Dolby Atmos® Cinema Processor CP850 Manual

Issue 2
Model CP850
Model DAC3201 Part Number 9111710

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OPEN SOURCE SOFTWARE ATTRIBUTION:

Axis/Apache/: http://axis.apache.org/axis2/c/core/

GWT: https://developers.google.com/web-toolkit/

Source Sans Pro font: http://www.fontsquirrel.com/foundry/Adobe

Part Number 9111710
Issue 2
S14/28171/28258

Regulatory Notices

United States (FCC)

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

European Union (CISPR 22)

The Dolby Atmos® CP850 Cinema Processor and the Dolby Atmos Interface DAC3201comply with the EMC requirement of EN55022 and EN55024 when operated in accordance with this manual.

WARNING: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Canada

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil de la calsse A est conforme à la norme NBM-003 de Canada.

China

警告
此为 A 级产品。在生活环境中，该产品可能会造成无线电干扰。在这种情况下，
可能需要用户 对下扰采取切实可行的措施。

Korea

이 기기는 업무용 (A 급) 전자파적합기기로서 판
매자 또는 사용자는 이 점을 주의하시기 바라
며 , 가정외의 지역에서 사용하는 것을 목적으로
합니다 .

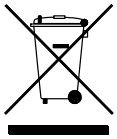
Important Safety Instructions

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. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
7. Clean only with dry cloth.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. No naked flame sources, such as lighted candles, should be placed on the apparatus
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 when unused for long periods of time.
13. 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.
14. Do not expose the apparatus to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
15. CAUTION: Troubleshooting must be performed by a trained technician. To reduce the risk of electric shock, do not attempt to service this equipment unless you are qualified to do so.
16. 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 is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
17. This apparatus must be earthed (grounded) by connecting to a correctly wired and earthed power outlet.
18. Ensure that your mains supply is in the correct range for the input power requirement of the unit.
19. In order to reduce the risk of electrical shock, the power cord must be disconnected when the power supply assembly is removed.
20. This equipment is designed to mount in a suitably ventilated 19” rack; ensure that any ventilation slots in the unit are not blocked or covered.
21. The mains power disconnect device for this unit is the plug-in mains cord rather than a power switch. The mains cord must remain readily accessible for disconnecting mains power.
22. To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect the rear-panel Ethernet port to telephone circuits.

23. As the colors of the cores in the mains lead may not correspond with the colored markings identifying the terminals in your plug, proceed as follows:
    - The green and yellow core must be connected to the terminal in the plug identified by the letter E, or by the earth symbol ⏚, or colored green, or green and yellow.
    - The blue core must be connected to the terminal marked with the letter N or colored black.
    - The brown core must be connected to the terminal marked with the letter L or colored red.
24. This apparatus must be earthed.

CAUTION – Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of used batteries according to local law.

PRODUCT END-OF-LIFE INFORMATION



This product was designed and built by Dolby Laboratories to provide many years of service, and is backed by our commitment to provide high-quality support. When it eventually reaches the end of its serviceable life, it should be disposed of in accordance with local or national legislation. For current information please visit our website: www.dolby.com/environment.

This symbol that appears on the unit rear panel and in this manual is intended to alert the user to the presence of uninsulated "dangerous" voltage within the product's enclosure that maybe of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important safety operating and maintenance instructions.

IMPORTANT SAFETY NOTICE

These units comply with safety standard EN60950-1. These units shall not be exposed to dripping or splashing and no objects filled with liquids, such as coffee cups, shall be placed on the equipment. To ensure safe operation and to guard against potential shock hazard or risk of fire, the following **must** be observed:

- Ensure that your mains supply is in the correct range for the input power requirement of the unit.
- Ensure **fuses** fitted are the **correct rating and type** as marked on the unit.
- The unit **must be earthed** by connecting to a correctly wired and **earthed** power outlet.
- The **power cord** supplied with this unit must be wired as follows:

Live—Brown Neutral—Blue Earth—Green/Yellow

GB

IMPORTANT – NOTE DE SECURITE

Ces unités se conformer à la norme de sécurité EN60950-1. Ne pas exposer ces appareils aux éclaboussures ou aux gouttes de liquide. Ne pas poser d'objets remplis de liquide, tels que des tasses de café, sur l'appareil. Pour vous assurer d'un fonctionnement sans danger et de prévenir tout choc électrique ou tout risque d'incendie, veillez à ob les recommandations suivantes.

- Le selecteur de tension doit être placé sur la valeur correspondante à votre alimentation réseau.
- Les fusibles doivent correspondre à la valeur indiquée sur le materiel.
- Le materiel doit être correctement relié à la terre.
- Le cordon secteur livré avec le materiel doit être cablé de la manière suivante:

Phase—Brun Neutre—Bleu Terre—Vert/Jaune

F

WICHTIGER SICHERHEITSHINWEIS

Diese Geräte erfüllen die Sicherheitsnorm EN60950-1. Die Geräte darf nicht mit Flüssigkeiten (Spritzwasser usw.) in Berührung kommen; stellen Sie keine Gefäße, z.B. Kaffeetassen, auf die Geräte. Für das sichere Funktionieren der Geräte und zur Unfallverhütung (elektrischer Schlag, Feuer) sind die folgenden Regeln unbedingt einzuhalten:

- Der Spannungswähler muß auf Ihre Netzspannung eingestellt sein.
- Die Sicherungen müssen in Typ und Stromwert mit den Angaben auf dem Gerät übereinstimmen.
- Die Erdung des Geräte muß über eine geerdete Steckdose gewährleistet sein.
- Das mitgelieferte Netzkabel muß wie folgt verdrahtet werden:

Phase—braun Nulleiter—blau Erde—grün/gelb

D

NORME DI SICUREZZA – IMPORTANTE

Queste unità sono costruiti a norma di sicurezza EN60950-1. I prodotti non deve essere sottoposto a schizzi, spruzzi e gocciolamenti, e nessun tipo di oggetto riempito con liquidi, come ad esempio tazze di caffè, deve essere appoggiato sul dispositivo. Per una perfetta sicurezza ed al fine di evitare eventuali rischi di scossa êlettrica o d'incendio vanno osservate le seguenti misure di sicurezza:

- Assicurarsi che il selettore di cambio tensione sia posizionato sul valore corretto.
- Assicurarsi che la portata ed il tipo di fusibili siano quelli prescritti dalla casa costruttrice.
- L'apparecchiatura deve avere un collegamento di messa a terra ben eseguito; anche la connessione rete deve avere un collegamento a terra.
- Il cavo di alimentazione a corredo dell'apparecchiatura deve essere collegato come segue:

Filo tensione—Marrone Neutro—Blu Massa—Verde/Giallo

I

AVISO IMPORTANTE DE SEGURIDAD

Estas unidades cumplen con la norma de seguridad EN60950-1. Estas unidades no debe ser expuesta a goteos o salpicaduras y no deben colocarse sobre el equipo recipientes con liquidos, como tazas de cafe. Para asegurarse un funcionamiento seguro y prevenir cualquier posible peligro de descarga o riesgo de incendio, se han de observar las siguientes precauciones:

- Asegúrese que el selector de tensión esté ajustado a la tensión correcta para su alimentación.
- Asegúrese que los fusibles colocados son del tipo y valor correctos, tal como se marca en la unidad.
- La unidad debe ser puesta a tierra, conectándola a un conector de red correctamente cableado y puesto a tierra.
- El cable de red suministrado con esta unidad, debe ser cableado como sigue:

Vivo—Marrón Neutro—Azul Tierra—Verde/Amarillo

E

VIKTIGA SÄKERHETSÅTGÄRDER!

Dessa enheter uppfyller säkerhetsstandarden EN60950-1. Dessa enheter får inte utsättas för yttre åverkan samt föremål innehållande vätska, såsom kaffemuggar, får ej placeras på utrustningen. För att garantera säkerheten och gardera mot eventuell elchock eller brandrisk, måste följande obas:

- Kontrollera att spänningsväljaren är inställd på korrekt nätspänning.
- Konrollera att säkringarna är av rätt typ och för rätt strömstyrka så som anvisningarna på enheten föreskriver.
- Enheten måste vara jordad genom anslutning till ett korrekt kopplat och jordat el-uttag.
- El-sladden som medföljer denna enhet måste kopplas enligt foljande:

Fas—Brun Neutral—Blå Jord—Grön/Gul

S

BELANGRIJK VEILIGHEIDS-VOORSCHRIFT:

Deze eenheden voldoen aan de EN60950-1. Deze apparaten mag niet worden blootgesteld aan vocht. Vanwege het risico dat er druppels in het apparaat vallen, dient u er geen vloeistoffen in bekers op te plaatsen. Voor een veilig gebruik en om het gevaar van electrische schokken en het risico van brand te vermijden, dienen de volgende regels in acht te worden genomen:

- Controleer of de spanningscaroussel op het juiste Voltage staat.
- Gebruik alleen zekeringen van de aangegeven typen en waarden.
- Aansluiting van de unit alleen aan een geaarde wandcontactdoos.
- De netkabel die met de unit wordt geleverd, moet als volgt worden aangesloten:

Fase—Bruin Nul—Blauw Aarde—Groen/Geel

NL

Table of Contents

Introduction

Welcome to Dolby Atmos®.

The Dolby Atmos Cinema Processor CP850 is a direct result of Dolby Laboratories' continued leadership in the development of innovative cinema technologies. The CP850 supports Dolby Atmos, our latest innovation in audio technology. Dolby Atmos vastly expands the palette for content creators and enhances the audience experience in cinematic presentations. In addition, the CP850 supports multichannel PCM, Dolby® Digital, Dolby Digital Plus™, Dolby E, Dolby TrueHD, and our next-generation upmixer technology.

With the CP850, you can present high-quality audio from the following audio sources:

- Dolby Digital Cinema playback systems
- Onscreen advertising servers
- Digital video tape recorders (VTRs)
- Digital satellite or cable TV receivers
- Blu-ray Disc™
- DVDs

The CP850 provides audio inputs for:

- 8 ×AES digital audio
- S/PDIF
- AES3-ID (two inputs)
- Optical S/PDIF
- HDMI™ (two inputs)
- Stereo nonsync
- Microphones (two inputs)

The analog audio outputs are balanced, with two multipin connectors. Built-in Ethernet, USB, and serial interfaces accommodate PC control and cinema network connectivity.

An independently adjustable global audio delay is assigned to each input to ensure that sound and picture are perfectly synchronized during digital cinema presentations. You can assign delays to different inputs, providing flexibility for alternative content sources, which often require different delays.

The CP850 is compatible with existing theatre automation systems and ASCII command strings. Its ability to handle multiple formats and future upgrades make it an essential tool for an evolving digital cinema market.

The CP850 utilizes high-resolution multiple-rate equalization for all channels that you can set automatically using Dolby Atmos Designer software or manually from the web client user interface.

You can store calibration settings for one unit on a PC, and, if desired, transfer these settings directly to another CP850. This minimizes the need for additional calibration after repairs. As improvements to the CP850 digital control and processing software are developed, the latest revisions are transferable from a PC to the CP850.

1.1 About This Manual

This manual shows you how to install and operate a Dolby Atmos Cinema Processor CP850 using the front-panel navigation keys, user-control screen, and web client user interface. It also explains how to calibrate an auditorium using Dolby Atmos Designer software.

This chapter covers the following:

1.2 CP850 Front Panel

Figure 1-1 shows the CP850 front-panel components.

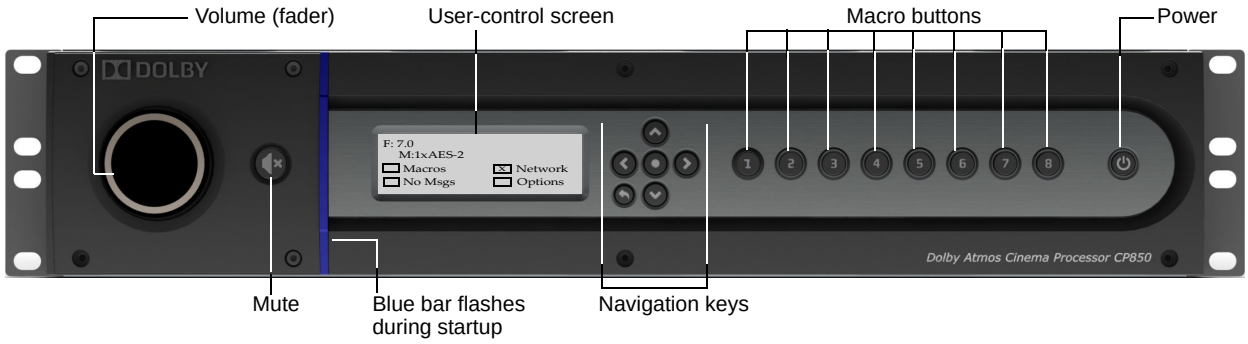


Figure 1-1 CP850 Front Panel

Following is a description of the CP850 front-panel components.

1.2.1 Front-Panel Macro Buttons

You can configure specific parameters and assign each of these to the front-panel macro buttons using the web client. After configuring these macros, you can press one of these buttons to select the respective macro settings. The CP850 switches automatically between PCM and Dolby Digital bitstreams. These buttons are backlit in white. When you press a button to activate a specific macro, it illuminates in blue. If the full name of the selected macro is not visible, press the corresponding button again to page to the right, and you can read the entire macro name. The name of the currently-selected macro automatically scrolls across the user-control screen. You can scroll through a list of all the macro names on the **Macros** screen. (See Section 1.2.2 for information on navigating through the user-control screen.)

1.2.2 User-Control Screen and Navigation Keys

You can change some settings and perform other operations using the front-panel navigation keys and the user-control screen. With the up, down, left, and right arrow keys, you can navigate user-control screen menus and select parameters. Pressing the enter key (middle key) allows you to display or edit the selected parameter. Pressing the escape key (lower-left key) displays the previous menu. Using these arrow keys, you can select a macro, set up the network, and view system messages. In addition, selecting **Options** allows you to view the audio meter, disable Dolby Atmos, and view the hardware and software versions.

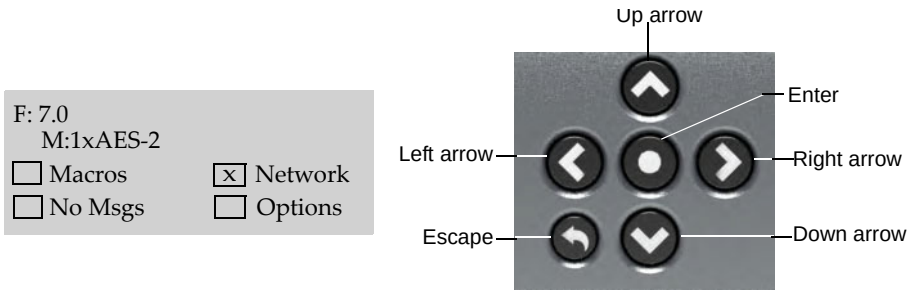


Figure 1-2 User-Control Screen and Front-Panel Navigation Keys

1.2.3 Mute Button

Press this button (shown in Figure 1-3) to mute the audio output to all channels without changing the current main fader setting. Fade-in and fade-out speeds are separately adjustable from 0.2 to 5 seconds, using the web client interface. The mute button flashes red when activated. Press the mute button again to unmute all outputs. Alternatively, you can reselect any macro button to unmute the CP850.

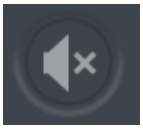


Figure 1-3 Mute Button

1.2.4 Main Volume (Fader) Knob

Rotate this knob to adjust the volume. A fader setting of 7.0 is the nominal correct operating level. The main fader knob rotates continuously with no end stops.

When you adjust the volume between 0 and 4.0, the output level changes in 20 dB steps between –90 and –10 dB. When you adjust the volume between 4.0 and 10, the output level changes in 3.33 dB steps between –10 and +10 dB. If you use the front-panel navigation keys to select **Fader** and then press the enter key (middle key), the user-control screen reflects the fader setting as you rotate the fader knob. Figure 1-5 shows the characteristic graph.

Figure 1-4 Volume Knob (Fader)

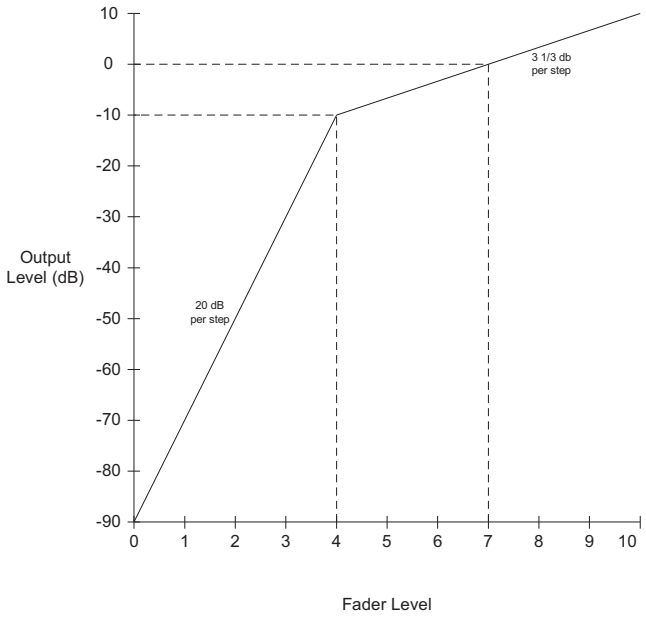


Figure 1-5 Fader Characteristic

1.3 CP850 Rear Panel

Figure 1-6 shows the CP850 rear-panel components.

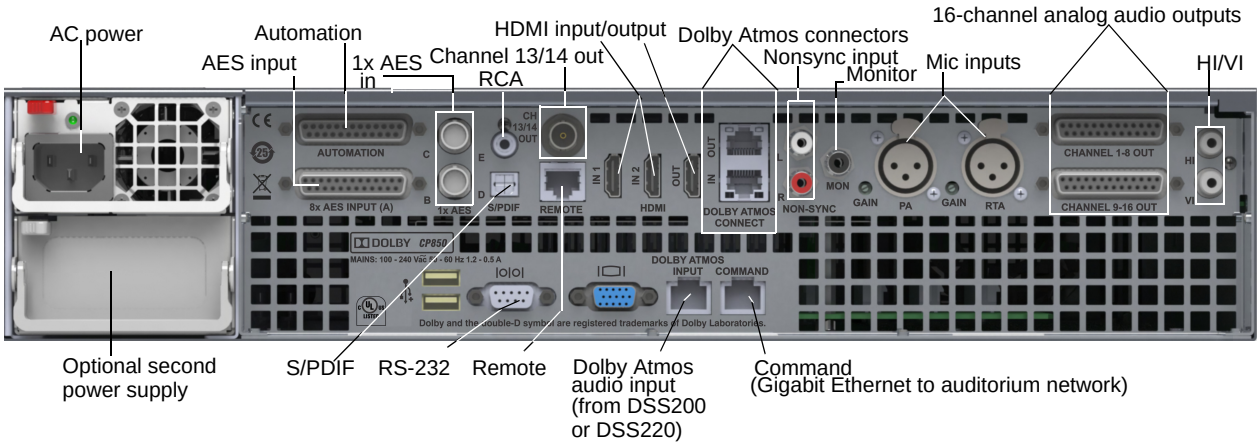


Figure 1-6 CP850 Rear Panel

Following is a description of the CP850 rear-panel components.

AC Input

This is a simple unswitched IEC power inlet module.

Dolby Atmos Input Port

If your unit has the required enablements installed, this Gigabit Ethernet port receives Dolby Atmos audio from a Dolby DSS200 or DSS220 playback unit. This is a point-to-point connection. Connect this port according to the wiring diagram in Figure 2-10. Do not connect this port to an Ethernet switch. For third-party digital cinema systems, follow the instructions provided by your manufacturer. For information on obtaining enablements, see Enablements.

Command Port

This Gigabit Ethernet port connects the CP850 to the Dolby Digital Cinema auditorium network.

RS-232 Serial Port

You can use this standard 9-pin port for serial control using ASCII string commands. See Appendix B for details on the command strings.

The equipment connected to this port should have its serial port set to 9,600 baud, no parity, one stop bit. Use a pin-to-pin serial cable.

The same control functions are available through the Ethernet port.

Remote Connector

This connector allows the use of a Dolby CAT868 remote fader for installations requiring a remote fader. This is not a standard Ethernet port, and Ethernet devices should never be connected to this port. For more information, see the *Dolby CAT868 Installation Manual*.

8x AES In Connector

This 25-pin female D-connector receives eight AES/EBU streams. The eight AES input signals must be time aligned with each other. Typically, this input connects to a Dolby DSS200 or DSS220 playback system. It accommodates PCM audio at 96, 48, 44.1, and 32 kHz (16, 20, and 24 bits), and Dolby Digital at all data rates and sample rates. The decoding of Dolby Digital is restricted to the first AES3 channel pair. This connector has a floating ground.

Channel 13/14 Out Connector

This allows other hardware to use the standard sync signal and other data that is embedded in channels 13 and 14.

HDMI In 1 and 2 Connectors

These allow you to use any HDMI device as an audio source. The CP850 passes the selected HDMI input video data to the HDMI output connector. See the pinouts in Appendix A.

HDMI Out Connector

This passes through the video from the selected HDMI input source (currently inactive). See the pinouts in Appendix A.

Dolby Atmos Connect In and Out Ports

If your unit has the required enablements installed, these two RJ-45 Ethernet ports transmit Dolby Atmos audio to the Dolby Atmos Interface DAC3201 breakout box (or to Dolby Atmos Connect enabled amplifiers). For information on obtaining enablements, see Enablements.

1x AES In Connectors

Two BNC connectors accommodate PCM audio at 96, 48, 44.1, and 32 kHz (16, 20, and 24 bits), and Dolby Digital and Dolby Digital Plus at all data rates and sample rates. These connectors have floating grounds.

S/PDIF Connector

This is an optical input connector that accommodates PCM audio at 96, 48, 44.1, and 32 kHz (16, 20, and 24 bits), and Dolby Digital at all data rates and sample rates. There is also an RCA jack that accommodates the same inputs. Two BNC male to RCA female adapters are provided in case you require additional RCA connectors.

Automation Connector

This 25-pin female D-connector allows you to select an audio input, verify the currently selected input, and to remotely assert the mute command. The pinouts are listed in Appendix A.

The automation subsystem is referenced to pin 12 (automation return). This is the ground for these functions, and connects to the CP850 ground only through a 1 kΩ resistor. An isolated power supply is provided, so connecting to automation systems does not introduce hum due to ground loops.

Caution: The isolated power supply can function properly only if the automation return pin is within ±5 volts DC (or peak AC) of the CP850 chassis ground.

The automation control system is designed to accept contact closure inputs. A closed contact asserts a command. Connect the low side of the contact closing switch or relay to the automation return.

Warning: Under no circumstances should you provide power from an external source to any pin in this connector. Connecting external power is likely to damage the CP850.

Nonsync Input Connector

Nonsync input is on two RCA jacks labeled **L** and **R** that accept 3 V_{RMS} maximum input.

Monitor (Mon)

You can configure this output via the web client and connect it to a powered speaker to monitor any channel or set of channels (including any AES audio channel). This is an RCA jack that provides a signal to a projection booth audio monitor or active loudspeaker. You can select a center-weighted sum of the Left/Center/Right channels or any speaker from the user-control screen or the web client.

Hearing Impaired (HI) Connector

You can use this RCA output for hearing impaired output. You can assign this output to any digital audio track from the DSS200 or DSS220. You can configure this output for Left + 2 Center + Right by unassigning all outputs to this connector. You can configure the hearing impaired routing using the web client.

Visually Impaired (VI) Connector

You can use this RCA output for visually impaired output. You can assign this output to any digital audio track from the DSS200 or DSS220. You can configure the visually impaired routing using the web client.

Microphone Gain

This multiple-turn trimpot adjusts the gain of the mic preamp. If you use the microphone input for public address purposes, adjust this control for the desired volume in the auditorium.

PA and RTA Microphone Inputs

Two 3-pin female XLR connectors for PA or auditorium equalization microphones. Phantom power is provided, which you can turn on and off using the web interface.

Channel 1–8 Out/Channel 9–16 Out

25-pin female D-connectors provide balanced audio output to the auditorium sound system. See Appendix A for pinout details.

1.4 CP850 Audio Connections

The CP850 provides 16 standard analog output channels. With the optional Dolby Atmos Interface DAC3201, you can combine these analog outputs with the Dolby Atmos Connect outputs to deliver a maximum of 64 output channels. To play back Dolby Atmos audio, you need either the DAC3201 or optional third-party Dolby Atmos Connect enabled amplifiers.

1.4.1 Dolby Atmos Interface DAC3201

The Dolby Atmos Interface DAC3201 is a 1U 19-inch rackmount unit, which receives digital audio from the CP850 rear-panel **DOLBY ATMOS CONNECT** ports. The DAC3201 converts this data to analog audio (up to 32 channels), which can drive the analog input to the auditorium amplifiers. If more than 32 channels are required, you can connect a second DAC3201 to provide up to 64 output channels. In addition, you can use one or more of the CP850 16 analog outputs combined with the DAC3201 outputs (up to the maximum of 64 output channels).

DAC3201 Front Panel

Figure 1-7 shows the DAC3201 front-panel components.

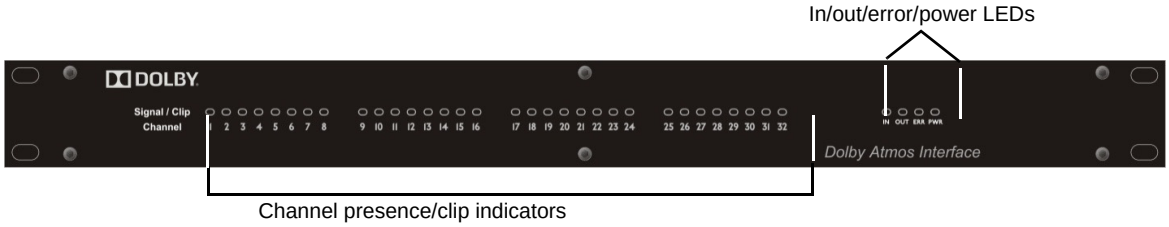


Figure 1-7 Dolby DAC3201 Front Panel

Following is a description of the DAC3201 front-panel components.

Channel Presence/Clip Indicators

The **Signal/Clip Channel** (channel presence/clip indicator) LEDs specify whether audio is present on the analog outputs of the various channels, as indicated by the number below the LEDs. These LEDs illuminate in green if a signal is present. If a signal is clipping, the corresponding LEDs illuminate in orange.

In LED

The **IN** LED indicates that the DAC3201 is connected to a CP850 (or upstream DAC3201) and is receiving Dolby Atmos Connect data. When connected properly, this LED illuminates in green.

Out LED

The **OUT** LED indicates that the DAC3201 is connected to either a CP850 or another downstream DAC3201 in loop-back mode. If this connection is valid, this LED illuminates in green.

Power LED

The **PWR** LED indicates that the DAC3201 is powered on and ready to process audio. This LED illuminates in blue when the unit is powered on.

Error LED

The **ERR** LED indicates that the **Channel Select** switch located on the DAC3201 rear panel is set to an invalid state (that is, when using two DAC3201 units with the switches set to the same configuration). This LED illuminates in red if there is an error condition.

DAC3201 Rear Panel

Figure 1-8 shows the DAC3201 rear-panel components.

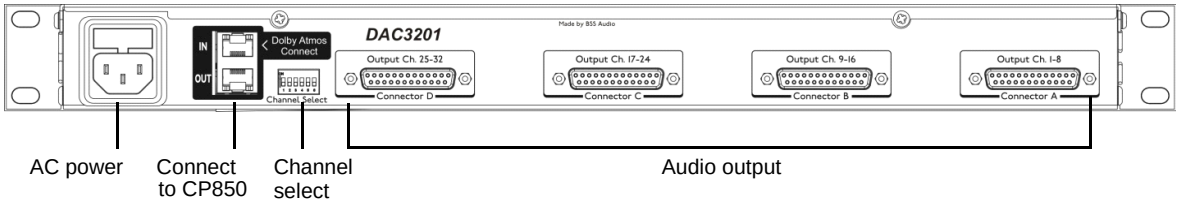


Figure 1-8 Dolby DAC3201 Rear Panel

Following is a description of the DAC3201 rear-panel components.

Power Inlet Module

The DAC3201 has an internal power supply. This power supply is a switching type that is rated for input voltages from 85 to 265 VAC and is autoswitching. A standard North American IEC power cord is included in the DAC3201 packing kit.

The power inlet module has a built-in fuse that is user replaceable. In the unlikely event that this fuse fails, you must replace it only with a T1.6A 250 volt fuse.

In/Out RJ45 Ports

You use these ports to connect to the CP850, as described in Section 2.5.

Channel Select Switch

You can connect one or two DAC3201 units to the CP850, which provides 32 or 64 channels of analog audio output. You select channel banks using the **Channel Select** switch on the DAC3201 rear panel.

Channel Bank	1	2	3	4	5	6
1–32	Off	Off	Off	Off	Off	Off
33–64	Off	Off	Off	Off	Off	On

DAC3201 Analog Output Connectors

The DAC3201 has four analog audio output connectors (**Connector A**, **Connector B**, **Connector C**, and **Connector D**) that conform to the TASCAM® pinouts shown in Appendix A.

Installing the CP850 in a Dolby Digital Cinema Network

This chapter provides authorized technicians with instructions for installing the CP850 in a Dolby® Digital Cinema network. It covers the following:

2.1 CP850 Packing Kit

In addition to the CP850, your unit ships with the following components:

- Power cable
- International power cable
- RJ45/DB25 adapter
- Two BNC male to RCA female adapters

2.2 Mounting the CP850

To avoid heat and hum pickup problems, do not mount the CP850 immediately above or below power amplifiers. Locate power amplifiers away from the CP850 to avoid hum pickup problems. Always leave a 1U space (43 mm, or 1.75 inch) above and below the CP850 to provide adequate ventilation. Install an air guide or baffle to deflect hot any air coming from equipment below the CP850.

To ensure good ground contact, install a star washer on at least one (and preferably all) rack-mounting screws, as shown in Figure 2-1. This will also aid in the prevention of electrical noise problems.

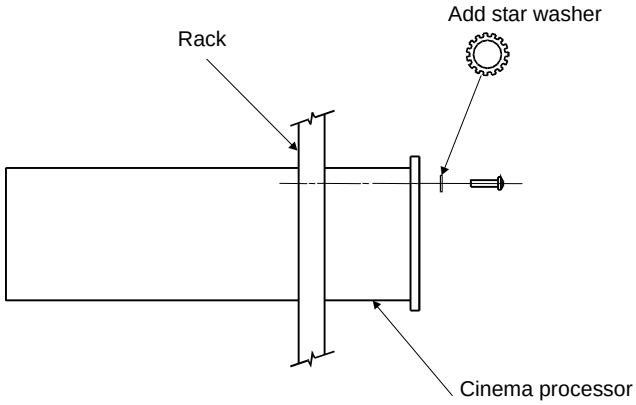


Figure 2-1 Star Washers and Rack-Mounting Screws

Proper shielding and termination of cables and cable assemblies are also very important. Follow the methods shown in the wiring diagrams.

Caution: To ensure proper ventilation, do not block the CP850 front-panel cutouts (top and bottom). See the cutout locations in Figure 2-2.

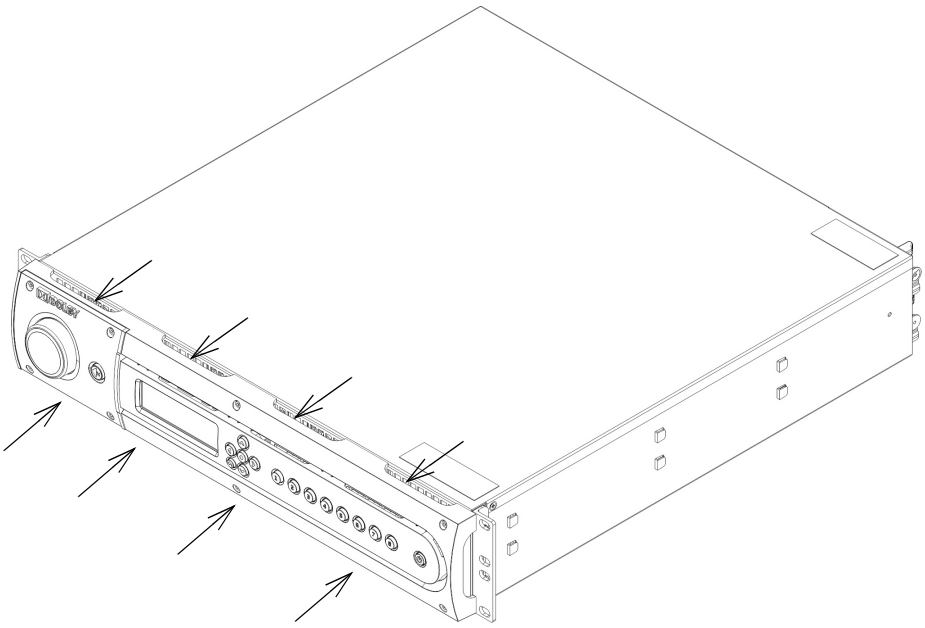


Figure 2-2 Cutout Locations (Top and Bottom)

2.3 Connecting the CP850 to a Dolby Digital Cinema Playback System

This section provides instructions for connecting the CP850 to a Dolby DSS200 or DSS220 playback system. Before using your CP850 to play back Dolby Atmos® audio, you must update your DSS200 or DSS220 to software v4.6 or later. You can download the latest software at https://www.dolbycustomer.com.

2.3.1 Connecting a DSS200 to the CP850

To connect a DSS200 to the CP850:

1. Use a CAT5E (or greater) Ethernet cable to connect the upper right-side Ethernet port on the DSS200 to the **DOLBY ATMOS INPUT** port on the CP850, as shown in Figure 2-3 for a DSS200-3 (Series 2) playback system.

Note: There may be a port protector covering the DSS200 Ethernet port. In this case, insert a 3/32-inch Allen wrench into the hole in the protector, turn counterclockwise, and remove the port protector.

2. Connect one side of a 25-pin D-connector cable to the DSS200 **8x AES OUTPUT**, then connect the other end of the cable to the CP850 **8x AES INPUT**.

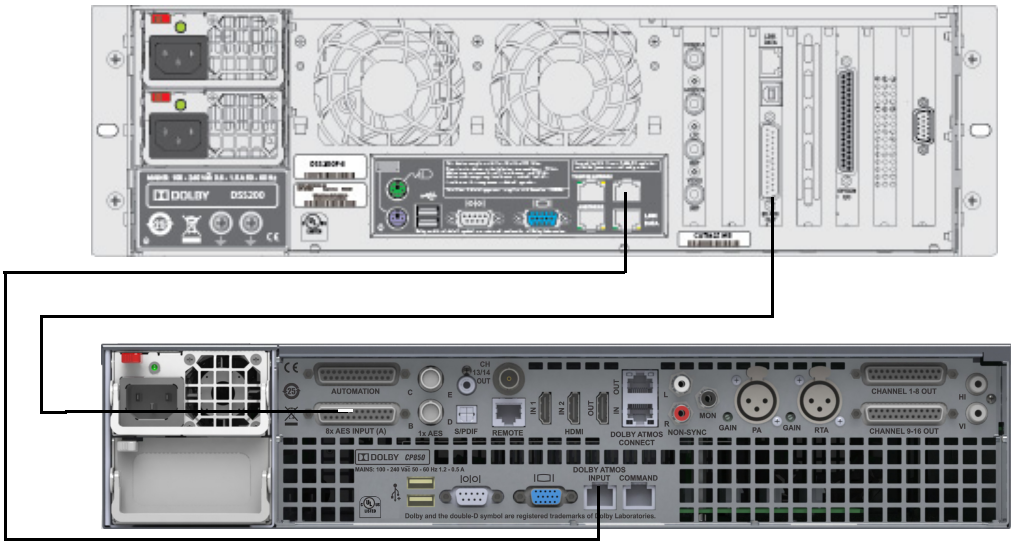


Figure 2-3 Connecting a DSS200-3 (Series 2) Playback System to the CP850

Note: Some early DSS200 playback systems have an available Ethernet port that is located in a different area of the rear panel. To connect these units to the CP850 **DOLBY ATMOS INPUT**, see Figure 2-4. However, other early units do not contain an available Ethernet port for connecting Dolby Atmos audio, and require the installation of a compatible Ethernet card (Dolby Part Number 8705660).

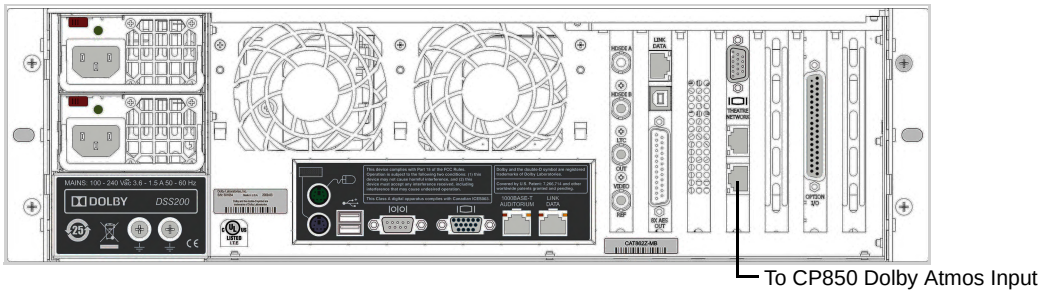


Figure 2-4 Connecting a DSS200 (Series 1A) Playback System to the CP850

Note: If you are connecting your DSS200 to an Integrated Media Block (IMB) in a Series 2 projector, follow the instructions included with your IMB. To connect from the IMB to the CP850, you will need to use the RJ45/DB25 adapter included with your CP850. (Refer to the wiring diagram in Figure 2-10 for the adapter pinouts.)

2.3.2 Connecting a DSS220 to the CP850

To connect a DSS220 to the CP850:

1. Use a CAT5E (or greater) Ethernet cable to connect the **CP DATA** port on the DSS220 to the **DOLBY ATMOS INPUT** port on the CP850, as shown in Figure 2-5.

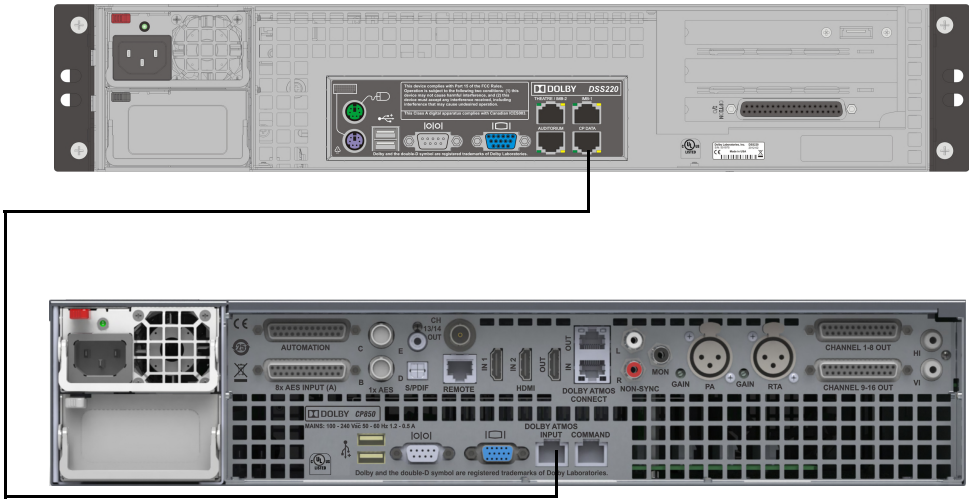


Figure 2-5 Connecting a DSS220 to the CP850

Note: To connect the DSS220 to the IMB in your Series 2 projector, follow the instructions in your *Dolby Digital Cinema System Manual*. To connect from the IMB to the CP850, you will need to use the RJ45/DB25 adapter included with your CP850. (Refer to the wiring diagram in Figure 2-10 for the adapter pinouts.)

2.4 Connecting the CP850 to the Auditorium Network

Use a CAT5E (or greater) Ethernet cable to connect the CP850 rear-panel **COMMAND** port to the auditorium network switch.

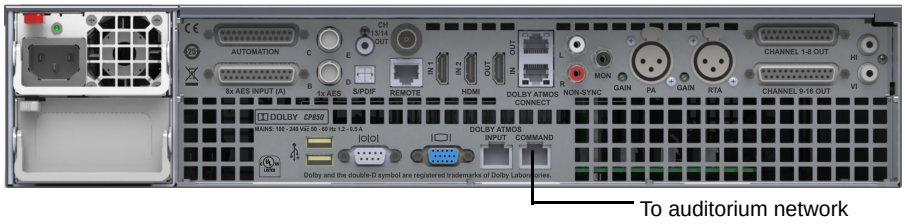


Figure 2-6 Connecting the CP850 to the Auditorium Network

2.5 Connecting Dolby Atmos Audio

You can use the optional Dolby Atmos Interface DAC3201 to connect to the auditorium amplifiers. With two of these units, you can play back a maximum of 64 channels of Dolby Atmos audio. You can also connect directly to Dolby Atmos Connect amplifiers to play back Dolby Atmos audio. For information on connecting to Dolby Atmos Connect enabled amplifiers, refer to the documentation included with the amplifiers.

2.5.1 Connecting a Single Dolby Atmos Interface DAC3201

To connect a single DAC3201 to the CP850.

1. Use a CAT5E or greater Ethernet cable to connect the CP850 **DOLBY ATMOS CONNECT OUT** port to the **IN** port on the DAC3201 rear panel.
2. Use a second CAT5E or greater Ethernet cable to connect the CP850 **DOLBY ATMOS CONNECT IN** port to the **OUT** port on the DAC3201.

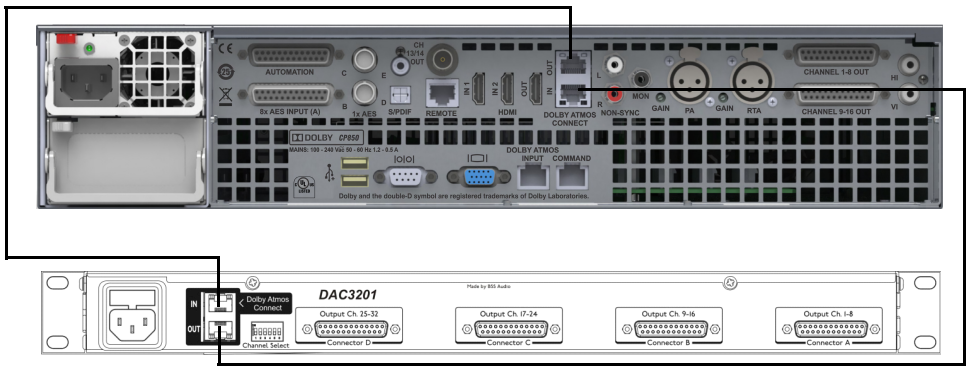


Figure 2-7 Connecting a Single Dolby Atmos Interface DAC3201 to the CP850

2.5.2 Connecting Two Dolby Atmos Interface DAC3201 Units to the CP850

To connect two DAC3201 units:

1. Use a CAT5E or greater Ethernet cable to connect the CP850 **DOLBY ATMOS CONNECT OUT** port to the **IN** port on the first DAC3201 rear panel.
2. Use a second CAT5E or greater Ethernet cable to connect the **OUT** port on the first DAC3201 to the **IN** port on the second DAC3201.
3. Use a third CAT5E or greater Ethernet cable to connect the CP850 **DOLBY ATMOS CONNECT IN** port to the **OUT** port on the second DAC3201.

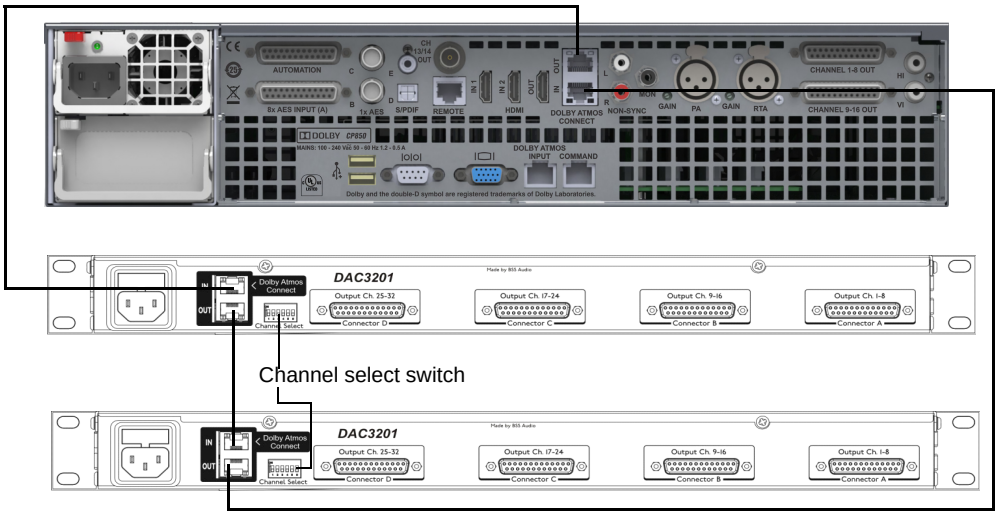


Figure 2-8 Connecting Two Dolby Atmos Interface DAC3201 Units to the CP850

4. Set the DA3201 channel select switch as listed in the following table.

Channel Bank	1	2	3	4	5	6
1–32	Off	Off	Off	Off	Off	Off
33–64	Off	Off	Off	Off	Off	On

2.5.3 Connecting the DAC3201s to the Auditorium Amplifiers

After connecting the DAC3201s to the CP850, use the four analog audio output connectors (**Connector A**, **Connector B**, **Connector C**, and **Connector D**) on the DAC3201 rear panel to connect to the auditorium amplifiers. These connectors conform to the TASCAM® pinouts listed in Appendix A.

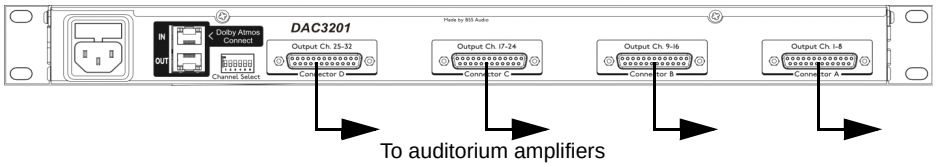


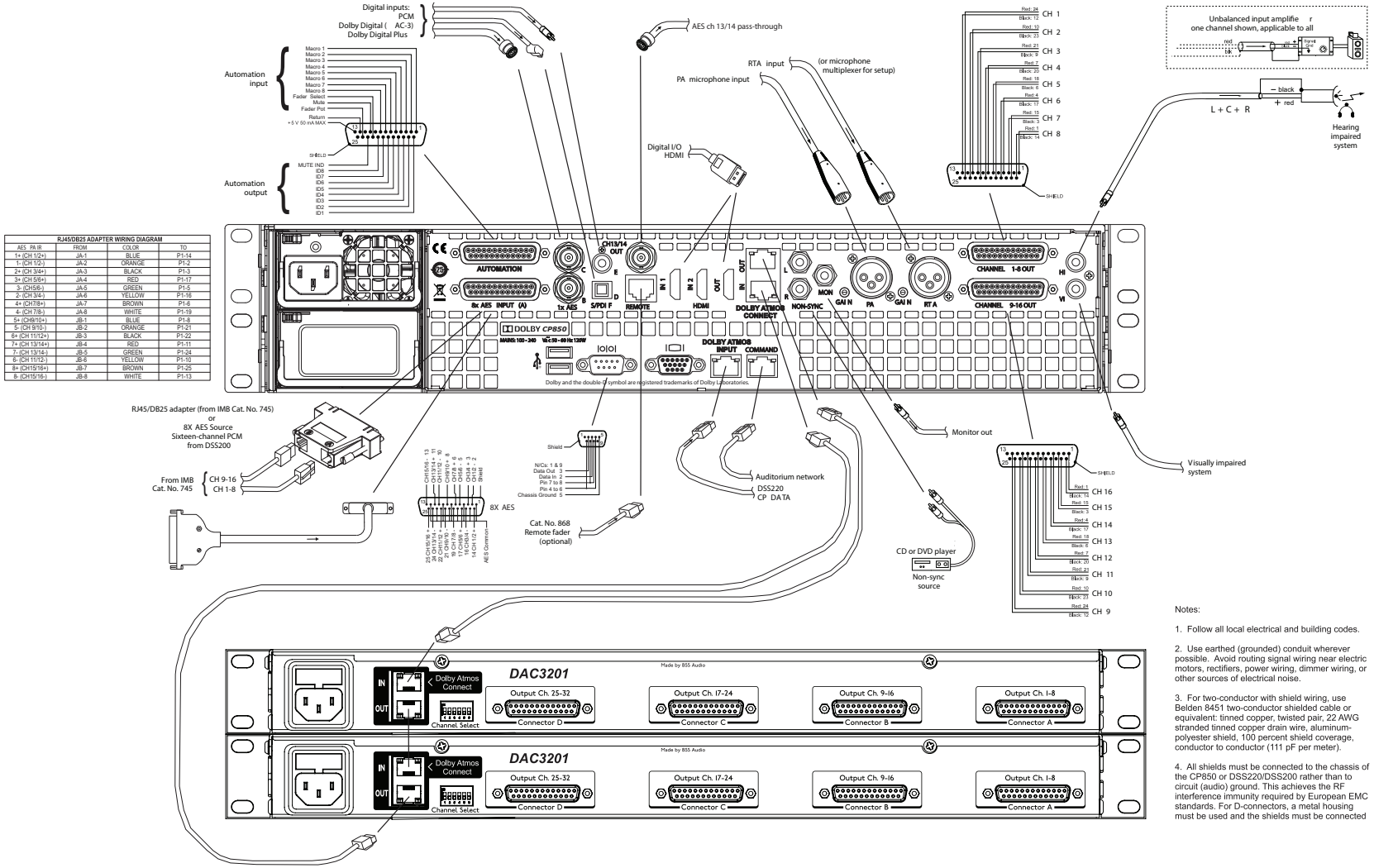
Figure 2-9 Connecting the DAC3201 to the Auditorium Amplifiers

2.6 Configuring the DSS200 or DSS220

Before using your CP850, you must run the DSS200 or DSS220 configuration software (Config script) to select the CP850 as your cinema processor. You must also use the Media Block setup software to set the media block delays to the same setting as the global audio delay on the CP850. (The default is 80 ms.) Refer to your *Dolby Digital Cinema System Manual* for instructions on how to perform these tasks.

2.7 Wiring the CP850

Figure 2-10 shows the CP850 wiring diagram.



Notes:

1. Follow all local electrical and building codes.

2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

4. All shields must be connected to the chassis of the CP850 or DSS220/DSS200 rather than to circuit (audio) ground. This achieves the RF interference immunity required by European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected

Figure 2-10 CP850 Wiring Diagram

2.8 Connections

For proper operation in locations where there is considerable interference, strictly adhere to the cable types, lengths, and pin assignments. Shields must connect only to the chassis and should not be paralleled with the negative side of inputs or outputs.

Connector pinouts are listed in Appendix A.

2.9 Mains Power Wiring

In some countries, the primary mains cable may not have a connector fitted. Nonterminated leads must be properly wired to an approved mains connector in accordance with the following international code:

- Brown wire: Live or hot
- Blue wire: Neutral
- Green wire: Mains ground

Warning: If you are uncertain about the wiring of your AC mains outlet, do not use it. Consult a qualified electrician.

2.10 Starting Up the CP850

The CP850 is configured to automatically power up when you connect the power cable. If the unit is turned off, press and release the power button on the front panel to power up. While the unit starts up, the blue bar on CP850 front panel flashes on and off. After approximately one minute, the unit starts up, and when the boot process is complete, the user-control screen displays the information shown in Figure 2-11.

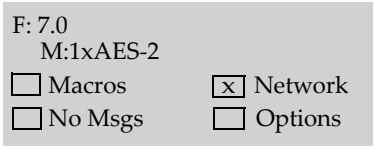


Figure 2-11 User-Control Screen

2.11 Configuring the Network Settings

With the front-panel navigation keys (see Figure 2-12), you can configure the network settings in the user-control screen.

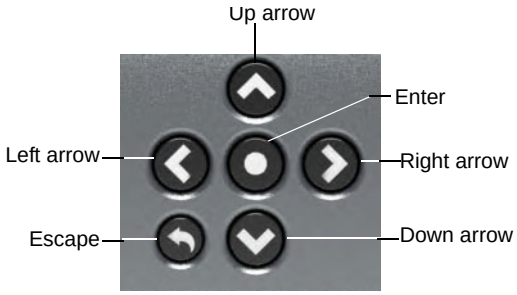


Figure 2-12 Front-Panel Navigation Keys

The **Command** port default IP address is 192.168.1.139. You will need to change the third octet to match your auditorium number. To configure this port:

1. Press the arrow keys to select **Network** in the user-control screen (as shown previously in Figure 2-11), then press enter.
2. Use the arrow keys to select **Command**, then press enter.
3. Use the arrow keys to display **IP address**, then press enter. A prompt asks if you want to change the IP address. Use the right arrow to select **Yes**.
4. Use the arrow keys to enter the IP address, then press the down arrow to select **Done**.
5. Repeat steps 2, 3, and 4 for the **Netmask**.
6. Repeat steps 2 and 3 for the **Gateway**.
7. Use the arrow keys to select either the **Command** gateway (default) or the **Dolby Atmos Input** gateway for the network interface gateway, then select **Done**. This can help after a system upgrade if you are unable to connect with a system that does not use the default (**Command**) network gateway.

The **Dolby Atmos Input** port default IP address is 131.1.1.2. To configure this port:

1. Press the down arrow to select **Network** in the user control screen (as shown previously in Figure 2-11), then press enter.
2. Use the arrow keys to select **Input**, then press enter.
3. Repeat steps 3, 4, and 5 in the previous procedure (for the **Command** port) to configure the **Dolby Atmos Input** port (except for the **Gateway**).
4. Repeat steps 6 and 7 in the previous procedure (for the **Command** port) to configure the **Gateway** for the **Dolby Atmos Input** port.

Caution: You should never need to change the **Dolby Atmos Input** port IP address. This is a point-to-point connection. Connect this port according to the wiring diagram in Figure 2-10. Do not connect this port to an Ethernet switch. If you experience any difficulty, contact customer support.

Note: After starting up the system and configuring the network settings, you can use your web browser to connect to the CP850, as described in the following section.

2.12 Connecting to the CP850

To connect your computer to the CP850:

1. Connect your computer to the auditorium network switch.
2. Open the web browser on your computer. Currently, the CP850 is compatible with Mozilla® Firefox® v3.5 or later, Google™ Chrome™ v5.0 or later, Apple® Safari® v6.0 or later, and Microsoft® Internet Explorer® v8.0 or later.
3. Connect to the CP850 by typing its IP address in your web browser.

   A login screen appears requesting a user name and password, as shown in Figure 2-13. The default administrator user name and password are both *admin*. If you are a system administrator, you should change the administrator password, and then set up user access levels and passwords for all other users, as described in Section 4.7.

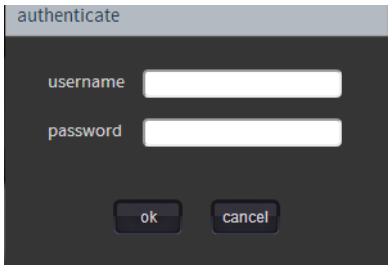


Figure 2-13 Login Screen

After you log in, the CP850 web client **status** screen appears, as shown in Figure 2-14.

Figure 2-14 CP850 Web Client Status Screen

2.13 Registering the CP850

Before you can process Dolby Atmos audio, you need to register your CP850 by entering its serial number and the CAT1600 serial number in the *Dolby Atmos Cinema Installation Submission* form along with the other required information. You can find these serial numbers on the lip below the CP850 rear panel, as shown in Figure 2-15.

You can access the electronic submission form by clicking **manuals** at the bottom of the CP850 web client navigation bar, as shown in Figure 2-14. This form requires Adobe® Acrobat® Reader® 7 or later. Always enter all of the required information (electronically) in the provided fields, then email the information to the appropriate Dolby location following the instructions on the form. Once Dolby sends an email confirmation, the respective CP850 is valid for a specific theatre. This enables authorized users to play back Dolby Atmos audio.

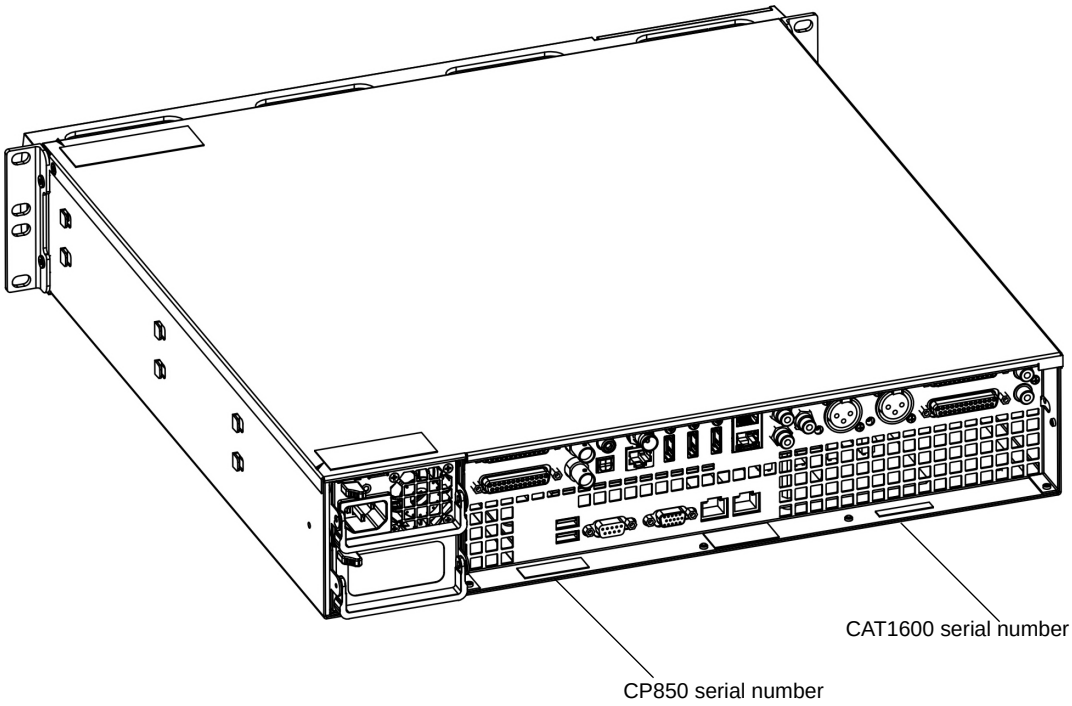


Figure 2-15 CP850 and CAT1600 Serial Number Locations

2.14 Using the CP850

Now that you have registered your unit and installed it, Chapter 3 explains how to set up an auditorium for Dolby Atmos using the Dolby Atmos Designer software and Chapter 4 explains how to operate the CP850 using the web client. You can download the Dolby Atmos Designer software from https://www.dolbycustomer.com.

2.15 Replacing a CP850 Power Supply

The CP850 requires only one power supply; a second unit is optional for a backup. The Dolby Part Number is 4901660. If you want to add a second power supply, remove the blanking plate covering the vacant slot and perform steps 5 and 6 in the following procedure.

To replace a CP850 power supply (refer to Figure 2-16):

1. Identify the failed unit on the CP850 rear panel by its nonilluminated LED.
2. Unplug the power cable from the failed power supply.
3. Push the red release tab on the power supply.
4. While holding the extraction handle, move the red release tab to the right and gently pull the handle to remove the power supply from the CP850.

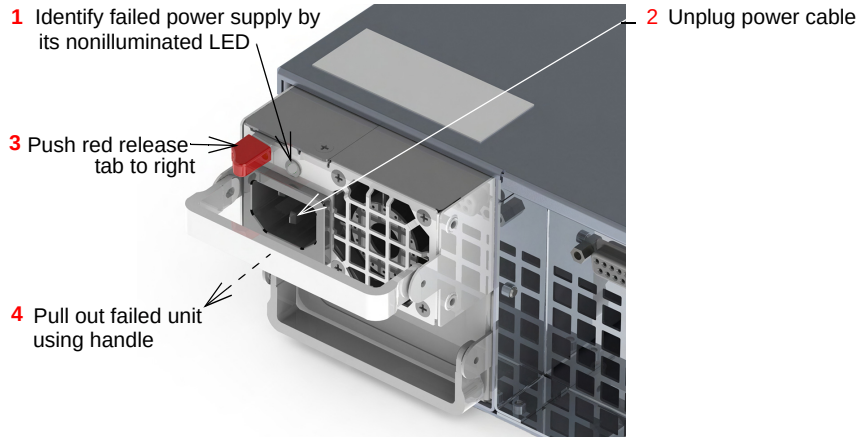


Figure 2-16 Removing the Failed CP850 Power Supply

5. Push the replacement power supply into the empty bay until you hear a click.
6. Plug the power cable into the replacement unit. Its LED should illuminate in green.

Using Dolby Atmos Designer

This chapter shows you how to use the Dolby Atmos® Designer software to calibrate an auditorium in a Dolby Atmos Cinema Processor CP850 playback environment. In addition, postproduction engineers use this application to configure the Dolby® Rendering and Mastering Unit (RMU). Information on the RMU is provided with that unit.

With Dolby Atmos Designer, you can calibrate your auditorium using its automated equalization (AutoEQ) capability. This application provides tools for measuring the response of an auditorium and designing and implementing an equalization configuration. You can configure different target response curves, such as a flat response, the standard cinema X-curve, or a custom curve.

Dolby Atmos Designer runs in online mode when you connect to a Dolby Digital Cinema network that includes a CP850, or in offline mode when disconnected from the network. In offline mode, you can enter information regarding an auditorium and save a Dolby Atmos configuration (.dac) file. You can then reopen this file later to complete the process when you are online in your auditorium.

This chapter covers the following information:

Note: Before you begin this process, follow the instructions in Chapter 2 to install your CP850 in a Dolby Digital Cinema network.

3.1 Positioning Microphones

This section assumes that you are online in your auditorium. If you are offline, proceed to Section 3.2.

To run Dolby Atmos Designer in online mode, you need the following equipment:

- Microphones (minimum of five, maximum of eight)
- Supported audio interface
- External sound pressure level meter

Begin the configuration by positioning your microphones:

1. Place microphone 1 at the reference position, along the center line of the image at a point approximately two-thirds the length of the room.
2. Place microphones 2–8 at different positions within the room, so they cover the middle to rear portion of the seating area. (Use the following guidelines, and refer to Figure 3-1.) If possible, avoid the following:
   - Do not place microphones 2–8 at points of symmetry. That is, avoid placing microphones half the distance between walls (antinode for all harmonics), one-third the distance between walls, or one-quarter of the distance between walls.
   - Two microphones in the same node structure: Do not place microphone pairs with front/back or left/right symmetry. That is, avoid placing two microphones at the same distance from a parallel wall. (For example, if one microphone is placed 15 feet from the left wall, do not place a second microphone 15 feet from the right wall.)
   - Do not place microphones close to wall surfaces, hard partitions, equipment credenzas, or other surfaces that could cause errors in the measured frequency response due to sound reflections.
   - Do not place microphones in close proximity to an individual loudspeaker.

Figure 3-1 shows a typical auditorium microphone setup.

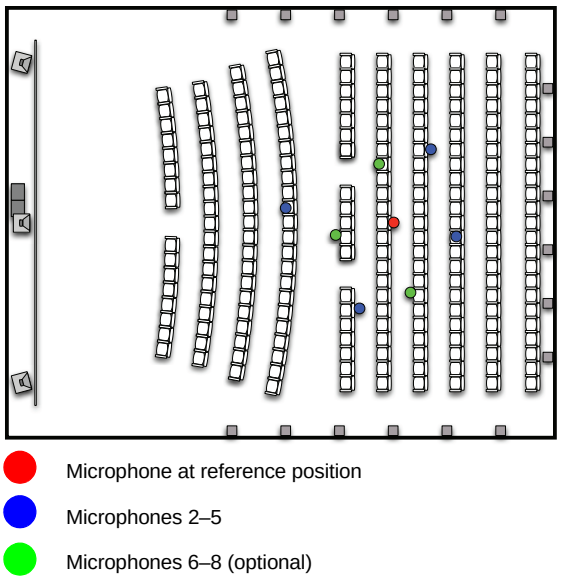


Figure 3-1 Auditorium Microphone Setup

Microphone Angle and Elevation

Take the following precautions when positioning the angle and elevation of your microphones:

1. Position each microphone near the typical ear height of a seated person, but with enough distance from the seat to prevent frequency response errors due to sound reflections.
2. Place microphone capsules no closer than 6 inches (15.24 cm) from the top of a seat and oriented straight up.

Caution: High-back chairs can prevent you from placing a microphone near the ear height of a seated person. In such a case, elevated seated ear height is desirable to avoid frequency response errors that result from sound reflecting off the seat.

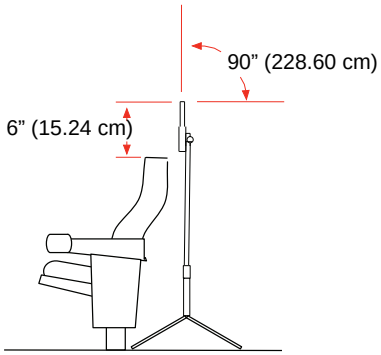


Figure 3-2 Microphone Relative to Seated Person Ear Height

3.1.1 Setting Up Audio Capture

You continue the auditorium configuration by setting up audio capture.

Audio Capture Configuration

Figure 3-3 shows you how to set up a CP850 with a computer, PC audio interface, and microphones to perform audio measurements.

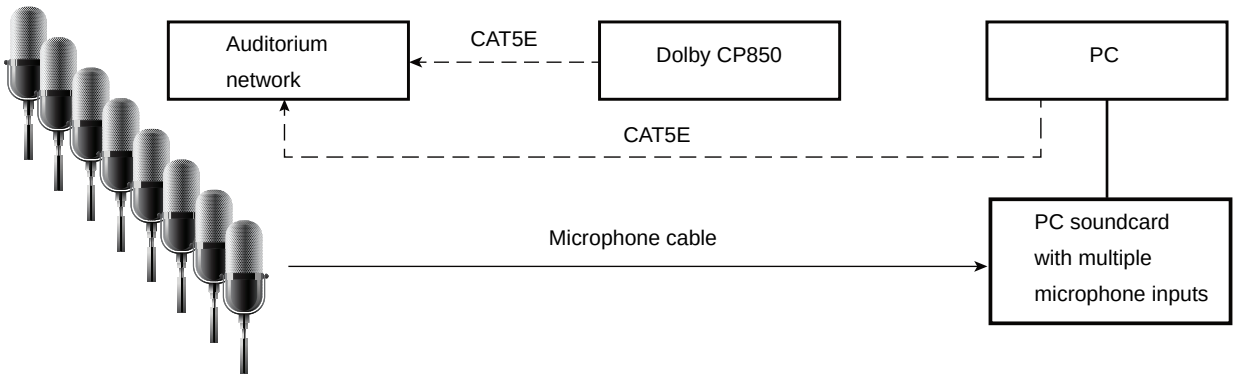


Figure 3-3 Audio Capture Configuration

Dolby Atmos Designer supports the following audio interfaces:

- Roland® Octa-Capture high-speed USB audio interface
- RME Micstasy with DiGiCo UB MADI Multichannel Audio Digital Interface (MADI) USB 2.0 connector

3.2 Installing Dolby Atmos Designer

The Dolby Atmos Designer software runs on Microsoft® Windows® 7 and 8, and Apple® Mac® OS® X® v10.8 and v10.9. VMware® is not supported. To install Dolby Atmos Designer:

1. Download the Dolby Atmos Designer software from https://www.dolbycustomer.com. You will need to set up a user ID and password to access this website. You can also download periodic software updates here.
2. Double-click on the **Dolby Atmos Designer** icon to begin the installation process, then follow the screen prompts.

3.3 Launching Dolby Atmos Designer

To launch Dolby Atmos Designer, click **Start** > **Dolby Atmos Designer** or click the shortcut on your desktop.

The **main menu** screen appears. When you launch Dolby Atmos Designer, this screen always opens a new project, as indicated in the title bar as **untitled Dolby Atmos configuration**.

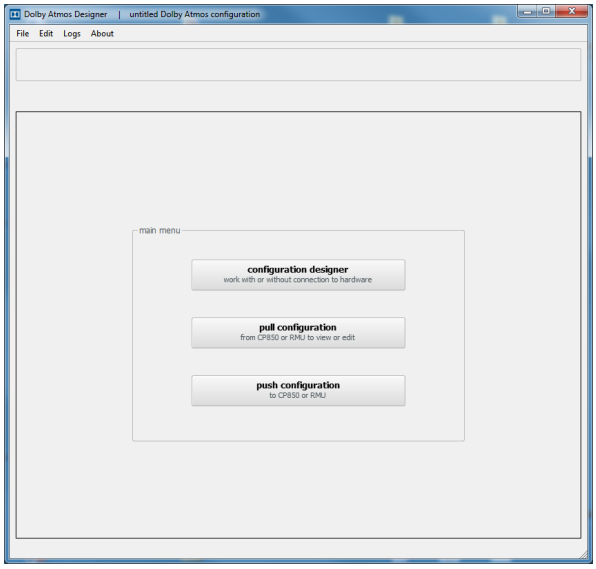


Figure 3-4 Main Menu Screen

In the **main menu** screen, you can:

- Design a new configuration (online or offline)
- Open an existing configuration from disc (online or offline)
- Pull an existing configuration from a CP850 (online)
- Push a configuration to a CP850 (online)
- Save a configuration to disc (online or offline), or push it to a CP850 (online)

- Configure preferences (online or offline)
- Show or clear logs (online or offline)

After opening an existing configuration, you can edit the respective settings.

Note: When you design or edit a configuration by making entries in the various screens, be sure to click **Save** in the **File** menu to save your settings.

3.3.1 Using the File Menu

In the **File** menu, you can open an existing configuration from your local disc, start a new configuration (if an existing configuration is open), save your configuration settings, or exit Dolby Atmos Designer.

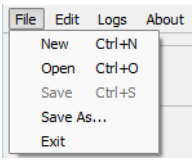


Figure 3-5 File Menu

3.3.2 Pulling and Pushing a Configuration

To pull an existing configuration from a CP850 or push an existing configuration to a CP850, click the **pull configuration** 

button or the **push configuration** 

button, then click on the respective CP850 button, and enter the desired IP address at the prompt.

3.4 Designing a New Configuration

To design a new configuration:

1. If Dolby Atmos Designer is not running, launch it by clicking **Start** > **Dolby Atmos Designer** or click the shortcut on your desktop.

   A new untitled project opens in the **main menu** screen.

2. Click **Preferences** in the **Edit** menu.

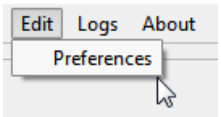


Figure 3-6 Select Preferences in the Edit Menu

The **Preferences** screen appears. In this screen, you can select your ASIO device, enable the display of speaker labels in your speaker and array configurations, and specify your measurement units in meters or feet.

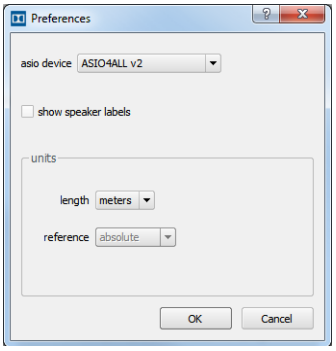


Figure 3-7 Preferences Screen

3. Enter your preferences, then click **OK**.
4. Click the **configuration designer**  button.

   The **configuration designer** screen appears. In this screen, you can configure a room and configure speakers and arrays online or offline. To run the automated equalization tool (AutoEQ), you must be online.

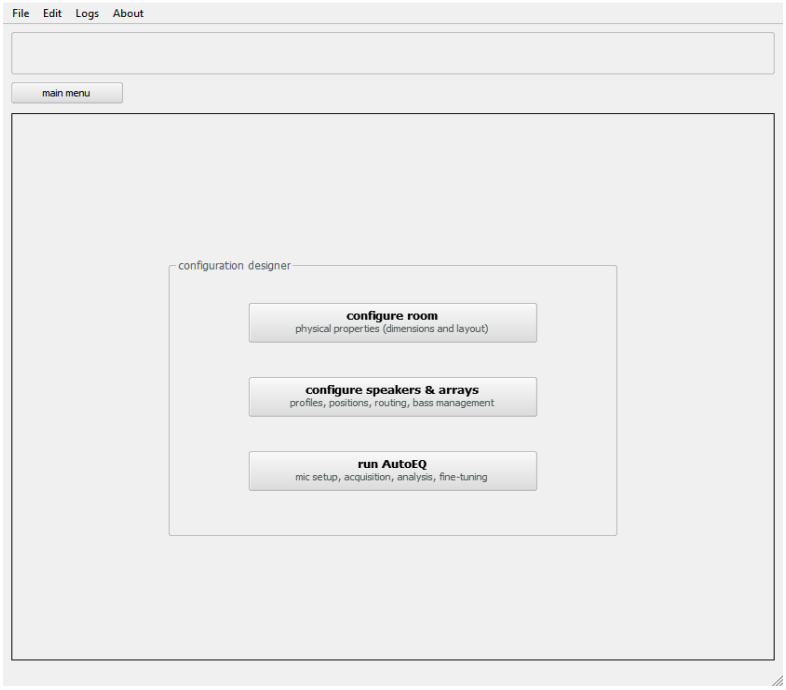


Figure 3-8 Configuration Designer Screen

3.4.1 Configuring the Auditorium

To configure your auditorium:

1. Click **configure room** 

.

   The **configure room** screen appears. In this screen, you click the wall and ceiling icons to enter the respective parameters for each area in your auditorium. You can also use the left and right arrows  at the upper-right corner to move to the next or previous set of parameters. Figure 3-9 shows the **screen wall** parameters, which is the first set of parameters to appear. The active wall is always highlighted in blue, while inactive walls are highlighted in red. After configuring a wall, it changes from red to green, as shown in Figure 3-16.

   To enable the use of internal crossovers, your CP850 must have the required enablement installed. For information on obtaining enablements, see Enablements.

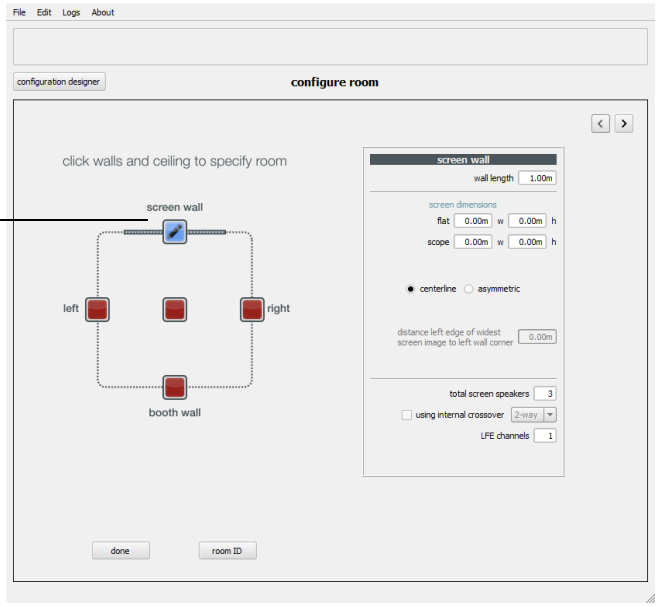


Figure 3-9 Configure Room Screen (Screen Wall)

2. Enter the desired parameters for the screen wall.

If your CP850 is enabled for internal crossovers, you can click the **using internal crossover** box and then select **2-way**, **3-way**, or **4-way** in the drop-down menu, as shown in Figure 3-10.

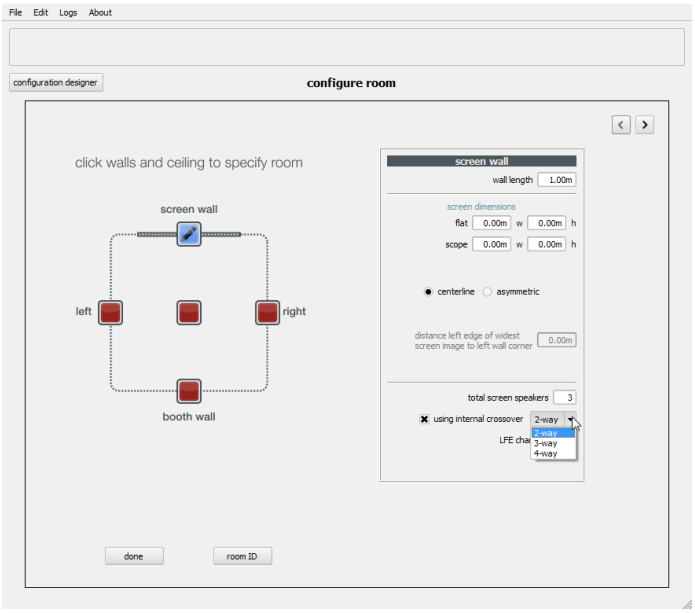


Figure 3-10 Configuring Crossovers (Only for Enabled Units)

When you click the **done** done button to confirm your settings (see step 8), the icons turn green (except for the active wall), which indicates that you entered complete and valid data (see Figure 3-16).

3. Click the **left** 

or **right** 

icon.

   The **left** and **right** icons are highlighted in blue to indicate they are now active, and the **left and right walls** parameters appear, as shown in Figure 3-11.

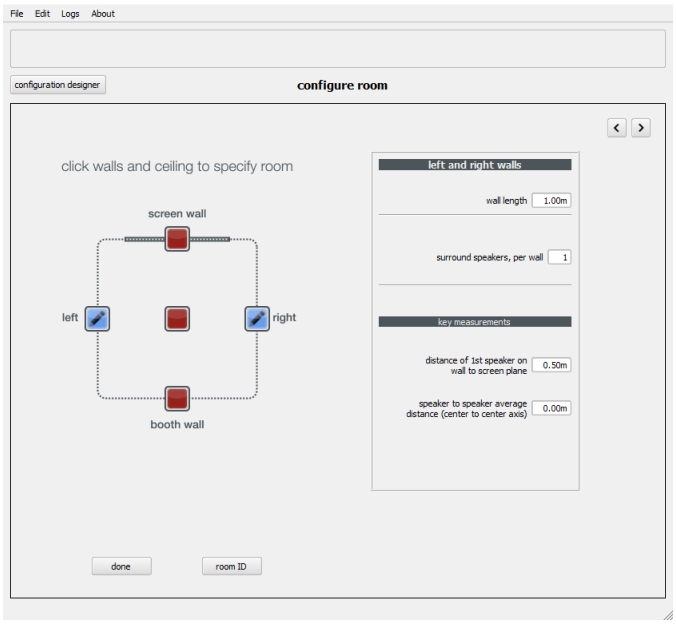


Figure 3-11 Left and Right Walls Parameters

4. Enter the desired **left and right walls** parameters in the respective fields.

5. Click the **booth wall** icon 

to enter the parameters for the booth wall and bass management subwoofers.

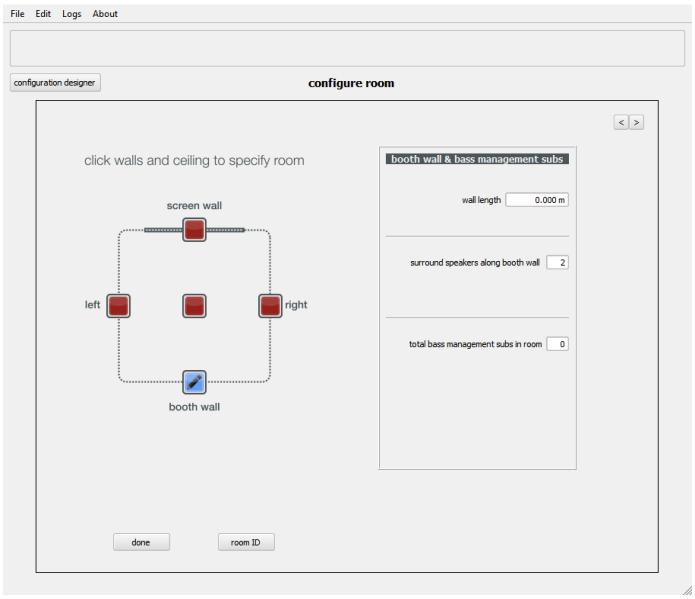


Figure 3-12 Booth Wall and Bass Management Parameters

6. Click the **floor & ceiling** icon (middle icon) to enter the respective parameters.

   If the auditorium floor is flat, retain the default floor settings (0.000 m). If the auditorium ceiling is flat, enter the ceiling elevation at the screen for all three values.

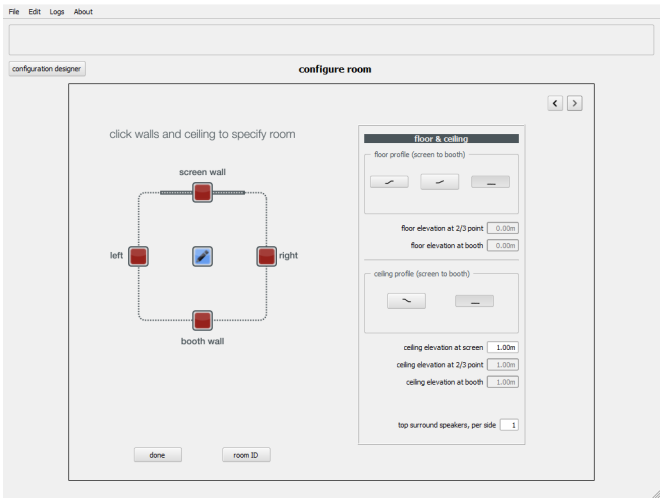


Figure 3-13 Floor and Ceiling Parameters

7. Click the **room ID** button at the bottom of the **configure room** screen to enter the desired information, then click **OK**.

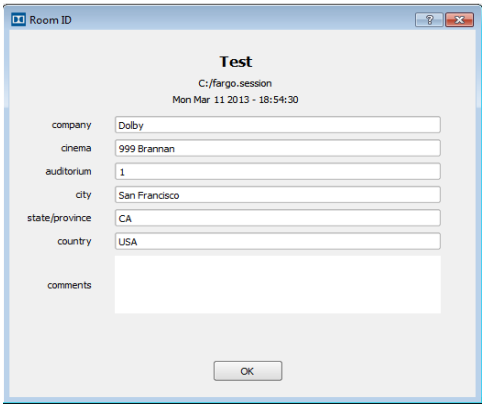


Figure 3-14 Room ID Screen

8. Click the **done** button at the bottom of the **configure room** screen. If your parameters are valid, the specified room configuration appears and the **done** button changes to an **edit** button, as shown in Figure 3-15. Clicking **edit** allows you to change any of your previously saved parameters.

   If you enter valid parameters, icons change to green, except for the active wall (see Figure 3-16).

   If you enter incomplete parameters but the data includes the minimum viable settings, icons are half white and half green. If you press the **done** button and your parameters are invalid, icons are red and an error message appears. In such a case, you must enter valid settings.

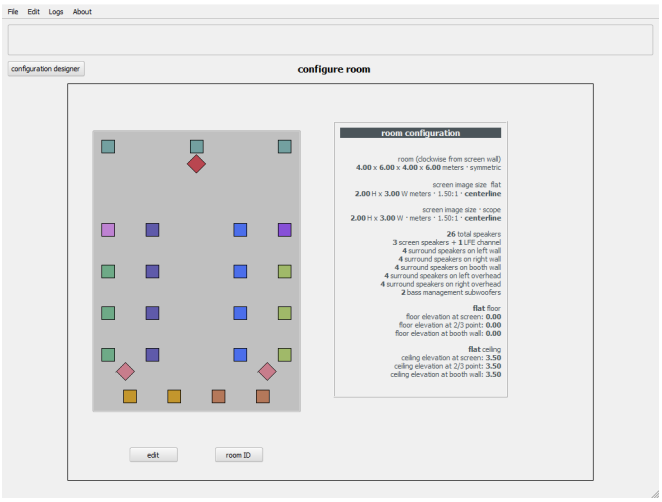


Figure 3-15 Room Configuration Summary

9. After entering complete valid parameters and clicking the **done** button, the respective icons change to green, except for the active wall, which is editable (see Figure 3-16).

Figure 3-16 Editable Room Screens

3.4.2 Configuring the Speaker Parameters

To configure the speaker parameters:

1. Click **configuration designer** 

at the upper-left side of the screen.
2. Click **configure speakers & arrays** 

to display the parameters under the **edit speaker** tab.

x, y speaker locations are in relation to the plane

Figure 3-17 Configure Speakers and Arrays

3. To configure the parameters for a specific speaker, click on its icon at the left side of the screen. The speaker and amplifier profile database is prepopulated with read-only profiles. If your speaker model is not in the database, you can add a profile and edit it accordingly. Screen speaker x, y locations are read only.

   You can also draw a marquee around a group of speakers and edit the parameters for that group, except when you enter the x and y coordinates for a speaker location (as in step 6). To add or remove a speaker, press <Ctrl> on your PC.

4. To select a speaker configuration, click in the **profile** field and assign the appropriate speaker model from the drop-down menu.

   If your speaker model is not listed, proceed directly to step 5.

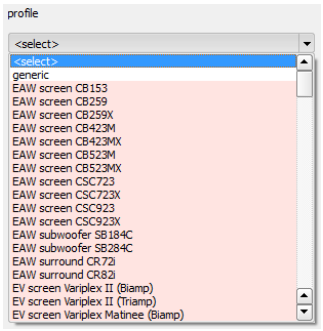


Figure 3-18 Select Speaker Model

When you select a speaker model, the manufacturer and speaker specifications automatically populate the respective fields, as shown in the following figures.

If you click on a speaker to select it, a dashed outline appears around the speaker. To select a group of speakers, click and drag a box (within the gray area) around them. To select speakers one at a time, press <Ctrl> while you click on each speaker.

Red outlines displayed around a speaker indicate an unconfigured speaker, or a speaker missing critical information. This is simply an indication of an incomplete configuration (for example, an unconfigured speaker or a speaker missing critical information). In addition, error messages may appear in red near the bottom of the screen (for example, when a parameter value is not within the proper range).

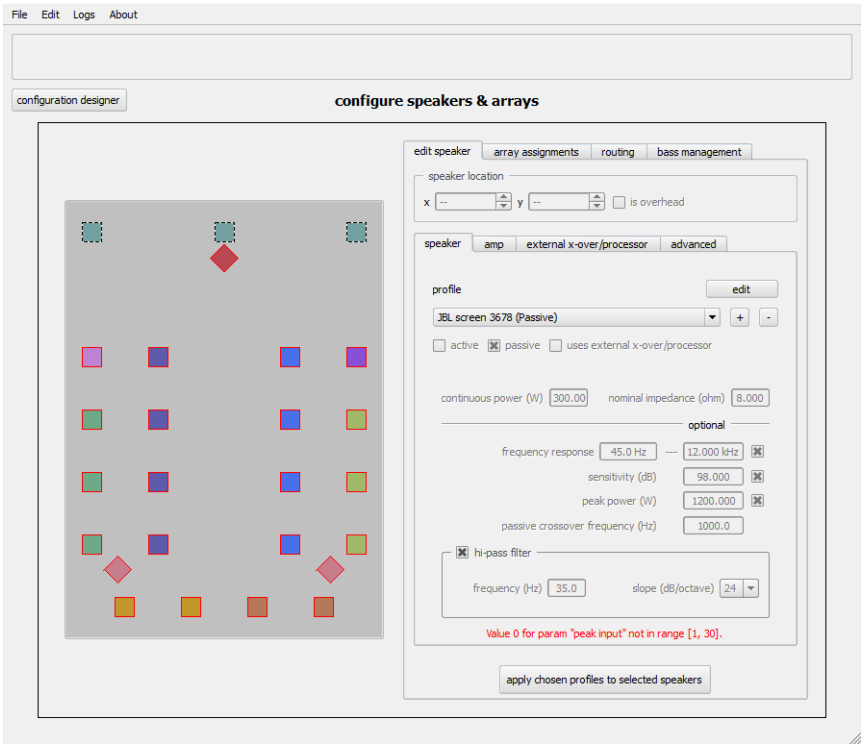


Figure 3-19 Configure Screen Speakers

For screen and Low-Frequency Effects (LFE) channels, an external crossover (**x-over**) setting is provided. For speakers that use crossovers, you must configure this setting by clicking the **external x-over/processor** tab and selecting a crossover profile. (See Figure 3-20.) For all other speakers (that is, passive speakers), this setting is optional. In addition, speakers that are outlined in red are invalid. (For example, a speaker and amplifier may not be assigned.)

Figure 3-20 Configure Screen Speakers with External Crossovers

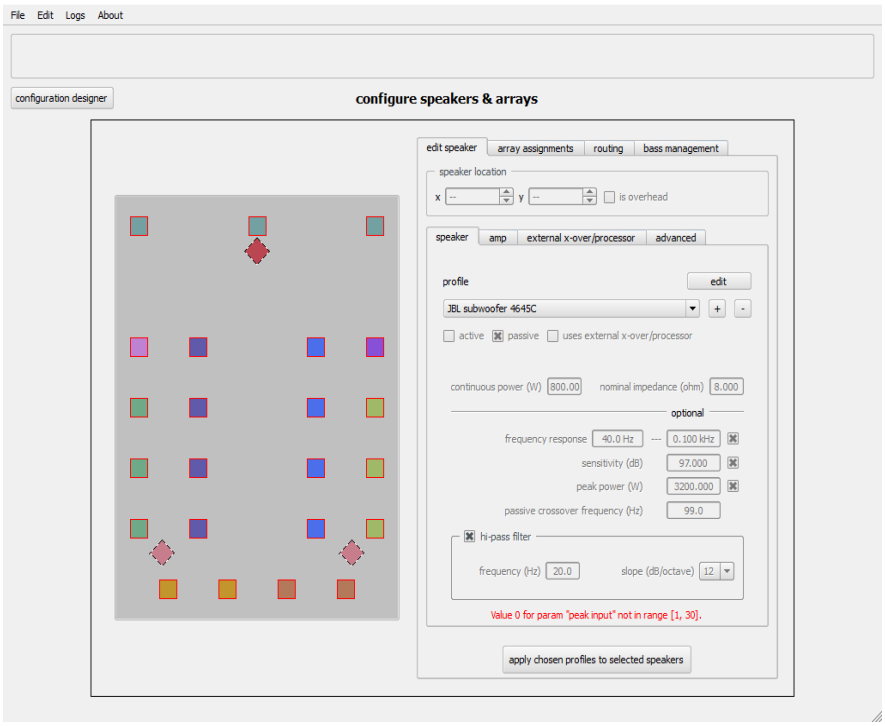


Figure 3-21 Configure Subwoofers

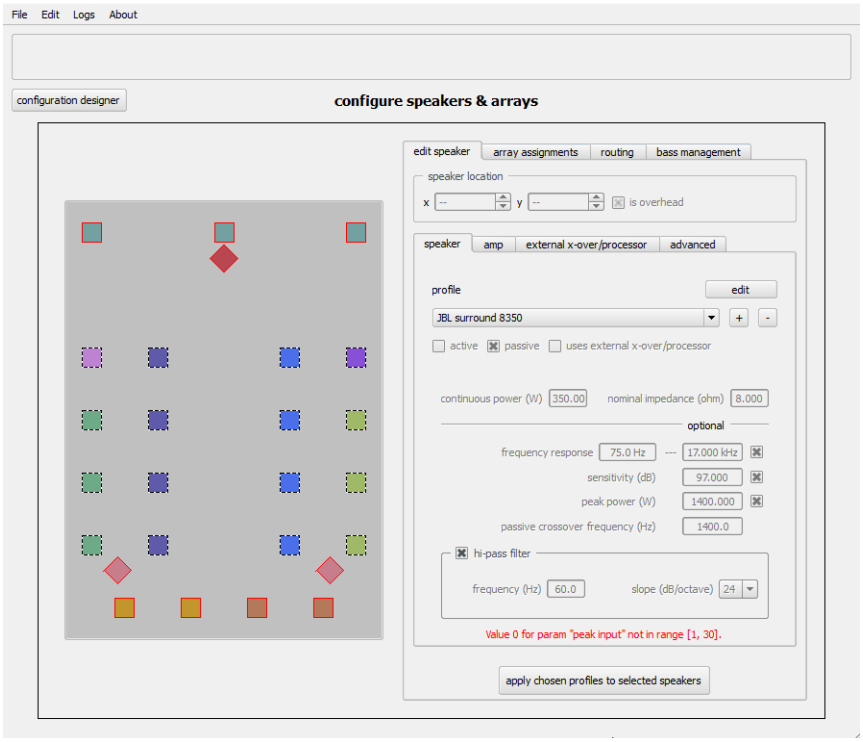


Figure 3-22 Configure Surrounds

5. If your speaker model is not listed, click the + button next to the speaker model field, then enter the manufacturer, the specifications (per the speaker data sheet), and optional data (if available) in the respective fields. The **edit** edit button changes to a **save** save button:
   - Click **save** to save your custom speaker settings to your speaker database. To edit a custom configuration, click the **edit** button, change the desired settings, then click the **save** button.
6. If you need to manually override the speaker locations, enter the **x** and **y** coordinates, in the respective fields. The x and y coordinates are in relation to the plane.

   If you are designating a speaker as an overhead, click in the **is overhead** box.

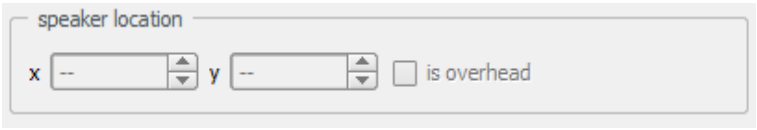


Figure 3-23 Enter Speaker Location

7. Click the **advanced** tab to verify the speaker limiters setting.

   A message indicates that checking the **speaker limiters disabled** box is not recommended, as this disables speaker limiters. In addition, this message explains that if the box is checked, you can uncheck it to reenable speaker limiters.

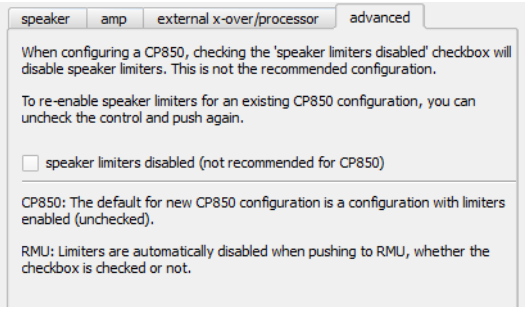
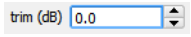


Figure 3-24 Advanced Tab Speaker Limiters Parameter

8. After configuring all your settings, click **apply chosen profiles to selected speakers** to complete your configuration. Repeat this step each time you select and assign a single speaker or a group of speakers.

3.4.3 Configuring the Amplifier Parameters

To configure the amplifier parameters, click the **amp** tab and follow the same sequence that you performed for the speaker parameters. In addition, you can also adjust the amplifier input trim 

in this screen. The **trim** parameter is very important during the AutoEQ operation, as described in Section 3.4.7.

Figure 3-25 Amplifier Parameters

3.4.4 Assigning Arrays

After configuring your speakers, as described in the previous section, you can assign the arrays as follows:

1. Click the **array assignments** tab.

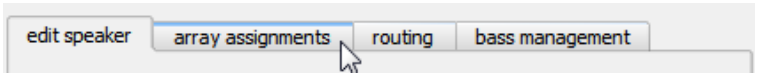


Figure 3-26 Click Array Assignments Tab

The **array assignments** appear, as shown in Figure 3-27.

Dolby Atmos Designer automatically assigns speaker feeds to the arrays based on predefined rules. The colors of the speakers correspond to their array assignments, as shown in Figure 3-27.

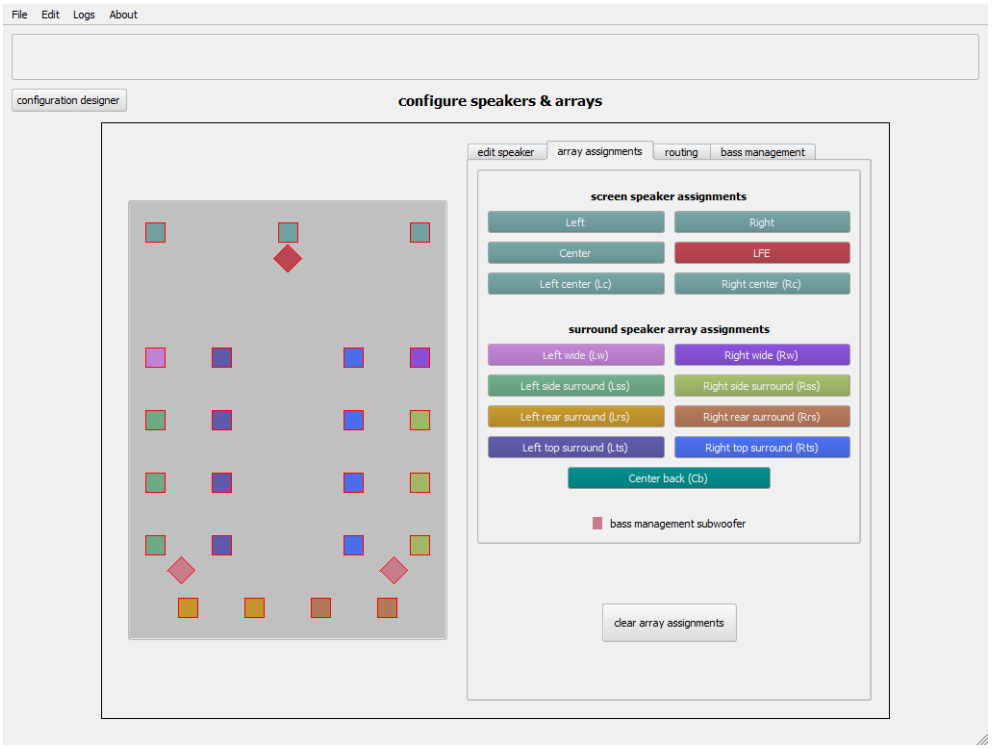


Figure 3-27 Array Assignments

2. To change the speaker assignments:
   - Click on a speaker to outline it with dashes.
   - Click the desired speaker assignment button.

Figure 3-28 shows a configuration with five subwoofers (one LFE designated by a  icon, and four bass management subwoofers designated by  icons). Also shown are three crossovers designated by  icons.

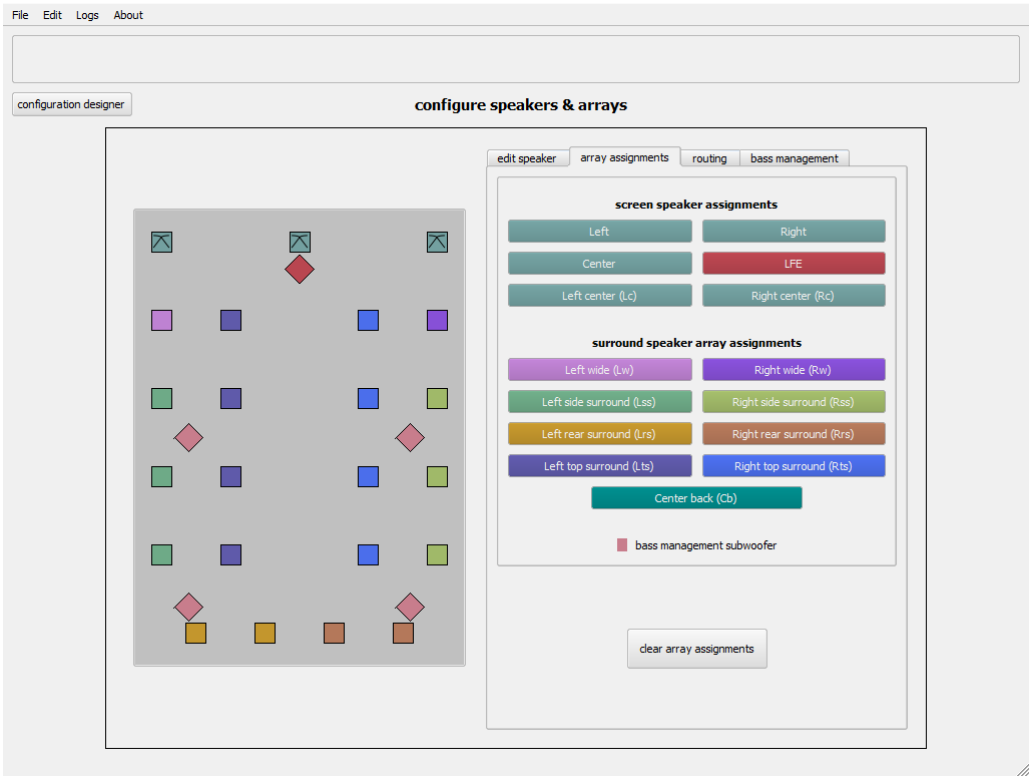


Figure 3-28 Array Assignments (Five Subwoofers)

3.4.5 Configuring the Routing Parameters

After you assign arrays, click the **routing** tab to configure routing.

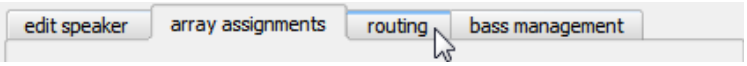


Figure 3-29 Click Routing Tab

The routing parameters appear. In this screen, you can apply Automatic Routing or Manual Routing.

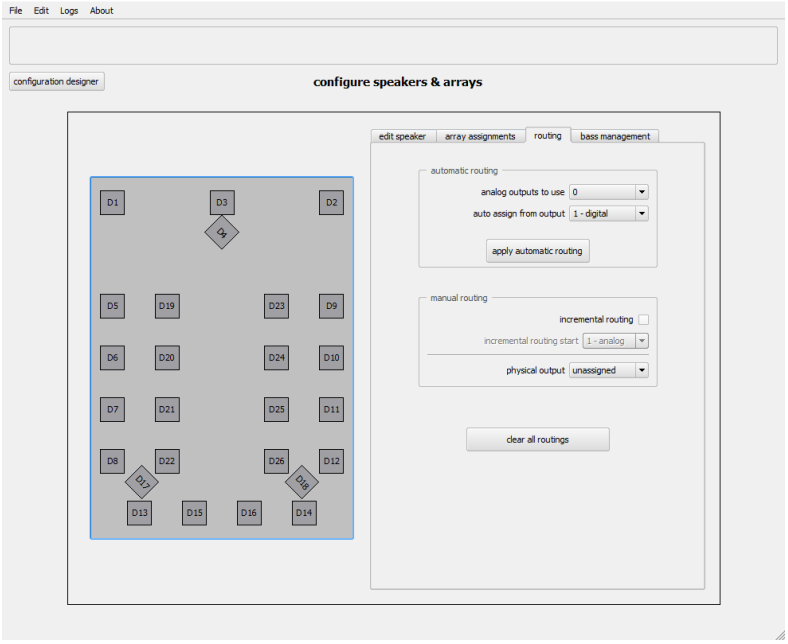


Figure 3-30 Routing Parameters (Three Subwoofers, No Crossovers)

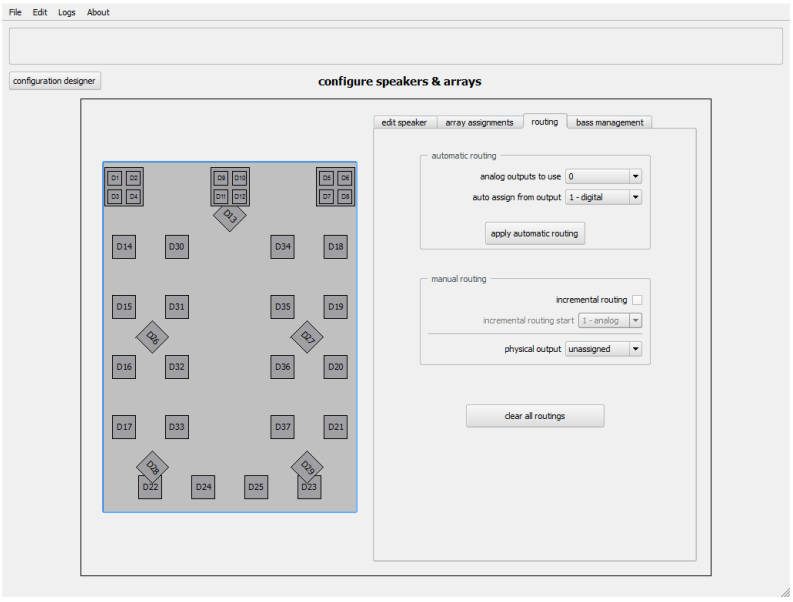


Figure 3-31 Routing Parameters (Five Subwoofers, Three Crossovers)

Automatic Routing

Automatic routing follows these predefined rules:

- The automatic assignment of the screen is left, right, center.
- The automatic assignment for the left and right side and ceiling surrounds is screen to booth.
- The automatic assignment for the rear surrounds is left, right, left, right, left, right until the system fully assigns the arrays

To apply automatic routing:

1. Click and drag a box around a group of speakers (within the gray area) to select them. (You can select speakers one at a time by pressing <Ctrl> while you click on each speaker.)

   A dashed outline designates each of the selected speakers.

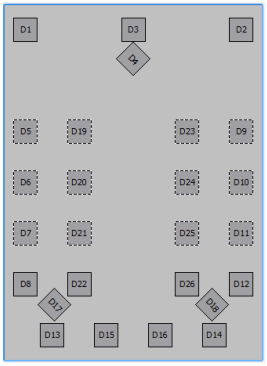


Figure 3-32 Select Group of Speakers for Automatic Routing

2. In the **automatic routing** pane, select the number of CP850 analog outputs you are using from the **analog outputs to use** drop-down menu.

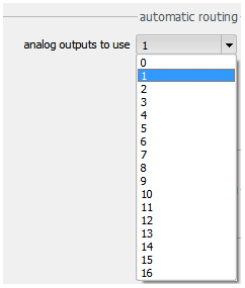


Figure 3-33 Select Analog Output for Automatic Routing

3. Select the output where you want to start the automatic routing operation in the **auto assign from output** drop-down menu.

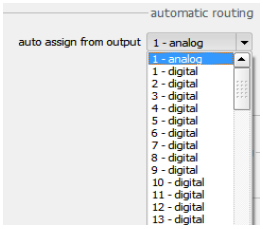
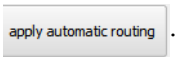


Figure 3-34 Assign First Output for Automatic Routing

4. Click the **apply automatic routing** button 

.

   The automatic routing operation begins routing incrementally from the first speaker in the speaker group (according to the previously described automatic routing rules) until the process is completed.

Manual Routing

To apply manual routing:

1. Click on a speaker to outline it 

.
2. In the **manual routing** pane, select an output that corresponds to the appropriate routing in the **physical output** drop-down menu. Alternatively, you can type the number of the desired output on your keyboard and press <Enter>.

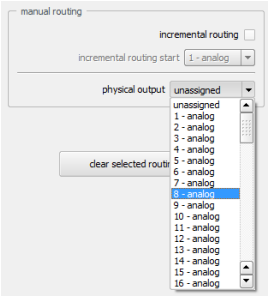


Figure 3-35 Select Output for Manual Routing

3. Repeat steps 1 and 2 for each speaker.
   You can clear all of your selections by clicking the **clear selected routings** button.

Incremental Routing

To enable this feature:

1. Click the respective box in the **Manual Routing** pane, then select the starting output number.
2. Click the first speaker in the routing display to assign that output number.
3. Click the next speaker to assign the next output number in order.
4. Continue clicking on speakers to assign additional outputs.

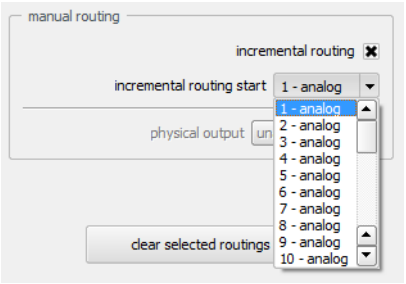


Figure 3-36 Select Starting Output for Incremental Routing

3.4.6 Configuring the Bass Management Parameters

After you configure the routing parameters, configure the bass management parameters for one or two subwoofers as follows:

1. Click the **bass management** tab.

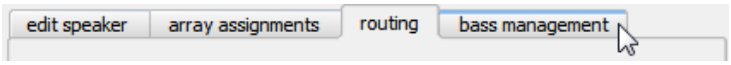


Figure 3-37 Click Bass Management Tab

2. Select speakers one at a time or by clicking and dragging a box around a group of speakers.

   Do not select subwoofers. If you accidentally select subwoofers, press <Ctrl> on your keyboard to deselect them.

3. Assign the speaker or speakers to the bass management subwoofers.

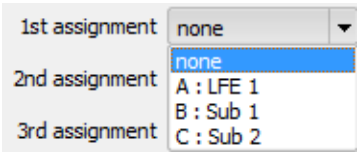


Figure 3-38 Assign Speakers to Bass Management Subwoofers

4. Assign a bass management frequency to the group.
5. Click the **apply** button.

   Figure 3-37 shows a configuration with three subwoofers (**A**, **B**, and **C**).

Figure 3-39 Configure Bass Management (Three Subwoofers)

Figure 3-39 shows a configuration with five subwoofers (**A**, **B**, **C**, **D**, and **E**) and three crossovers.

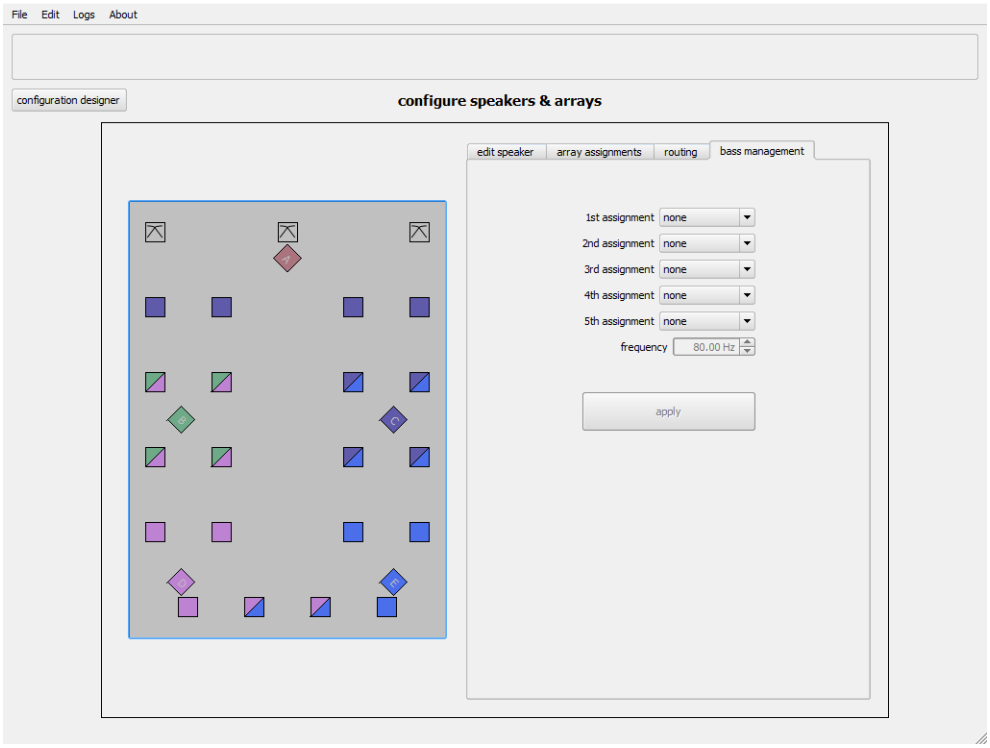
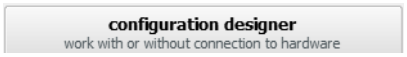


Figure 3-40 Configure Bass Management (Five Subwoofers)

3.4.7 Running AutoEQ

After you configure your speakers and arrays, you can run AutoEQ, as follows:

1. Click the **configuration designer** 

button.
2. Click **run AutoEQ** to display the **AutoEQ** screen, as shown in Figure 3-41.

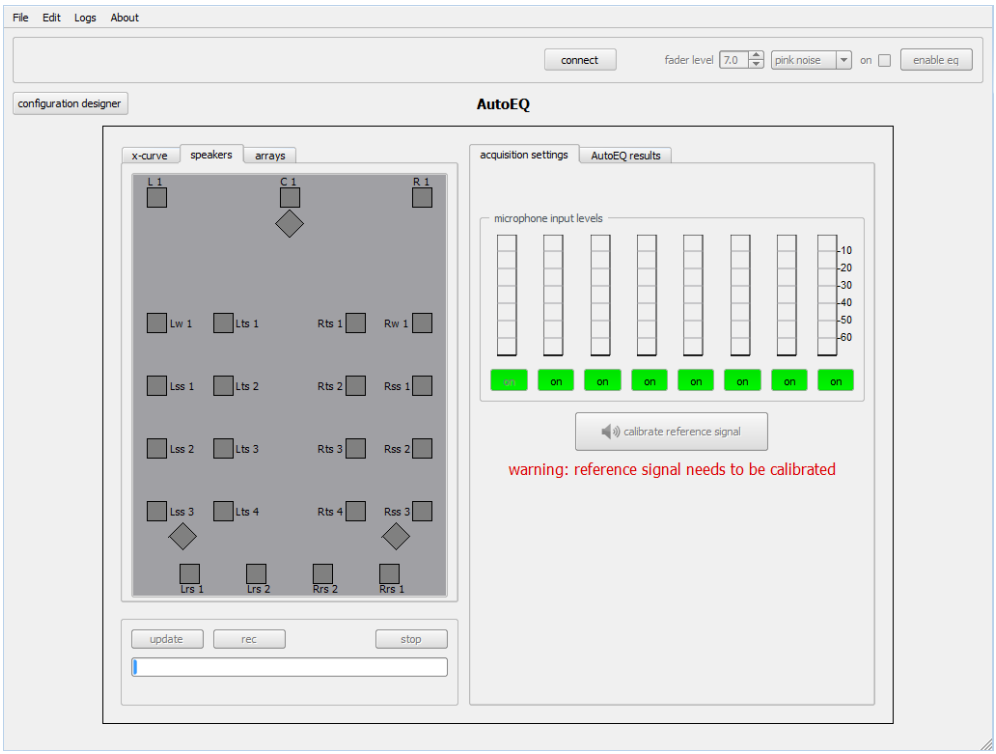


Figure 3-41 AutoEQ Screen

3. Click the **connect** button at the top of the screen.

Figure 3-42 Click Connect

A warning message indicates that connecting interrupts theatre audio.

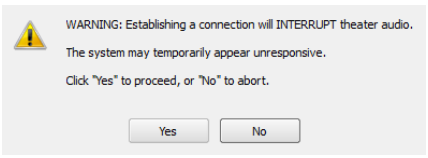


Figure 3-43 Connect Warning

4. Click **Yes** to proceed.
   A dialog box requests an IP address for your CP850.

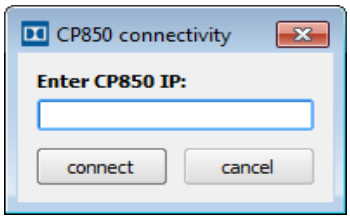


Figure 3-44 Enter CP850 IP Address

5. Enter the CP850 IP address, and click **connect** in the dialog box.
   Once connected, the **connect** button in the **AutoEQ** screen changes to a **disconnect** button and the color changes to green, indicating that you are now connected to your CP850. In addition, the CP850 IP address is displayed in the Windows title bar, as shown in Figure 3-45.

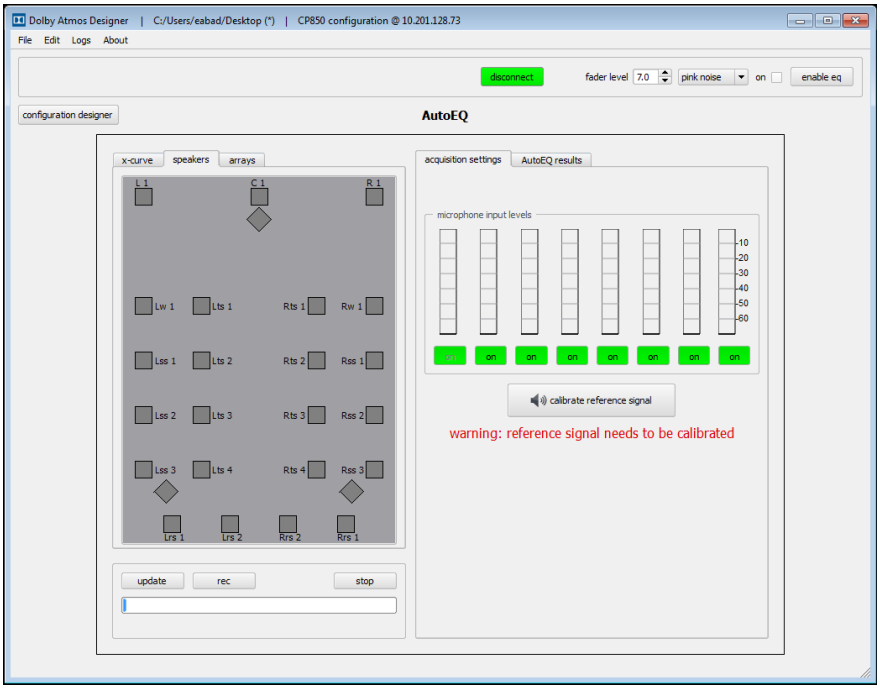
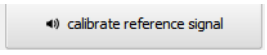


Figure 3-45 Connected to CP850

6. Select the number of microphone inputs you are using for the calibration. An **x** below any meter in the **microphone input levels** section indicates that the system will use the corresponding microphone input for the acquisition process. You cannot disable microphone 1.

7. Click the **calibrate reference signal**  button.
   The **Reference Signal Calibration** screen appears.

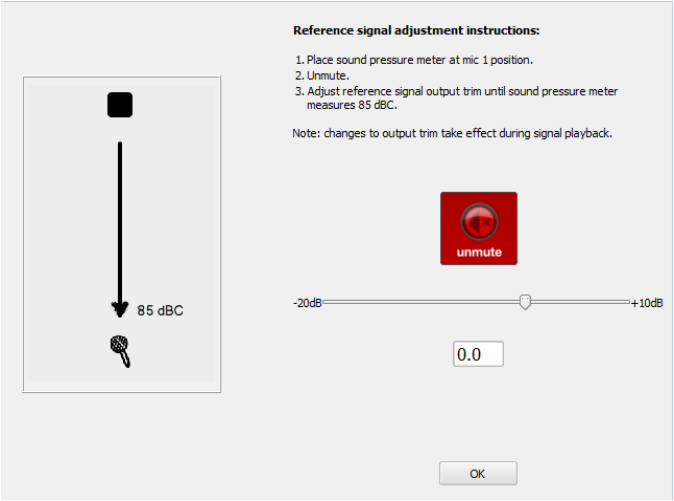


Figure 3-46 Reference Signal Calibration Screen

8. Unmute the signal by clicking the **unmute**  button.

   The red **unmute** button changes to a gray mute  button. This generates pink noise from the center speaker. The signal is attenuated by –20 dB. The sound pressure level (SPL) should be very low. Using an SPL meter, increase the fader icon until the sound pressure level from the Center channel is 85 dBC.

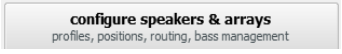
9. Click **OK**.
10. After calibrating the reference signal, we recommend that you adjust the output gain of each speaker to optimize the dynamic range of the system:
    a. Turn on noise by clicking the check box at the top of the **AutoEQ** screen.
    b. Select **pink noise** as the test signal.
    c. Select the speaker feed by clicking the desired speaker icon on the left side of screen.
    d. Measure the C-weighted SPL at the reference position in the auditorium.
    e. Adjust the amplifier gain until the speaker output level is 85 dBC.
    f. Note the input gain adjustment.
    g. Repeat the preceding steps for each speaker.
    h. Once the gain adjustments are complete for each speaker, turn off the pink noise.

Note: Set the Low-Frequency Effects (LFE) channel to +10 dB in-band gain (approximately 91 dBC SPL), and set bass management subwoofers to 0 dB in-band gain (approximately 81 dBC SPL).

11. After setting all the speaker feeds to 85 dBC SPL, click **configuration designer**.

    at the upper-left side of the screen.

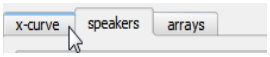
12. Click **configure speakers & arrays** 

    .
13. Select a speaker feed by clicking a speaker on the left side of the screen.
14. Select **edit speaker** > **amp** to display the amplifier parameters.

15. Adjust the amplifier input trim (see Figure 3-25) using the up/down arrows in the **trim** field 

based on the input gain adjustment. (See step 10-f.)
16. Repeat the preceding steps for each speaker based on the input gain adjustment. (See step 10-f.)

Caution: Before proceeding further, be sure to select **configuration designer** > **configure speakers & arrays** > **edit speaker** > **amp** > **trim** (see Figure 3-25) and set the amplifier input trim for each channel, as previously specified in steps 10–15. This is necessary to ensure that the limiter thresholds are properly configured.

17. Click the **x-curve** 

tab.

    The **x-curve** parameters appear, as shown in Figure 3-47.

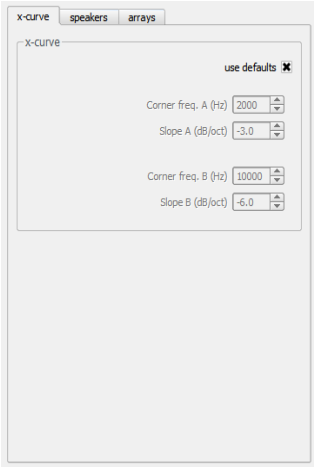


Figure 3-47 Default X-Curve Parameters

18. Set the boost-level frequencies.

    Boost limits define the point where no boost above 0 dB is applied to frequencies above and below the high and low limits for a speaker or an array feed. The system automatically assigns default boost-limit frequency points to each speaker and array feed. To change the boost-limit frequency:

    a. Select a speaker at the left side of the screen, or draw a marquee around a group of speakers to edit the parameters for that group.
    b. Select the **AutoEQ results** tab.
    c. Edit the boost-limits value by typing in a value or using the up/down arrows.

Note: Avoid setting boost limits to frequencies above or below the bandwidth limits of the speakers (±3 dB points) to avoid excessive boost where the output of the speaker begins to rapidly decrease.

19. Click the record 

button.
20. At the prompt, enter a file name and click **save** to save your file if you have not done so already.

Recording begins immediately. During a measurement, the speaker being measured flashes red and a signal is displayed on the input level meter. In addition, a progress bar appears at the bottom of the screen and the speaker being acquired is displayed below the progress bar.

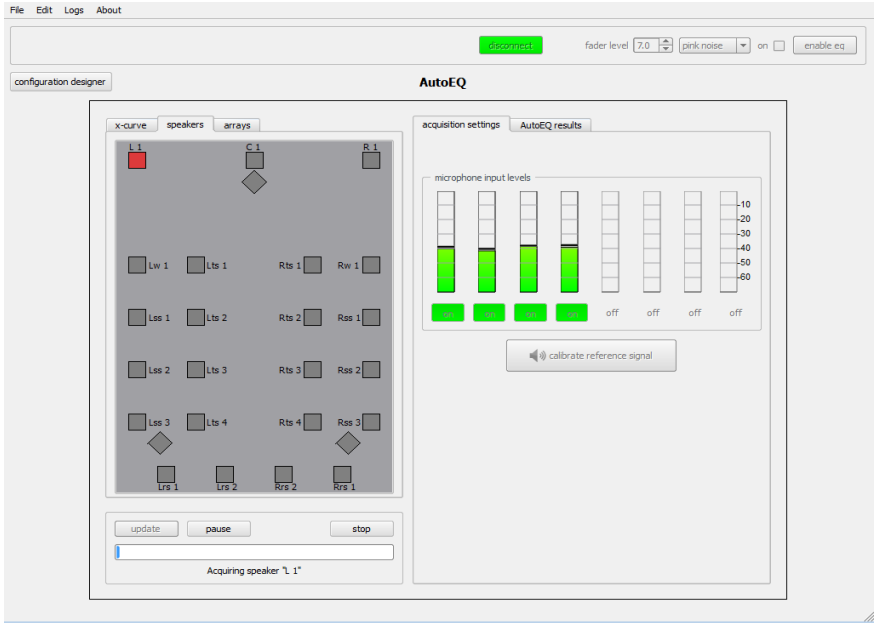


Figure 3-48 Speaker Measurements

When the speaker feed measurement is completed, the system automatically starts processing data. Once processed, a speaker icon turns green.

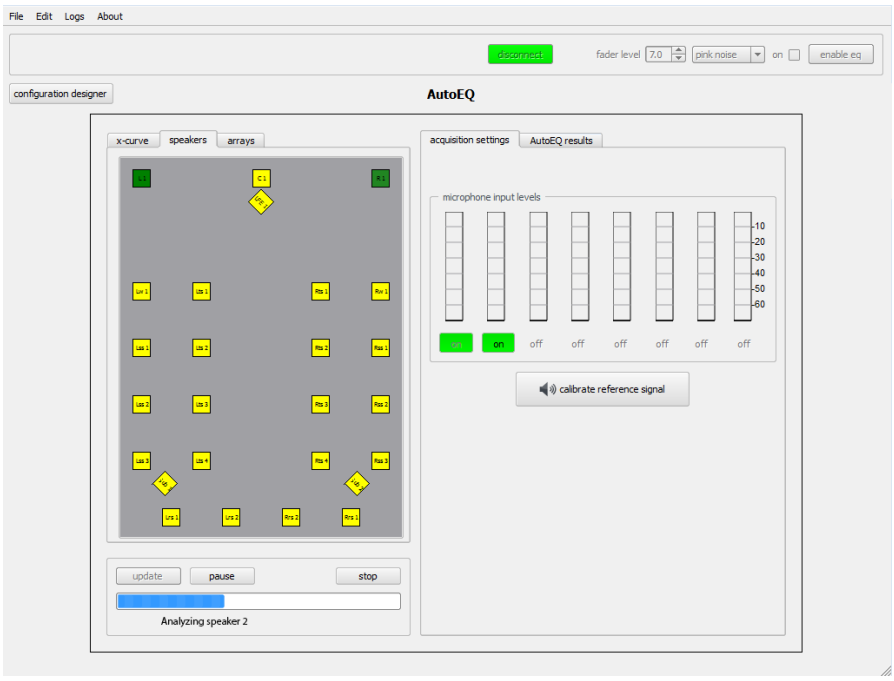


Figure 3-49 Processing Speaker Feed Data

During the EQ process, you can view real-time results by clicking the **AutoEQ results** tab.

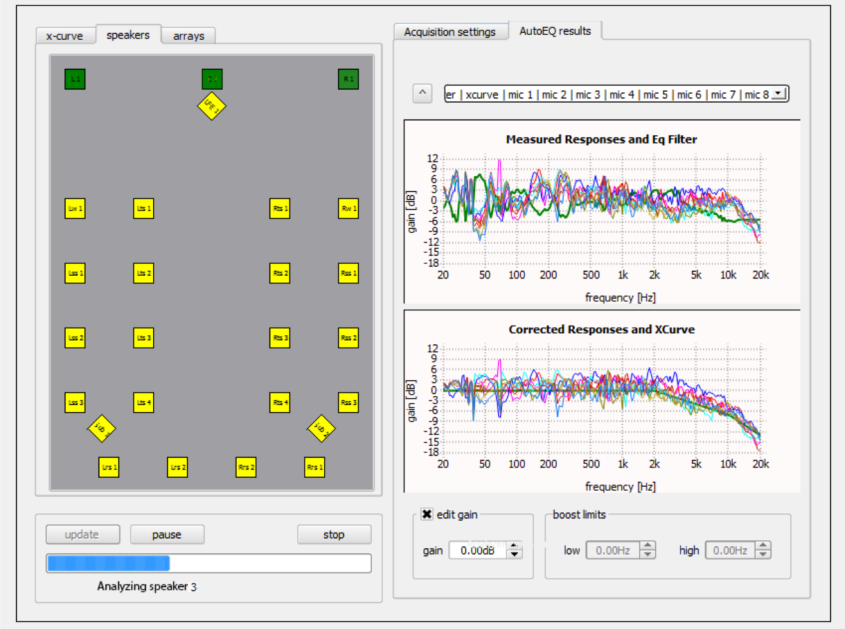


Figure 3-50 AutoEQ Processing

After speaker feed processing, the system automatically begins array measurements. The arrays being measured flash red, measured arrays appear in yellow, and a signal appears on the input level meters. Array icons with no color indicate that there is no measurement data present. Some speakers are assigned to multiple arrays. Array icons that are half green and half yellow indicate that one of the arrays is processed and the other is not. Array icons that are completely green indicate that the array acquisitions were processed.

Figure 3-51 Array Measurements

At the end of the entire process, a message indicates that AutoEQ is completed.

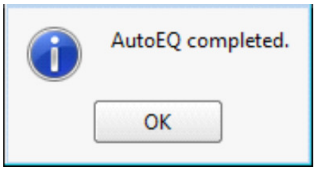


Figure 3-52 AutoEQ Completed

21. Click **OK**.

    Once the equalization process is complete, we recommend that you inspect each speaker feed and array feed to confirm that the equalization and levels are appropriate:

    - Select a speaker feed by clicking a speaker icon on the left side of the screen.
    - Navigate to the **AutoEQ results** tab.
    - Observe the gain value for each speaker feed and equalization curve.
    - If the gain or equalization seems incorrect for a speaker feed, you can:

    a. Remeasure the speaker by clicking on a speaker at the left side of the screen, or select multiple speakers by pressing <Ctrl> and clicking on the desired speakers. You can also draw a marquee around a group of speakers. Remeasure by pressing the **rec** button.

    b. Update the speaker by clicking on a speaker at the left side of the screen, or select multiple speakers by using the methods described in step a. Change a value, such as a boost-limit frequency or x-curve parameter. Select **update** to reprocess the data with the edited value.

Note: If you update a surround speaker, the system remeasures the array to which the speaker feed is assigned.

22. Click the **Configuration Designer** button.
23. Click the **Main Menu** button.
24. Click **Save Configuration**.
25. Click **Push to CP850**.

    A warning message indicates that establishing a connection will interrupt audio.

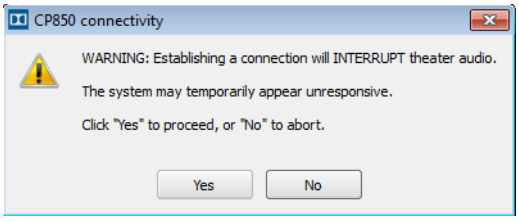


Figure 3-53 Connectivity Warning

26. Click **Yes** to continue.

    If you are connected to a CP850, the system pushes the Dolby Atmos configuration .dac file to your unit. If you are not connected to a CP850, you must enter an IP address at the prompt before the system pushes the EQ file to your unit.

A warning message with a backup prompt appears. You can ignore this warning and click **overwrite**. However, if you need to back up the existing .dac file on the CP850, use the CP850 web client, as described in Settings Management.

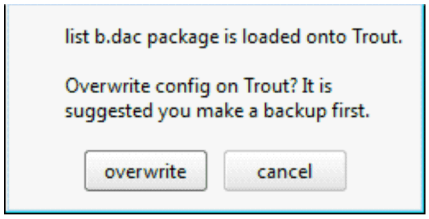


Figure 3-54 Backup Prompt

When the system writes the Dolby Atmos configuration (.dac) file to the CP850, a confirmation dialog box appears.

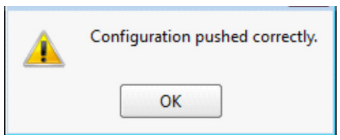


Figure 3-55 Configuration Pushed Confirmation

27. Click **Save As** in the **File** menu to save your .dac file to the desired directory on your PC as a backup. You can also transfer these settings directly to another CP850.

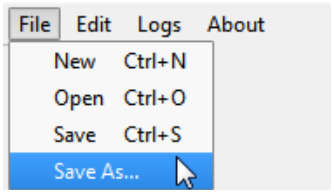


Figure 3-56 Save Dolby Atmos Configuration File Backup

Dolby Atmos Configuration File Contents

The .dac file contains the following information, which includes speaker data:

- Site information
- Room configuration
- Speaker type
- Amplifier type
- Output routing
- Speaker location
- Limiter settings
- Bass management routing (if used)
- Bass management frequency
- Equalization data for speakers and arrays
- File version data
- Indexes to capture data for a given session

For information on using the web client backup and restore functions to load .dac files that contain additional data from web client settings, see Settings Management.

Using the Web Client User Interface

After using Dolby Atmos® Designer software to calibrate your auditorium, this chapter shows you how to operate the CP850 using the web client user interface. It covers the following information:

- Connecting to the CP850
- Configuring Macros
- Displaying and Configuring the Equalization Parameters
- Displaying and Configuring the Auditorium Parameters
- Configuring Preferences
- Checking the Logs
- Setting Up User Access
- Modifying the Network Settings
- Performing Maintenance Tasks
- Rebooting the System
- Accessing Documentation

Note: Before you begin, follow the instructions in Chapter 2 to install your CP850 in a Dolby® Digital Cinema network, and refer to Chapter 3 for information on calibrating an auditorium and running AutoEQ.

4.1 Connecting to the CP850

After you install the CP850 (as described in Chapter 2), connect your computer to the CP850:

1. Connect your computer to the auditorium network switch.
2. Open the web browser on your computer. Currently, the CP850 is compatible with Mozilla® Firefox® v3.5 or later, Google™ Chrome™ v5.0 or later, Apple® Safari® v6.0 or later, and Microsoft® Internet Explorer® v8.0 or later.
3. Connect to the CP850 by typing its IP address in your web browser.

   A **authenticate** login screen appears requesting a user name and password, as shown in Figure 4-1. The default administrator user name and password are both *admin*. If you are a system administrator, you should change the administrator password, and then set up user access levels and passwords for all other users, as described in Section 4.7.

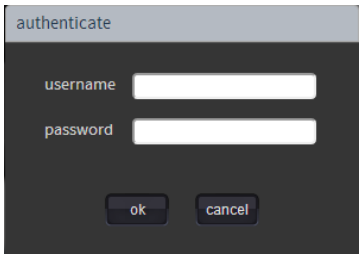


Figure 4-1 Authenticate Login Screen

After you log in, the CP850 web client **status** screen appears. To activate the Dolby Atmos Connect ports and play back Dolby Atmos content, you must have the required enablements installed. For information on obtaining enablements, see Enablements.

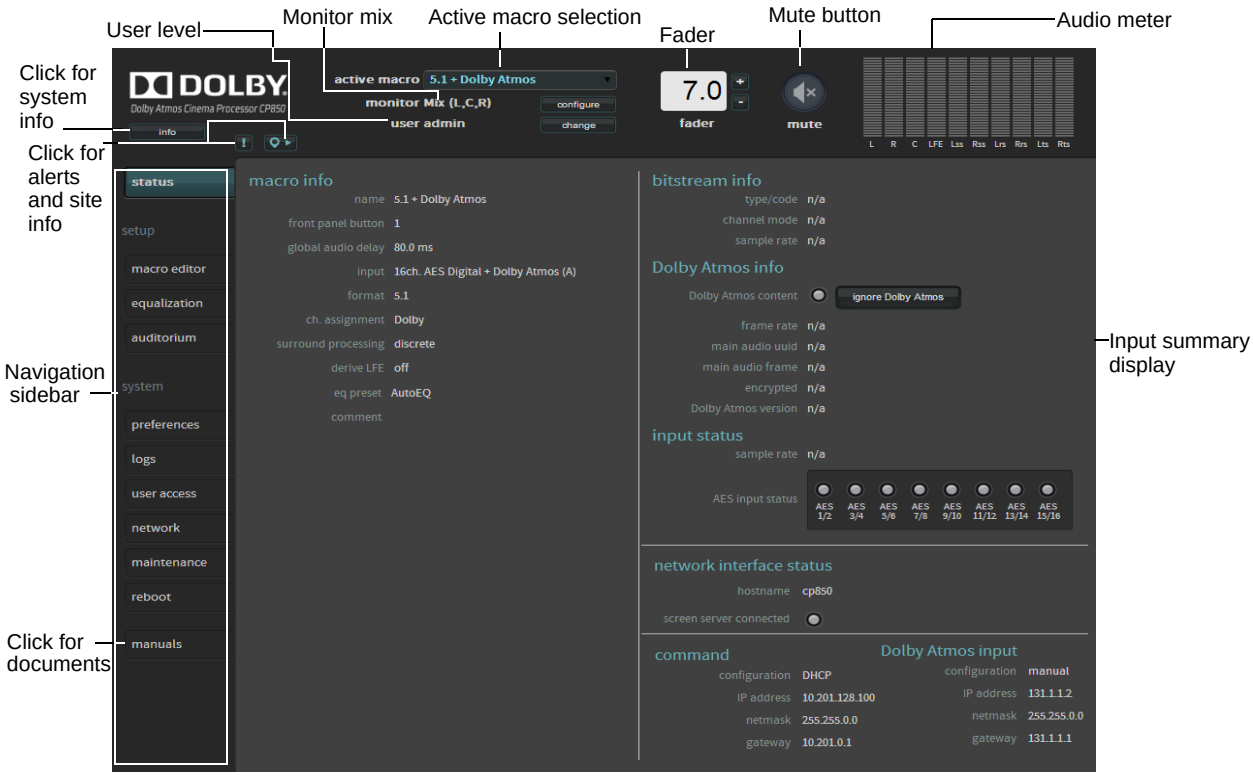


Figure 4-2 CP850 Web Client Status Screen

Note: You can disable Dolby Atmos playback by clicking **Ignore Dolby Atmos** in the web client **status** screen or by using the front-panel user-control screen (in the **Options** menu). You should do this only if you are experiencing Dolby Atmos playback problems. When you confirm at the prompt, **Ignore Dolby Atmos** changes to **Enable Dolby Atmos** and you can reenable Dolby Atmos. When rebooting or changing macros, the system reverts to Dolby Atmos playback.

Following is a description of all of the objects that appear in each of the web client user-interface screens.

4.1.1 Navigation Bar

The CP850 navigation bar provides access to all of the CP850 **status**, **setup**, and **system** screens. Click the desired menu option to display the corresponding screen.

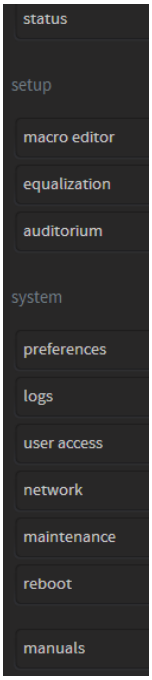


Figure 4-3 Navigation Bar

4.1.2 Active Macro Field

In this field, you can select the desired macro to use for your input source. The CP850 requires macros to process audio. You can use the default macros that are provided with the system, or you can create your own macros. For more information, see Section 4.2.

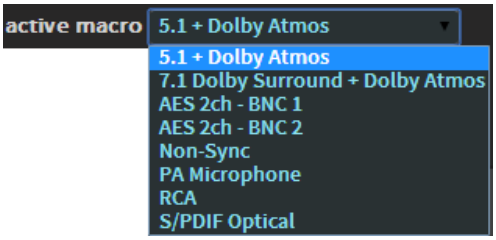


Figure 4-4 Active Macro Menu

4.1.3 Monitor Mix Field

Click the **configure** button next to this field to select and monitor a mix of the Left, Center, and Right speaker feeds, any individual speaker feed, or an AES input when the 16-channel input is active.

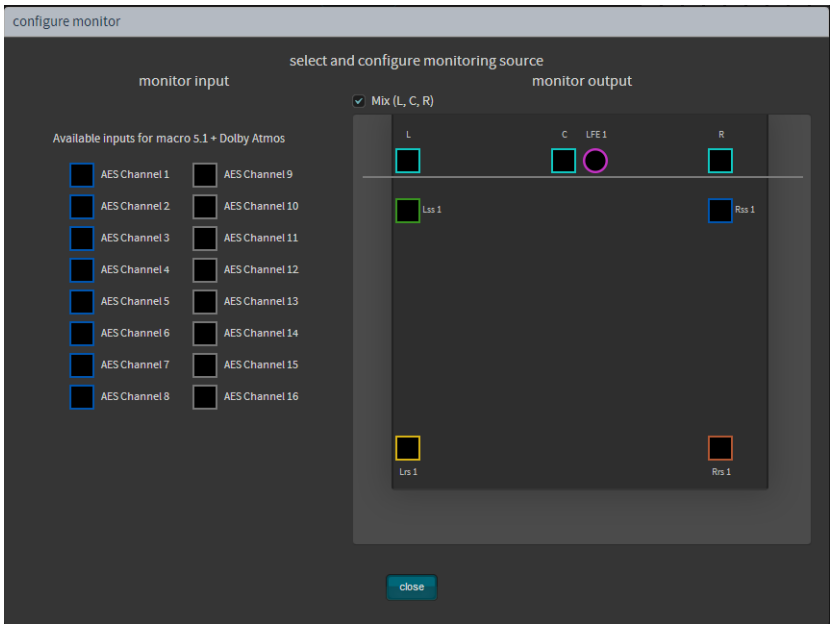


Figure 4-5 Configure Monitor Menu

If you change to a macro that does not use an AES 16-channel input, the system defaults to Left, Center, and Right, and you can select a speaker to monitor. If you select the Center speaker and you change the current macro with the Center speaker selected, the system defaults to the Center speaker.

4.1.4 Fader Field

Increase or decrease the volume by clicking the **+** or **–** buttons or by entering the desired value in this field.

Figure 4-6 Fader Field

4.1.5 Mute Button

Click this button to mute and unmute the system.

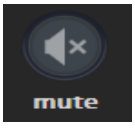


Figure 4-7 Mute Button

4.1.6 Audio Meter

This meter displays the audio levels for channel-based audio. It shows the signal intensity of PCM input channels, decoded bitstreams, and upmixed content. When decoding a Dolby Atmos soundtrack, this meter shows the intensity of object audio and bed audio.

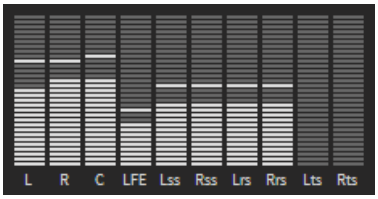


Figure 4-8 Audio Output Meter

4.1.7 Alerts

If the system activates an alert, the alert icon changes to a blinking yellow icon, as shown in Figure 4-9.

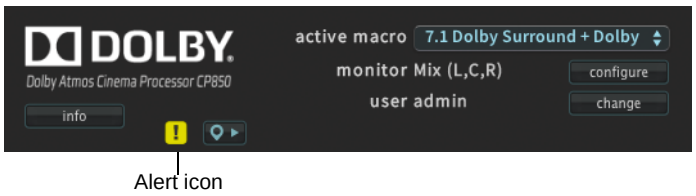


Figure 4-9 Alert Icon Indicating an Alert

To view an alert, click the alert icon. The alert message appears in the **messages and alerts** screen, as shown in Figure 4-10 for a low battery alert.

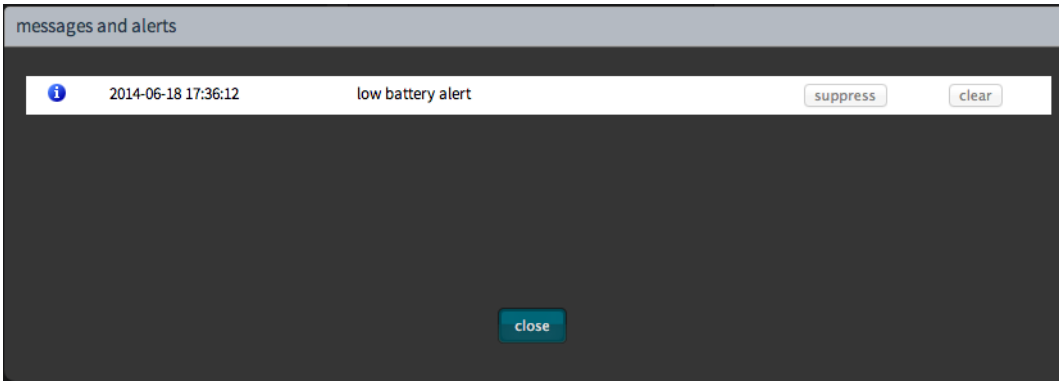


Figure 4-10 Alert Message (Low Battery Alert)

You can stop this type of alert from blinking by selecting it and then clicking the **suppress** button.

You can remove the displayed alert by selecting it and then clicking the **clear** button.

You cannot remove or suppress a temperature alert. A temperature alert will disappear when the temperature returns to normal.

4.1.8 Site Information

To display the serial number and IP address of your unit and verify whether the CP850 is connected to a Dolby DSS200 or DSS220, click the site information button, which is located next to the alert icon at the upper-left side of the screen.

Figure 4-11 Site Information Pop-up

4.1.9 User

This field displays the current user level. If you have the necessary credentials, you can click the **change** button, enter your user name and password, and change the current user level. For more information on user levels, see Section 4.7.

4.1.10 Info

To view system information, click the **info** button at the upper-left corner of the screen to display the **CP850 information** pop-up list. Enablements that appear in white text show the function and date/time validity. Enablements highlighted in yellow show the expiration dates for enablement functions that will expire soon, while those that appear in red indicate expired enablement functions. For information on obtaining enablements, see Enablements.

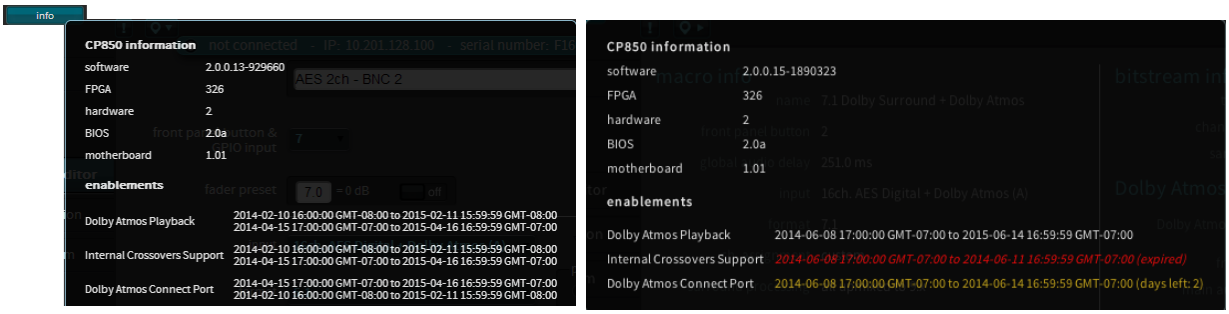


Figure 4-12 CP850 Information with Enablement Status

4.2 Configuring Macros

The CP850 requires macros to process audio. The system provides you with the following default macros that you can use, edit, or discard. To activate the Dolby Atmos Connect ports and play back Dolby Atmos content, you must have the required enablements installed. For information on obtaining enablements, see Enablements.

- **5.1 + Dolby Atmos**
- **7.1 Dolby Surround + Dolby Atmos**
- **AES 2ch – BNC 1**
- **AES 2ch – BNC 2**
- **Non-Sync**
- **PA Microphone**
- **RCA**
- **S/PDIF Optical**

In addition, you can create macros from scratch. To configure a macro and assign it to a front-panel button and GPIO input, select **macro editor** in the **setup** menu.

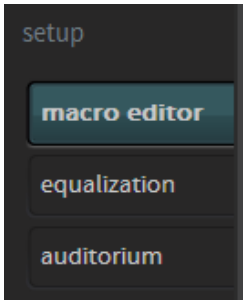


Figure 4-13 Select Macro Editor in Setup Menu

The **macro editor** screen appears, as shown in Figure 4-14. In this screen, you can create or edit a macro by entering the desired parameters.

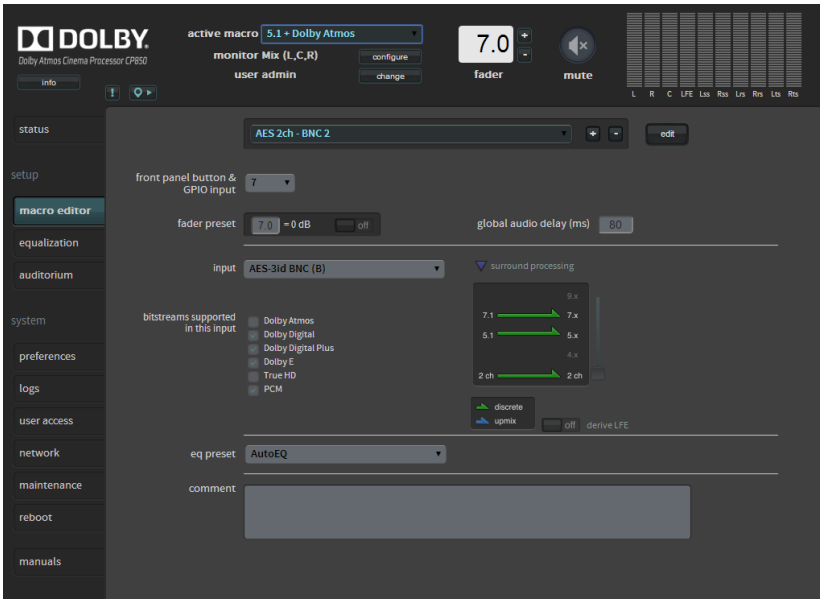


Figure 4-14 Macro Editor Screen

Figure 4-15 and Figure 4-16 show the parameters in the **macro editor** screen for 16 channels plus Dolby Atmos input. These examples show how the screen changes when you click the **ch. assignment** or the **surround processing** tabs. The surround upmixing parameters are available only for encoded audio (for example, Dolby Digital). The available parameters can also change, based on your input source and your enablements. For information on obtaining enablements, see Enablements.

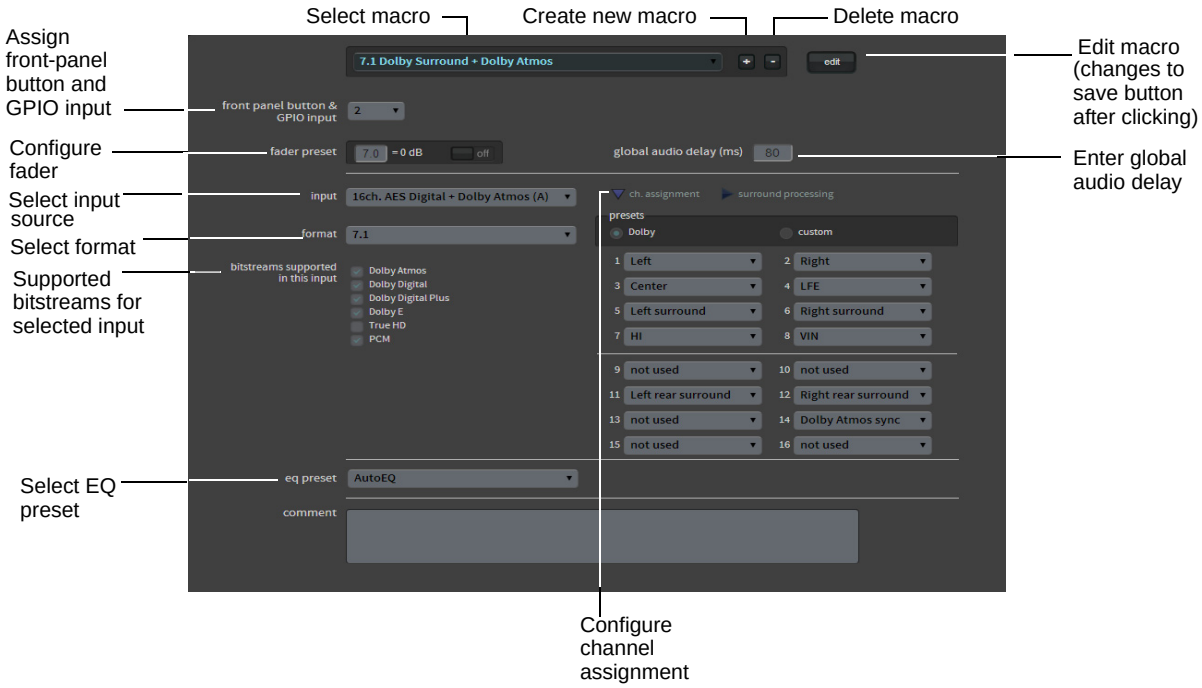


Figure 4-15 Configure Macro Channel Assignment

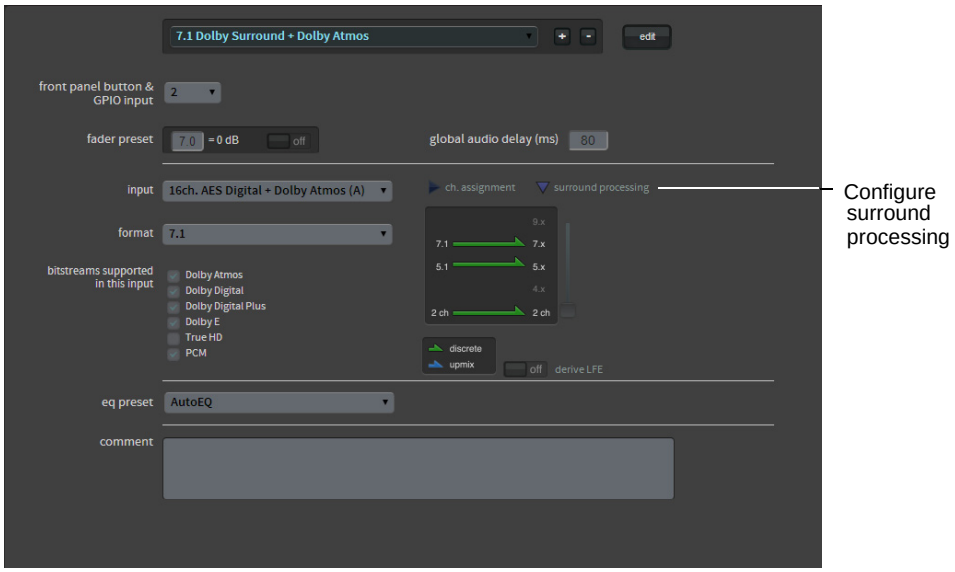


Figure 4-16 Configure Macro Surround Processing and Upmixing

Create or Edit a Macro

1. Click the + button to create a new macro or the **edit** edit button to edit an existing macro.

   If you click either of these buttons, the parameter fields are now active and you can enter the desired settings. In addition, the **edit** button changes to a **save** button and a **cancel** button appears save cancel. The **cancel** button allows you to cancel your entries.

2. Configure the desired parameters in the **macro editor** screen.

   Following is a description of all the parameters in the **macro editor** screen. The available parameters can change, based on your input source. After configuring all of the parameters, click the **save** button.

Macro Selection

Click in this field to select the macro that you want to edit.

If you click the + or edit button, you can enter a name for your macro in this field.

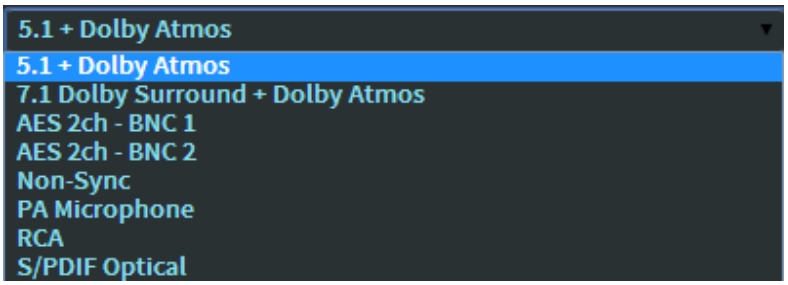


Figure 4-17 Select Macro to Configure

Delete Macro

Click the - button to delete the selected macro.

Front-Panel Button and GPIO Input

Click in this field to assign a front-panel button and GPIO automation input for your macro.

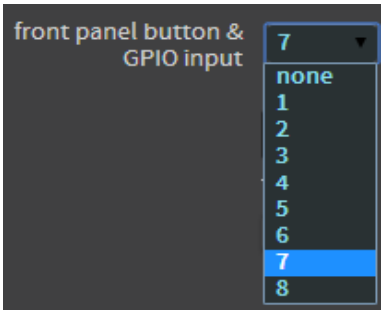


Figure 4-18 Select Front-Panel Button and GPIO Input

Fader Preset

Click in this field to enter a fader value, and click the **on**/**off** button to activate or deactivate the fader for your macro.

Figure 4-19 Enter Fader Preset

Global Audio Delay (ms)

Click in this field to enter a global audio delay (in milliseconds) for your macro. You may need to add picture delay to the media block when using a 16-channel input. The minimum global audio delay for digital cinema content is 80 milliseconds. (For details, refer to the media block setup instructions in your *Dolby Digital Cinema System Manual*.)

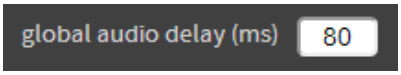


Figure 4-20 Enter Global Audio Delay

Input

Click in this field to select the desired input source.

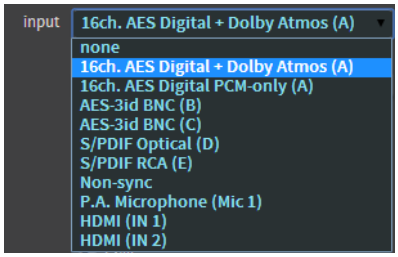


Figure 4-21 Select Input Source

Format

This parameter appears for 16 channel inputs, where you can click in this field to select the desired audio format. You can customize your audio format by selecting **custom**. (See **Channel Assignment** in the next section.)

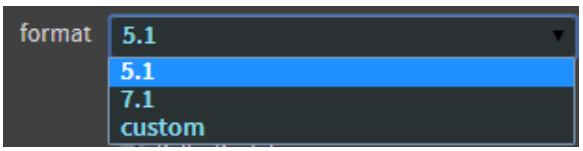


Figure 4-22 Select Audio Format

Channel Assignment

For 16 channel inputs, click the **ch. assignment** tab to view the **Dolby** channel assignment presets.

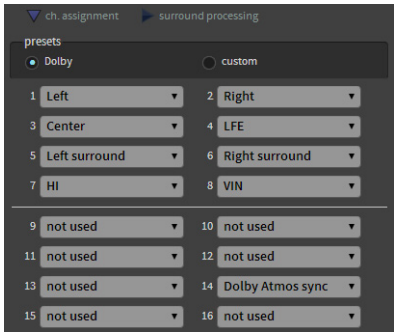


Figure 4-23 Dolby Preset Channel Assignments

To change the **Dolby** presets, click on the **custom** button, then click in the respective fields to select the desired channel assignments.

Note: To play back Dolby Atmos content, you must always configure your macro with **Dolby Atmos sync** assigned to channel 14.

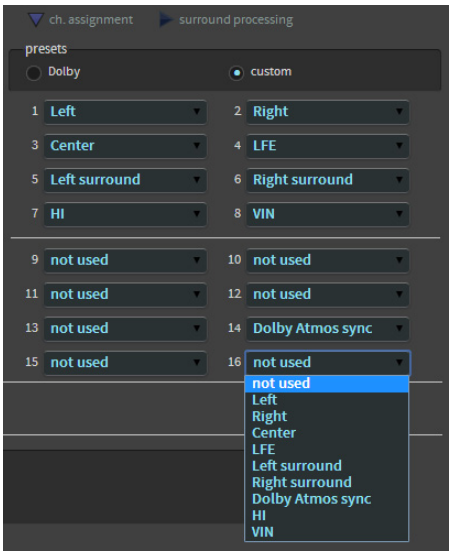


Figure 4-24 Customize Channel Assignments

Surround Processing

Click the **surround processing** tab to configure upmixing (for encoded audio only) by dragging the slider to the desired position. Figure 4-25 shows the parameters for the **Non-sync** input. Depending on your input source, you can also enable/disable the subwoofer by clicking the **derive LFE** button, drag the **input trim** slider to the desired trim setting for the **Non-sync** input, and enable/disable phantom power for the **P.A. Microphone** by clicking the respective button.

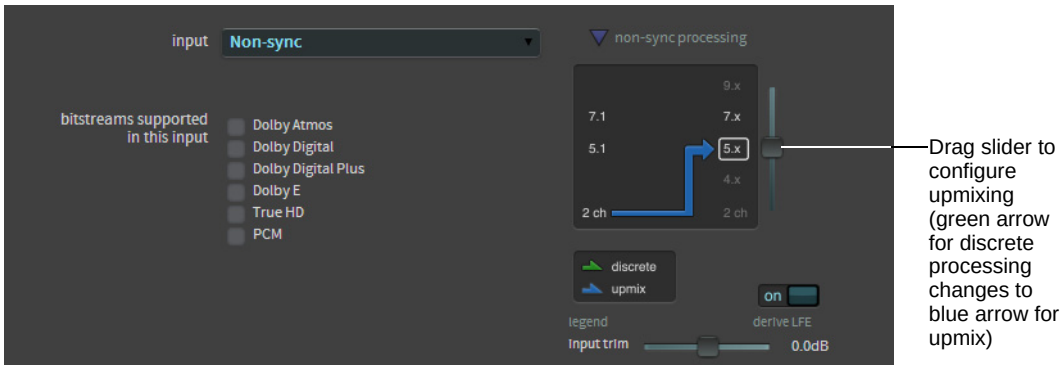


Figure 4-25 Surround Processing Parameters (Non-Sync Input)

EQ Preset

Click on this field to select the equalization preset parameters. These parameters are either the automated equalization (**AutoEQ**) settings or custom settings that you can create, as described in Section 4.3.

Figure 4-26 Select an EQ Preset

4.3 Displaying and Configuring the Equalization Parameters

To display and configure the equalization parameters, select **equalization** in the **setup** menu.

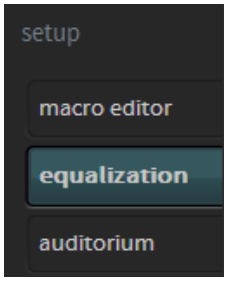


Figure 4-27 Select Equalization in Setup Menu

The real-time analyzer EQ display appears in the **equalization** screen. In this screen, you can add or edit a specific configuration of equalization parameters, based on the AutoEQ preset parameters or any custom preset parameters. You can then load any of these presets as required.

Note: You cannot edit the AutoEQ preset parameters. However, you can save a copy of these parameters under a different name, and make changes to the copy.

Figure 4-28 Displaying and Configuring the Real-Time Analyzer EQ Display

4.3.1 Adding an Equalization Preset

To add a new equalization preset:

1. Click the + button.
   You are prompted to base your new preset on either the **AutoEQ** preset or a copy of a previously created customized preset. In either case, you must also enter a name for your new preset. Alternatively, you can create a new customized preset by following the instructions in Section 4.3.2.

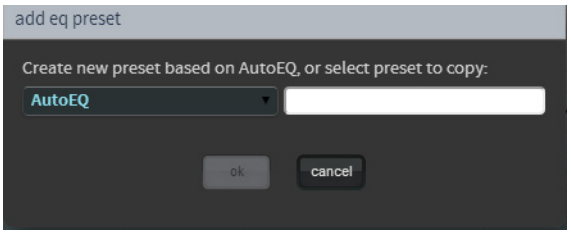


Figure 4-29 Add an EQ Preset

2. Enter a name for your new preset, then click the **ok** button to save your new preset.
3. Click the activated **edit** edit button. The **edit** button changes to a **save** button, and a **cancel** button appears, which allows you to cancel your entries.
   The equalization parameters are now activated for editing, as shown in Figure 4-32.
4. Configure the desired parameters in the **equalization** screen.
   After configuring all of the desired parameters, click the **save** button to create your new preset.

   You can delete a customized preset by clicking the - button. You cannot delete the **AutoEQ** preset.

4.3.2 Loading or Editing an Equalization Preset

To load an existing preset:

1. Select the desired preset in the EQ presets menu.

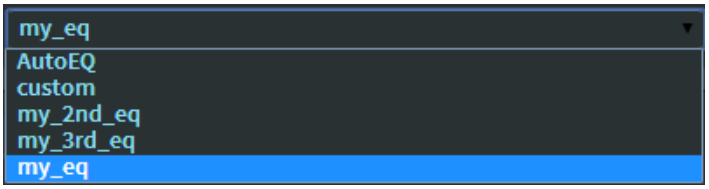


Figure 4-30 Load an EQ Preset

You can use the loaded preset for equalization, or you can edit the parameters for one of your customized presets, as described next.

If you want to edit one of your customized presets, click the **edit** button. (The **custom** preset option in the EQ presets menu is based on the **AutoEQ** preset parameters.) You cannot edit the **AutoEQ** preset unless you save it under a different name.

After clicking the **edit** button, a warning message appears.

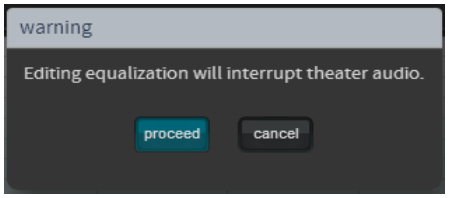


Figure 4-31 Editing Equalization Warning Message

2. Click **proceed** to edit your preset.

   The **edit** button changes to a **save** button, and a **cancel** button appears, which allows you to cancel your entries.

   The equalization parameters are now activated for editing, as shown in Figure 4-32.

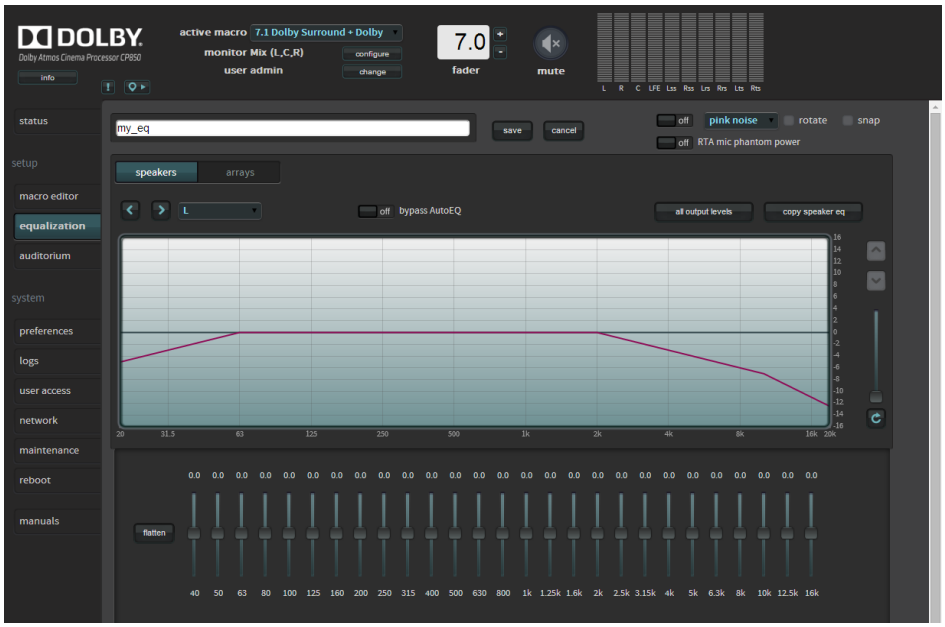


Figure 4-32 Equalization Parameters Activated for Editing

3. Configure the desired parameters in the **equalization** screen.
4. After configuring all of the desired parameters, click the **save** button to finalize your changes to the existing preset.

   You can delete a customized preset by clicking the - button. You cannot delete the **AutoEQ** preset.

4.3.3 Equalization Parameters

Following is a detailed description of all the parameters that appear in the **equalization** screen. You can configure these parameters for customized presets when you click the **edit** button.

Signal Generator and Microphone Phantom Power

Click the respective **on**/**off** button to turn these parameters on and off.

You can select an option from the signal generator drop-down menu.

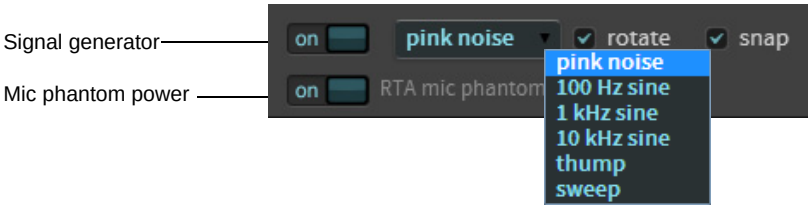


Figure 4-33 Real-Time Analyzer Signal Generator and Microphone Phantom Power

When you click the **on**/**off** button to enable the signal generator and select **pink noise**, you can configure the system to automatically pan pink noise through each channel sequentially using the **rotate** and **snap** options:

- **Rotate**: Pans the signal through each channel sequentially, maintaining a continuous panning volume. As the signal in one channel starts to end, the signal in the next channel begins, so the signals overlap in a smooth fashion.
- **Snap**: Pans the signal through each channel sequentially, one channel at a time, with only one signal present at any time. After one signal ends, the next signal begins.

The default output level for pink noise, as well as for the thump and sine signal tones, is –30 dBFS. The default output level for the sweep signal tone is –40 dBFS.

Speakers and Arrays Feeds

Select **speakers** or **arrays**, then click in this field to select the respective feed.

These parameters are always active. You can select from the drop-down menu or use the arrow buttons to scroll through the list.

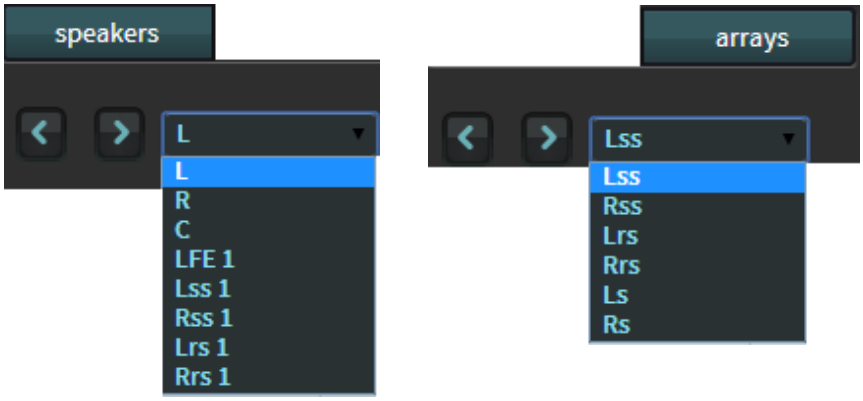


Figure 4-34 Speaker and Array Feeds

Bypass AutoEQ

This parameter specifies that the system will bypass the AutoEQ parameters and use the specified custom preset. You can click on the **on**/**off** button to enable or disable this parameter.

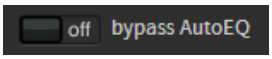


Figure 4-35 Bypass AutoEQ

Note: When you select **on**, the system bypasses AutoEQ only for the speaker or array you are currently editing (as specified in the speaker/array feeds drop-down menus, as shown in Figure 4-34).

All Output Levels

Click this button to display and adjust the output levels for each speaker or array in your preset. Select an individual speaker or array by clicking on it, or press <Ctrl> (or <Command> on a Mac®) on your keyboard to make multiple selections. You can move the slider with the mouse or the up/down arrow keys to specify output levels. In addition, you can generate signals in this screen. Click **ok** to confirm your entries.

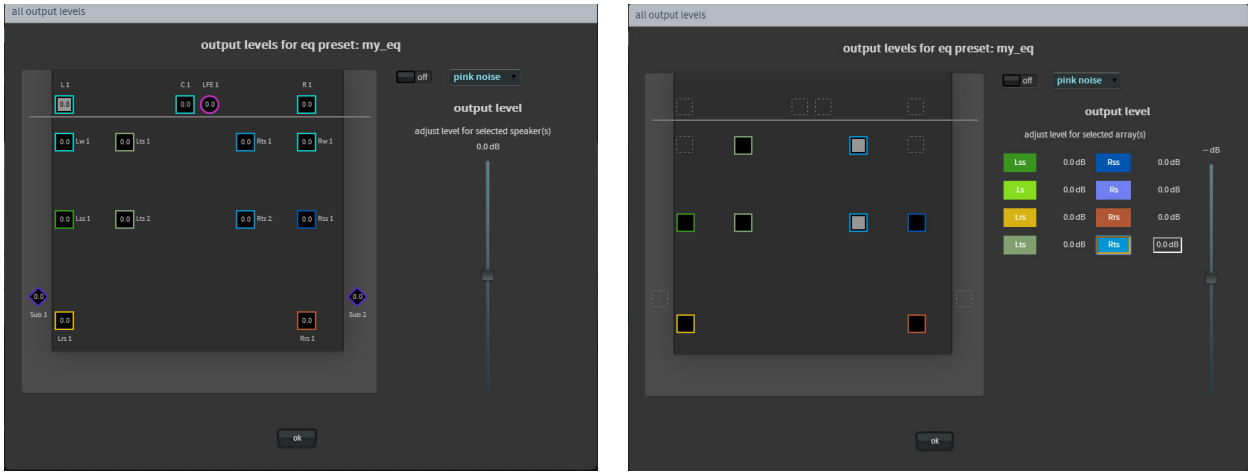


Figure 4-36 All Output Levels Screen (Speakers and Arrays)

Copy Speaker EQ

Click this button to copy manual speaker EQ settings from one source to one or more destinations. When you click on a source and then click on a destination, the **copy** button is activated, and you can click on this button to confirm the location.

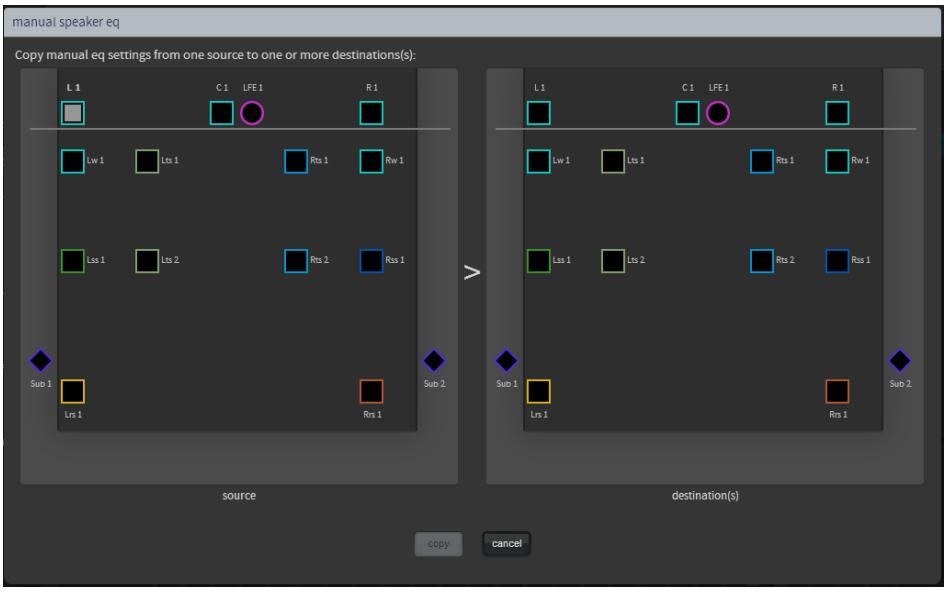


Figure 4-37 Manual Speaker EQ

Real-Time Analyzer EQ Display Slider

Drag the slider or click the up and down arrow buttons (shown in Figure 4-38) to view different areas of the real-time analyzer EQ display.

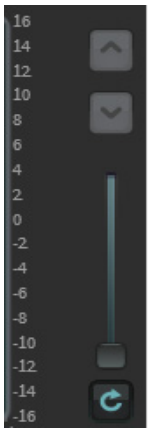


Figure 4-38 Real-Time Analyzer EQ Display Slider

Graphic Equalizer

Click on the **graphic eq** button, and drag each slider to adjust the gain throughout the range of frequencies, as shown on the real-time analyzer EQ display. Click the **flatten** button to flatten the curve.

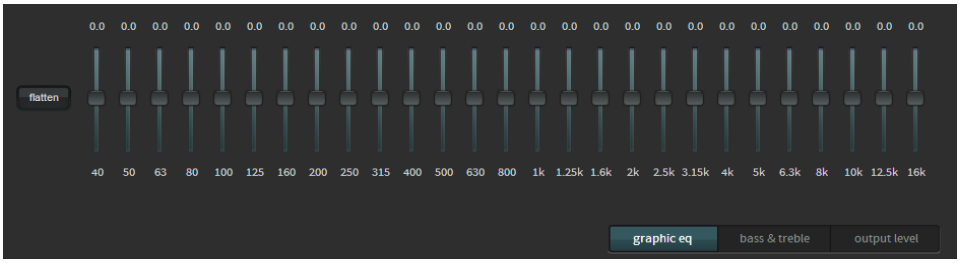


Figure 4-39 Graphic Equalizer

Bass and Treble

Click on the **bass & treble** button, drag the corresponding sliders, and change settings to adjust each parameter, as shown on the real-time analyzer EQ display. Click the **flatten** button to flatten the curve.

Figure 4-40 Bass and Treble

Output Level

Click on the **output level** button, and drag the corresponding slider to adjust the output level. Click the **flatten** button to flatten the output level.

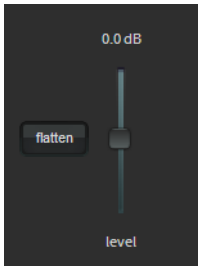


Figure 4-41 Output Level

4.4 Displaying and Configuring the Auditorium Parameters

To display the auditorium configuration summary and routing information:

1. Select **auditorium** in the **setup** menu.

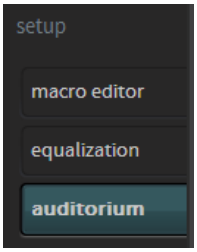


Figure 4-42 Select Auditorium in Setup Menu

The **auditorium** screen appears. In room view (under the **summary** tab), the speakers are displayed according to their x and y coordinates with the corresponding configuration summary. Figure 4-43 shows a configuration with no crossovers, and Figure 4-44 shows a different configuration that includes two crossovers (designated by icons).

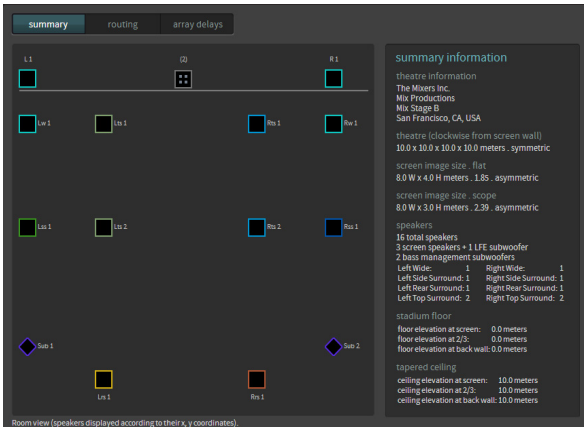


Figure 4-43 Auditorium Configuration Display (Room View)

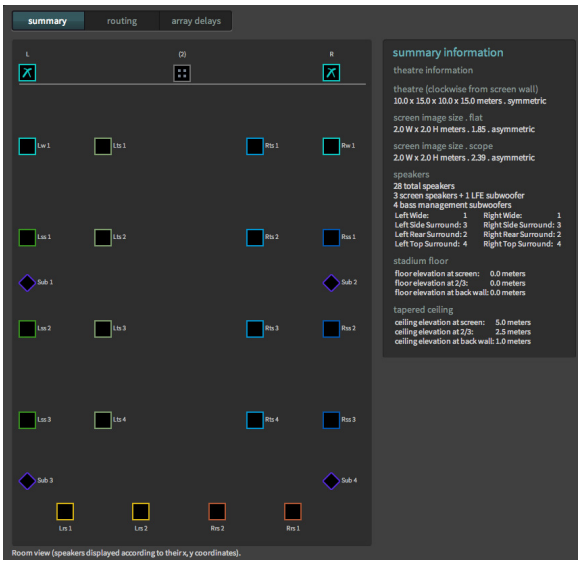


Figure 4-44 Auditorium Configuration Display (Room View with Crossovers)

When you hover your mouse on any of the solid-colored icons, the following information appears: channel name, position, array (if assigned to an array), routing, speaker data (if populated), and bass management assignment (indicating the speaker that is bass managed) if bass management is applied.

If you have multiple speaker feeds with the same positional data, an icon with four small squares appears. When you click on this icon, it indicates the speakers that share this positional data.

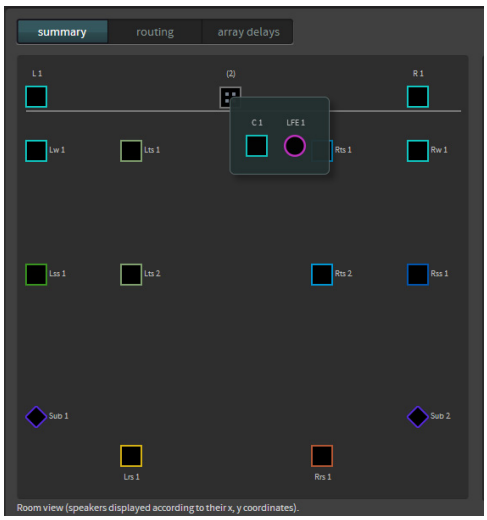


Figure 4-45 Hover Mouse to Display Additional Information

2. Click the **routing** tab.

   The **routing** screen appears. In this screen, the output routing channel is identified within each icon. If it is a digital output, the routing icon is a square. If it is an analog output, the routing icon is a circle.

Figure 4-46 Routing Screen

When you hover your mouse on any of the icons, the following information appears: channel name, position, array (if assigned to an array), routing, speaker data (if populated), and bass management assignment (indicating the speaker that is bass managed) if bass management is applied.

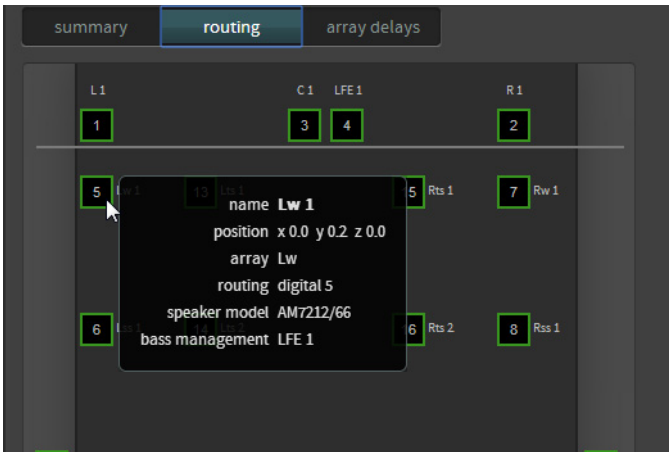


Figure 4-47 Hover Mouse to Display Channel Information

3. Click the **array delays** tab.

   The **surround speaker array delays** screen appears. The Dolby Atmos Designer software automatically creates the surround delay values. If you click (to place a check mark) in the **use configuration file values** box, the system uses the AutoEQ values. When this box is not checked, you can enter the desired delay values and then click the **apply** button.

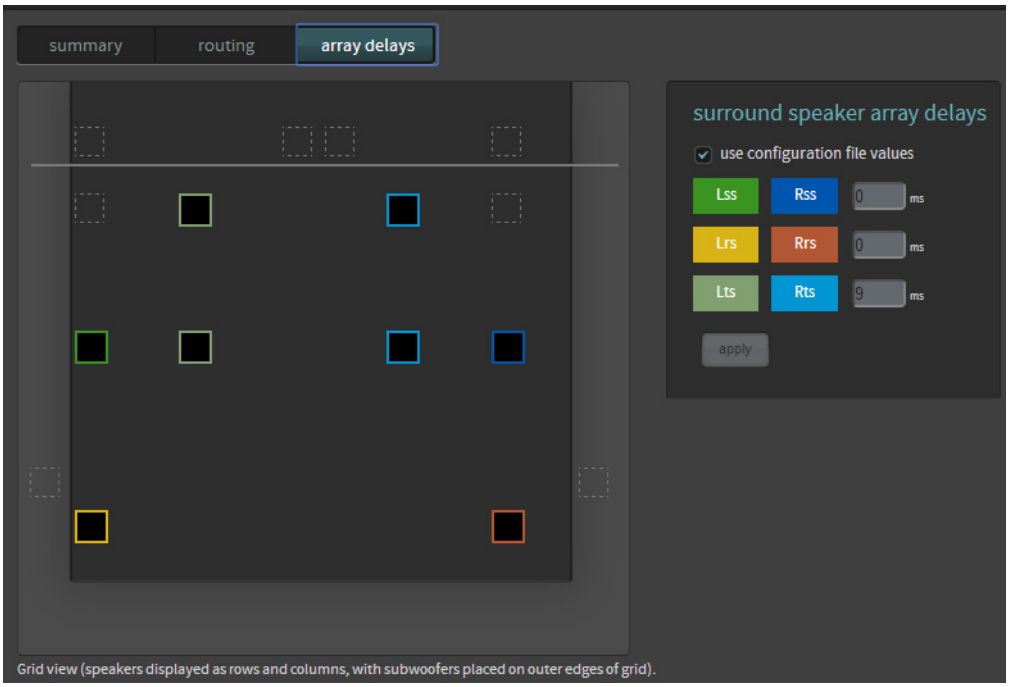


Figure 4-48 Surround Speaker Array Delays Screen

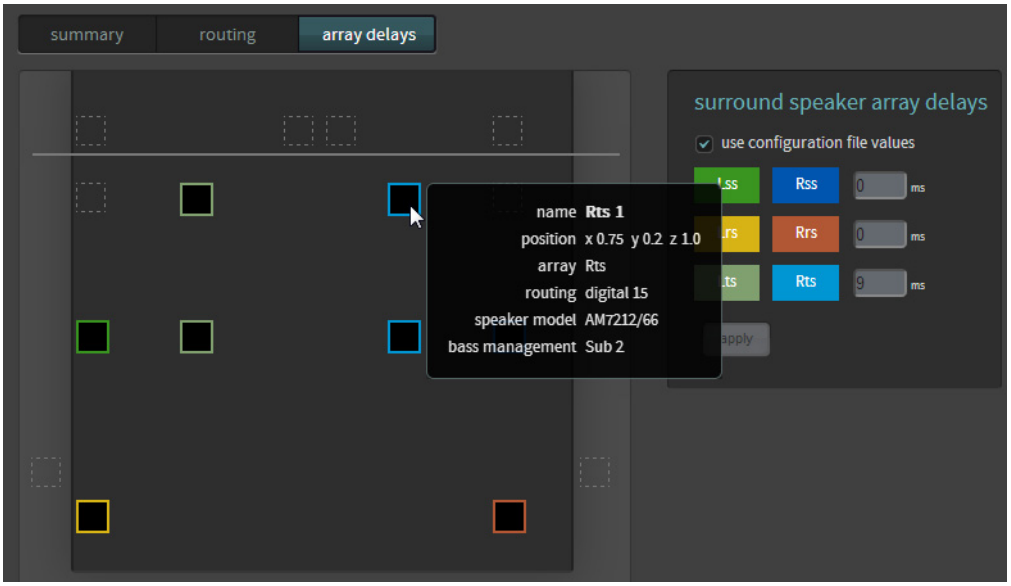


Figure 4-49 Hover Mouse to Display Additional Information

4.5 Configuring Preferences

To configure preferences, select **preferences** in the **system** menu.

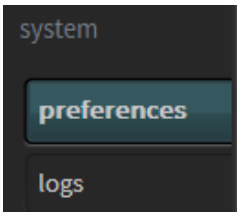


Figure 4-50 Select Preferences in System Menu

The **preferences** screen appears. In this screen, you can enter the mute duration. The **fade in** and **fade out** settings each have a range of 0.2 to 5 seconds, in 0.1-second steps. You can set these values by moving the respective sliders. This system also uses this setting when switching between macros.

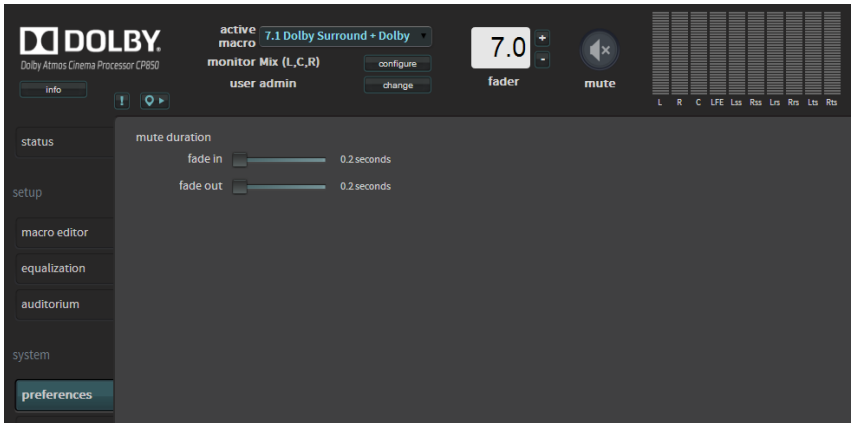


Figure 4-51 Preferences Screen

4.6 Checking the Logs

The logs display information regarding the incoming signal and the system. To check the logs status, select **logs** in the **system** menu.

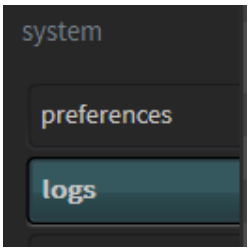


Figure 4-52 Select Logs in the System Menu

The **logs** screen appears. You can filter the logs by **level**, **category**, and **start time**/**end time** by clicking the respective area and making the desired selection, or by clicking **show all** to remove all filters. In addition, you can download a .tgz file by clicking **download**.

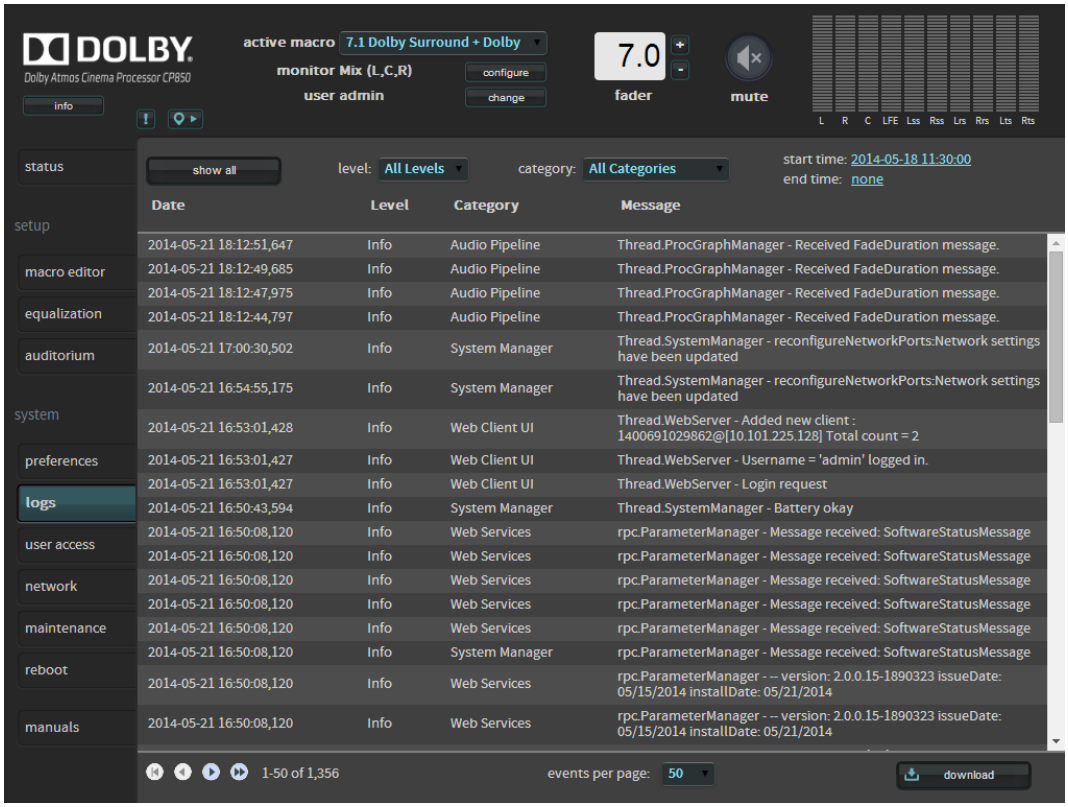


Figure 4-53 Event Logs Screen (All Levels, All Categories Selected)

When you click the **level** field, the corresponding drop-down menu appears, where you can select the user log display level, as shown in Figure 4-54.

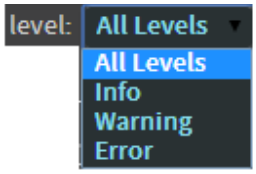


Figure 4-54 Level Menu

Category

When you click the **category** field, the corresponding drop-down menu appears, where you can select the user log display category, as shown in Figure 4-55.

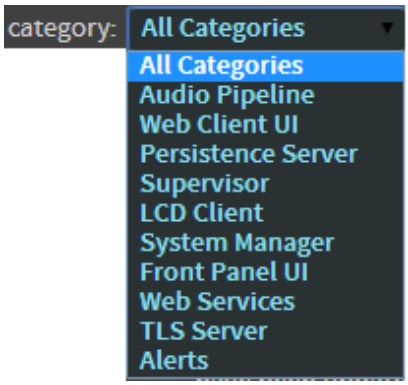


Figure 4-55 Category Menu

Start Time/End Time

When you click the **start time** or **end time** field, two options appear: **All** and **Custom. All** specifies a log for all time frames. **Custom** activates the date and time fields, where you can select a specific time frame. Click the ✔ to display the specified log. If you click the ✖, the system displays all time frames (same as **All**).

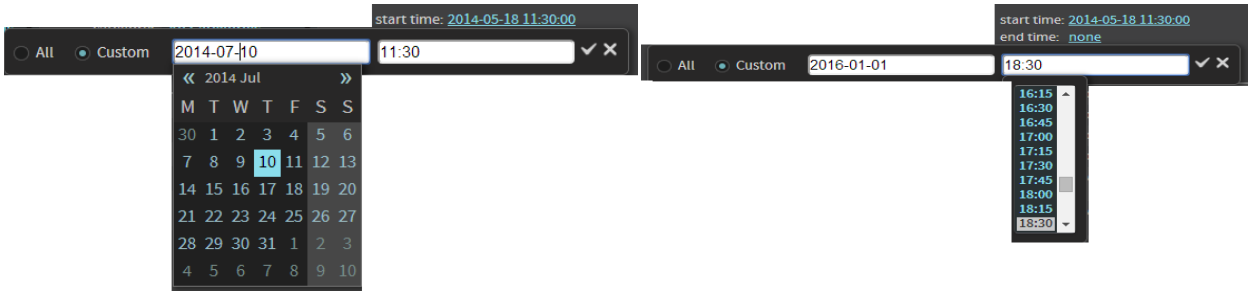


Figure 4-56 Start Time/End Time Fields

4.7 Setting Up User Access

If you have administrator privileges, you can set up user access as follows:

1. Select **user access** in the **system** menu.

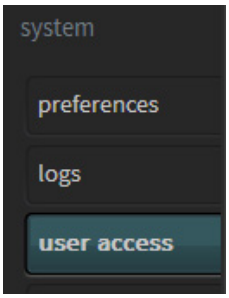


Figure 4-57 Select User Access

The **user access** screen appears. In this screen, if you are a system administrator, you can change (or reset) the default administrator password (*admin*) and set up (or reset) user access and passwords for all other users.

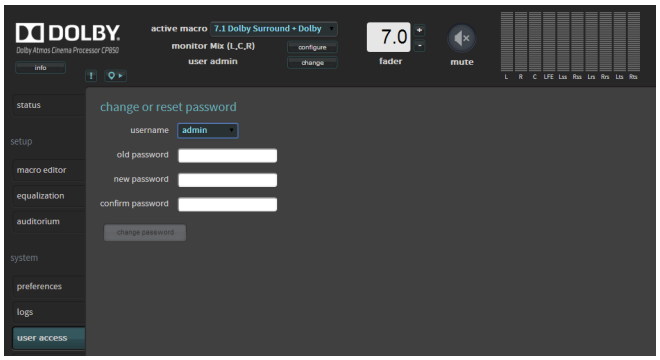


Figure 4-58 User Access Screen

2. Click the **username** field.
   The **username** menu appears with a list of all user levels.

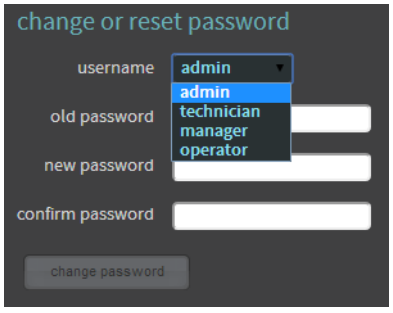


Figure 4-59 User Name Menu

3. Select a user name, enter the old password, enter the new password, and then confirm the new password in the respective fields. The default passwords are the same as the user names.

   Following are the capabilities at each user level:

- **operator**: Access status screen, change macros, fader, and monitor selection. View auditorium configuration and event logs. Download event logs.
- **manager**: Access all operator-level tasks, and edit macros and assign them to front-panel buttons. Change the operator-level password.
- **technician**: Access all manager-level tasks. Perform manual equalization, change network settings, clear event logs, update system software, manage system settings, reboot system, change the operator- and manager-level passwords, and update the certificate.
- **admin**: Access all technician-level tasks, and change the operator-, manager-, and technician-level passwords.

4.8 Modifying the Network Settings

To modify the network settings, select **network** in the **system** menu.

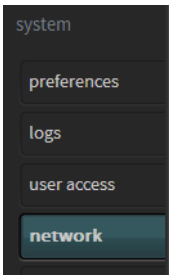


Figure 4-60 Select Network in the System Menu

The **network** screen appears. In this screen, you can change the host name, specify a Network Time Protocol (NTP) server, modify the IP configuration for the command port and the Dolby Atmos input port, and disable jumbo frames for the network interfaces. In addition, you can specify the default network interface gateway (for a manual configuration) using either the **command** gateway or the **Dolby Atmos input** gateway. You can also specify the default network interface gateway from the user control screen, as described in Section 2.11. This can help after a system upgrade, if you are unable to connect with a system that does not use the default (**command**) network gateway.

Note: For some third-party servers, you may need to disable jumbo frames.

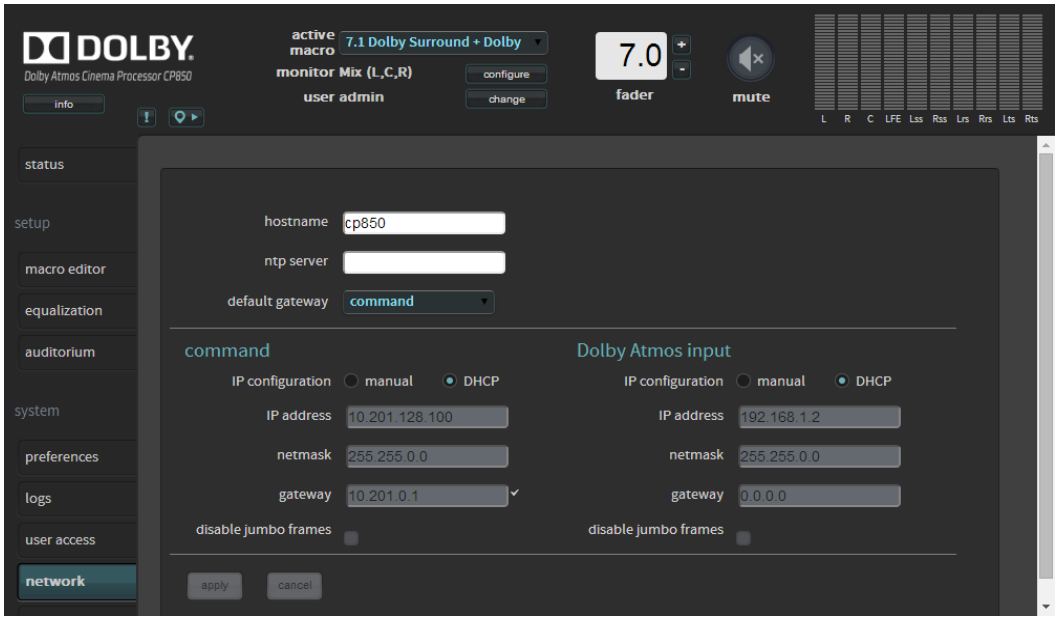


Figure 4-61 Modifying the Network Settings

4.9 Performing Maintenance Tasks

If you are a technician or a system administrator, select **maintenance** in the **system** menu to perform maintenance tasks.

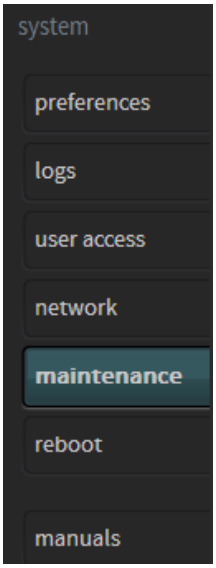


Figure 4-62 Select Maintenance in the System Menu

The **maintenance** screen appears. In this screen, you can download the CP850 certificate, upgrade the system, install enablements, and backup, restore, and reset system settings.

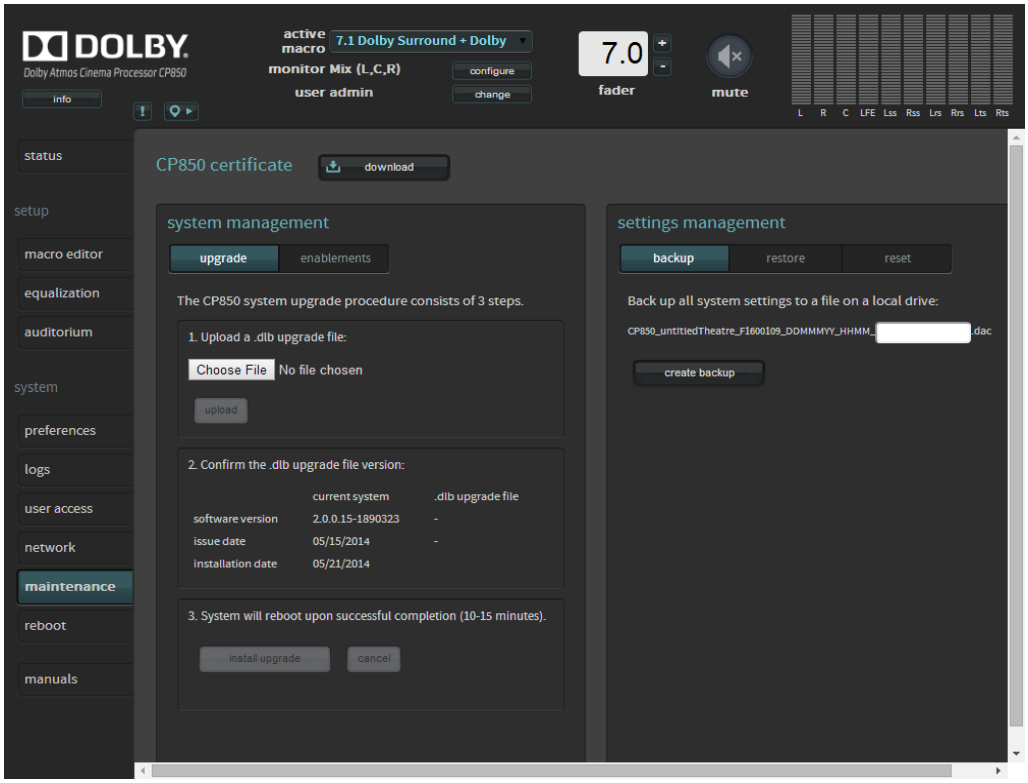


Figure 4-63 Maintenance Screen

Following is a description of each of the **maintenance** screen operations.

CP850 Certificate

The CP850 certificate identifies the specific media block inside the CP850. Your content distributor may include information regarding the certificate in key delivery messages (KDMs) in the trusted device list to authorize content to your unit.

Upgrade

To upgrade your CP850 system software:

1. Obtain the .dlb upgrade file from Dolby Laboratories at https://www.dolbycustomer.com.
2. Click the **upgrade** button.
3. Copy the upgrade file to your local disk.
4. Click **Choose File**, then click **upload**.
5. Confirm the displayed upgrade file version, then click **install upgrade**.

   The system initiates the upgrade process, displays the progress, and reboots the CP850 when the upgrade is completed.

Enablements

To activate the CP850 Dolby Atmos connect ports, play back Dolby Atmos content, and enable crossover support, you must install the required enablements. To install the desired CP850 enablements:

1. Obtain the .dae enablement files from Dolby Laboratories at https://www.dolbycustomer.com. For help in obtaining enablements, send an email to customer support.
2. Click the **enablements** button.
3. Copy the enablement files to your local disk.
4. Click **Choose File**, then click **upload**.
5. Repeat step 4 for each .dae enablement file.
6. Confirm the displayed .dae enablement files, then click **apply enablement**.

The system initiates the enablement process, displays the progress, and reboots the CP850 when the enablement installation is complete.

Settings Management

To back up your system settings, click the **backup** button, enter a name for your .dac restore file, then click the **create backup** button to save the .dac restore file in the designated directory on your PC.

To restore your system settings:

1. Click the **restore** button at the upper-right side of the screen, then click **Choose File** to select a .dac restore file. You can restore all of your system settings (except user access) or select specific settings (by clicking in the corresponding boxes).
2. Click the **restore** button at the lower-right side of the screen to run the restoration process.

To reset your system settings, click the **reset** button at the upper-right side of the screen. You can reset your system to the factory defaults (except for user access) or reset specific factory settings (by clicking in the corresponding boxes). Click the **reset** button at the lower-right side of the screen to run the reset operation.

4.10 Rebooting the System

If you have technician- or administrator-level access, you can reboot the CP850 by clicking **reboot** in the **system** menu, and then clicking the displayed **reboot** button.

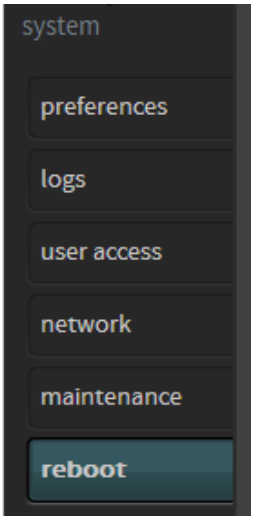


Figure 4-64 Rebooting the System

4.11 Accessing Documentation

To access the CP850 English and Chinese manuals, the *Dolby Atmos Cinema Installation Submission* form, and web services, click **manuals** in the **system** menu.

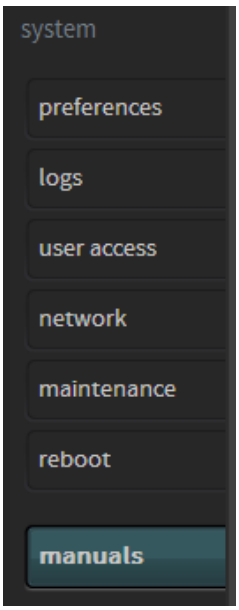


Figure 4-65 Select Manuals

Pinout Information

A.1 CP850 16-Channel AES Pinouts

The CP850 has a 16-channel AES/EBU balanced input via a 25-pin D-connector (female), IEC 60958 type I balanced three-conductor, 110Ω input impedance, transformer isolated, input connection.

Table A-1 AES Input Pinouts

Pin	Description
1	AES common
2	Channels 1/2 –
3	Channels 3/4 +
4	AES common
5	Channels 5/6 –
6	Channels 7/8 +
7	AES common
8	Channels 9/10 +
9	AES common
10	Channels 11/12 –
11	Channels 13/14 +
12	AES common
13	Channels 15/16 –
14	Channels 1/2 +
15	AES common
16	Channels 3/4 –
17	Channels 5/6 +
18	AES common
19	Channels 7/8 –
20	AES common
21	Channels 9/10 –
22	Channels 11/12 +
23	AES common
24	Channels 13/14 –
25	Channels 15/16 +

A.2 CP850 HDMI Input and Output Pinouts

The CP850 has two HDMI™ inputs and one HDMI output connector. The HDMI inputs and output are HDMI 1.4 compliant and utilize type A connectors.

Table A-2 HDMI Input and Output Pinouts

Pin	Description
1	Transition-minimalized differential signaling (TMDS) data 2 +
2	TMDS data 2 shield
3	TMDS data 2 –
4	TMDS data 1 +
5	TMDS data 1 shield
6	TMDS data 1 –
7	TMDS data 0 +
8	TMDS data 0 shield
9	TMDS data 0 –
10	TMDS clock +
11	TMDS clock shield
12	TMDS clock –
13	Consumer Electronics Control (CEC)
14	Reserved
15	Serial Clock for DDC (SCL)
16	Serial DataLine for DDC (SDA)
17	Display Data Channel /CEC ground (DDC)
18	+5 V power
19	Hot plug detect

A.3 CP850 16-Channel Analog Outputs

The CP850 has 16 electronically balanced, floating output channels, 100Ω output impedance. The outputs are split between two 25-pin subminiature D-connectors (male). The maximum RMS output level for the analog output level is +26 dBu (15.45 V). The pinout conforms to the TASCAM® standard.

Table A-3 Analog Output 1 Channels 1–8 Pinouts

Pin	Description
1	Channel 8 +
2	Channel 8 ground
3	Channel 7 –
4	Channel 6 +
5	Channel 6 ground
6	Channel 5 –
7	Channel 4 +
8	Channel 4 ground
9	Channel 3 –
10	Channel 2 +
11	Channel 2 ground
12	Channel 1 –
13	Empty
14	Channel 8 –
15	Channel 7 +
16	Channel 7 ground
17	Channel 6 –
18	Channel 5 +
19	Channel 5 ground
20	Channel 4 –
21	Channel 3 +
22	Channel 3 ground
23	Channel 2 –
24	Channel 1 +
25	Channel 1 ground

Table A-4 Analog Output 2 Channels 9–16 Pinouts

Pin	Description
1	Channel 8 +
2	Channel 8 ground
3	Channel 7 –
4	Channel 6 +
5	Channel 6 ground
6	Channel 5 –
7	Channel 4 +
8	Channel 4 ground
9	Channel 3 –
10	Channel 2 +
11	Channel 2 ground
12	Channel 1 –
13	Empty
14	Channel 8 –
15	Channel 7 +
16	Channel 7 ground
17	Channel 6 –
18	Channel 5 +
19	Channel 5 ground
20	Channel 4 –
21	Channel 3 +
22	Channel 3 ground
23	Channel 2 –
24	Channel 1 +
25	Channel 1 ground

A.4 DAC3201 Analog Output Connectors

The DAC3201 has four analog audio output connectors (**Connector A**, **Connector B**, **Connector C**, and **Connector D**). The pinout conforms to the TASCAM standard.

Table A-5 DAC3201 Analog Output Connectors

Pin	Description
1	Channel 8 +
2	Ground
3	Channel 7 –
4	Channel 6 +
5	Ground
6	Channel 5 –
7	Channel 4 +
8	Ground
9	Channel 3 –
10	Channel 2 +
11	Ground
12	Channel 1 –
13	N/C
14	Channel 8 –
15	Channel 7 +
16	Ground
17	Channel 6 –
18	Channel 5 +
19	Ground
20	Channel 4 –
21	Channel 3 +
22	Ground
23	Channel 2 –
24	Channel 1 +
25	Ground

A.5 CP850 Automation Contact Closure Pinouts

The CP850 has one automation port for contact closures. The contact closures control CP850 functions, including macro button selection and three-wire fader control. The contact closure automation interface is a female 25-pin subminiature D-connector.

Table A-6 Automation Pinouts

Pin	Description
1	Macro 1 input
2	Macro 2 input
3	Macro 3 input
4	Macro 4 input
5	Macro 5 input
6	Macro 6 input
7	Macro 7 input
8	Macro 8 input
9	
10	Mute
11	
12	Return
13	+5 VDC
14	ID1 output
15	ID2 output
16	ID3 output
17	ID4 output
18	ID5 output
19	ID6 output
20	ID7 output
21	ID8 output
22	Fader select
23	Mute indicator (IND)
24	Fader pot
25	

A.6 CP850 Serial Port Pinouts

The CP850 has one RS-232 serial port.

Table A-7 Serial Port Pinouts

Pin	Description
1	Data Carrier Detect (DCD)
2	Received Exchange Data (RXD)
3	Transmit Exchange Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready(DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)
10	No Connection (NC)

Web Services API and Serial Commands

B.1 Web Services API

There is a web services API provided for the CP850. For details, go to https://www.dolbycustomer.com. In addition, you can access web services by selecting **system** > **maintenance** > **manuals** in the CP850 web client.

B.2 ASCII Serial Commands

The following table lists the CP850 ASCII serial commands.

Table B-1 Serial Commands

Parameter Name	Description	Possible Values
`sys.macro_preset`	Set and read the current macro preset. Maps directly to macro buttons on front panel of CP850.	Integer (1–8)
`sys.macro_name`	Set and read the current macro name.	String
`sys.fader`	Dolby® fader value 0–100, default 70.	Integer (0–100)
`sys.mute`	Mute Boolean.	Integer (0–1)
`sys.macros`	Read only. Returns a list of all system macros in the format **1:5.1 + Dolby Atmos**.	

`sys.ip_settings`	A string used to configure either of the two interfaces.	String in format `"[interface index 0|1] [dhcp| static ip_address netmask gateway]"`
		For example:
		`sys.ip_settings 0 dhcp`
		`sys.ip_settings 1 static 192.168.1.2 255.255.0.0 192.168.1.1`

`sys.reboot`	Command that reboots the system immediately.	No arguments

B.3 Sending ASCII Commands over Ethernet

To send ASCII serial commands via Ethernet, send them to the CP850 **COMMAND** port IP address. You must use the automation port number, 61408 (for example, 192.168.1.139:61408).

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