool with no possibility to override them in the ISP/ISR UI (all adjustments will be grayed out). See "Dirac Live®" on page 32.

### 2. Size/filter

When in Standard or Expert modes, the system offers the possibility to define how the bass are extracted 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. Linkwitz-Riley, Bessel and Butterworth type filters are available

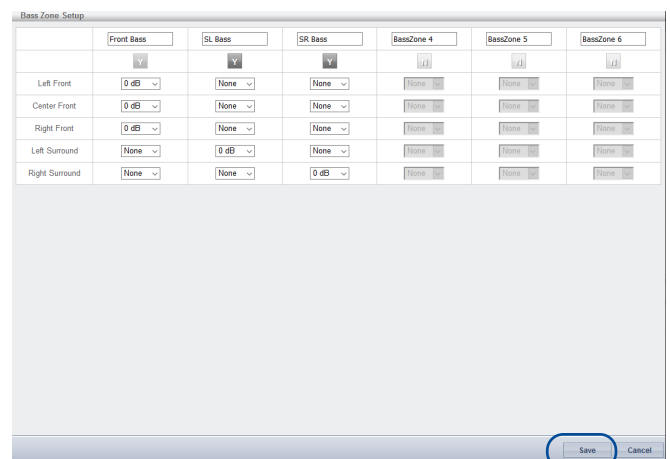
with 12dB to 48dB / octave slope (8<sup>th</sup> order).

### 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

## Immersive Sound Processor and Receiver

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.

the overall channel delay. It is therefore recommended that you first make sure that all speakers are well time aligned before starting to tune the Bass delay.

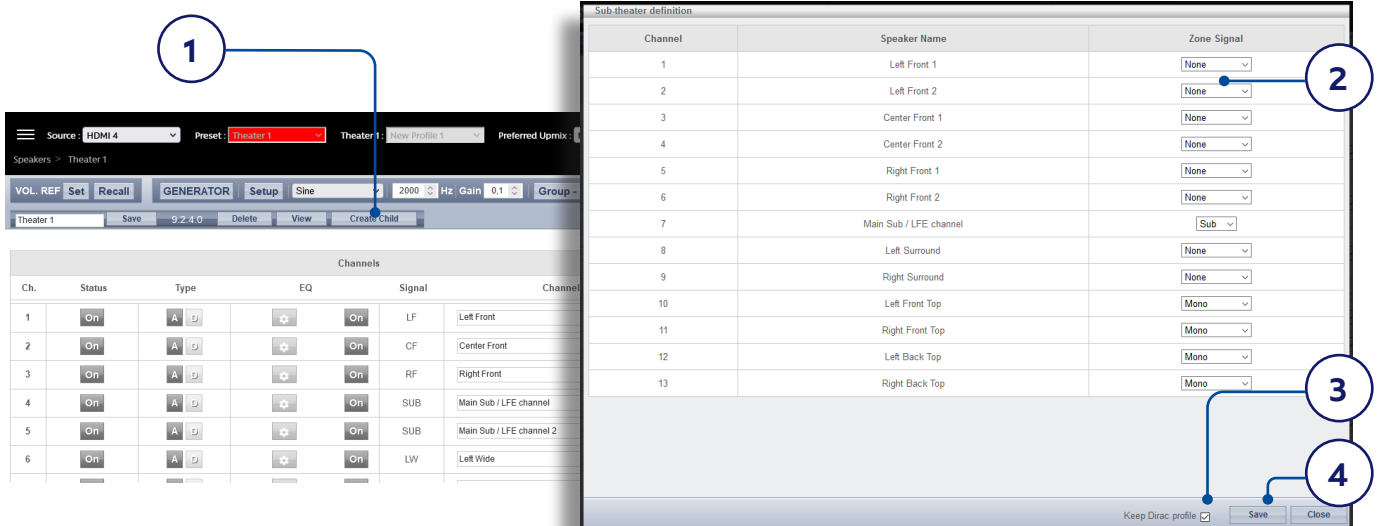
*Note that after making any changes, you must press the SAVE button near the top right of the screen or you will loose your changes.*

### 8. Subsonic filter

In Expert Bass Management mode, there is the possibility to adjust a Subsonic filter for each Bass reproducer, whether being a speaker or a subwoofer channel. This will apply a High Pass filter to the selected channel. Change the setting from None to any desired slope (from 12 to 48 dB) and filter type, and adjust the crossover frequency.

### 9. Bass delay

Each Bass Zone and LFE reproducer channel has an individual delay adjustment, useful to carefully align the phase response of the system. Note that this delay is an offset of



## 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.

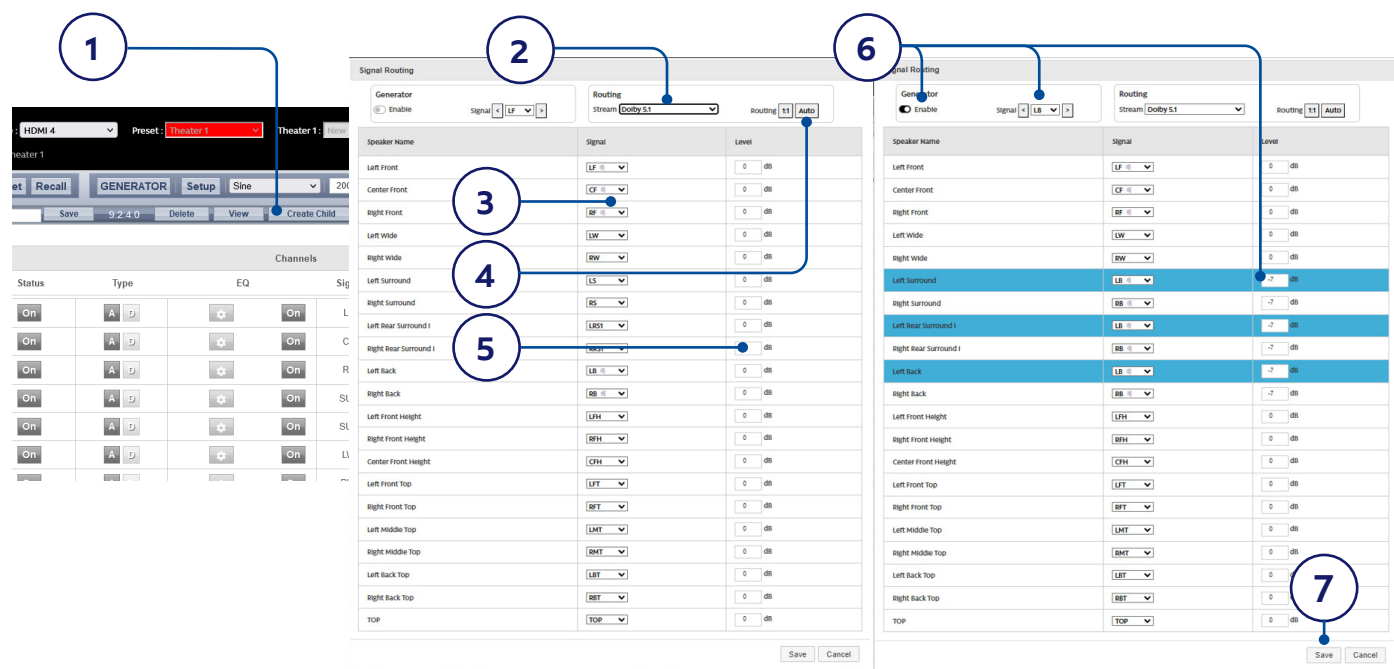
### 4. Save/Close

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.

# Immersive Sound Processor and Receiver



## Flexible Signal Routing

Depending on the Codec played and the Theater Layout, the default signal route may not use the speakers optimally. Some speakers can remain silent, although they could be used to play the same signal as other speakers in the room, such as for example in a typical case where you play a 5.1 content in a 11.1 or bigger layout: the LS/RS signals could be routed to more surround channels available in the layout. To do so, one must select the route and adjust the signal level in order to maintain overall signal level balance.

### 1. Signal Routing

From the Main Speakers page, Edit your theater. Click on Signal Routing. A window will appear with the list of the speakers installed and the default routing.

### 2. Select the stream context

Analysis of the various codecs helps define common stream contexts, being the possible signal routing in a given speakers map. For each context, the default signal routing is shown by a small "speaker" logo in the signal table.

### 3. Edit the signal route

For each speaker and selected context, it is possible to change the signal route. Select

the signal you want to play amongst the available signals.

### 4. Predefined routing

At first installation, the routing is following the default immersive decoding route. This default route can be recalled at anytime for each stream context using the 1:1 button. It is also possible to use the Auto routing. Selecting the Auto route button, the system will define automatically the best route (and signal level) for the selected context, based on each codec recommendation and CEDIA RP22 guidelines.

### 5. Signal level adjustment

When routing a signal into multiple speakers, we are increasing the overall signal SPL in the room, requiring the signal level to be adjusted.

### 6. Noise generator

Using the noise generator, a SPL meter and scanning each signal feed, one can adjust the signal level. Sound will come from all speakers fed with the same signal, and the adjustment will apply in all of them equally.

### 7. Save and exit

When the adjustment is completed, press SAVE to exit the Signal Routing window.

## 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.x 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/ISR comes by default with the activation of both Bass Control and Active Room Treatment add on modules which add to the standard Dirac Live room correction suite the ability to also include the bass management with any number of subwoofers and speakers used in the installation. This is enabled automatically in the tool once the ISP/ISR connection is confirmed.

All Theaters, zones, and child theaters can be calibrated with Dirac Live.® Presuming you have a calibration kit, prepare your ISP/ISR for calibration by following the steps below. **Warning:** do not use the remote controls to adjust volume during the process.

### 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 25).

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 21) 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 Control or the Active Room Treatment (ART) module of the Dirac Live tool that will be described in the next pages, you can skip the bass management adjustments and move to the next step. We recommend to use ART.

### 2. Download and install Dirac Live® 3.6.x Calibration Tool Software

You can download a Mac or PC version of the software at <https://www.dirac.com/live/downloads/> or on the StormAudio Client Portal ([www.stormaudio.com](http://www.stormaudio.com)). Depending on your ISP/ISR model acquisition date, the ART licence shall be bought from Dirac.

Install the software on the laptop you will use to calibrate the ISP/ISR. 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

On the Main Speakers page, EDIT 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

Multi-way speakers and Subwoofers are automatically grouped so Dirac sees them as one speaker and doesn't change the interchannel adjustments. They should share the same index when accessing the Dirac Group Setup (A).



When multiple subwoofers have been

## Immersive Sound Processor and Receiver

configured using the replication, grouping them will forbid the calibration with Bass Control or Active Room Treatment. Shall you wish to adjust manually your subwoofer and present them as one group to Dirac and still allow Bass Control or Active Room Treatment, you must use the multi-way subwoofer function at the configuration level, else only Room Correction will work.

Ch.	Signal	Channel Name	Speaker Group
1	LF	Left Front 1	1
2	LF	Left Front 2	1
3	CF	Center Front 1	2
4	CF	Center Front 2	3
5	RF	Right Front 1	5
6	RF	Right Front 2	5
7	SUB	Main Sub / LFE Channel	7
8	LS	Left Surround	8
9	RS	Right Surround	9
10	LFT	Left Front Top	10
11	RFT	Right Front Top	11

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

### 7. Initiate Calibration

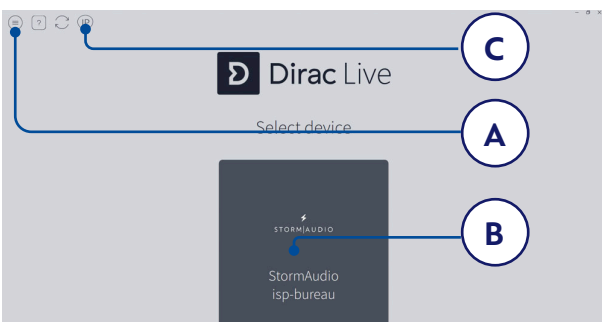
Press DIRAC (A) to ready the ISP for calibration.



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.

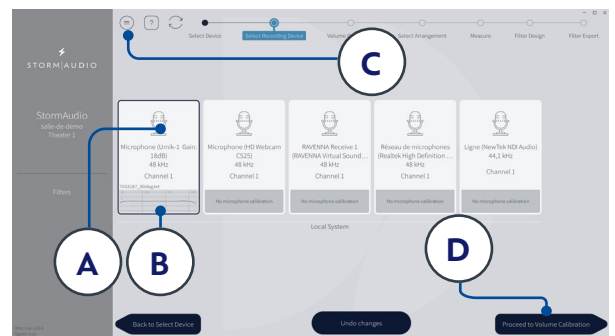
### 8. Return to / Open Dirac Live® Calibration Tool Software

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/ISR ready for calibration (B). If it does not, manually enter the IP address of the ISP/ISR (C). Select the device to calibrate (B).

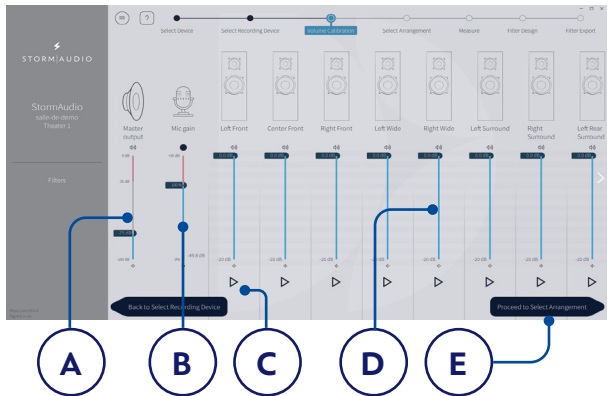


### 9. Configure Microphone

Choose the Recording Device UMIK-1 (A). Load the microphone calibration file (B) downloaded in step "3. Prepare Calibration Hardware" on page 31. 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



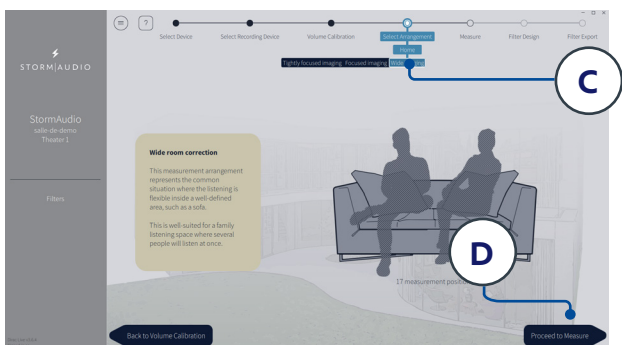
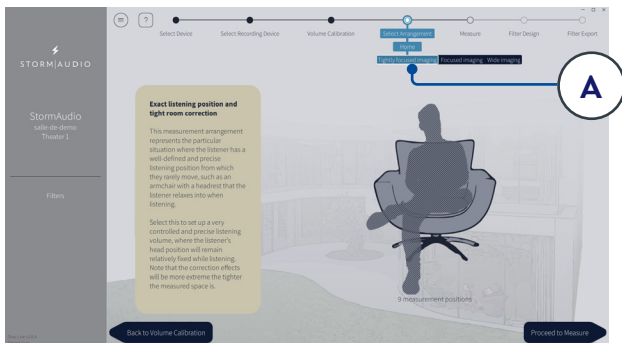
Now that the microphone is connected, ensure that the room is quiet. Adjust the Mic gain to 100% (B). Set the output volume (A) to a low level (-40dB for example). Start the test noise by pressing the PLAY button (C) on the first channel and adjust the Master volume to reach the middle area in the channel's meter. For each channel, activate the test noise and correct the channel volume using the corresponding slider (D) so that the meter reaches the middle 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.

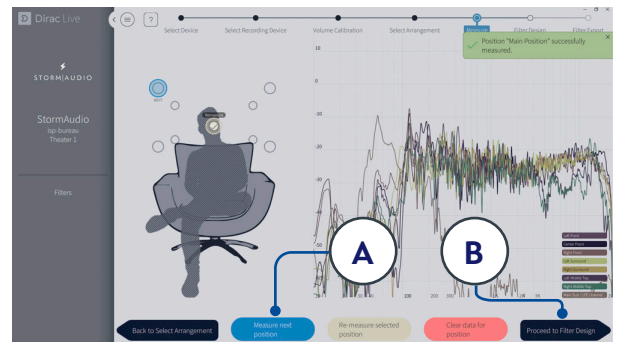
Select the arrangement you wish to define between tightly focused imaging (A), Focused imaging (B) and Wide Imaging (C) as illustrated below and described in the tool.



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

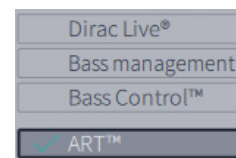
Once the first measurement is taken, that position will be checked indicating successful capture. Move the microphone to the next position. Repeat measurements for all listening positions (A). With each measurement, the waveform graphic will update.



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

## 13. Filter Design

Dirac Live® 3.6.x offers the standard Dirac Live® Room Correction, Bass Management, Bass Control and ART modules.



- **Dirac Live:** This mode provides the regular Dirac Live® design with per speaker target curve and standard Dirac Live® filters calculation (so called Dirac Live® Room Correction)
- **Bass Management:** This mode provides regular bass management filters with standard Dirac Live® filters design and calculation including each sub-woofer gain being scaled by  $1/(\text{numbers of sub woofers})$  to match the target curve.
- **Bass Control:** 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.
- **ART:** Selecting ART will enable the Active Room Treatment proposing to use all speakers and subwoofers to actively compensate for room issues under 150 Hz.

In the next parts, we will focus on the Active Room Treatment mode. With ART, we'll introduce the notion of Main and Support

# Immersive Sound Processor and Receiver



speakers. Any speaker can be a support of another Main speaker. For detailed explanation on ART, please consult website and tutorial videos to get more insights.

## 14. Support speakers definition

For each Speaker group, you can define which group will support it in the (A) area.

- By default the selected group will have its speakers supporting each other. This can be disabled by clicking on the Support range of the group.
- Other groups can be added by clicking on the (A) area below the Main group. A default estimated support frequency range will be proposed, limited to 50 Hz for the Speakers and 20 Hz for the subwoofer. Adjust this range (B) according to the Speakers and Subwoofers specifications sheet for the low frequency, to avoid overload at unsupported low frequencies. For the Main speakers, the low frequency of the range defines the bass management crossover for this group. You can also adjust the max support frequency (max is 150 Hz).
- Subwoofers will usually offer the widest Support frequency range. Depending on the Sub location and type, it might be preferred to limit their high frequency cut so to not be able to hear and locate them. ART acts down to 20 Hz. It is possible to extend the Speaker/Subwoofer response to the infra bass by clicking the (C) box and adjust range to 20 Hz. System will go down to 10 Hz.
- Selecting a Group activates filters, as many as dots shown in (D) with a max possible number that will depend upon the unit and the speaker configuration defined. With this limit, not all Groups can be Support. Some arbitration might be required.

## 15. Target Curve

In Dirac Live® ART, just as in other Dirac Live® modes, the color and balance of the sound is set through a target curve. In ART mode the target curve is set per Speaker group considering the input signal:

- You can adjust the correction window by moving the curtain (E) for the high frequencies. Low frequencies are defined by the overall extension that all Support groups can offer (20 Hz here).
- The input target curve shows the coloration for the complex summation of the Main speaker high-range above 150 Hz and a mix of the Main speaker (in its working range), the subwoofers and all Support speakers within their capability range below 150 Hz.
- The target curve defaults to a flat correction that can be adjusted. Changing (F), it will be possible to either use the auto-target feature with the (G) adjustments for low and high frequencies or by defining adjustable points. You can add points by right-clicking on the target curve and select "Add control point to". You can also download StormAudio proposed target curves in our [Download Center](#).
- 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.

It is possible to save or load target curve through the menu (H). 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 (I). Save the Target Curve through the Menu (H) for use in another channel or for other future use. Repeat for all speakers groups and then press Calculate (J) so the ART filters got calculated.

Note that calculation can take up to 15mn.

### 16. Corrected response

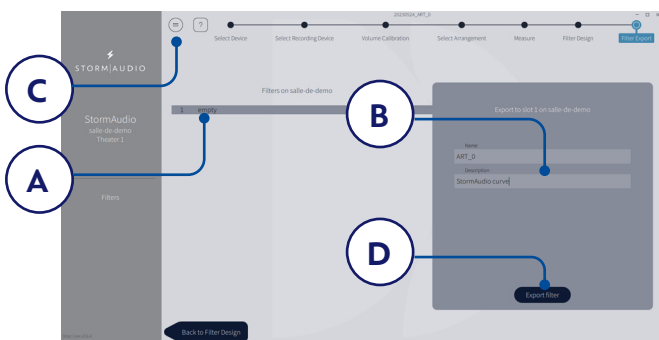
After the ART filters calculation is done, select the "Corrected" check-box in the plot options (A) to show the estimated input magnitude response for the selected channel. The corrected curve should conform to the target curve, as illustrated below.



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

### 17. Export Filters to ISP/ISR

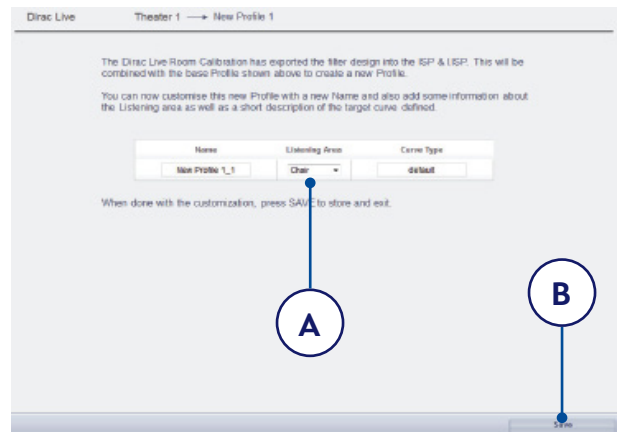
In this last step, filters created in previous steps are exported to the ISP/ISR and combined into the new profile selected "5. Select Base Profile" on page 32.



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/ISR Web UI.

### 18. Return to ISP/ISR web UI

A popup has been updated to confirm that you wish to combine the Dirac Live



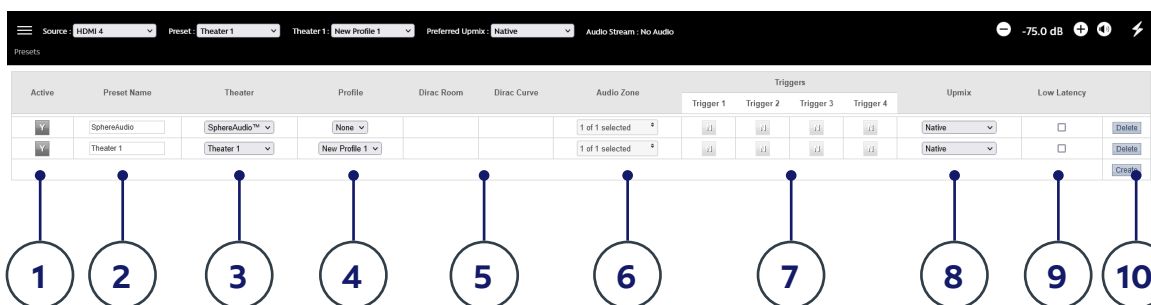
corrections with the base profile. The Name and Description Target curve can be changed using Latin-1 table characters. We also recommend to select the correct listening area that you used to make the Dirac Live® measurements (A). Click save (B) to continue. For corrections made to a zone, options are 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 "Audio Profiles" on page 20.

# Immersive Sound Processor and Receiver



## 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/ISR - a highly complex and capable theater controller - extremely simple and enjoyable to operate. For each new audio profile configured, a Preset gets automatically created. Each preset includes the following settings:

### 1. 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.

### 2. Preset Name

Name 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.

### 3. Theater

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

### 4. Profile

Each theater can have multiple audio 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 audio profile was created with Dirac Live®, the listening area and curve description you entered in "18. Return to ISP/ISR web UI" on page 36 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 41, 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. Low Latency

In some use cases, it might be required that the audio latency gets reduced to its minimum, such as for Karaoke or live music sessions. In such case, it is possible to select the Low Latency mode that will help reduce the latency to below 15ms. Downside to this reduced latency is the deactivation of part of the post processing such as Dirac filtering. If the Theater was calibrated using Dirac, it might therefore be recommended to at least create a new blank audio profile and adjust the bass management and potentially some manual PEQs to meet expected sonical performance and create the related Preset.

*Note: only RCA analog inputs or HDMI (forced to LPCM digital via EDID) can be used in the Low Latency mode. Selecting a source with Coaxial/Optical audio input will disable the Low Latency mode as we cannot know whether it is LPCM or RAW stream. Also, no decoding nor upmixing is possible.*

### 10. Delete / Create

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

## Settings

The ISP/ISR includes a variety of system-wide 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/ISR and any attached devices. These are only accessible to those with Installer level access or Expert User if assigned by the Installer.

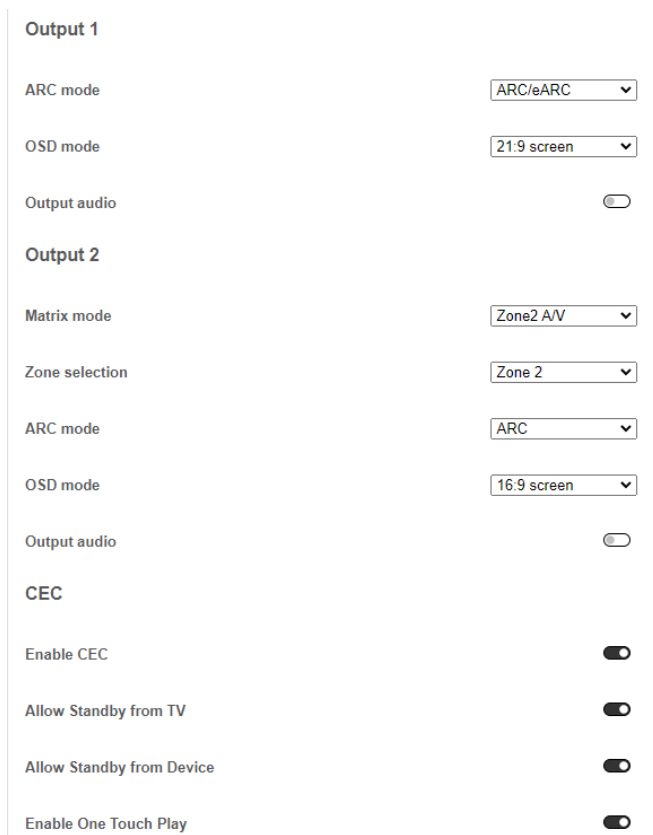


### HDMI

There are two HDMI Output ports in any ISP/ISR.

- **HDMI Out 1** port is linked to the Main Theater audio path
- **HDMI Out 2** port can follow HDMI Out 1 content, be linked to an Audio Video Zone defined in the ISP/ISR or used to provide an unprocessed HDMI source to a TV or processor.

Below adjustments are available to adjust these two ports to match your audio video system requirements.



#### Output 1:

- **ARC Mode:** it is possible to get the audio from a TV connected to HDMI Out 1 through the HDMI cable. Select which mode you want to allow

your TV set to provide through the link between ARC alone (Audio Return Channel) or ARC/eARC (enhance ARC). eARC allows for HiBitRate audio transmission, carrying Dolby Atmos and DTS:X stream.

- **On Screen Display (OSD):** it is possible to enable the On Screen Display function of the ISP/ISR to show status information in the screens with two positions to fit the best way 16:9 or 21:9 screens ratio.
- **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/ISR output(s).

#### Output 2 - Matrix mode:

- **Mirror Mode:** In this mode, the two HDMI outputs will provide the same video content coming from the Main theater source selection.
- **Zone2 AV Mode:** In this mode, the HDMI Out 2 can be linked to an Audio Video Zone that would have been defined as described in section "4. Audio Zones" on page 20. The video content played on HDMI Out 2 would depend on the Zone2 source selected and the "Use Zone2 source" mode chosen in the Remote Controls.
- **Pass Through Mode:** In this mode, the HDMI Out 2 will have its own independant source selection amongst defined HDMI sources. When selected, the HDMI source is directly routed to the HDMI OUT 2 unprocessed, allowing for decoding and processing to be made either on the connected TV or processor.

#### Output 2 - Other settings:

- **Zone selection:** When in Zone2 AV Mode, you need to define which Audio Video Zone is linked to HDMI Out 2 port so audio and video path are matching.
- **ARC Mode:** it is possible to get the audio from a TV connected to HDMI Out 2 through the HDMI cable. Select ARC if you wish to allow for a corresponding source definition as described in "Input Settings" on page 16.
- **On Screen Display (OSD):** as for HDMI Out 1, select the desired OSD mode on HDMI Out 2.
- **HDMI output audio:** as for HDMI Out 1, select whether you desire the Zone2 audio to be fed to the HDMI Out 2 port. Note that it is not possible when in Pass Through Mode.

#### CEC (HDMI Output 1 only):

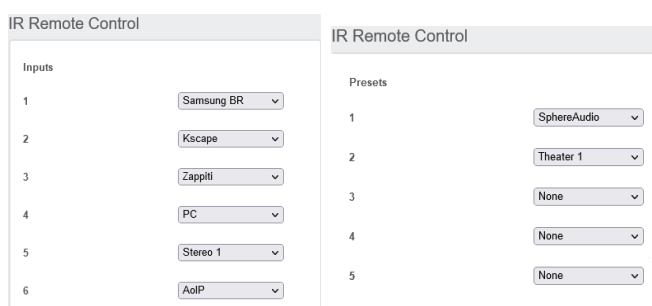
- **Enable CEC:** involves activation of Fast Boot mode (see System Setup) and will provide Volume control function.

## Immersive Sound Processor and Receiver

- **Allow standby from TV:** will add the ISP/ISR power On / Off control through TV commands
- **Allow standby from Device:** will add the ISP/ISR power On / Off control through Device commands.
- **Enable One Touch Play:** will allow auto switch to the correct ISP/ISR input when TV / Device gets activated.

### 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.

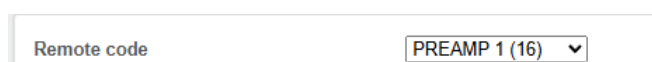


The ISP/ISR offers a front panel remote sensor. In case of a rack mount usage, it is also possible to use the back panel IR jack 3.5mm input to connect to remote IR sensor. It is also possible to daisy chain the input to the output jack to connect a IR blaster.

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



Two remote system codes are available: 16 (default) and 19. When two products share the same 16 system code, use the 19 for the ISP. Note that in this case, the ISP/ISR won't react to the StormAudio remote control, but can react to 19 via the back panel jack.



Group	Command name	System	Command
POWER	POWER ON	16	29
	POWER OFF	16	30
CONTROL	DISPLAY	16	71
	INFO	16	15
	UP	16	80
	LEFT	16	85
	HOME	16	82
	RIGHT	16	86
	DOWN	16	81
	EXIT	16	83
INPUTS	INPUT 1	16	1
	INPUT 2	16	2
	INPUT 3	16	3
	INPUT 4	16	4
	INPUT 5	16	5
	INPUT 6	16	6
	INPUT BACK	16	33
	INPUT NEXT	16	32
VOLUME	VOL UP	16	16
	VOL DOWN	16	17
	MUTE	16	13
PRESET	PRESET 1	16	67
	PRESET 2	16	68
	PRESET 3	16	69
	PRESET 4	16	70
	PRESET 5	16	72
	PRESET +	16	47
	PRESET -	16	48
PREFERRED UPMIX	NATIVE	16	94
	STEREO	16	95
	DOLBY SURROUND	16	91
	DTS NEURAL:X	16	92
	AURO-MATIC	16	93
	STORMXT	16	96

The ISP/ISR IR code table has been added to Harmony Logitech database. It is therefore possible to create Activities involving the ISP/ISR 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.

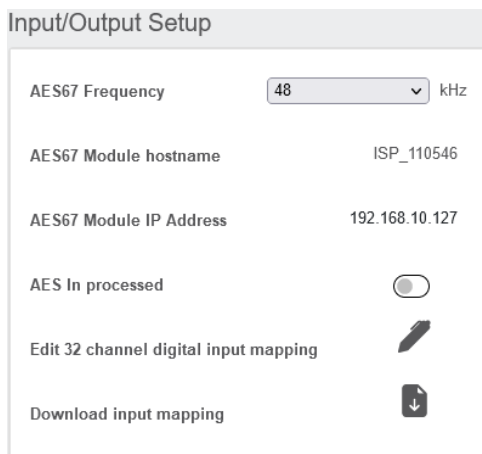
Do not connect directly to the Harmony Hub using a jack to jack cable as this can harm the

ISP/ISR IR internal circuitry, use only IR receiver/transmitter.

When using IR to control the ISP/ISR, we recommend activating the Fast Boot mode in “System Setup” on page 41 to ensure there is no loss of IR commands while the ISP/ISR powers up, especially when using Logitech Harmony and the IR sequences it may generate.

## Input/Output Setup

With the Optional 16ch AES/EBU Digital Input and Digital 32ch I/O AoIP modules installed (ISP Elite and Evo models), multiple parameters need to be set, as shown below.

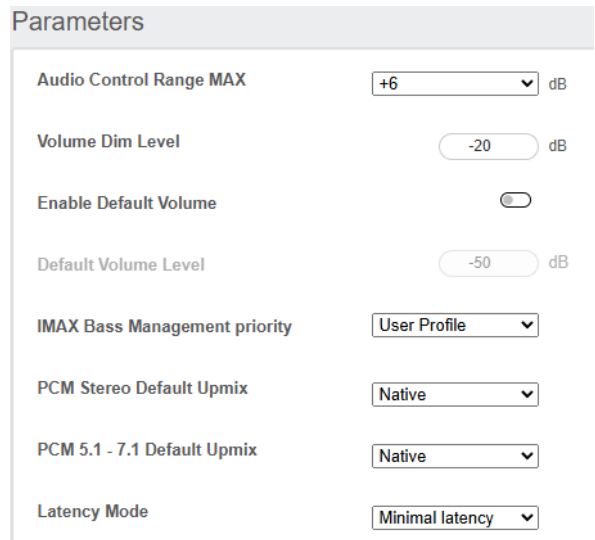


- **AES In processed:** Defines whether the upmixing capability is enabled (<8ch input) or bypassed, so Processed/Upmixed with your Preferred Upmix or only post-processed up to 32ch respectively. In case of Processed enabled, the channel mapping is fixed: L, R, C, LFE, Ls, Rs, Lb, Rb. In case of bypass mode, see “16/32 channel digital input mapping” section below. Note that Lb/Rb are equivalent to Lrs/Rrs of DCI specifications.
- **AES67 Frequency:** With the Digital AoIP module, it is necessary to indicate what the network Sampling Rate is to allow for a stream to be defined. Choose between 48 kHz or 96 kHz.
- **AES67 Module hostname:** This is the name given to the module at the factory. It is adjustable in the AoIP module specific WebUI. Consult our Knowledge Base and the dedicated AoIP module documentation for more information.
- **AES67 Module IP address:** The AoIP module comes by default in DHCP. When connected to the network, you'll find here the IP address that was automatically assigned, necessary for you to identify the module and define streams. Note

that clicking on the IP address will open the AoIP module WebUI in another browser tab.

- **16/32 channel digital input mapping:** The channel mapping between the audio server and the ISP defined theater might not match. Selecting EDIT will provide access to a mapping matrix allowing you to remap the signals accordingly.
- **Download input mapping:** you can download the input mapping as a spreadsheet.

## Parameters



- **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/ISR 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.
- **IMAX Bass Management priority:** The “IMAX default” mode follows the IMAX® Cinema recommendations with a Bass Management adjusted with a fixed 70 Hz crossover to any speakers, with no bass redirection to the subwoofers that will only reproduce the LFE signal. This mode is therefore only recommended if your system can accept such adjustments. If Dirac Live with Bass Control was used to calibrate the room, the Bass Control portion will be disabled and only the speakers filtering will remain in use. If the Bass Management was manually configured either in Standard or Expert mode, it will be overridden by these settings whenever IMAX®

## Immersive Sound Processor and Receiver

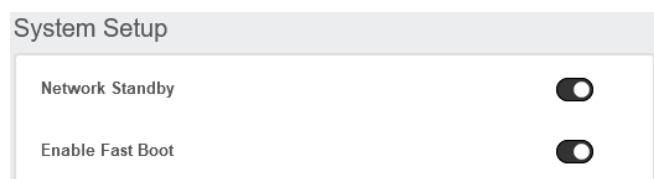
content is played. If you wish to keep the Dirac Live Bass Control correction or your own Bass Management setup, please select "User profile" so your Bass Management remains unchanged.

- **PCM Stereo Default Upmix:** When the Native Upmix is selected for a given preset Preferred Upmix setting, the detection of a Sterem PCM stream will activate the upmix defined here.
- **PCM 5.1 7.1 Default Upmix:** When the Native Upmix is selected for a given preset Preferred Upmix setting, the detection of a 5.1 or 7.1 PCM stream will activate the upmix defined here.
- **Latency mode:** The decoding is a process that create latency to the system. This latency can vary from codec to codec. Most of the time, it is preferable to have a constant latency whichever codec is played to ensure correct lipsync. But in some cases, such as with gaming, it might preferable to minimize this latency. In the latter use case, select Minimal Latency.

- **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.
- **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.

### System Setup

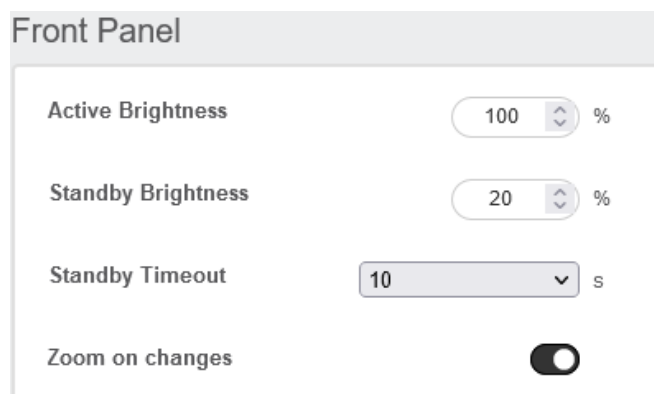
To control the ISP/ISR using the iPad StormRemote App or Control Systems via TCP/IP, the Network should remain active at all times.



- **Network standby:** Enable the Network Standby (On) to allow for control via IP when in Standby. Note that the standby consumption will be higher.
- **Enable fast boot:** this mode will substantially decrease power on time of the ISP/ISR at the expense of greater standby power consumption.

### Front Panel

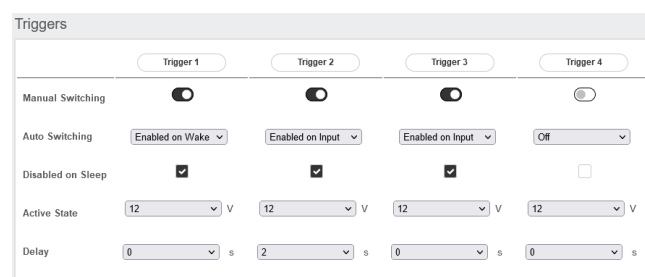
Settings that govern behavior of the front panel screen.



- **Active Brightness:** Brightness of the screen when the screen is actively being used.

### Triggers

The ISP/ISR 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/ISR is powered on from standby. It will not automatically deactivate the trigger when the ISP/ISR 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 "10. Triggers" on page 17. "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/ISR 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

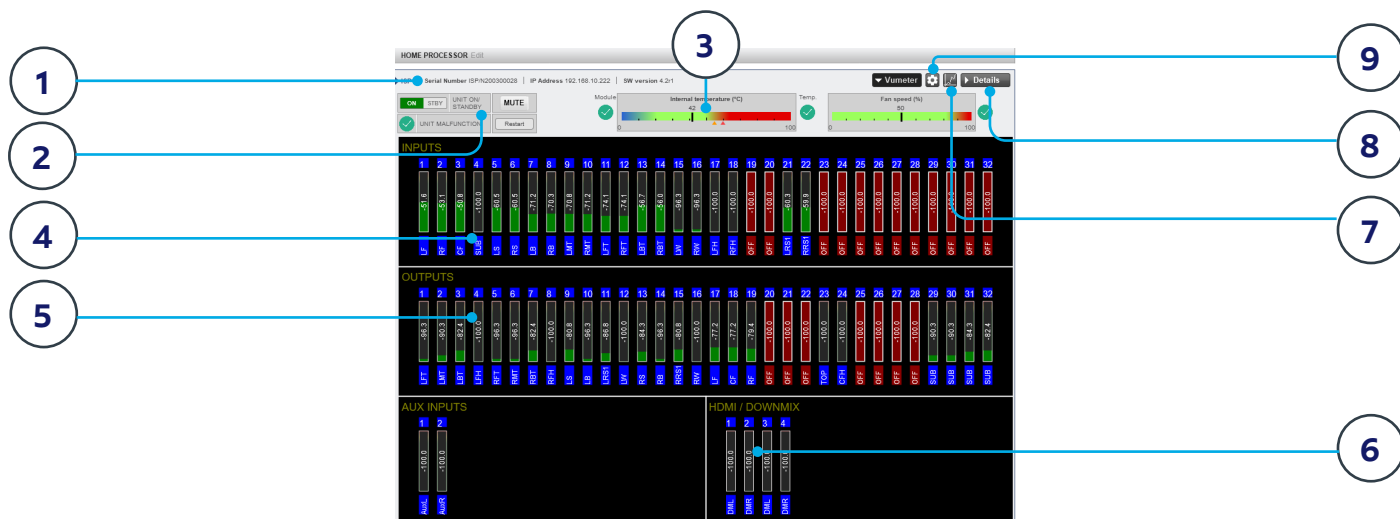
triggers may be daisy chained so that only once the preceding amplifier is fully powered does the following amplifier initiate it's power up sequence thereby obviating the need for a delay (or multiple triggers) when using modern StormAudio amplifiers.

## Zone Settings

Zone Settings					
AV Zone		Delay	A/V	Ref Volume	Max Volume
Theater 1	Auto lipsync <input type="checkbox"/>	<input type="text" value="0"/> ms	<input checked="" type="checkbox"/>	<input type="text" value="-30"/> dB	<input type="text" value="0"/> dB (8.696 V)
Theater 2	Auto lipsync <input type="checkbox"/>	<input type="text" value="0"/> ms	<input checked="" type="checkbox"/>	<input type="text" value="-30"/> dB	<input type="text" value="0"/> dB (8.696 V)
Downmix		<input type="text" value="0"/> ms	<input type="checkbox"/>	<input type="text" value="-40"/> dB	<input type="text" value="0"/> dB (8.696 V)

- AV Zone Delay adjustment:** Each Theater or Audio Zone when A/V is turned on can have audio delay adjusted within a range of 250ms. This adjustment can be made either manually using the delay adjustment in ms steps or automatically using the HDMI Auto Lipsync feature. When Auto Lipsync is ticked, the delay adjustment is overridden by a value of the delay deduced from the signal chain through the HDMI communication link. It has to be noted that Auto Lipsync can only work if all devices in a HDMI chain is supporting this feature. Please contact the device maker for compatibilty verification.
- Ref volume:** When using the Adaptive Loudness feature, a reference level is required. This level is by default adjusted at -30dB volume level. For the Adaptive Loudness to work properly, one must adjust the reference level at the closest sound pressure level that was used during the mixing of the soundtrack. Usually, this level will vary from 72 to 85 dB SPL, 78 dB being a good average level corresponding to a typical mix for a residential use. You can adjust the level here or using the SPL meter in the Speaker page. Refer to "13. Volume Reference" on page 22 for more informations.
- Max volume:** When there is a need to limit the global output level of the system, it is possible to use the Max Volume parameter. By default, it is set to the maximum volume control allowed (0 dB) but can be adjusted to any level required. To ease the matching to a max sensitivity requirement of an amplifier, the output level is also given in the corresponding RMS output level (max 21 dBu / 9Vrms).

# Immersive Sound Processor and Receiver



## Monitoring

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

### 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 web browser. For smart phones or tablet, it is recommended to use our dedicated applications running on both iOS and Android (see "StormRemote App" on page 46).

### 1. Input Select

Any inputs enabled on the Inputs setup page will appear here titled according to your setup. See "Input Settings" on page 16. 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 40.

- **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. Adaptive Loudness

Content is usually created at a reference level, such as 80 to 85 dB SPL. Ear sensitivity varies quite much: the lower the level, the less sensitive to lower frequencies we are. To maintain the same balance as defined by the sound engineer in his studio at any level, a compensation is then required: an Adaptive Loudness. Three modes are offered: Full (as intended by the author), Medium and Low. While changing the volume, compensation will be dynamically applied. See "13. Volume Reference" on page 22 or "Zone Settings" on page 42 to adjust the Reference Level of your system, usually the level you calibrated your system at.

### 6. 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/ISR includes multiple theaters, you should have presets available for each. See "Presets" on page 37.
- **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.

# Immersive Sound Processor and Receiver

- Dolby Surround, DTS Neural:X and Auro-Matic will force any legacy surround audio into one of these 3 formats. Immersive source audio will be rendered natively and this selection will be grayed out.
- **STORMXT:** Depending on the codec played, some speakers can become silent. By activating StormXT, adjacent channels are analysed to separate ambiance from direct sound. This ambiance sound is then redirected to the silent speakers, offering a smooth reproduction from speakers to speakers, without degrading spatial resolution.
- **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.
- **IMAX Mode:** The ISP/ISR is IMAX<sup>®</sup> Enhanced certified and can render IMAX<sup>®</sup> Enhanced optimised content. To enable IMAX<sup>®</sup> Enhanced, select "Auto". Whenever a content is flagged IMAX<sup>®</sup> Enhanced, the decoder will automatically render the stream properly with all required post-processing. Turning it "OFF" will always disregard IMAX<sup>®</sup> Enhanced specific content.
- **DTS Dialog Norm:** With some DTS soundtrack, a dialog normalization level might have been defined to allow for proper channels level alignments. Select "On" to automatically apply this when detected. When "Off" this feature will be bypassed.
- **Center Spread:** When the Dolby Surround preferred upmix is selected, you can decide to activate the Center Spread function. When "Off", dialog are mostly reproduced by the Center channel. When "On", dialog will also be reproduced by the L/R speakers. Usually, "On" is appropriate for Music content upmix, while "Off" is more adequate for Movies or TV playback.

## 7. Triggers

Any triggers configured for Manual Switching (see "Triggers" on page 41) will have a button available here. Clicking one of these buttons will toggle the trigger and therefore the connected device.

## 8. 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.
- **LFE Enhance:** Adjust the level of the LFE signal 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 timber (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 ("9. AV Delay" on page 17) or for the entire theater ("Zone Settings" on page 42).

## 9. Zone2 Control

When activated through "Presets" on page 37, auxiliary zones can be controlled and adjusted here (9a). You may choose them from the dropdown menu (9c) and individually adjust volume, bass, treble, mute for each A/V and Headphone zones, include a temporary lipsync adjustment and select Audio Profile.

A secondary input can be selected for the Zone2 auxiliary audio zones (9d), 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 (9b).

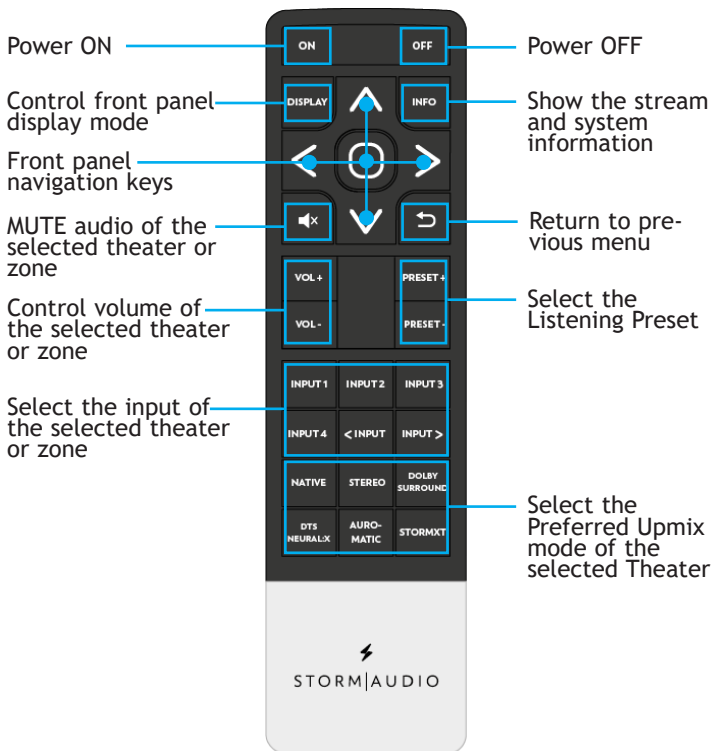
## 10. HDMI Pass Through

When the HDMI Matrix mode has been set to Pass Through (see "HDMI" on page 38), a new source selector will become visible in the remote control page. All sources defined with a HDMI path will be available for selection and routing to the second HDMI output port.

## Independent Remote Control

The IR control unit operates effectively within a distance of 23 feet (7 meters) and an angle of 30° from the processor. Using the control near fluorescent lights may shorten this range, as will any dust or dirt that accumulates on the front of the remote control or the remote-sensor area of the processor. Also, avoid blocking the line of sight between processor and remote.

Install the two supplied AAA batteries in the remote as shown. Be certain to follow the (+) and (-) polarity indicators that are on the top of the battery compartment.



## Disposal Of Used Batteries



These symbols shown on the product, the packaging or in the manual or separate information sheet mean that the product itself, as well as the batteries included or built into the product, should never be thrown away with general household waste. Take them to applicable collection points, where proper treatment, recycling and recovery takes place, in accordance with national or local legislation, or European Directives 2002/96/EC and 2006/66/EC.

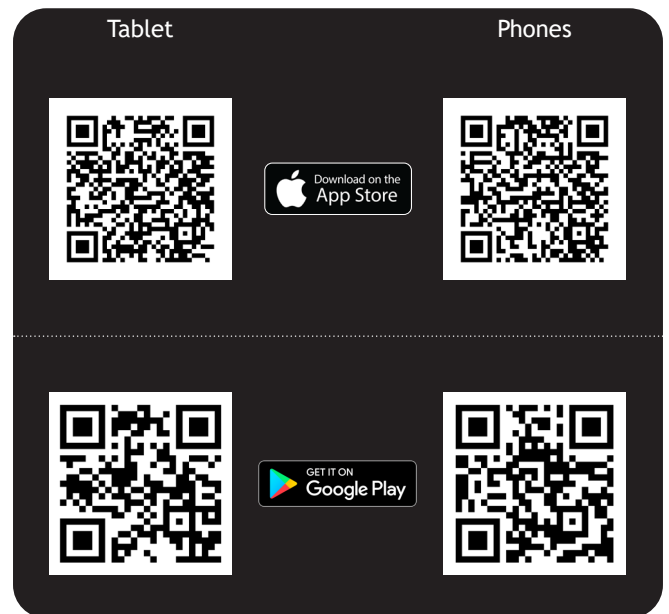
Correct handling of the product and batteries to be disposed helps save resources and prevents possible negative effects on the environment or human health.

The batteries included with your equipment may be alkaline or carbon zinc/manganese. All types should be disposed of according to the above instructions.

To remove the batteries from your remote control, reverse the procedure described in previous page for inserting batteries.

## StormRemote App

Apple iPad and Android users can download the StormRemote app from the Stores and control their ISP as in the web UI remote control.

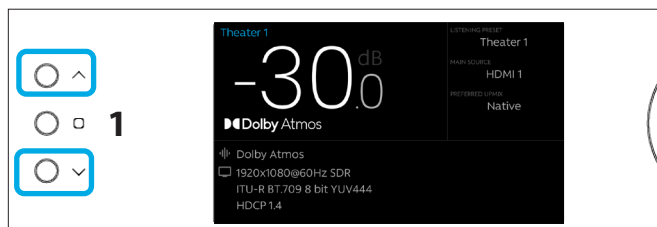


# Immersive Sound Processor and Receiver

## Front panel display control

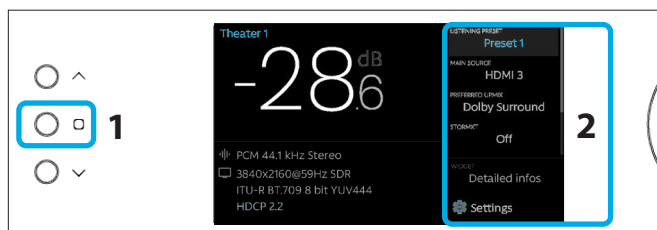
The front panel display offers a wide range of useful product activity information, being active Theater or Zone info, Volume level and stream info. The display can actually be used for more interactions as described in below sections.

## Theater / Zone playback info



1. Using the Up and Down buttons, it is possible to access the playback information of the current Theater and available Audio Zones that were created so far. The name of the current Theater/Zone is shown on the top left corner.

## Adjustment panel

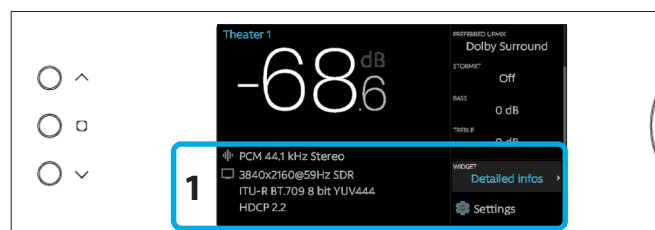


1. Using the Home button gives access to the adjustment panel on the right side of the display.
2. With the panel selected, the first item, Preset, will be highlighted and adjustable using the Volume knob. Once the expected Preset has been selected, you can validate Pressing the volume knob or using Up / Down button to move to next item. To exit press Home button (1) or you can adjust in the same way: Input , Preferred Upmix, StormXT, Bass and Treble, Widgets and Settings.

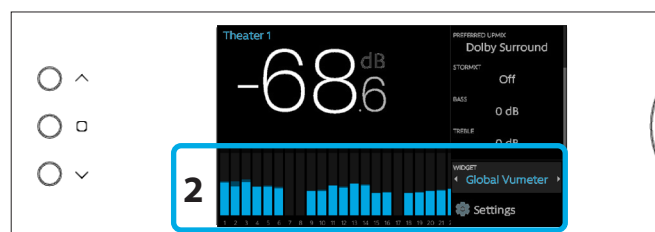
## Widgets

Following above steps, select the Widget item. The Widget corresponds to the bottom part of the display where various informations can be shown. Using the Volume knob will allow for selecting between 3 modes: Detailed info, Global Vumeter and Room Vumeter.

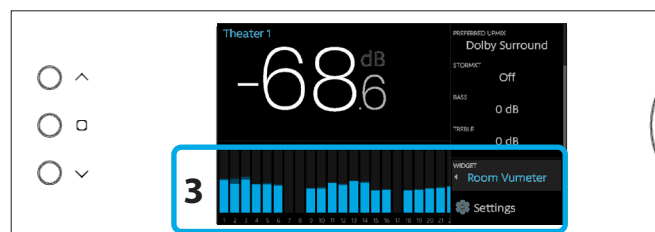
1. Detailed info provides important information on the audio and video stream currently played.



2. Global Vumeter shows the level (Vumeter) of all the channels available on your ISP/ISR.

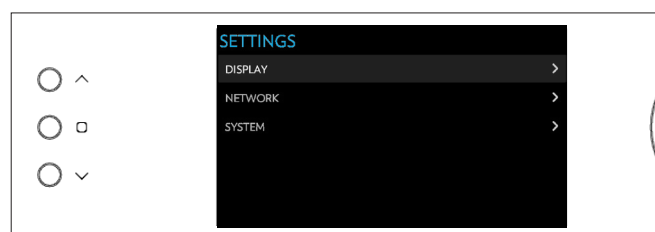


3. Room Vumeter shows the level (Vumeter) of the channels used only in currently selected Theater / Zone.

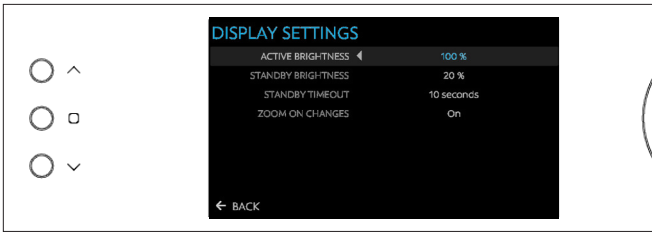


## Settings

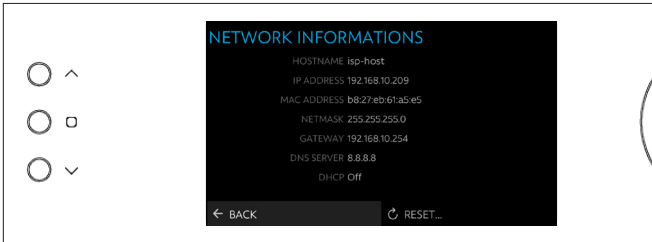
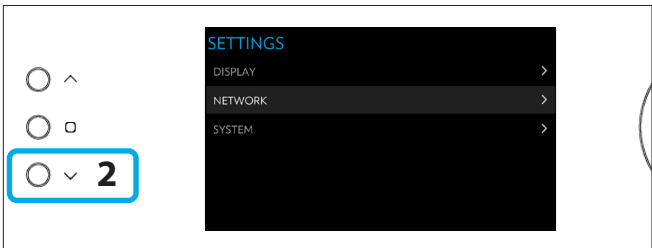
Selecting the last item Settings will give access to some more adjustments: Display, Network and System.



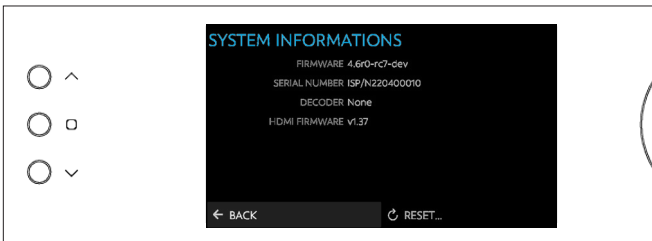
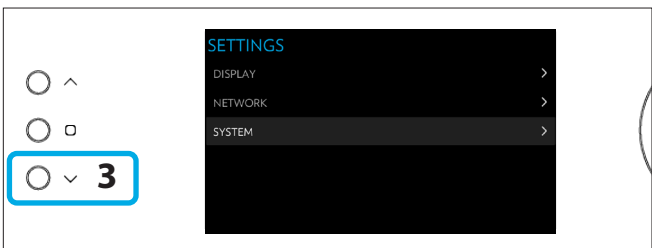
1. Select the Display item. This will allow you for adjusting the Active Brightness (brightness when changing volume or using the front panel buttons), the Standby Brightness (brightness when there is no control activity), Standby Timeout (the time it stays in Active Brightness) and Zoom on Changes (whether there is a specific highlight when a parameters gets changed by a control action).



2. Select the Network item and press the Volume knob to validate. This will give access to the Network informations and also reset the network parameters. Select Back to exit.



3. Select the System item to get access to important system information such as Firmware version, product serial number, decoder or HDMI firmware revision . Select Back to exit.

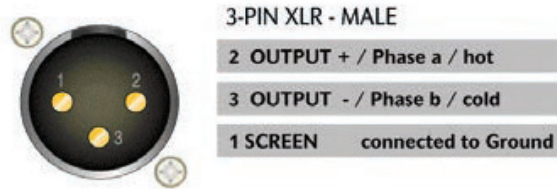


# Immersive Sound Processor and Receiver

## Wiring Recommendations

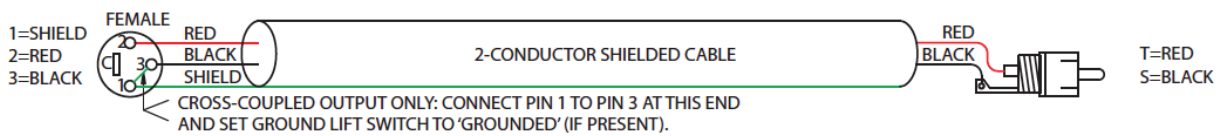
### 1. XLR pin out

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



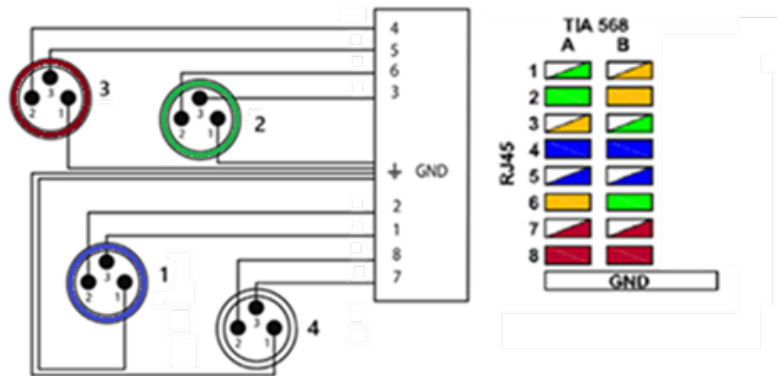
### 2. XLR to RCA unbalancing cable

In some cases, it might be required to connect to amplifiers 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 according to AES/EBU Type 1E, not grounded wiring. The pinout of the RJ45 connectors on the ISP is described herewith with the corresponding XLR connector wiring and color code used in StormAudio breakout cable available for order.

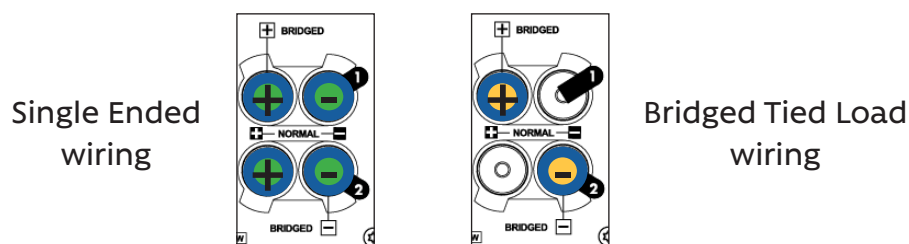


### 4. USB ports

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.

### 5. ISR Fusion amplifier outputs modes: Single Ended vs Bridge Tied Load

Single Ended mode and Bridge Tied Load require different wiring schemes. Please refer to below illustrations to correctly wire your system. Channels 1/2 are shown, but it is applicable to 5/6 and 9/10 too.



## Acknowledgements

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# Immersive Sound Processor and Receiver

## Specifications - ISP ELITE

### Audio

Audio Formats	up to 24ch (13.1.10), 192 kHz Dolby Atmos, DTS:X Pro, IMAX® Enhanced, Auro3D, MPEG-H, all Legacy codecs StormXT
Audio Inputs	16ch (AES/EBU) optional 32ch (AoIP) 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 AoIP) optional 1x Optical Toslink for Zone2 (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/Oc- tave, Linkwitz-Riley and Butterworth
Equalization per Channel	up to 20 band PEQ REW plugin
Calibration	Dirac Live suite

### HDMI

Inputs / Outputs	7 / 2 (matrix is 4K only)
Input Specs	7 ea. HDCP2.3 / HDMI2.1
Output Specs	2 ea. HDCP2.3 / HDMI2.1 ARC/eARC on HDMI Out1 ARC on HDMI Out2 On screen Display
Max Resolution	Up to 4K120 4:2:2 10 bit / 8K60 RGB/4:4:4/4:2:2 in DSC 1.2 mode 40 Gpbs all ports
HDR	HDR10, Dynamic HDR, HDR10+, Dolby Vision & HLG
Deep Color Support	12bpc
CEC	One Touch Play (ISR -> TV), System Standby, System Audio Control and Audio Return Channel Control.

### Control

Control Modules	Crestron and Crestron Home Control4 RTI Savant NICE URC
IR	Front panel sensor Rear panel I/O, jack 3.5mm Remote control handset
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 Android App : remote control
Network	100 Mbps Ethernet

### Power Supply

Type	Universal
Range	100 to 240V, AC signal
Max consumption	240W   818.91 BTU/h

### Weight and Dimensions

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

### 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 AoIP Input/Output	32 channel AES67 I/O module (2x RJ45)
16ch Digital AES Input	16 channel AES/EBU input module (2x RJ45) DCI compatible

## Specifications - ISP EVO

### Audio

<b>Audio Formats</b>	up to 24ch (13.1.10)*, 192 kHz Dolby Atmos, DTS:X Pro, IMAX Enhanced, Auro3D, MPEG-H, all Legacy codecs StormXT
<b>Audio Inputs</b>	16ch digital (AES/EBU) optional up to 32ch digital (AoIP)* 4x RCA analog (7.1 or 2.0) 1x XLR analog (stereo) 3x Coaxial (SPDIF) 3x Optical (Toslink)
<b>Streaming</b>	ROON Ready
<b>Post-Processed Outputs</b>	up to 32ch*, 48 kHz
<b>Audio outputs</b>	up to 32ch digital (AES/EBU or AoIP)* 1x Optical Toslink for Zone2 (Downmix)
<b>Bass Management</b>	Multiple subwoofers Per channel crossover Standard and Expert
<b>Multi-way speaker XO</b>	Up to 4-Way speakers 6, 12, 18, 24, 36, 48 dB/ Octave, Linkwitz-Riley, Bessel and Butterworth
<b>Equalization per Channel</b>	up to 20 band PEQ REW plugin
<b>Calibration</b>	Dirac Live suite

\* depends on ISP EVO model

### HDMI

<b>Inputs / Outputs</b>	7 / 2 (matrix is 4K only)
<b>Input Specs</b>	7 ea. HDCP2.3 / HDMI2.1
<b>Output Specs</b>	2 ea. HDCP2.3 / HDMI2.1 ARC/eARC on HDMI Out1 ARC on HDMI Out2 On screen Display
<b>Max Resolution</b>	Up to 4K120 4:2:2 10 bit / 8K60 RGB/4:4:4/4:2:2 in DSC 1.2 mode 40 Gpbs all ports
<b>HDR</b>	HDR10, Dynamic HDR, HDR10+, Dolby Vision & HLG
<b>Deep Color Support</b>	12bpc
<b>CEC</b>	One Touch Play (ISR -> TV), System Standby, System Audio Control and Audio Return Channel Control.

### Control

<b>Control Modules</b>	Crestron and Crestron Home Control4 RTI Savant NICE URC
<b>IR</b>	Front panel sensor Rear panel I/O, jack 3.5mm Remote control handset
<b>DC Trigger</b>	x4, jack 3.5mm Software assignable to inputs, presets, on/standby or ma- nual operation
<b>Applications</b>	WebUI: Setup & remote control iOS App: remote control Android App : remote control
<b>Network</b>	100 Mbps Ethernet

### Power Supply

<b>Type</b>	Universal
<b>Range</b>	100 to 240V, AC signal
<b>Max consumption</b>	240 W   818.91 BTU/h

### Weight and Dimensions

(net product)

<b>L x W x H (cm / inches)</b>	42 x 47.90 x 15.50
<b>with rack ears mounted</b>	16.53 x 18.86 x 5.91
<b>Weight</b>	8.3 KG   17.6 LBS

### Options

<b>UMIK-1 Microphone</b>	USB microphone. Allows for Monitoring, Calibration and RTA func- tion.
<b>16ch Digital AES Input</b>	16 channel AES/EBU input module (2x RJ45) DCI compatible (for AES/EBU model only)

# Immersive Sound Processor and Receiver

## Specifications - ISP CORE 16

### Audio

Audio Formats	16ch (9.1.6/11.1.4), 192 kHz Dolby Atmos, DTS:X Pro, IMAX Enhanced, Auro-3D, MPEG-H, all Legacy codecs StormXT*
Audio Inputs	4x RCA analog (7.1 or 2.0) 3x Coaxial SPDIF 3x Optical Toslink
Streaming	ROON Ready
Post-Processed Outputs	16ch, 48 kHz
Audio outputs	16ch analog (XLR) 1x Optical Toslink for Zone2 (Downmix)
Bass Management	Multiple subwoofers Per channel crossover Standard and Expert Flexible bass routing*
Multi-way speaker XO	6, 12, 18, 24, 36, 48 dB/ Octave, Linkwitz-Riley, Bessel and Butterworth
Equalization per Channel	up to 20 band PEQ REW plugin
Calibration	Dirac Live suite

\* optional features, consult your reseller

### HDMI

Inputs / Outputs	7 / 2 (matrix* is 4K only)
Input Specs	7 ea. HDCP2.3 / HDMI2.1
Output Specs	2 ea. HDCP2.3 / HDMI2.1 ARC/eARC on HDMI Out1 ARC on HDMI Out2 On screen Display
Max Resolution	Up to 4K120 4:2:2 10 bit / 8K60 RGB/4:4:4/4:2:2 in DSC 1.2 mode 40 Gpbs all ports
HDR	HDR10, Dynamic HDR, HDR10+, Dolby Vision & HLG
Deep Color Support	12bpc
CEC	One Touch Play (ISR -> TV), System Standby, System Audio Control and Audio Return Channel Control.

\* optional features, consult your reseller

### Control

Control Modules Available	Crestron & Crestron Home Control4 RTI Savant NICE URC
IR	Front panel sensor Rear panel I/O, jack 3.5mm
DC Trigger	x4, jack 3.5mm, 12V DC Software assignable to inputs, presets, on/standby or manual operation
Applications	WebUI: Setup & remote control iOS App: remote control Android App : remote control
Network	100 Mbps Ethernet

### Options

UMIK-1 Microphone	USB microphone. Allows for Monitoring, Calibration and RTA function.
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### Power Supply

Type	Universal
Range	100 to 240V, AC signal
Max consumption	200W   682.44 BTU/h

### Weight and Dimensions

(net product)

L x W x H (cm / inches) with rack ears mounted	42 x 47.90 x 15.50 16.53 x 18.86 x 5.91
Weight	8.3 KG   17.6 LBS

## Specifications - ISR FUSION 20

### Audio

Audio Formats	up to 20ch (11.1.8), 192 kHz Dolby Atmos, DTS:X Pro, IMAX Enhanced, Auro3D, MPEG-H, all Legacy codecs StormXT
Audio Inputs	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 20ch, 48 kHz
Audio outputs	16ch amplified analog (binding posts) 4ch analog (XLR) 1x Optical Toslink for Zone2 (Downmix)
Bass Management	Multiple subwoofers Per channel crossover Standard and Expert Flexible bass routing
Multi-way speaker XO	6, 12, 18, 24, 36, 48 dB/ Octave, Linkwitz-Riley, Bessel and Butterworth
Equalization per Channel	up to 20 band PEQ REW plugin
Calibration	Dirac Live suite

### HDMI

Inputs / Outputs	7 / 2 (matrix is 4K only)
Input Specs	7 ea. HDCP2.3 / HDMI2.1
Output Specs	2 ea. HDCP2.3 / HDMI2.1 ARC/eARC on HDMI Out1 ARC on HDMI Out2 On screen Display
Max Resolution	Up to 4K120 4:2:2 10 bit / 8K60 RGB/4:4:4/4:2:2 in DSC 1.2 mode 40 Gpbs all ports
HDR	HDR10, Dynamic HDR, HDR10+, Dolby Vision & HLG
Deep Color Support	12bpc
CEC	One Touch Play (ISR -> TV), System Standby, System Audio Control and Audio Return Channel Control.

### Control

Control Modules	Crestron and Crestron Home Control4, RTI, Savant, NICE, URC
IR	Front panel sensor Rear panel I/O, jack 3.5mm
DC Trigger	x4, 12V DC, jack 3.5mm Software assignable to inputs, presets, on/standby or manual operation
Applications	WebUI: Setup & remote control iOS / Android App: remote control
Network	100 Mbps Ethernet

### Audio Amplifier Specifications

Mode	Single ended (SE)	Bridged Tied Load (BTL)
Power (1% THD+N, 8 ohm)*	150W	500W
Power (1% THD+N, 4 ohm)*	300W	500W
THD+N (5W)	< 0.003%	< 0.003%
SNR (p-rated, unweighted)	> 100 dB	> 100 dB

\* CEA-490-A-2006

### Electrical and Thermal Specifications

Type	Universal SMPS
Range	100 to 240V, T10AL fuse
Consumption:	
Max power (continuous)	2000 W
Max power (CEA-490)	2500 W   8530 BTU/h
Dissipation:	
At Max power	400W   1370 BTU/h
Cooling :	Provide sufficient space on each side of the product
3 FANs on right side	

### Weight and Dimensions

(net product)

L x W x H (cm / inches)	
With rack ears, no foot	46.58 x 48.05 x 17.60 18.11 x 18.89 x 6.70
No rack ears, with feet	46.58 x 44.2 x 19.35 18.11 x 17.32 x 7.48
Weight	17 KG   37.48 LBS

### Options

UMIK-1 Microphone	USB microphone. Allows for Monitoring, Calibration and RTA function.
-------------------	--

## Immersive Sound Processor and Receiver

### Specifications - HDMI outputs - all modes

Video Size	VIC No	Frame Rate	Pixel Clock	Output A Support Bit per Component	Output B Support Bit per Component	
3840 x 2160	93, 103	24	297	444 8/10/12bit	444 8/10/12bit	
	94, 104	25	297			
	95, 105	30	297			
	3840 x 2160	114, 116	48	594	444 8/10/12bit	444 8/10/12bit
		96, 106	50	594		
		97, 107	60	594	444 8/10bit, 422 8/10/12bit, 420 8/10/12bit	420 8/10/12bit (444/422 Not Support)
		117, 119	100	1188		
118, 120	120	1188				
4096 x 2160	98	24	297	444 8/10/12bit	444 8/10/12bit	
	99	25	297			
	100	30	297			
	4096 x 2160	115	48	594	444 8/10/12bit	444 8/10/12bit
		101	50	594		
		102	60	594		
	4096 x 2160	218	100	1188	444 8/10bit, 422 8/10/12bit, 420 8/10/12bit	420 8/10/12bit (444/422 Not Support)
		219	120	1188		
5120 x 2160	121	24	396	444 8/10/12bit	444 8/10/12bit	
	122	25	396			
	123	30	396			
	124	48	742.5	444 8/10/12bit, 422 8/10/12bit (420 Not Support)	Not Support	
	125	50	742.5	444 8/10/12bit	420 8/10/12bit (444/422 Not Support)	
	126	60	742.5			
	7680 x 4320	194, 202	24	1188	444 8/10bit, 422 8/10/12bit, 420 8/10/12bit	420 8/10/12bit (444/422 Not Support)
195, 203		25	1188			
196, 204		30	1188			
197, 205		48	2376	420 8/10bit	Not Support	
198, 206		50	2376			
199, 207		60	2376			
*444 8/10/12bit support, 422 8/10/12bit and 420 8/10/12bit also supported						



STORM|AUDIO



StormAudio | Immersive Audio Technologies  
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