Installer Guide

BRYSTON

SP4 SURROUND PROCESSOR

Optional Modules

BRYSTON

Options slots usage

16ch Balanced
Dual Theater
Expansion

16ch Unbalanced
RCA
Expansion

Welcome

What's In the Box
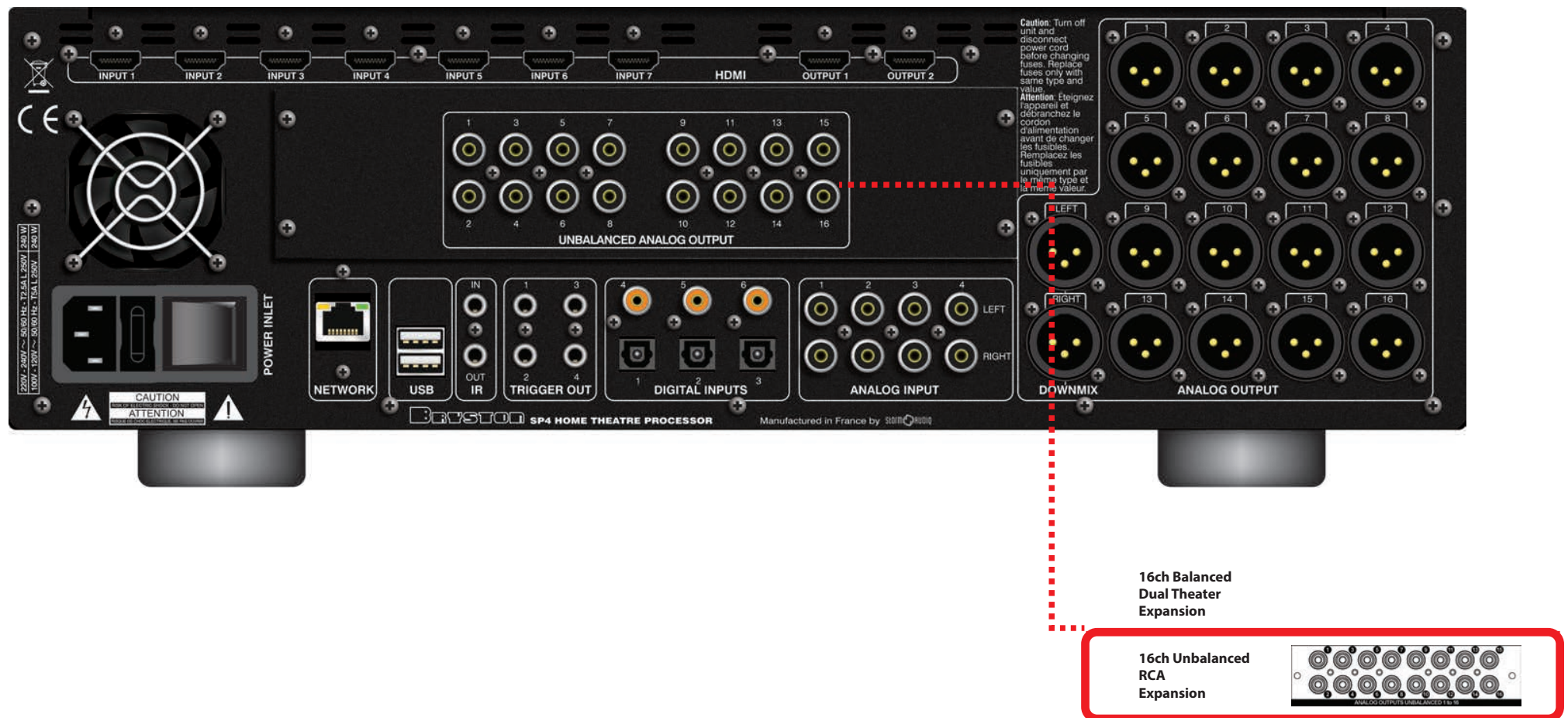
Thank you for choosing a Bryston SP4 Immersive Sound Processor. This guide provides step-by-step instructions for setting up your SP4.

This guide will describe the setup of the processor. The same process applies to other variants with options installed. Only the wiring and some elements of the setup will differ.

We continuously strive to improve our products. Some features might thus be added or be improved. Make sure to check whether the installed firmware version matches the installer guide version.

Installer Guide	SP4 Immersive Sound Processor *Firmware 3.3r1*
Safety Instructions	Power cord *

Rack mount ears **

* depending on the region, the power cord will be delivered with Fuse to be installed

** tools are required to mount/unmount the rack mount ears: Torx screwdriver (T10)

Before You Begin

1.   In case the AC cord is delivered with Fuses attached, make sure to install them before connecting the unit.

2.   Ensure your electrical circuit has a good ground connection with all audio equipment connected to the same ground node to avoid ground loop.

3.   Required equipment:

| Display / Projector	XLR cables RCA cables Optical Toslink wire	HDMI Cable
Amplifier units	Speakers with cables	LAN router with Cat5/6 RJ45 cable *

* the ISP needs a DHCP server to be part of the Network to get an IP address allocated.
Make sure to check your Internet Provider box or LAN/Switch box for router function.

Installation Flow

We have divided the unit configuration into several key steps, as shown below:

1.1)   Connect the unit as shown below. Do not connect the outputs at this stage: allocation is done automatically during speakers setup (Step 5 of this document).
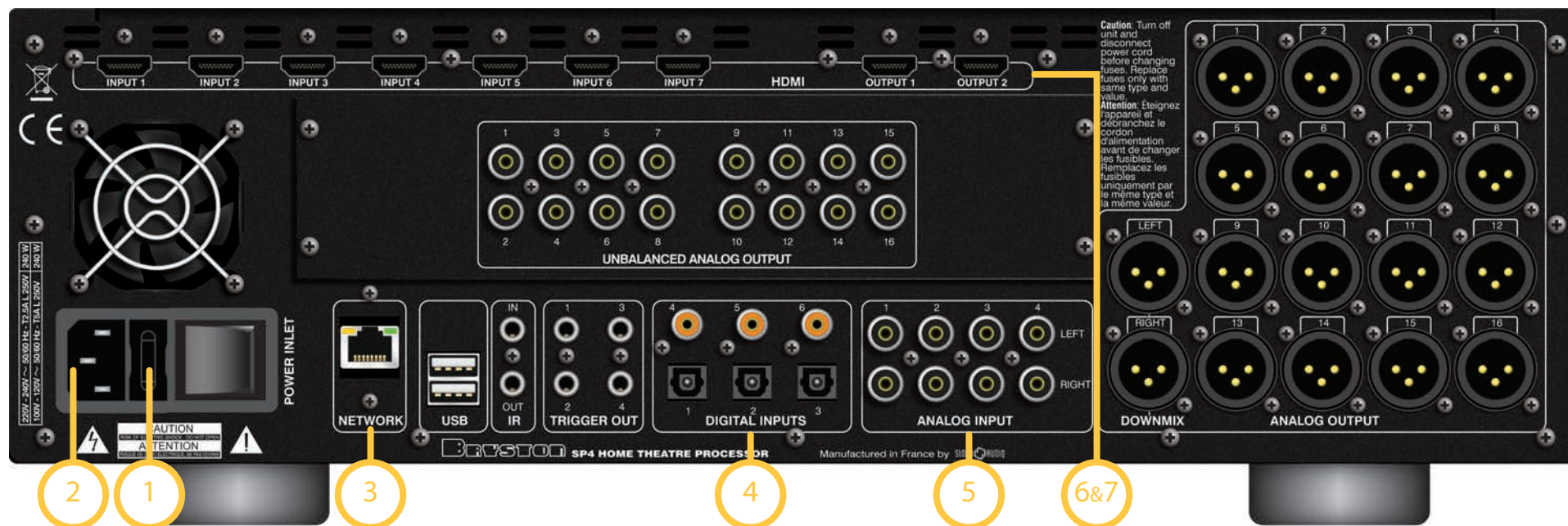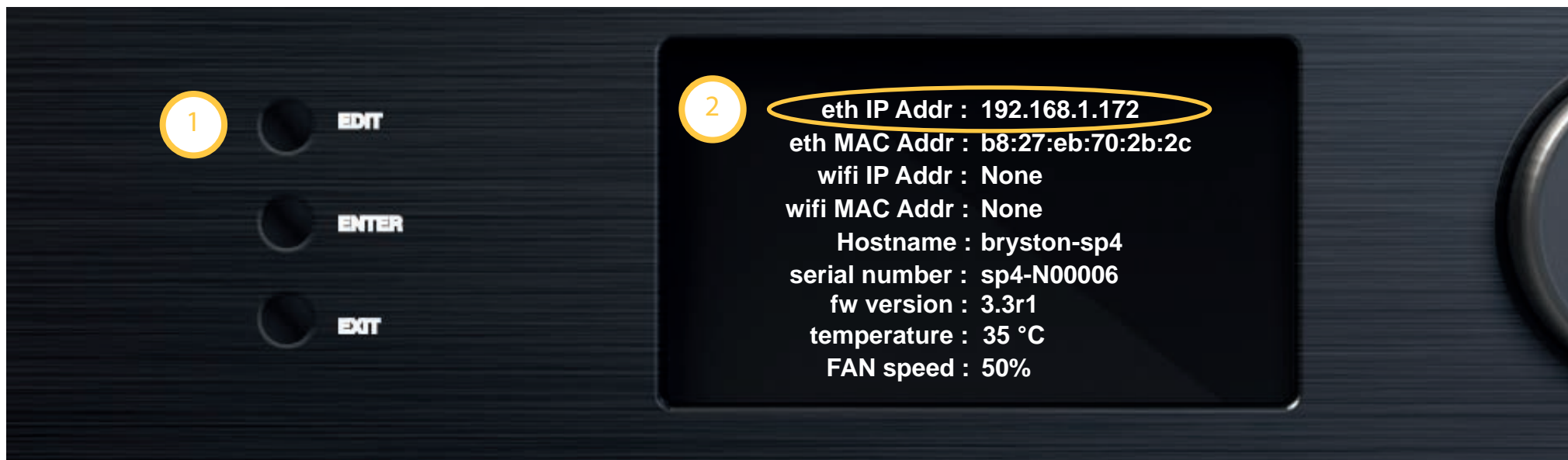

1.   Check Fuse. To replace the Fuse, make sure to disconnect the AC cord from the ISP to avoid electric shock.
2.   Connect AC cord to Power Outlet (do not turn ON now) using the earth connected cable delivered with the ISP.
3.   Connect the RJ45 LAN Network cable to the router/switch
4.   Connect appropriate Digital Sources via Coaxial or Optical
5.   Connect appropriate Analog Sources via RCA
6.   Connect your HDMI sources, all inputs support HDCP2.2
      (By default, HDMI1.4 speeds on HDMI IN 1 to 4, HDMI2.0 speeds on HDMI IN 5 to 7)
7.   Connect your displays (HDMI OUT 1 is HDCP1.4, HDMI OUT 2 is HDCP2.2, same content)

1.2)   Multiple connections are possible. Take note of your sources' connections to the SP4 by using the table of part 12, where you can also find connectors pinout.

2.1)   Power On the unit following below steps :

1.   Turn the Main Switch to ON (I) on the back panel.

2.   Display will show Bryston logo for few seconds and will
       enter the Sleep Mode (Led turns red continuously).

3.   When in Sleep Mode, press the Power Button. Unit will start.

2.2)   Check for Network Address :


```
eth IP Addr :  192.168.1.172
eth MAC Addr :  b8:27:eb:70:2b:2c
wifi IP Addr :  None
wifi MAC Addr :  None
Hostname :  bryston-sp4
serial number :  sp4-N00006
fw version :  3.3r1
temperature :  35 °C
FAN speed :  50%
```

1. Press EDIT button for about 3s

2. The display will show a list of system information, including the IP address allocated via DHCP

3. Take note of this address:

IP Address

> ℹ️ In case you need to bring the unit back to its default DHCP mode from the front panel, follow above Step 1, then press the EDIT button for a few seconds, until a message pops up asking for confirmation of this action by using the ENTER button.

2.3)   Use your computer and open a Web Browser.

2.4)   In the URL area, enter the IP address of your unit (such as 192.168.1.172 for example) and validate.

⚠ Only one instance of Web Browser can be opened to access the unit. If a window is already in use and another is opened to connect to the same unit, a message will ask you to close one.

2.5)   The Home Page will be shown as below :

Select the
Expert Setup →

CONNECTION

•••••••••

CONNECTION

Selecting this button
will give access to
End User Remote
Control page (see 9)

Selecting this button
will give access to
the Expert Setup
to configure the SP4

The Expert Setup has two levels
of access : Installer and Expert User.

Expert user gets access to portions
of the setup defined by the Installer.

Installer user gets full access to the setup.
Configuration is done at the Installer level.

Type the default password for Installer being:
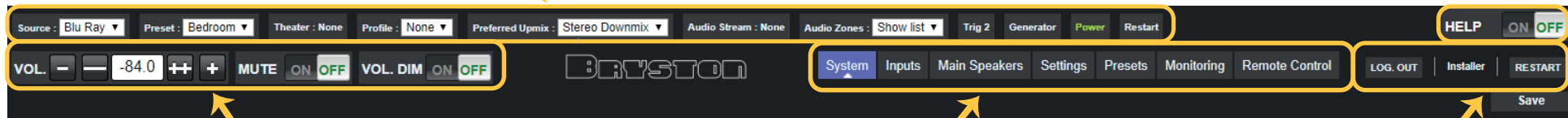**installer**
And press CONNECTION

2.6)   Select Expert User again. You will access the System Page of the SP4.

2.7)   The Web Installer Interface is structured around a common part on the top area that will remain accessible at all time and give access to the basic functions.

This area provides the means to change some of the settings at anytime without having to access the Remote Control page. Can be changed: Source, Preset, Theater (and related Profiles) and Surround mode.

To help you understand all the functions and settings of the product, an Online Contextual Help is accessible. By turning it to ON, question marks will pop up next to each function. Simply click on it for the function you need help on.

Source : Blu Ray ▼   Preset : Bedroom ▼   Theater : None   Profile : None ▼   Preferred Upmix : Stereo Downmix ▼   Audio Stream : None   Audio Zones : Show list ▼   Trig 2   Generator   Power   Restart   HELP   ON OFF

VOL. − − -84.0 ++ +   MUTE ON OFF   VOL. DIM ON OFF   BRYSTON   System | Inputs | Main Speakers | Settings | Presets | Monitoring | Remote Control   LOG. OUT | Installer | RESTART   Save

Master Volume of the selected Theater can be adjusted here. MUTE is available as well as a DIM function that turns the Volume down by an amount defined in the Settings page (see part 7).

Configuration of the ISP is made in few tabs split in the following categories:
- System parameters
- Inputs definition
- Speakers allocation and Room Calibration for Mains and Alternate outputs
- General settings
- Listening Presets
- Monitoring to visualize system status
Once configured you can control the ISP via the Remote Page

In some cases, it might be required to restart the ISP by pressing the RESTART button. Note that this will not erase the stored settings. Pressing LOG OUT will take you back to HOME page with only possible access to REMOTE control.

2.8)   In order to support the Installer in his configuration process in the best way possible, we have developped an Online Contextual Help that can be activated at anytime as shown in 2.7.

This Help Guide provides detailed information on each item you can adjust or consult during the SP4 Configuration. Thanks to this tool, the Installation Guide you have in hands at the moment can be kept quite light.
More importantly, we work continuously on improving or adding features to the product. Such Online Help can be updated at the same pace as the Firmware.

2.9)   The first level of Help consists on information about how the function works and how to configure it. It is highlighted as a «Question Mark» in blue background. Standard information will be visible only with Help set to ON.

2.10)   The second level of Help consists on critical information warning the user about specific and important information about a function and how to adjust it. Warnings are always visible on the Web Installer Interface.
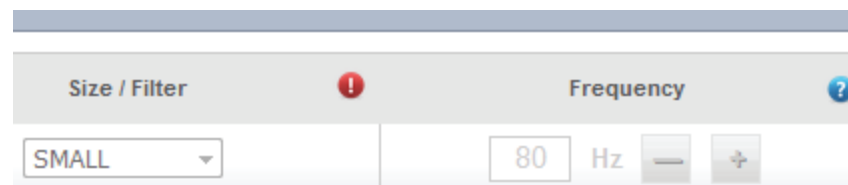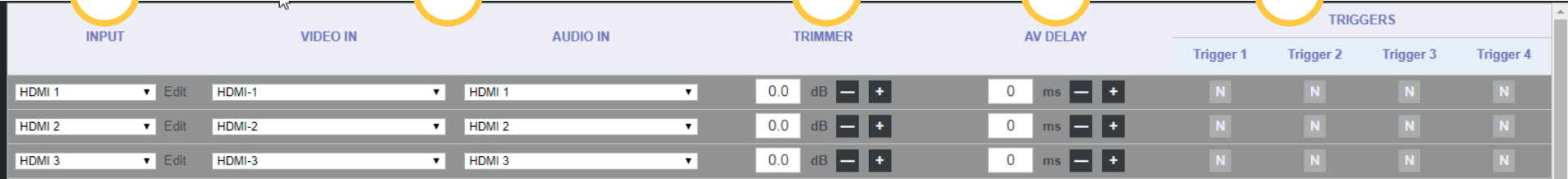
In the System page, you can visualise hardware and software status of the ISP, change password for Expert and Installer access, modify the Network parameters and define the access level of the Expert user level. It is also possible to backup and restore the Configuration. Follow the Steps defined below to configure these settings.
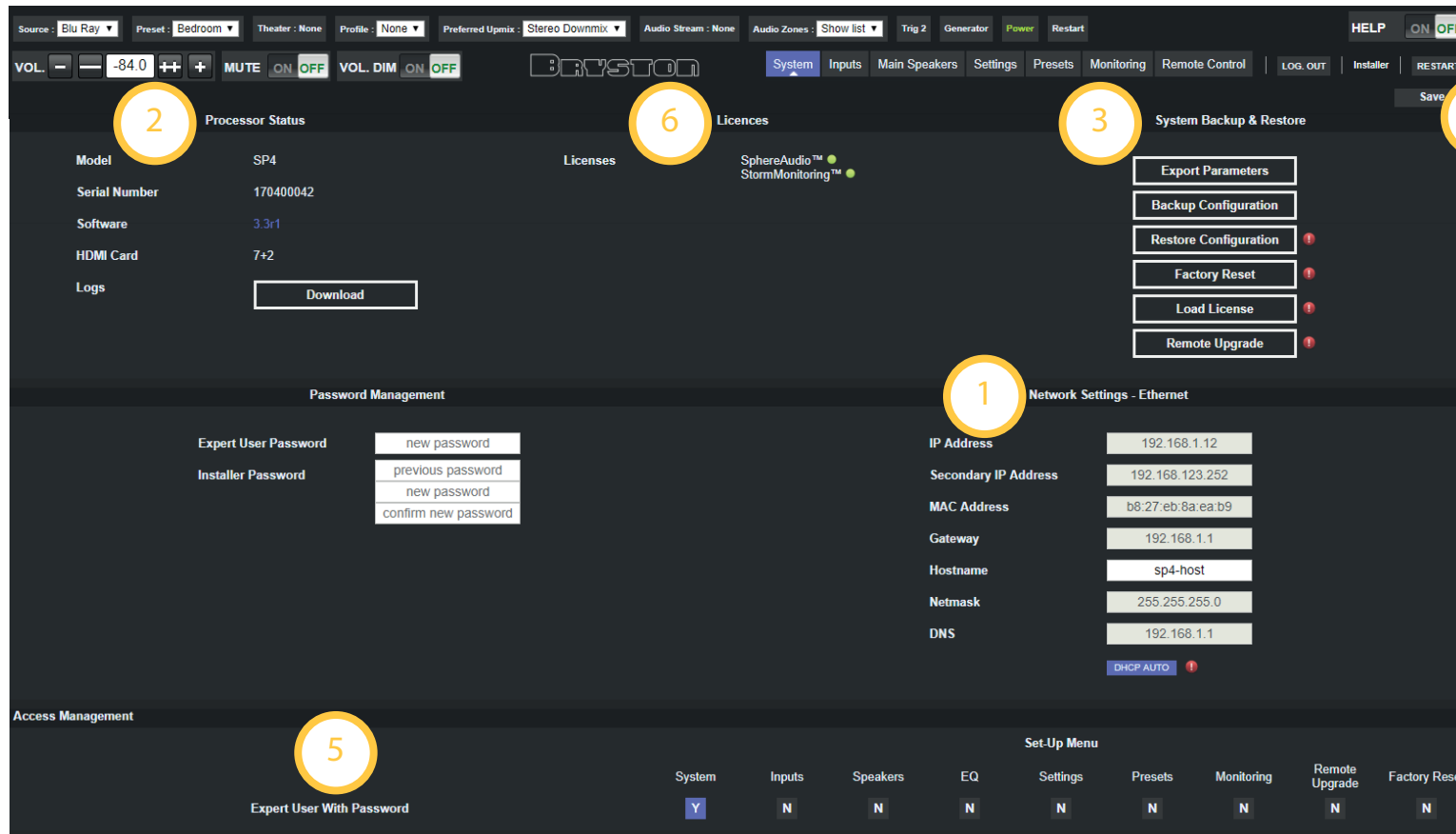
1. By default, DHCP is set to Auto. If a static IP must be defined, press DHCP AUTO icon. Then enter the IP address and router settings.

2. This area provides info on your unit with software revision and possibility to download logs for support matters.

3. Later in the configuration, it will be possible to save the configuration as a backup file. It will also be useful to export the parameters for the wiring of the Outputs. Finally, upgrade of the SP4 is done here.

4. To complete the system page configuration, you must click SAVE. Then, select INPUTS.

5. Define which aspects of configuration you wish to grant to an expert user. If required, you can change the passwords. Default Expert User password is Expert.

6. This area provides info on the options and licenses installed on the SP4.

Using the table you have filled up in previous step **1** , you will now adjust the Inputs of the ISP. By default, as many inputs as there are available physical connections have been created. Follow the below steps to modify them.

For each input to define:

1. Select a predefined name or press Edit to change it.
2. Select which physical inputs should be activated. For non HDMI audio inputs, you may still select a video input. Define what physical audio signal to play amongst Analog, Coaxial, Optical, HDMI
3. To compensate for level difference between inputs, you can adjust input level.
4. To compensate for specific synchronisation issue with the connected source, you you can adjust an AV delay per input.
5. Once defined in Settings page (see part 7), you can configure Triggers to activate when the Input is selected.
6. To complete the Inputs definition, press SAVE then Main Speakers (8) to access next step.

> ⓘ To remove unused inputs so they are not visible in the Remote Controls, change them to NONE.

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Speakers setup Principles

| Theater configuration | | | Speakers Adjustments | | | | | Audio Zones |
| Creation | Layout | Replication | Bass Management | Distance | Noise Generator | Levels | Manual Equalization | |

Depending on your SP4, your system will support up to 16 channels on Main Outputs and 16 additional channels on Alternate Outputs for Dual Theater (with 16 Channel RCA Outputs). For both sets of outputs, the Speakers configuration will follow the same flow, as described below.

1. A single SP4 can manage several Theaters and switch from one to the other during playback. A Theater can be defined according to a Speaker Layout. By default a Theater is proposed in a 2.0.0.0 layout.

2. The mapping (Signal --> Output Channels) is shown on a per Theater basis with different colour.

3. Output mapping can be changed. See section 9 (p 43).

4. New Theaters or Audio Zones (Mono/Stereo) can be added.

At this stage, you can decide to EDIT the Theater 1 if the Layout meets your requirements.
If the case, go to step 5.6 (Bass Management & Distance). If not, go to step 5.1 in next page.

⚠ Please note that in case «ISP-O-Dual Theater» option is installed (Alternate Speakers), you should make sure before selecting EDIT that the current Preset (therefore Theater) playing is from the same channels bank: Main or Alternate Speakers bank.

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Theater configuration is made in 3 steps: Creation (5.1 & 5.2), Speakers Layout selection (5.3) and Speakers/Subwoofers Replication definition (5.4 & 5.5).

5.1)   If the default Theater 1 doesn't fit your need, you have to replace it.
Press Edit then Delete as shown below.
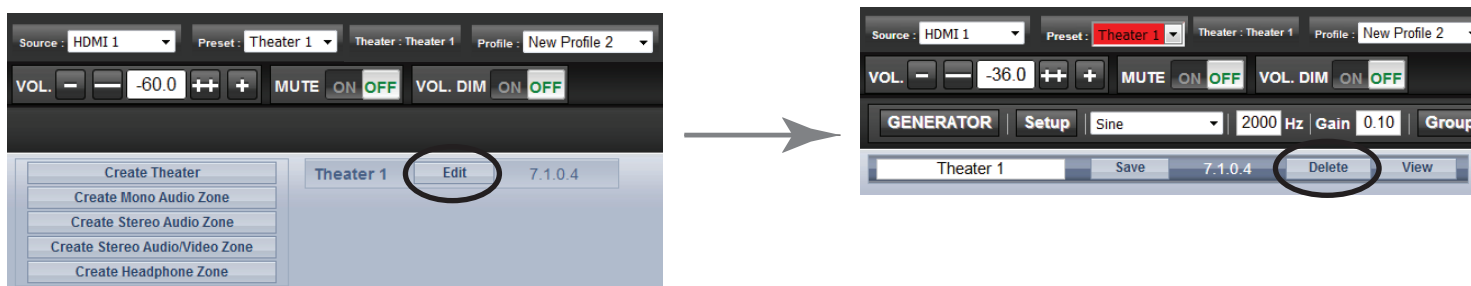
5.2)   To create a new Theater, select Create Theater, it will appear as shown below. By then pressing Configure, you will go to the Speakers Layout selection and configuration steps described in next page.
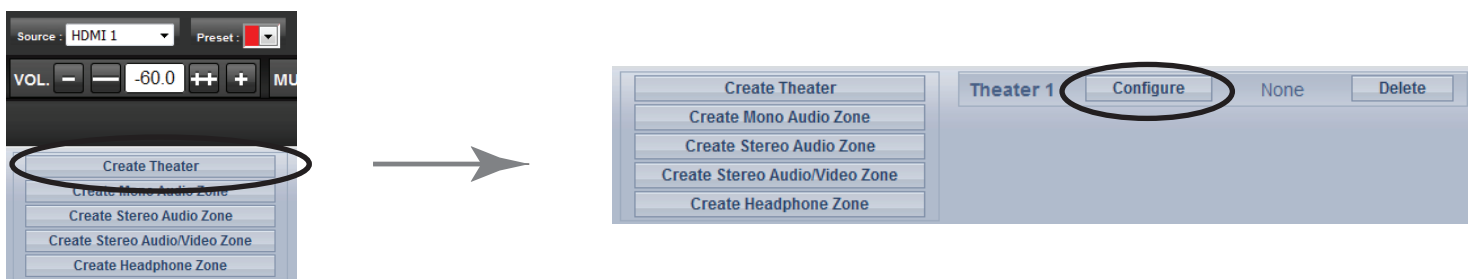
At this stage you can also create Stereo/Mono audio zones. We do recommend to first define the Theater and use remaining channels for Audio Zones creation. See step 5.11 for Audio Zone creation.

5.3) Speakers Layout selection.

1. To make the Speakers Layout definition easier, we have made a short list of Recommendations. If you don't see the Layout you need, select All. The List will show more with a highlight on the Recommendations.

2. You can visualise the basis layout in the table with the channels ticked and graphically by selecting View.

3. Select the Layout that meets your requirements.

	Fully optimized
Green:	Fully optimized
Yellow:	Supported
Orange:	Not optimized
Red:	Not supported

«View» selection
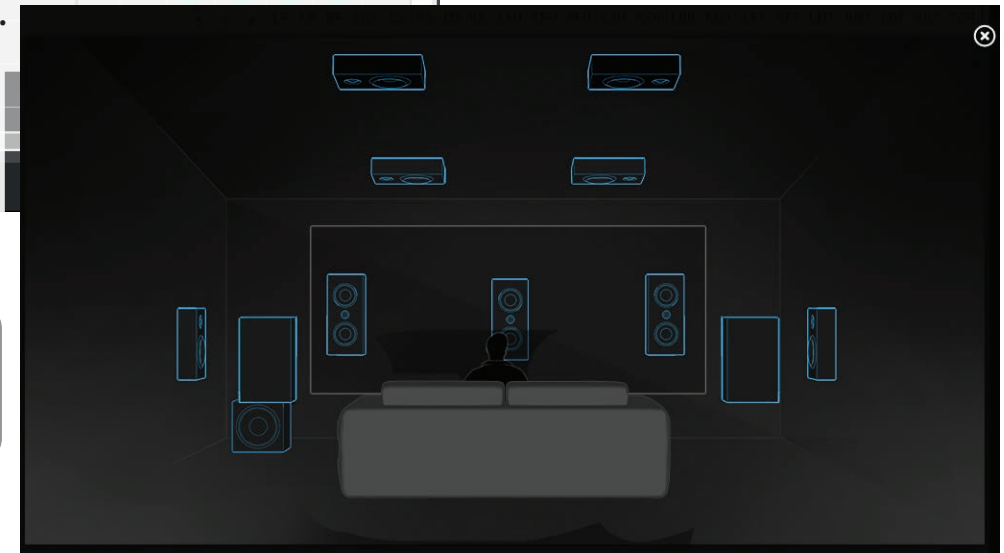
ⓘ *Information about compatibility of the selected layout with the Dolby Atmos, DTS:X and Auro-3D is also given via a color code.*

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Speakers setup

Theater configuration

Speakers Adjustments

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Principles | Creation | Layout | Replication | Bass Management | Distance | Noise Generator | Levels | Manual Equalization

5.4)   The basic layout can be tuned to meet your exact speaker configuration, being multiway, with replication of some channels and/or with several subwoofers.

1. For LCR, you can define as many ways as you want. Generally up to 3.
2. Replicate surrounds to meet seating row count.
3. Indicate the number of subwoofers required («0» if no Subwoofer required).
4. Dolby Atmos offers the option to simulate its ceiling speakers via «top firing» speakers located in the main «front firing» speakers, so called Dolby Enabled speakers. Define here whether the Dolby Atmos top layer is reproduced with such speakers and on which position you will place them.
5. Replication of other channels than Surrounds is possible: tick the Custom Channel Duplicator to access the feature then enter numbers required for each channel.
6. Save your configuration

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5.5) Following the Speakers Layout definition, you will be back to Speakers edition mode, you can then select View to visualise the layout: multi-way, replication, subwoofers...

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Audio Zones
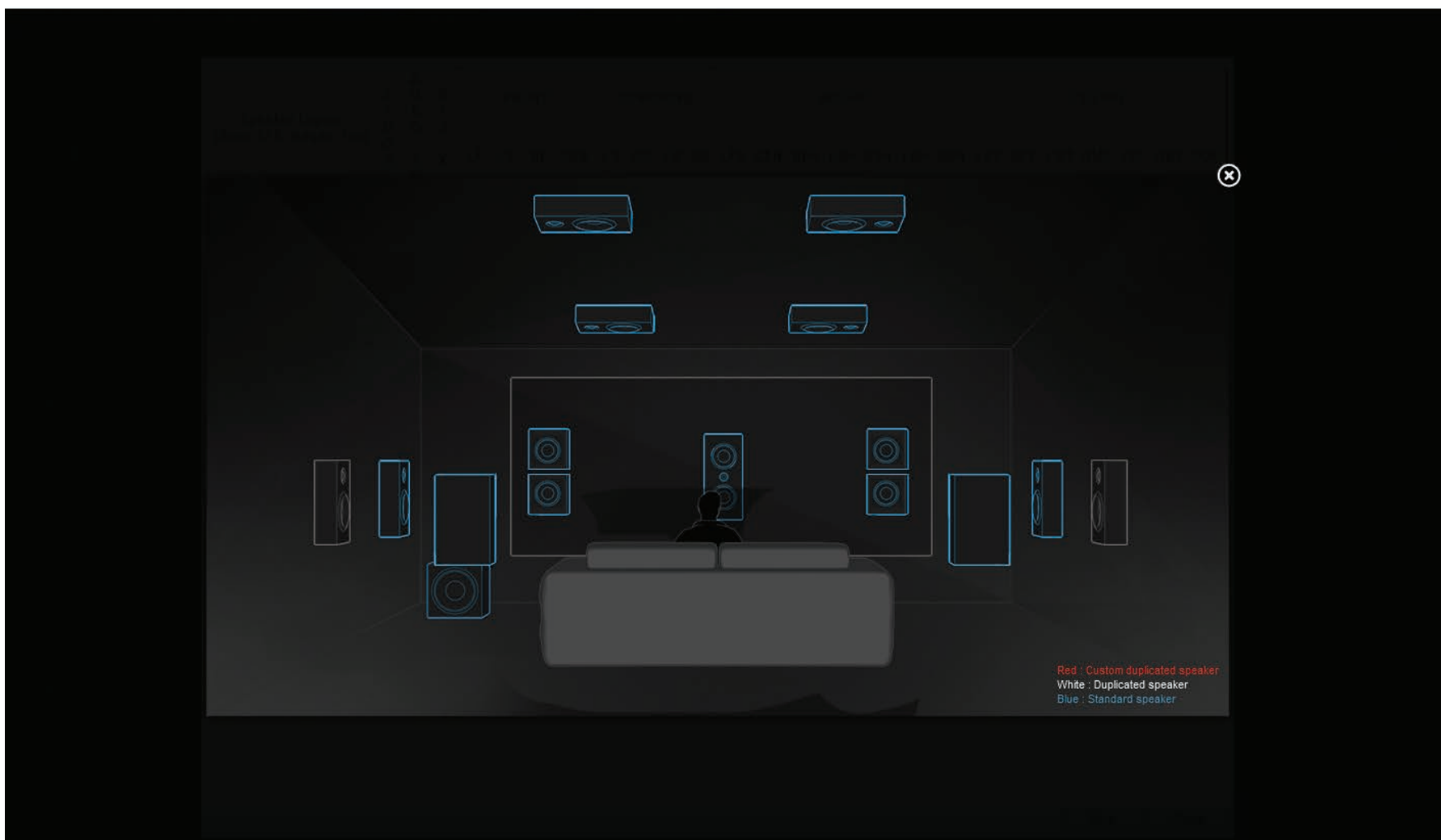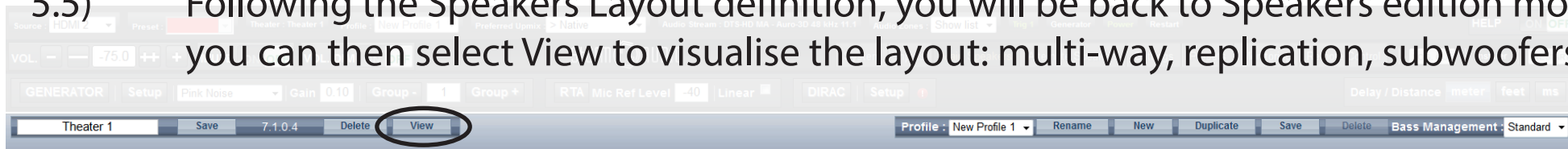
5.6) Once the Layout has been defined and saved, you get access to the Speaker based adjustments. The Theater is shown with its channels allocation. At this stage you can connect the Speakers to the system (please go to section 9).
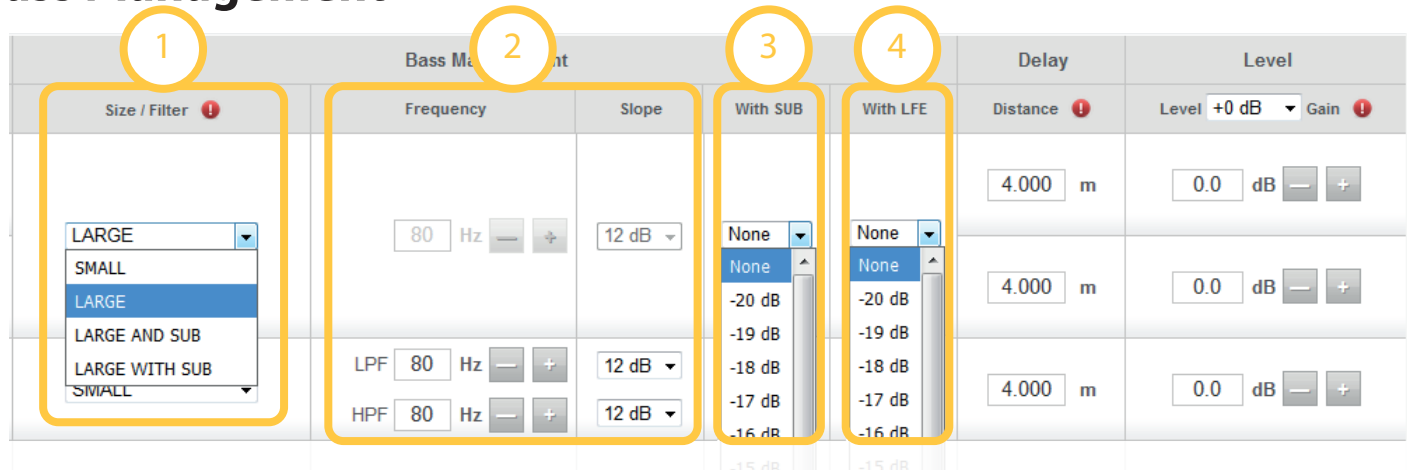

1. For each Theater, multiple audio Profiles can be created. A Profile is the combination of the Speakers definition (mutiways, levels, delay), Bass Management, Manual EQ and a Dirac filter design if applied (see part 6).

2. We offer two approaches to Bass Management. A first one that is the Standard Bass Management as specified by Dolby and a second one that is a Custom Bass Management which opens up full access to how the Bass should be managed/redirected in the system. The Custom mode has been designed for installation where main channel speakers are used to reproduce the Bass. At this stage, you should select which mode you want to use, considering that going from one mode to the other will reset the adjustments made. To help you on this decision, the two modes are described in the next pages.

3. Adjust the crossover filters (Low, Middle and High) of LCR Multiways Speakers with cut-off frequency, slope and phase. For more than three ways, additional filters can be adjusted via the Manual EQ (see 5.10).

4. With Manual EQ and the Dirac Filter Design corrections applied, the average output level in the Theater might be lowered significantly. You can boost this average output level between 0 to 12 dB, in 3 dB steps. ⚠ Note that setting a too high level can lead to clipping.

Standard Bass Management
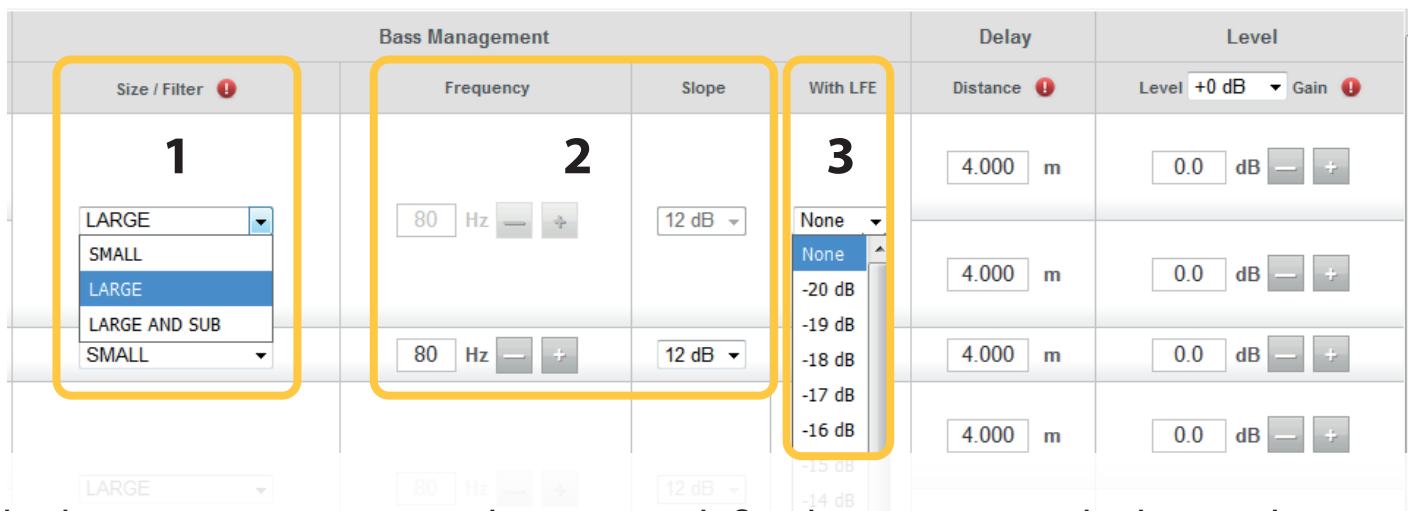
1. In Standard Bass Management mode, you can define how you want the bass to be managed for each Speaker with three options: Small, Large and «Large and Sub». Small will cut the Bass and redirect them to the Subwoofer channel. Large will keep the Bass in the Speaker. «Large and Sub» will keep the Bass in the Speaker and also redirect them to the Subwoofer channel. Speaker characteristics should be clearly known to ensure you don't overload them with frequencies that they are not capable to reproduce, especially in the case of small speakers limited in the low frequencies extension.

2. Cut-off frequency of the Bass Management is adjusted per Speaker, either by entering the required value or using the - / + buttons. The crossover Slope can be either 12 dB or 24 dB per octave, with Linkwitz-Riley type. Frequencies and Slopes are the same for both the Speaker and the redirected Bass filters.

3. When Speakers are set to Large, it is possible to redirect the LFE channel (Low Frequency Enhancement) to them. Change this setting from None to a level between 0 to -20 dB, 0 dB being the highest.

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Custom Bass Management

1. In Custom Bass Management mode, you can define how you want the bass to be managed for each Speaker with four options: Small, Large, «Large and Sub» and «Large with Sub». Small, Large and «Large and Sub» have same properties as in Standard mode. «Large with Sub» offers the possibility to use a Large Speaker with low frequencies capability to act as an independent Subwoofer channel plus a Small Speaker in the same physical speaker.

2. Cut-off frequency of the Bass Management can be adjusted per Speaker, either by entering the required value or using the - / + buttons. The crossover Slope can be either 12 dB or 24 dB per octave, with Linkwitz-Riley type. Frequencies and Slopes can be different for the speaker High Pass Filter and redirected Bass Low Pass Filter.

3. When Speakers are set to Large, «Large and Sub» or «Large with Sub», it is possible to redirect the Subwoofer channel (redirected Bass from all Small or «Large and Sub» Speakers) to them.
Change this setting from None to a level between 0 to -20 dB, 0 dB being the highest.

4. When Speakers are set to Large, «Large and Sub» or «Large with Sub», it is possible to redirect the LFE channel (Low Frequency Enhancement) to them.
Change this setting from None to a level between 0 to -20 dB, 0 dB being the highest.

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1. Subwoofer channels have specific filtering for the LFE content (bass channel from decoder). You can define a High Pass Filter to avoid rumble from subwoofer limited in the low frequency and a Low Pass Filter.

2. You can adjust the Distance between the listener and the listening sweet spot, usually in the center of the sitting area. By default they are in «m» for meters, but you can select «feet» or «ms» reflecting more a delay. The latter is usually used to fine tune a distance.

> **❗** If you intend to do the Automatic Room calibration process using the Dirac Live® Calibration Tool and the Integrator Calibration kit, you don't need to adjust the Distance/Delay and the Levels of the Speakers in the Theater. Nevertheless, any required Manual EQ should be adjusted prior to going through the Automatic calibration process. It is also recommended to do multiple subwoofers alignment (level and delay) to correct for Room Modes prior to Dirac and to Group them in the Dirac process as one Subwoofer. See next parts 5.7 to 5.10 for Manual EQ, otherwise proceed to part 6.

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5.7)   Next steps of the Manual Calibration process are level adjustments and equalization. To make these adjustments comfortable and eventually using Microphones with Capture systems, a Noise Generator is provided. You can set up how the Generator works as described below.

1.   Press Setup, the Group configurator will pop up.

2.   Define Groups of speakers that should play the noise at the same time, such as active multiway speaker.

3.   Make sure the Speaker is enabled.

4.   Once Groups are defined, simply close the window.

Ch.	Signal	Speaker Name	Generator Group	Enabled
1	LF	Left Front 1	1	✓
2	LF	Left Front 2	1	✓
3	CF	Center Front	2	✓
4	RF	Right Front 1	3	✓
5	RF	Right Front 2	3	✓
6	SUB	Main Sub / LFE channel	4	✓
7	LS	Left Surround 1	5	✓
8	LS	Left Surround 2	6	✓
9	RS	Right Surround 1	7	✓
10	RS	Right Surround 2	8	✓
11	LB	Left Back	9	✓
12	RB	Right Back	10	✓
13	LFT	Left Front Top	11	✓
14	RFT	Right Front Top	12	✓
15	LBT	Left Back Top	13	✓
16	RBT	Right Back Top	14	✓

Close

5.8) Groups being defined, you can now adjust the levels as described below.

1. Select the signal you want to generate between Sine, Pink Noise and Narrow Band Pink Noise.
   In case of Sine selection, a frequency parameter that you can adjust will be shown.

2. Activate the Noise Generator.
   Group playing is highlighted in Green.

   > ⚠ *Before activating the Generator, make sure the Master Volume is at a reasonable level to start, such as -30 dB. Default gain is set to 0.10 (-20 dBfs)*

3. Adjust the level of the Group playing.

4. Change from Group to adjust using Group + and Group -
   Once you have completed the levels adjustments, turn the Generator to OFF.

5. It is possible to visualize the response of a speaker group by activating the RTA function. See next part 5.9 for a detailed description.

5.9)   When optional Storm Monitoring license is purchased, The RTA function provides 32 band capture of the acoustic response of the selected speakers/group, using the various signals available with the generator.
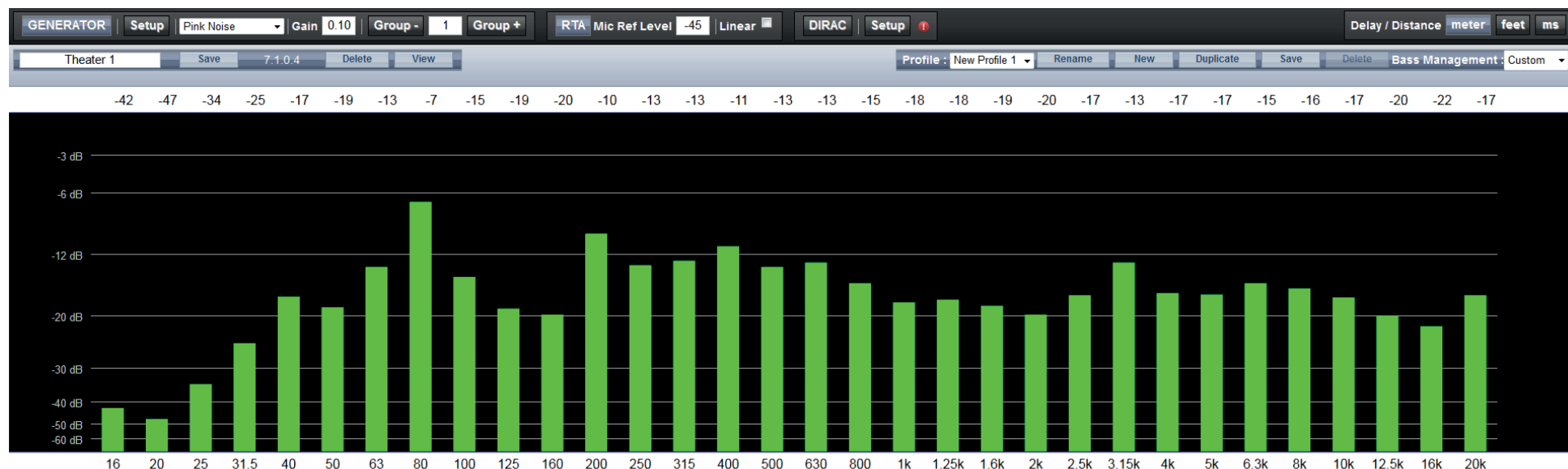
The RTA tool is not meant to be used to define an equalization using the Manual EQ, but it is a good tool to verify the overall acoustic response. It is especially useful when used together with the Monitoring function (see part 11): with a microphone always connected to the system, the RTA and the noise generator, it is possible to verify the overall behaviour of a speaker remotely. We provide two settings to change the scale and reference of the capturing.

1.   The maximum level of the capture can be defined by adjusting the Microphone Reference Level. This will allow to move the window 0dB reference level, independently from the output level.

2.   The resolution of the graph can be changed from a Non Linear scale (default) providing more screen space in the range near 0 dB to a Linear one, scaling from noise floor level to 0dB.

5.10)   Whether you adjust an EQ for a Theater channel or Audio Zone channel, the same process will need to be followed for both (see next part 5.11).

1.   The channel to adjust can be changed via the drop down list.

2.   There are up to 10 bands of EQ you can adjust per channel.

3.   A wide numbers of filters is available allowing almost any equalization to be made. Select the filter type you want.

4.   Depending on the filter type selected, additional parameters will be made available. Check the contextual help for details. Once parameters are set, you can move to another band adjustment.

5.   Finally, you can save your EQ adjustments in the current audio Profile.

6.   Return to Speakers page.

ⓘ *We have defined a «Copy to» function, allowing to copy a channel EQ to any channel of any Theater defined. This simplifies the configuration when correction curve is identical.*

5.11)   You have several possibilities to create an Audio Zone. It can be created as a Mono or Stereo Audio Zone without any display, as a zone dedicated for Headphones playback via an external headphones amplifier or as an Audio / Video Stereo Zone with a display involved.

An Audio / Video Zone (including Headphones Zone) will have General A/V delay adjustments added in the Settings page as well as LipSync control on the Remote Control interfaces.

To create a new Audio Zone, select the type of zone required to create.
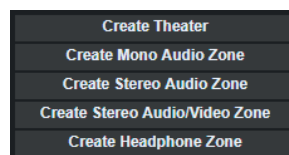
| Create Theater |
| Create Mono Audio Zone |
| Create Stereo Audio Zone |
| Create Stereo Audio/Video Zone |
| Create Headphone Zone |

1.   You can decide here to Enable or Disable one of the Channels
2.   You can equalize the channels individually. Note that there is only one audio Profile possible per Audio Zone. The audio Profile will include the manual equalization and the Dirac filter design if applied.
3.   You can also rename the Speaker.

You have now done all the manual adjustments required to proceed with the Automatic Room Calibration powered by the Dirac Live® Room Calibration Tool. Before proceeding, you must verify that you are in possession of an Integrator Calibration Kit including:

1. A Dirac Live® Room Calibration Tool with StormAudio license,
2. The microphone UMIK-1 and its accessories.

If you do not have these two elements, we invite you to contact your distributor to acquire an Integrator Calibration Kit or a Dirac Live® Room Calibration Tool with StormAudio license alone.

> ⊘ The Dirac Live® Room Calibration Tool for Bryston is a specific version of the tool, with Bryston drivers integrated, for sole use with Bryston processors.
> Other versions of the Dirac LCT license will not work with the SP4.

Notes:
1. *Although recommended, you are not obliged to use the UMIK-1 USB microphone delivered in the Integrator Kit. You can use your own measurement equipment as long as supported by the Dirac Live® Room Calibration Tool for Bryston.*
2. *The process described in this Guide will only cover our standard case based on using UMIK-1 USB microphone.*
3. *The next steps will describe a basic calibration using the standard target curve and automatic correction window defined by Dirac.*

6.1) After having downloaded the Dirac Live® Calibration Tool software from Bryston, install it on your laptop. Make sure to be connected to Internet during installation.

6.2) Once installed, go to your browser in the SP4 Web Installer Interface and:

1. Select Main Speakers.
2. Edit the Theater or Audio Zone to which you want to apply Dirac Live.

6.3)

1. Select the Audio Profile you have configured with your manual settings and that you want to use as basis.

2. Press Setup and put the channels of a same multiway speaker in the same Group. In case a multiple subwoofers setup has been manually aligned, it is also recommended to put them in the same group to maintain inter-subwoofer adjustments, otherwise Dirac process will change adjustments of each subwoofer individually without taking care of potential room modes.

3. Press DIRAC to start the process.

CH.	SIGNAL	CHANNEL NAME	SPEAKER GROUP
1	LF	Left Front	1
2	CF	Center Front	2
3	RF	Right Front	3
4	SUB	Main Sub / LFE channel	4
5	LS	Left Surround	5
6	RS	Right Surround	6
7	LFT	Left Front Top	7
8	RFT	Right Front Top	8
9	LBT	Left Back Top	9
10	RBT	Right Back Top	10

Close

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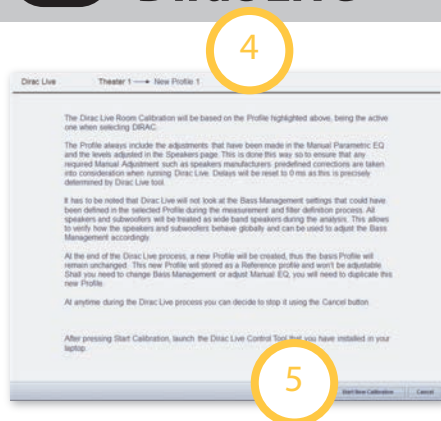
4.   A pop-up describing the process will be shown. Verify that you are in the correct Theater and Audio Profile. If not, cancel and make proper selection as described in 6.3) step 1.
Also make sure you now have your microphone connected to the laptop.

5.   Press Start New calibration to set the ISP in Calibration mode.
At this time, all audio adjustments made on the remote will be deactivated to not alter the calibration.

6.4) Launch the Dirac Live® Calibration Tool (DLCT) for StormAudio. The application will go into the first tab / step of the DLCT. Note that the Dirac software is branded StormAudio but works with Bryston.

1.   Process Tabs. The first one being the System Config tab

2.   At any step of the process, you can find some HELP in the right part of the screen.

3.   In this step, you must select the device you want to calibrate and check the correct Theater configuration is chosen.

4.   In case the device is not found, you can «tick» to choose to manually enter the SP4 IP address. Click on Rescan to confirm the connection. Device should appear in the Test Device list. Keep the port as «5000».

5.   When the configuration is correct, go to the next step of the Setup by pressing Proceed.
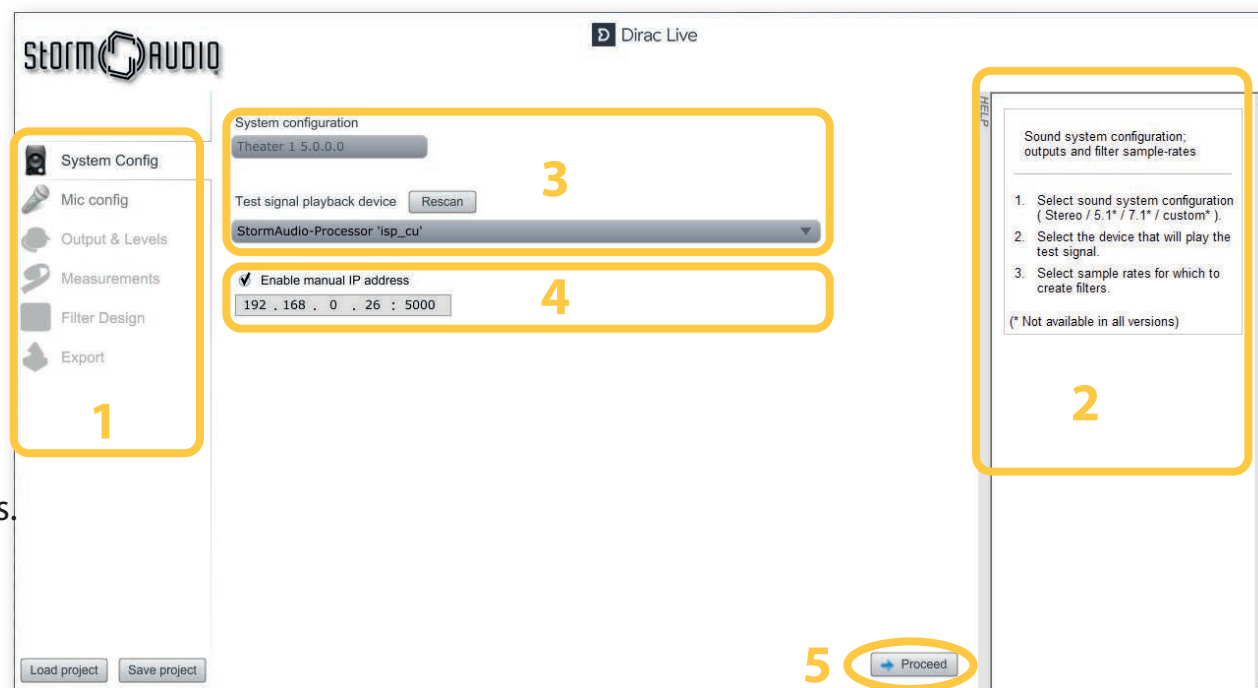
6.5) In this step, you will configure the microphone to use.

1. The Recording device will show which microphone is selected.

2. Click on the arrow to check the UMIK-1 microphone is correctly selected.

3. On the microphone body, take note of the serial number 70x-xxxx and go to the download url to get the calibration file.

4. Two files will be available for download. In the case of a multi-channel setup, we usually use the microphone pointing upward for constant directivity in all directions. Select the **70xxxx_90degree.txt** file in such case.

5. Then proceed to the next step.

⚠️ All along the process, it is advised to save the design into a Project. Also, you can reuse measurements made in a Theater and saved in a Project to regenerate a new set of design filter following new adjustments on the target curve for example.

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6.6) In this step, you will adjust the output levels to match measurement requirements

1. With UMIK-1 connected, make sure the room is quiet. Adjust the Input gain so the background noise doesn't exceed -24 dB in the level meters.

2. After making sure the Output volume is reasonably low (-40 dB for example), start the playback of the white noise on the first channel and adjust the volume so to reach -12 dB in the level meter.

3. For each channel, activate playback one by one and correct the Channel volume using following rules:
   - if the level remain in the green area below -12 dB --> keep unchanged
   - if the level is between -12 dB and -6 dB, reduce the Channel volume to get -12 dB average.

4. Then proceed to the next step.
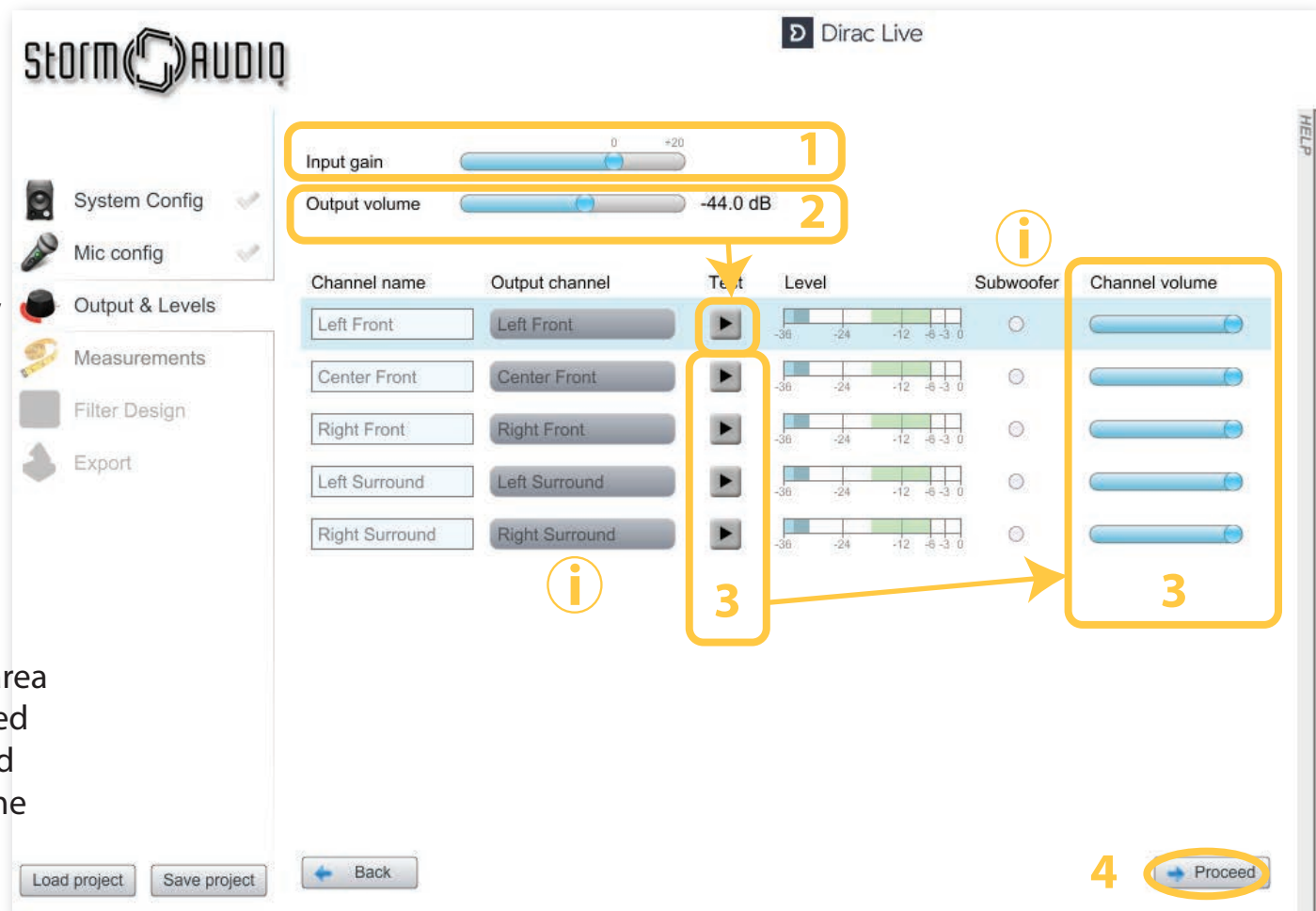
Notes:
- *All channels are automatically listed. Note that it is important for the setup to be done properly in terms of grouping multi-way channels into the same Speaker, before activating Dirac, for Dirac to recognize it as one Speaker. Refer to part 6.3.*
- *Subwoofer channels are automatically recognized and «ticked» in the subwoofer column. Multiple subwoofer aligned manually in step 5 should be shown as one Subwoofer. If not, exit the process and go back to step 6.3 to group them.*

6.7) In this step, you will measure the acoustic room response placing the microphone into the sweet spot (exact center of the listening area).

1. You will first need to select the type of listening area you want to define. 3 options are available, from narrow to wide listening area: Chair, Sofa and Auditorium.

2. Once selected, you will need to place the microphone into the first position which reflects the best positions in terms of expectations, usually in the center of the listening area. This position is critical as it will be used for the Distance and Level calculations.

ⓘ You can change the view to have a better understanding on how to place the microphone.

3. Once the microphone is placed as illustrated, you can Start the first measurement by pressing on Start button. The measurement capture gets updated realtime:
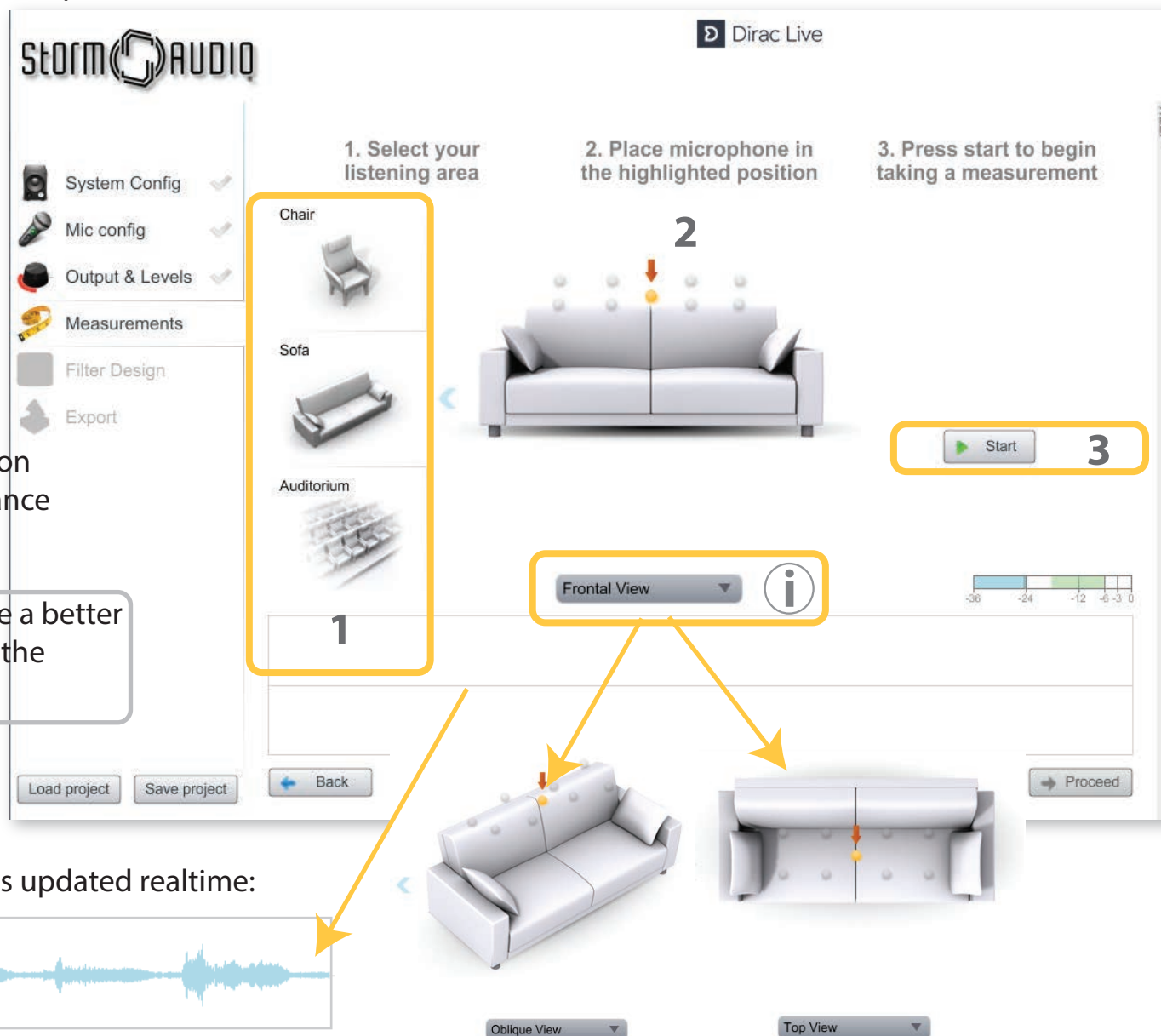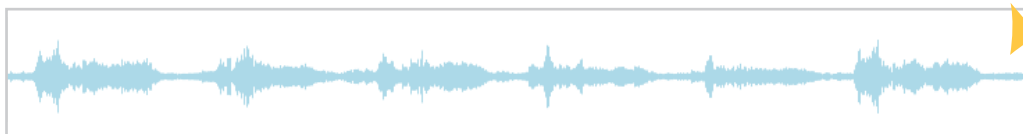
6.8) With the first measurement completed, the position is changed to Green and a new position is shown in yellow. There will be 8 additional positions of the microphone required, to complete the capture process.

1. Press Start when you have placed the microphone into the expected position.

2. For each new measurement, the plot will get updated.
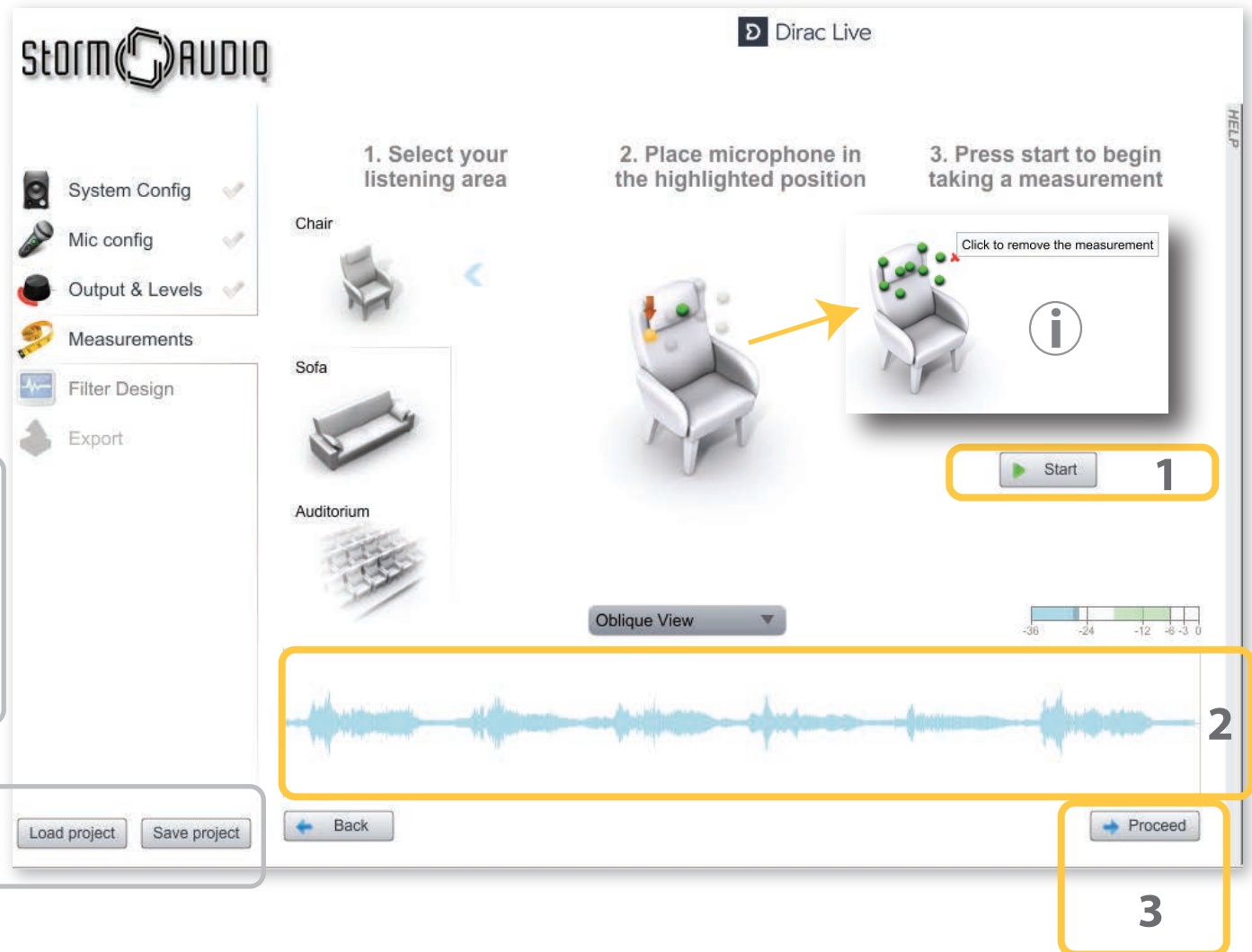
Proceed as described in 1 and 2 above until all 9 measurements are completed.

ⓘ At anytime during the process, you can redo a new measurement at an already covered position. Click on the position to redo and then in the red cross. You can now press Start again to measure this position.

❗ Don't forget to save your project on a regular basis.

3. Then proceed to the next step.

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6.9) Once all measurements are completed, you will be able to visualise magnitude and impulse responses of all speakers. In addition, Dirac Live® will add the recommended target curve as well as the window of correction deduced from the measurements. In this Quick Guide, we will follow Dirac Live® recommendation to proceed. Shall you need to customize these two elements, please refer to the ***StormAudio_Dirac Live CT_Installer_Manual_rev 2.pdf*** to find the descriptions of all the adjustments options available.

1. The orange Target Curve can be adjusted by moving the markers and markers can be added by double clicking on the curve at the needed frequency.

ⓘ Auto Target will recall the Dirac Live® recommended curve.
You can Save and Load your own created Target Curve.

2. It is possible to limit the correction to a certain frequency range in order to avoid low frequency correction in speakers limited or not capable in this area. The same applies in high frequency. By default correction window is kept full frequency spectrum.

3. Keeping the recommended curve and correction window, you can launch the Optimization.

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4. After Optimization, the simulated magnitude response curve is shown in Green.

5. You can tick in these boxes to visualize different curves.

6. You can browse the channels to check simulated curves for each speaker.

ⓘ For illustration of the correction window effect, it was here moved so no correction were done above 2kHz. Simulated response = actual response.

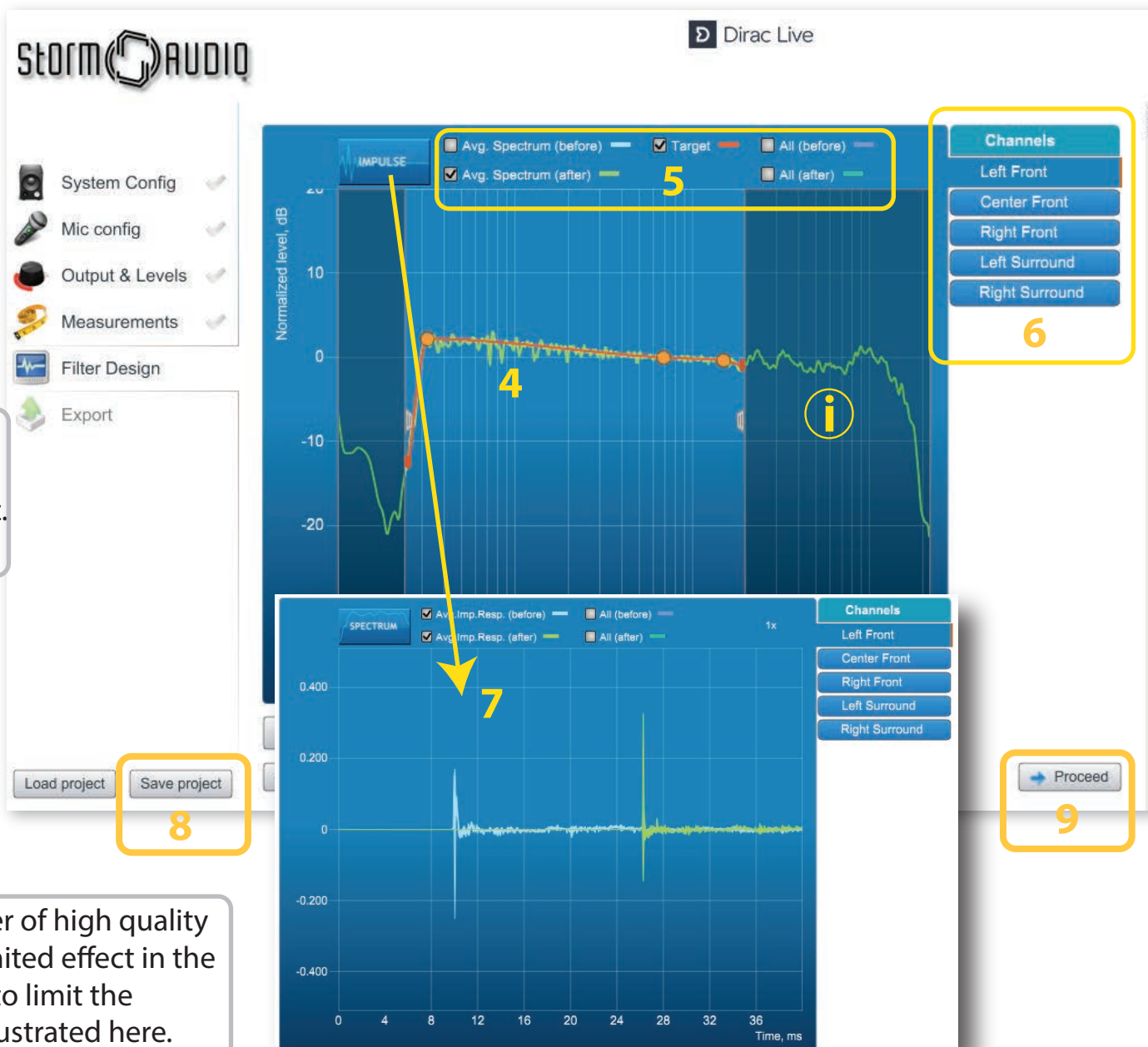7. You can also visualize the effect in the impulse response.

8. Save your project.

9. Proceed to the filter design Export page.

ⓘ To maintain overall signature and timber of high quality speakers, and because the room has limited effect in the high frequency range, we recommend to limit the window to below 1 or 2 kHz range as illustrated here.

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6.10)   The last step of the Dirac Live® process is to export the filter design into the ISP so it is combined into a new Audio Profile with all manual audio adjustments made in part 5.

1. Drag and drop the project file in the light blue area into the StormAudio Audio-Processor Project slot.

2. While dropping the project, this will actually download the complete filter design package into the ISP. Download is complete when all channels are listed in the Project slot.

3 The process is now complete from a Dirac Live® Calibration Tool standpoint. You can now Exit and go back to the browser to finalize the New Profile creation in the ISP interface.

⚠ Don't forget to save your project before exiting.

6.11)   Back to the Web User Interface, the Dirac Live® pop up has been updated as shown below.

Theater Calibration

Audio Zone Calibration

1.   A default name has been given to the new Profile. Change it into a name of your choice.

2.   To help you remember what Listening Area was used during the measurements, you can select the correct one in the list.

3.   To describe the target curve that was defined, you can give an alternative name to this curve.

4.   Finally save to complete the New Profile creation.

1.   For the Audio Zones, we manage a single Audio Profile. Save to complete the Audio Zone Profile update.

ⓘ   Each time you go through the Dirac Live® process, the former filter design gets replaced by the new one.
Activation / deactivation of Manual EQ and Dirac EQ is done at the Remote Control level.

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Introduction	Setup	Measure	Optimize	Export

6.12)
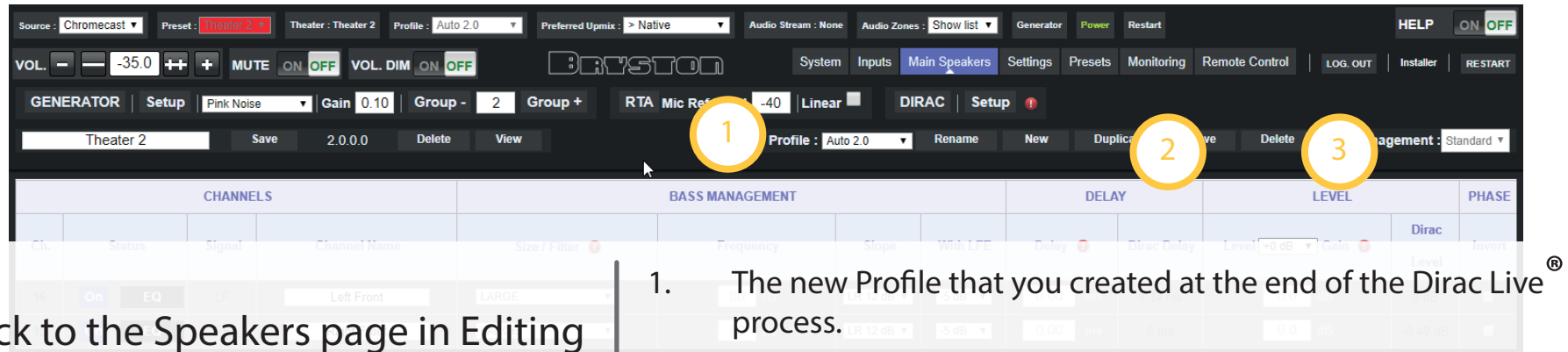
Back to the Speakers page in Editing mode you can now see:

1. The new Profile that you created at the end of the Dirac Live® process.

2. The values of Delay calculated by Dirac and applied in the Profile.

3. The values of Level calculated by Dirac and applied in the Profile.

> **!** This new Profile resulting from a Dirac Live® process cannot be adjusted manually via the Speakers page.
>
> We are not allowed to make changes to this Profile, in order to ensure integrity of the Dirac Live® calibration, as any modification in delay or level can dramatically alter the overall listening experience: this is the Reference Profile for this Dirac Live® calibration round.

6.13) If you wish to change the paramaters of a Reference Profile, you should first create a Duplicate of this Profile by selecting Duplicate (4) when in Reference Profile editing.
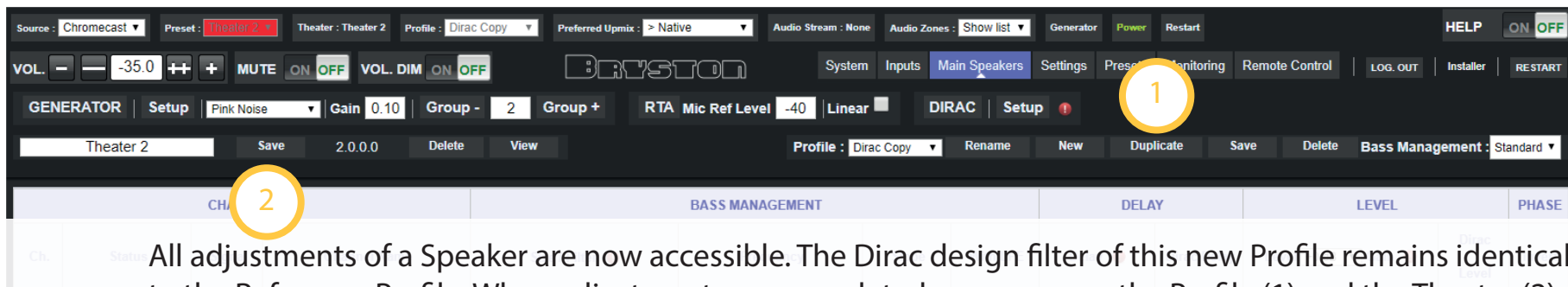
All adjustments of a Speaker are now accessible. The Dirac design filter of this new Profile remains identical to the Reference Profile. When adjustments are completed, you can save the Profile (1) and the Theater (2) to go to the next Step.

In this Step, you will adjust the Settings of the SP4 by selecting the Settings tab.
Adjustment of Triggers are made as below:

1. To allow manual change of a Trigger on the Remote, turn Manual Switching to ON
2. To automatize the Trigger behaviour, there are three possible modes:
   - on Wake = Trigger takes its active status at unit Wake Up,
   - on Input = Trigger takes its active status when an Input is selected,
   - on Presets = Trigger takes its active status when a Preset is selected.
3. When Unit goes to Sleep mode, you can define how the Trigger should react.
4. The Active Status can be defined as 0V or 12V.
5. Finally, it is possible to define a delay between the action occurence and the Trigger change between 0 to 8s.

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| Triggers | Parameters | Limiters | Front Panel | AV Delay | HDMI | 16ch AES |

PARAMETERS

Downmix Zone ①	Audio Zone ▾	
Audio Control Range MAX ②	+6 dB ▾	
Volume Dim Level ③	−	-20 dB +

1. Downmix output can be used with a screen. Selecting Audio/Video Zone will add LipSync adjustment to the remote as well as general AV Delay in Settings page.
2. To avoid damage of speakers, the installer may decide to limit the range of the audio adjustments available in the remotes (0 to 6dB).
3. Master Volume can be decreased by a fix amount of dB via a DIM button on Remotes. Define this level here. Default is -20dB.

LIMITERS

Enable ①		On Off
Chan Limit Threshold	0 dBFS	+
②		
LFE Limit Threshold	0 dBFS	+

SYSTEM SETUP

Enable Fast Boot ③		On Off

1. Limiters allow you to define a certain output level you don't want the ISP to exceed. You can turn it ON here.
2. The Limiter threshold can be set independently for normal channels and subwoofer channels.
   Adjust the level at which the limiters will start to work.
3. There are two modes available in Sleep Mode: a low power consumption one (slow start up, 40s) and a fast start up one (higher consumption, <5s). Select whether to enable the Fast Boot mode here.

FRONT PANEL

Active Brightness ①	−	100 %	+
Standby Brightness ②		20 %	+
Standby Timeout ③	−	10 s	+

1. Set Brightness level when adjusting through the Front Panel.
2. Set Brightness level when in idle mode.
3. Set time out between Active Mode and Idle Mode.

Settings   Triggers   Parameters   Limiters   Front Panel   AV Delay   HDMI   16ch AES

AUDIO/VIDEO GENERAL DELAY PER AV ZONE

| Theater 1 | ① | - | 0 | ms | + |
| Zone AV 1 | | - | 0 | ms | + |

1. For each zone, adjust the Delay required to compensate Audio and Video desynchronization due to the display.

The HDMI inputs can be configured so to provide a better compatibility between the source devices and the displays when issues such as blanked video or snow noise are encountered due to HDCP interoperability problems.

1. For the inputs defined as HDMI2.0 compatible being by default inputs 5 to 7 (or 1 to 7 when the HDMI2.0 extension setting «2» below is set to ON), it is possible to limit the datarate to 450 MHz instead of the default 600 MHz required for HDMI2.0.

2. By default inputs 1 to 4 are limited to HDMI1.4 speeds (340 MHz datarate). It is possible to set all inputs to accept HDMI2.0 speeds, defined by the setting «1» above between 450 MHz and 600 MHz. Be aware that changing this setting requires source to be tested at the required resolution to ensure proper behaviour of the whole HDMI chain.

Note: a change of these settings will force the unit to restart after SAVE operation.

This page intentionally blank

The last part of the Configuration of the unit consists on creating Listening Presets that will link together all the adjustments you have made in previous parts, that is to say:

- Theaters with an Audio Profile,
- Audio Zones to activate,
- Triggers to control,
- Preferred Upmix.

These Listening Presets become available and selectable in the Remote Controls.
Changing from Listening Preset will load all related settings, seamlessly to the user.
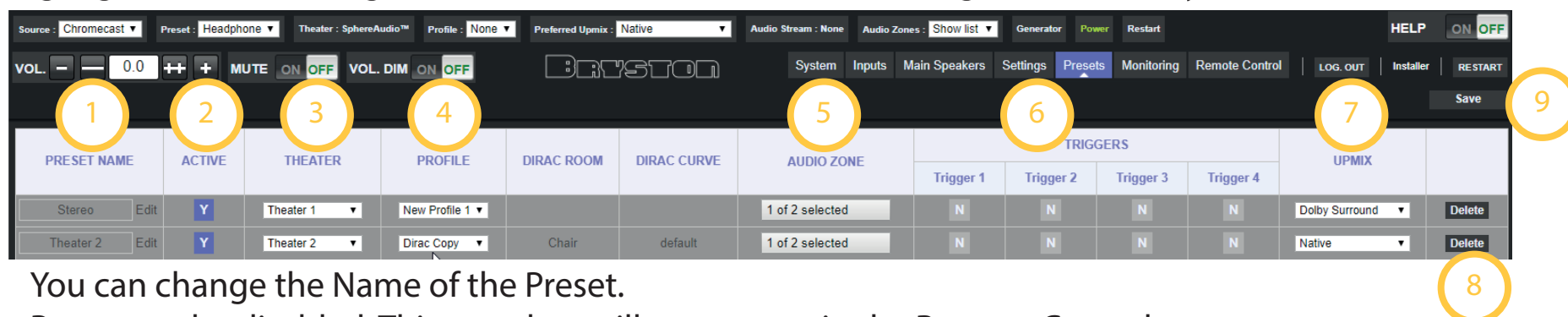
1. You can change the Name of the Preset.
2. Preset can be disabled. This way they will not appear in the Remote Control.
3. A Preset can be linked to a Theater that would become active when the Preset is selected.
4. When the Theater has been selected, you can choose an Audio Profile among those created for the selected Theater. When it is a Dirac profile, its Room and Curve description will be shown,
5. It is possible to get Audio Zones playback together with a Theater. Select the Zones you want to activate by ticking the corresponding box in the list.
6. Triggers that have been «Enabled on Preset» in the Settings page can take their active status when this Preset is selected.
7. For each Preset, you can define which Preferred Upmix should be activated when allowed by the decoder.
8. You can Create or Delete Presets.
9. At the end, you will be able to Save when your Preset configuration has been completed.

To make use of the optional SphereAudio™ binaural engine powered by Auro®-Headphones™ and integrated into your SP4, a dedicated SphereAudio™ preset is defined with the Downmix output selected by default. When selected in the Remote Controls, it will create a 3D Immersive experience via headphones by binauralizing the mono or up to 13.1 encoded formats (native Immersive Sound) into two channels.

To add more Headphones zones to this preset, you must adjust the SphereAudio™ preset as shown below.

1. Identify the SphereAudio™ preset,

2. In the Audio Zone list, select the Headphones zones you want to activate and access SphereAudio™ mode,

3. Select the Preferred Upmix to activate when the SphereAudio™ preset is selected,

4. Save when your Preset configuration has been completed.

Outputs Mapping   Outputs Connections

9.1) You can connect the analog outputs to your amplifiers according to the outputs mapping that has been automatically generated during the Speakers Layout definition. In case the proposed mapping doesn't match your need, it is possible to rearrange the outputs order as shown below.
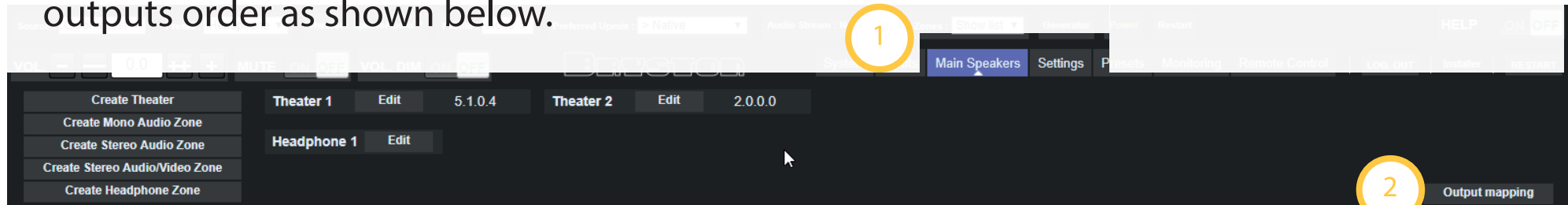
1. Select the Speakers tab and stay in Speakers list visualization mode.

2. Select the «Output Mapping» function. A pop up window will be shown allowing the mapping to changed.

3. Change the output number according to connections expectations.

4. Save to store the new output mapping and to exit the pop up window.

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 Front Top	7	7 ▾
	Right Front Top	8	8 ▾
	Left Back Top	9	9 ▾
	Right Back Top	10	10 ▾
	Inactive channel	11	11 ▾
	Inactive channel	12	12 ▾
Headphone 1	Headphone Right	13	13 ▾
	Headphone Left	14	14 ▾
Theater 2	Right Front	15	15 ▾
	Left Front	16	16 ▾

Save   Close

Connections to your amplifiers according to the Speakers mapping and type installed, as well as the Trigger outputs defined in the section 7 (Settings), can be done following below steps.

9.3) In the System Page, select the «Export Parameters» function. A file containing the SP4 Main Speakers Channel Mapping will be downlaodable and printable.
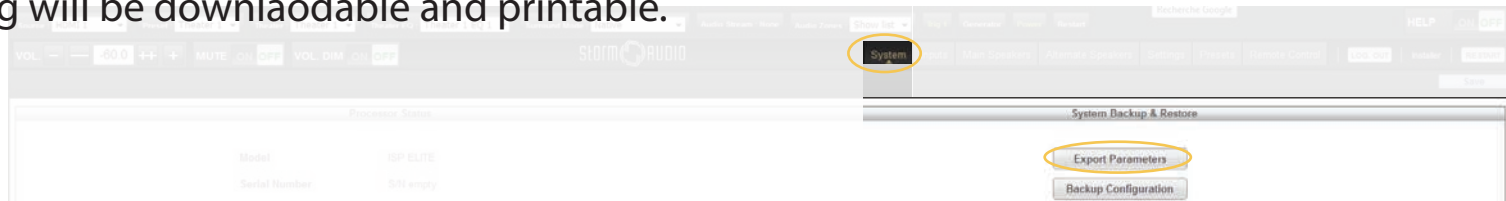
9.3) With the exported Excel file, you can now go and connect your cables to the correct output.
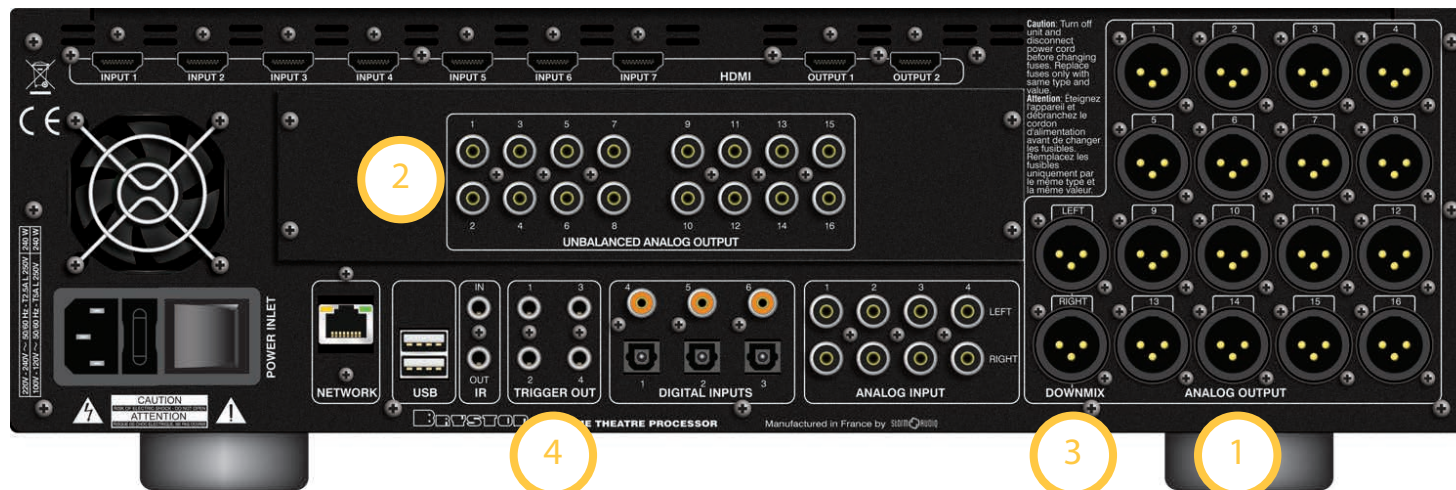
Main Outputs :
1. Analog, Ch1 to Ch16
2. Alternate Analog RCA
    Ch1 to Ch16

Downmix Outputs:
3. Analog, R and L

Triggers:
4. Jack 3.5mm

See part 11 for details in connectors description.

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Web Remote   SP4 Remote
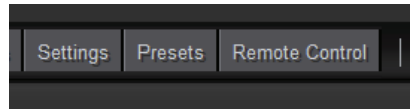
1

1. In the Web Interface, select Remote Control tab to access it.

2. Source/Input selection area.

3. Theater control with:
   - Unit power control
   - Master Volume, Mute and Volume Dim
   - Loudness, Cinema EQ and LFE Dim

4. In this zone the Listening Preset can be selected, which defines where the playback is expected. The Preferred Upmix (Dolby Surround, DTS Neural:X or Auro-Matic®) can be selected in this area. Additionaly upmix parameters can be adjusted.

5. For the Theater, this offers quick level adjustments of Center, Surround and Subwoofers

6. Additional settings for the Theater with Tone Control, Audio Brightness and LipSync.

7. When set to Manual in the Settings page, the Triggers can be controlled in the Remote.

8. Audio Zone control: for each Audio Zone defined and active with the Preset, a set of adjustments is given:
   - Volume and Mute,
   - Tone Control,
   - LipSync when AV Zone

1. In the Remote Control interface, you can select the Listening Preset that was created to call up the SphereAudio™ mode.

2. When the SphereAudio™ Mode has been selected, the main Theater will get muted. All Theater related adjustments won't be accessible anymore.

3. In SphereAudio™ Mode, you have access to several effects. There are five available as described here

4. For each Headphones Zone you can enable or disable the SphereAudio™ effect.

Home Cinema:
allows to enjoy cinema quality sound when watching e.g. movies

Cinema:
provides the best cinematic experience, similar to what you would hear in a large theatre equipped with an Immersive Sound speaker setup

Lounge:
for a more intimate listening experience, as in a cozy cafe

Concert:
setting that reenacts Immersive Sound in a huge concert hall or large-scale room

Bypass:
this is an exclusive SphereAudio downmix that will mix all decoded channels into 2 headphone channels, including height and top channels. This is not really a binaural mode, but rather an optimized downmix for headphones

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A Remote Control application is available on the Apple AppStore portal: SP4 Remote™.

Parameters page

1. You will first connect the App to the ISP you want to control. Insert the IP address of the unit. You can identify the IP address of the SP4 by pressing and holding the EDIT button on the front panel.
2. Select Connect, a white LED will show up when connected.
3. In each of the Remote Control pages, you will always have access to Master Volume, Mute, Dim, Loudness and CinemaEQ.
4. Triggers that have been set to «Manual Switch ON» in Settings page can be controlled here.
5. Front panel display settings are changeable here.
6. As in the Web Interface, it is possible to restart the unit remotely using the Restart button.
7. Access the other App Pages by selecting the icons.

Home page
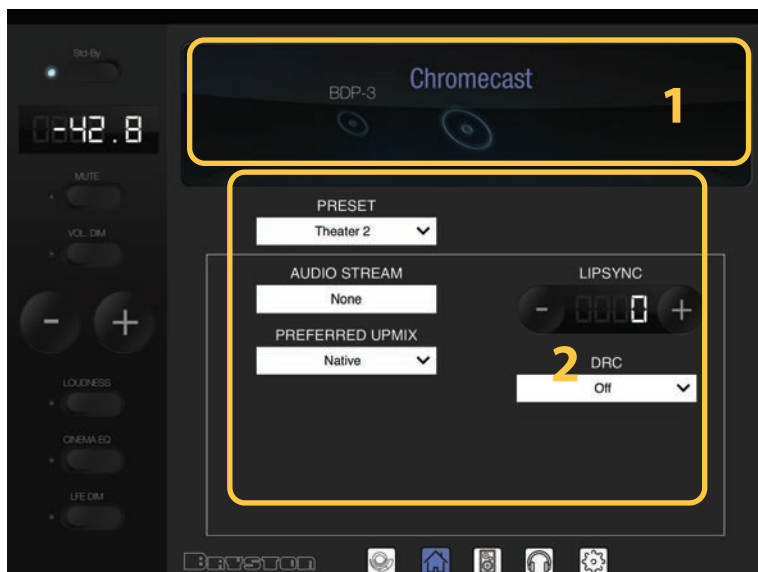
1. Input selection.
2. Playback control with selection of the Listening Presets, Surround Modes and LipSync adjustment.

Web Remote   SP4 Remote
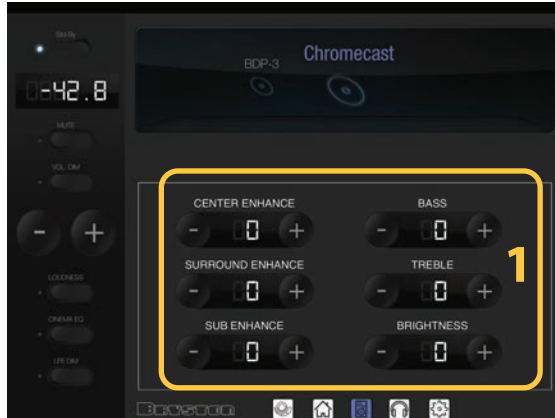
Adjustment page

1. Same additional adjustments as described in the Web Remote interface are available in the Adjustment page of the App Remote.

Audio Zone page
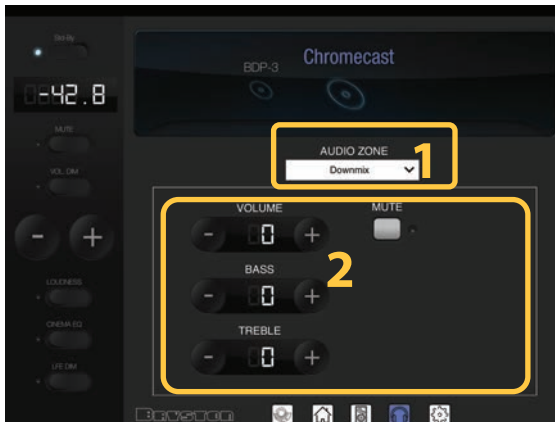
1. In the Audio Zone page, you can select which Zone you would like to control and adjust.

2. For the selected Zone, a set of parameters is adjustable, depending on the Zone type defined. Amongst them we can find: Volume, Mute, EQ, Tone Control and LipSync.

Volume page

The Volume Page features a large volume knob which makes it easy to adjust the main theater volume.

When a Listening Preset activating the SphereAudio™ mode is selected in the Preset area, the StormRemote™ will behave differently from the usual case, as described below

Home page

1. In SphereAudio™ mode, the Theater is muted and cannot be controlled. This is a mode for Headphones only, that offers 5 different Effects as described earlier.

2. The 5 Effects can be selected here.
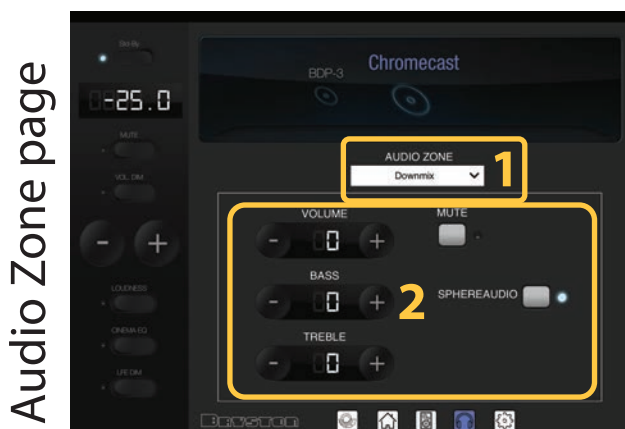
Audio Zone page

1. In the Audio Zone page, you can select which Headphones you would like to control and adjust.

2. For the selected Headphones, a set of parameters can be adjusted, depending on the Zone type defined. In case of the SphereAudio™ mode, there is a switch to enable or disable it for each Headphones.

11.1) To provide an overview of the installation status, a Monitoring function is implemented on the SP4, accessible via the Monitoring tab selection. Note that Monitoring is an optional feature available for a small fee.
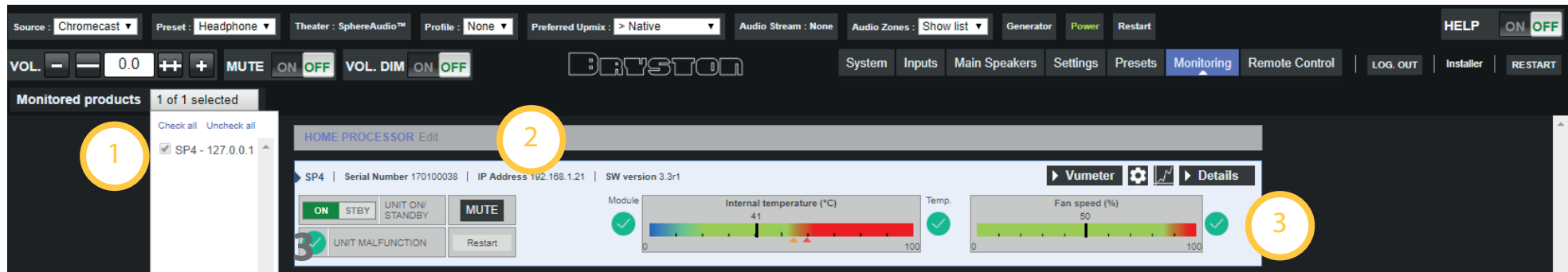
1. A list of the SP4s installed and connected to the same network is shown.
    Select which devices you would like to monitor and they will appear in the main area.
2. The current SP4 will be listed first. By default the window is collapsed and show limited information.
    It is possible to expand it (a), to visualize the history of temperature and FAN behaviour (b), to adjust the threshold of the Alert Messaging (c), to activate the VuMeter offering real time signal visualization (d).
    It is also possible to control the ISP with Power, Unit or Restart (e). A summary status information is also shown. More details will be provided in section 11.2.
3. Using the Monitoring tool, you can visualize the internal average temperature. The SP4 will also indicate the current FAN speed. For each scale, an indication of the Status is provided, with good Status ✓ and Alert ⚠ signs.

c **b** **a**

a. Expanding the window will give access to detailed informations about the unit's status, what will be described in parts 11.2 and 11.3.

b. An important feature of the Monitoring is the possibility to visualize the history of the unit temperature and the FANs values over time. Selecting this button will show a pop up window as below:
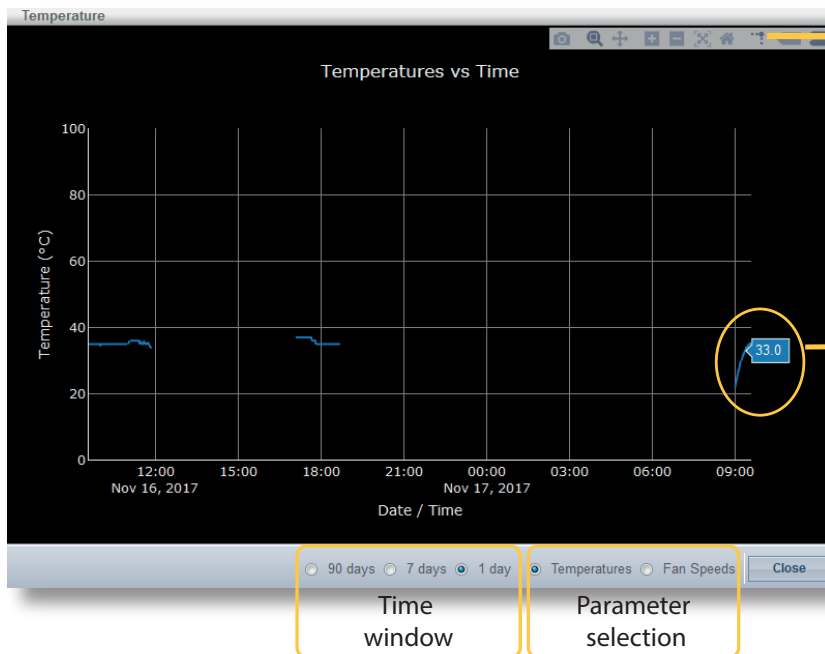
Tools to manipulate the data are provided, from left to right:
- «snapshot» tool to make a picture of the curve,
- «zoom in» to allow for the definition of a new window size horizontally, by left-clicking your mouse,
- «pan» to allow translation in the horizontal axis but with the same scale,
- «zoom» + and -,
- «zoom out» to allow a rescale to the default window size
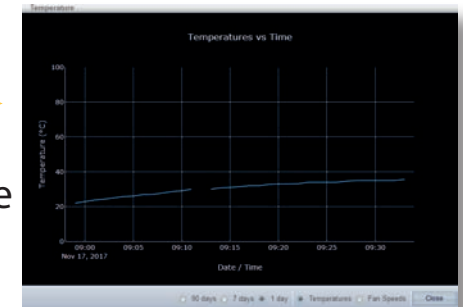
c. Settings provide access to the Alerts Thresholds adjustments. These Thresholds are by default defined at values seen critical for the long term reliability of the products. It is possible to create additional alerts by changing these values. Default one will still generate alerts when reached. Warning alert will trigger a message in the User Interface and the Remotes, while Critical alert might shut down the unit automatically for safety reasons.

11.2) Expanding the Processor Monitoring panel adds access to a lot of informations described below.
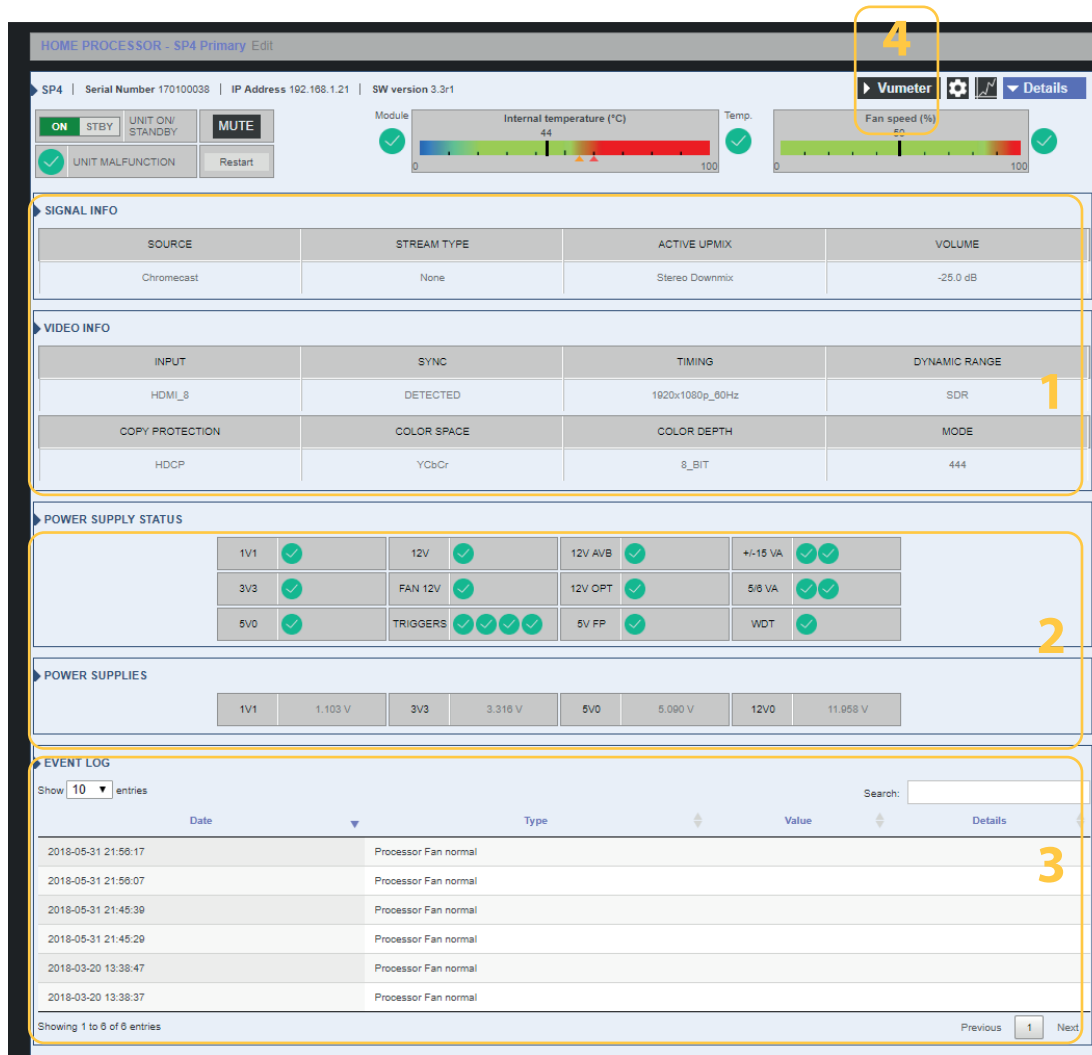
1. Detailed information about Audio and Video streams are provided.
2. Status of all the internal power supplies with the actual reading of the main ones,
3. A log of all the important events is maintained and shown in a list format. This log is important in case of an issue occurence, to help the support team to understand where the problem can come from. It is possible to do a search of a specific event. Storage is limited to the last 500 events.
4. It is possible to visualize the real-time levels of the decoder and the post processor channels by selecting «Vumeter», expanding the window as shown below.
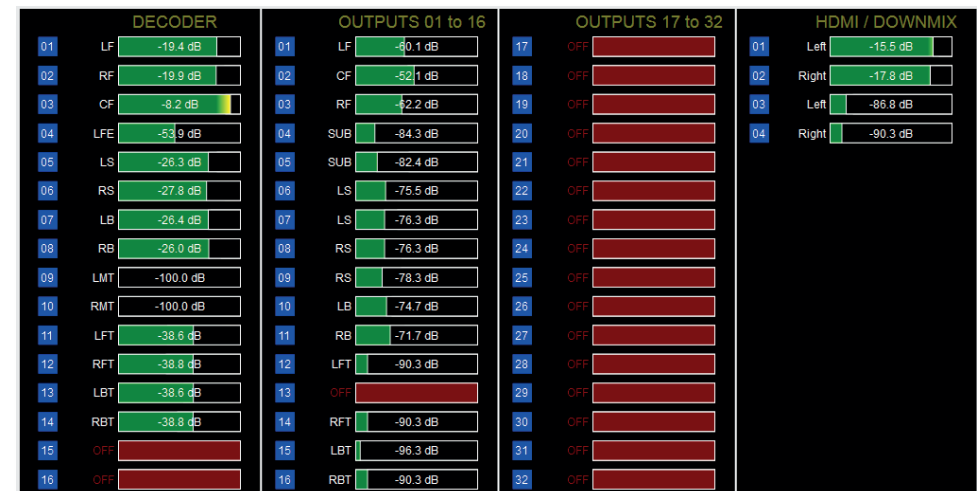
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Special care must be taken for the cables, wires and connectors to be used with the SP4. Here is a description of the connectors pin out and recommendation for the wiring.

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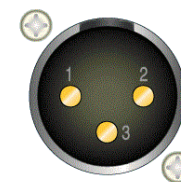
3-PIN XLR - MALE

2 OUTPUT + / Phase a / hot

3 OUTPUT - / Phase b / cold

1 SCREEN   connected to Ground

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

1=SHIELD   FEMALE   RED
2=RED   BLACK   2-CONDUCTOR SHIELDED CABLE   RED   T=RED
3=BLACK   SHIELD   BLACK   S=BLACK

CROSS-COUPLED OUTPUT ONLY: CONNECT PIN 1 TO PIN 3 AT THIS END
AND SET GROUND LIFT SWITCH TO 'GROUNDED' (IF PRESENT).

Connectors & Inputs table

Connectors   Inputs table
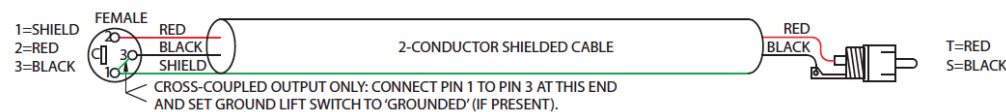
Source Name	Digital Input connection	Analog Input connection	HDMI Input connection

	SP4
	ELITE Range
Main Features	
Auro-3D / Dolby Atmos / DTS:X	✓ / ✓ / ✓
SphereAudio - Binaural Immersive Sound for Headphones	✓
StormOptimizer Room Calibration - powered by Dirac Live	✓
StormMonitoring - Remote Monitoring	✓
for initial room calibration and permanent remote monitoring	✓
Multichannel / Surround Processing	
Output channels	16 (32 optional)
Decoding / upmixing channels	up to 16
Input sampling rate supported	up to 192 kHz
Stereo downmix	✓
Post processing sampling rate	48 kHz
Dirac Live DSP runtime	✓
Bass management	✓ (fully flexible)
Multi-subwoofer channels	Unlimited
Multi-way crossover (6-12-18-24 dB/oct filter slopes)	✓
Parametric EQ per channel	10 bands
HDMI	
HDMI inputs / outputs	7/2
HDMI inputs	1-4 : HDMI 1.4 / HDCP 2.2
	5-7 : HDMI 2.0 / HDCP 2.2
HDMI outputs (mirroring)	1 : HDMI 1.4 / HDCP 1.4
	2 : HDMI 2.0 / HDCP 2.2
4K UHD HDR	✓
High Dynamic Range : HDR10 / HLG / Dolby Vision	✓ / ✓ / -
Color Space and Subsampling	4:4:4, 4:2:2, 4:2:0
Deep Color (12 bpc)	✓
Max. resolution support	4K 60fps 4:4:4 8bpc
HDMI: 3D / 4K / ARC / OSD	✓ / ✓ / - / -
Audio Inputs	
Digital input: coaxial, optical	3 / 3
Digital input: AES / EBU 16ch (Digital Cinema Input)	Optional Module
Analog stereo inputs: RCA	4
Audio Outputs	
Analog main outputs, balanced (ch 1 to 16)	XLR
Analog main outputs, balanced (ch 17 to 32)	Optional Module
Analog main outputs, balanced (4ch expansion)	Optional Module
Analog secondary outputs, balanced (ch 1 to 16)	Optional Module
Analog secondary outputs, unbalanced (ch 1 to 16)	Optional Module
Stereo downmix outputs, balanced	XLR (2)
Digital output: AES / EBU 32ch (ch 1 to 32)	Optional Module
Digital output: AVB 32ch (ch 1 to 32)	Optional Module
Set-Up Management	
Configurable multi-theater management	✓
Configurable audio zones management	✓
Theater and audio zones listening presets	Unlimited
Alternate theater management	Optional Module
Backup and restore of set-up	✓
Firmware update via USB / network	✓ / ✓
Control Inputs / Outputs	
USB type A	2
Ethernet / Wi-Fi	✓ / -
Output trigger control	4 (out)
IR remote ports, in / out	1 / 1
Control / Custom Installation	
Web-based product configurator	✓
TCP/IP API based control	✓
StormRemote iPad control application	✓
Control4, Crestron, Savant and RTI home automation	✓
Front panel display	✓ (TFT 4,3")
IR remote control handset	N/A
Power Supply	
Voltage range	100V to 240V
Type	SMPS
Range selection	Universal
Casing	
Home / Rack (removable ears)	✓ / ✓
Net Weight (kg/Lbs)	13.1 / 28.8
Size	4RU
Dimension (cm / in)	49.00 x 47.90 x 19.10 / 19.29 x 18.86 x 7.52

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