# Dolby Cinema Processor CP950 and Dolby Atmos Cinema Processor CP950A Manual

# Notices

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**Dolby Laboratories, Inc.**
1275 Market Street
San Francisco, CA 94103-1410 USA
Telephone 415-558-0200
Fax 415-645-4000
http://www.dolby.com

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## Product model

THIS DOCUMENTATION APPLIES TO MODEL CID1019.

## Limited warranty and warranty exclusions

THE LIMITED WARRANTY AND WARRANTY EXCLUSIONS MAY BE FOUND AT THE FOLLOWING URL: https://www.dolby.com/us/en/about/warranty-and-maintenance-policies.html

# 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

The Dolby Cinema Processor CP950 and Dolby Atmos Cinema Processor CP950A comply with the EMC requirement of EN55035 and EN55032 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 Canada CAN ICES-3 (A)/NMB-3 (A). Cet appareil de la calsse A est conforme à la norme CAN ICES-3 (A)/NMB-3 (A) 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 对干扰采取切实可行的措施.

仅适用于海拔 2000m 以下地区安全使用.

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

## Important safety instructions

**Caution:** This symbol is intended to alert the user to the presence of important safety, operating, or maintenance instructions.

**Danger:** This symbol is intended to alert the user to the presence of uninsulated "dangerous" voltage within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.

**Danger:** Do not use this apparatus near water.

**Danger:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

⚠️ **Caution:** Clean only with dry cloth.

⚠️ **Caution:** Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

⚠️ **Caution:** No naked flame sources, such as lighted candles, should be placed on the apparatus.

⚠️ **Caution:** Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

⚠️ **Caution:** Only use attachments/accessories specified by the manufacturer.

⚠️ **Caution:** Unplug this apparatus when unused for long periods of time.

⚠️ **Caution:** 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.

⚠️ **Caution:** Do not expose the apparatus to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

⚠️ **Danger:** 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.

⚠️ **Caution:** 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.

⚠️ **Caution:** This apparatus must be earthed (grounded) by connecting to a correctly wired and earthed power outlet.

⚠️ **Caution:** Ensure that your mains supply is in the correct range for the input power requirement of the unit.

⚠️ **Danger:** In order to reduce the risk of electrical shock, the power cord must be disconnected when the power supply assembly is removed.

⚠️ **Caution:** 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.

⚠️ **Caution:** 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.

⚠️ **Danger:** To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect any Ethernet port to telephone circuits.

⚠ **Caution:** 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.
- The plug must always be installed onto stripped end cords by qualified service personnel.
- The international power cord is not intended for use in North America.

⚠ **Caution:** The battery inside the unit is not replaceable, and it must be disposed with the unit according to local laws. For additional information, see Product End-Of-Life Information, which is located on this page these safety instructions.

ATTENTION: Risque d'explosion si la batterie est remplacée par un type incorrect. Mettre au rebus les batteries usagées selon les instructions.

⚠ **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.

⚠ **Danger:** ▭-N

CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

ATTENTION: Double pôle/fusible sur le neutre. Débrancher lalimentation avant lentretien.

# Product end-of-life information

|  |  |
|---|---|
| ♻ | This product is electronic equipment and should be disposed of in accordance with all applicable laws. Do not dispose as household waste. Do not dispose of the product in a fire. Please dispose of this product by taking it to your local electronic waste collection point or recycling center. For information regarding where to recycle electronic equipment, contact your local dealer. For additional information regarding Waste Electrical and Electronic Equipment (WEEE) and product disposal go to:<br><br>https://www.dolby.com/about/legal/weee-packaging-battery/ |

# Safety notices

These important safety notices are provided in English, French, German, Italian, Spanish, Swedish, and Dutch.

## Important safety notices

|  |  |
|---|---|
| GB | These units comply with safety standard EN 62368-1. 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:<br><br>• Ensure that your mains supply is in the correct range for the input power requirement of the unit.<br>• Ensure **fuses** fitted are the **correct rating and type** as marked on the unit.<br>• The unit **must be earthed** by connecting to a correctly wired and **earthed** power outlet.<br>• The **power cord** supplied with this unit must be wired as follows:<br>   • Live-Brown<br>   • Neutral-Blue<br>   • Earth-Green/Yellow |

## IMPORTANT – NOTE DE SECURITE

|  |  |
|---|---|
| F | Ces unités se conformer à la norme de sécurité EN 62368-1. 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:<br><br>• Le selecteur de tension doit être placé sur la valeur correspondante à votre alimentation réseau.<br>• Les fusibles doivent correspondre à la valeur indiquée sur le materiel.<br>• Le materiel doit être correctement relié à la terre.<br>• Le cordon secteur livré avec le materiel doit être câblé de la manière suivante:<br>   • Phase-Brun<br>   • Neutre-Bleu<br>   • Terre-Vert/Jaune |

## WICHTIGER SICHERHEITSHINWEIS

| | |
|---|---|
| (D) | Diese Geräte erfüllen die Sicherheitsnorm EN 62368-1. 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: <br><br> • Der Spannungswähler muß auf Ihre Netzspannung eingestellt sein. <br> • Die Sicherungen müssen in Typ und Stromwert mit den Angaben auf dem Gerät übereinstimmen. <br> • Die Erdung des Gerätes muß über eine geerdete Steckdose gewährleistet sein. <br> • Das mitgelieferte Netzkabel muß wie folgt verdrahtet werden: <br><br>     • Phase-braun <br>     • Nulleiter-blau <br>     • Erde-grün/gelb |

## NORME DI SICUREZZA – IMPORTANTE

| | |
|---|---|
| (I) | Queste unità sono costruiti a norma di sicurezza EN 62368-1. 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: <br><br> • Assicurarsi che il selettore di cambio tensione sia posizionato sul valore corretto. <br> • Assicurarsi che la portata ed il tipo di fusibili siano quelli prescritti dalla casa costruttrice. <br> • L'apparecchiatura deve avere un collegamento di messa a terra ben eseguito; anche la connessione rete deve avere un collegamento a terra. <br> • Il cavo di alimentazione a corredo dell'apparecchiatura deve essere collegato come segue: <br><br>     • Filo tensione-Marrone <br>     • Neutro-Blu <br>     • Massa-Verde/Giallo |

## AVISO IMPORTANTE DE SEGURIDAD

| | |
|---|---|
| (E) | Estas unidades cumplen con la norma de seguridad EN 62368-1. 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: <br><br> • Asegúrese que el selector de tensión esté ajustado a la tensión correcta para su alimentación. <br> • Asegúrese que los fusibles colocados son del tipo y valor correctos, tal como se marca en la unidad. <br> • La unidad debe ser puesta a tierra, conectándola a un conector de red correctamente cableado y puesto a tierra. <br> • El cable de red suministrado con esta unidad, debe ser cableado como sigue: <br><br>     • Vivo-Marrón <br>     • Neutro-Azul <br>     • Tierra-Verde/Amarillo |

## VIKTIGA SÄKERHETSÅTGÄRDER!

| | |
|---|---|
| (S) | Dessa enheter uppfyller säkerhetsstandarden EN 62368-1. 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

## BELANGRIJK VEILIGHEIDS-VOORSCHRIFT:

| | |
|---|---|
| (NL) | Deze eenheden voldoen aan de EN 62368-1. 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

# Contents

1

# Introduction to the Dolby Cinema Processor CP950 and Dolby Atmos Cinema Processor CP950A

The Dolby CP950 and CP950A are the next generation cinema processors from Dolby Laboratories, which continues its leadership in the development of innovative cinema technologies. The Dolby CP950 and CP950A feature modular designs that enable ease of maintenance and future upgrades. The Dolby CP950 and CP950A support multichannel pulse code modulation (PCM), Dolby Digital, Dolby Digital Plus, Dolby E, and Dolby TrueHD. The CP950 is designed for use in 5.1 or Dolby Surround 7.1 auditoriums or spaces. The CP950A supports Dolby Atmos when the required enablement (license) is installed. Dolby Atmos vastly expands the palette for content creators and enhances the audience experience in cinematic presentations. You can upgrade a CP950 to a CP950A by purchasing part number CP950-UPG from Dolby. This upgrade includes a CAT1710 Media Block and a CAT1741 Power Supply. In addition, to perform this upgrade, you must purchase a Dolby Atmos enablement for the CAT1710.

- About this documentation
- Dolby CP950 and CP950A front panels
- Dolby CP950 and CP950A rear panels
- Contacting Dolby

## 1.1 About this documentation

This documentation shows you how to install and operate a Dolby CP950 and CP950A.

With the Dolby CP950 and CP950A, 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
- Compatible servers supplied by any party other than Dolby

The Dolby CP950 and CP950A provide the following audio input connectors:

- 8 × Audio Engineering Society (AES) 16-channel digital AES3 audio input
- High-Definition Multimedia Interface (HDMI) input
- Stereo nonsync inputs (RCA)
- Microphone input (XLR)
- Two 1 × AES BNC input connectors
- CAT1710 media block board with Dolby Atmos Input Ethernet port (included only with CP950A).

The Dolby CP950 and CP950A provide the following audio output connectors:

- Dolby Atmos Connect output using either AES67 or BLU Link protocols

    16-channel digital on the CP950
    64-channel digital on the CP950A

- 16-channel analog audio outputs

    The analog audio outputs are balanced TASCAM female DB25 connectors.
- Hearing impaired (HI) and visually impaired (VI) analog output channels (RCA)
- HDMI repeater output

> 📄 **Note:** You can mix analog and digital outputs on the CP950 or CP950A. The maximum number of output channels cannot be exceeded. The CP950 supports 16 channels and the CP950A supports 64 channels.

The Dolby CP950/CP950A Ethernet port supports IPv4. You can use this port for automation and control through a web browser interface. To control automation from a Dolby Digital Cinema playback system or a device supplied by any party other than Dolby, you can use the Ethernet or serial interface. Ethernet supports SOAP web services and American Standard Code for Information Interchange (ASCII) commands. The RS232 serial interface also supports ASCII commands.

You can configure the Dolby CP950/CP950A with macros that accept audio using the system inputs. An independently adjustable global audio delay is assigned to each macro to ensure that sound and picture are perfectly synchronized. You can assign unique delays to different macros using the same input. This provides flexibility for alternative content sources, which often require different delays.

The Dolby CP950 and CP950A utilize high-resolution multiple-rate equalization (EQ) for all channels. You can perform the setup manually using the Dolby CP950/CP950A web client user interface (UI) through the standard one-third octave EQ (internal real-time analyzer). Advanced users can run the automatic EQ process in Dolby Atmos Designer (DAD) v3.3.x or later software. You can download the current version of DAD software by clicking **downloads** in the Dolby CP950/CP950A web client. Authorized users can download the current version of DAD software, release notes, and manual at https://customer.dolby.com. You can also access the DAD manual in the DAD software **Help** menu.

You can back up Dolby CP950/CP950A settings to a personal computer (PC) and restore the backup to another Dolby CP950/CP950A if you experience a hardware or software failure. This minimizes the need for additional calibration after repairs or unit replacement.

If you are using a Dolby CP950 or CP950A to replace another cinema processor (for example, a Dolby CP850, CP750, CP650, or a cinema processor supplied by any party other than Dolby), re-equalizing the room with a Dolby CP950 or CP950A is required.

## 1.2 Dolby CP950 and CP950A front panels

The Dolby CP950 and CP950A front panels provide a touch-screen user interface (FPUI) and other components that enable local control of the unit. The Dolby CP950 and CP950A front panel hardware is similar. However, the LED light indicators and VU meters are different.

*Figure 1: Dolby CP950/CP950A front panel*
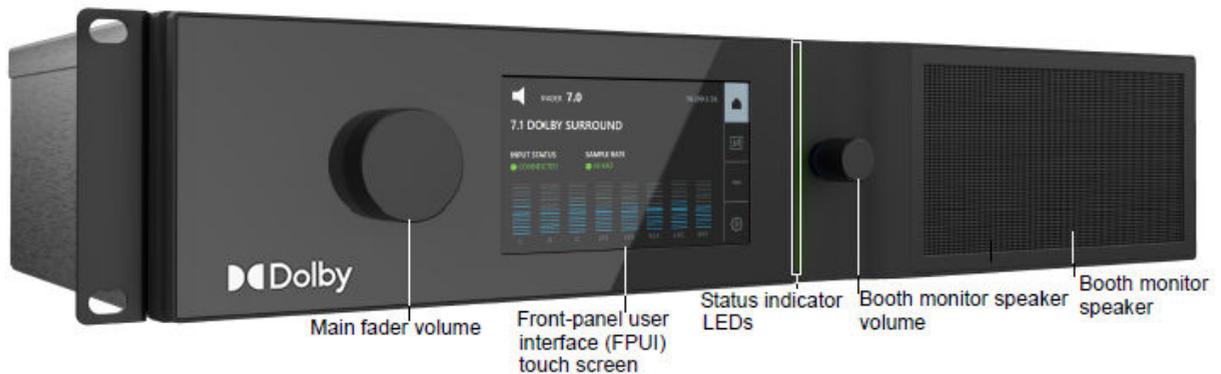


### 1.2.1 Front panel UI touch screen

Pressing soft buttons on this front-panel user interface enables you to set up the network, mute/unmute the fader (by clicking the speaker icon), activate macros, configure and view system settings, and view the technical support contacts and other information.

The following figure shows the FPUI home screen, which displays the menu bar buttons, mute/unmute control, fader level, current Internet Protocol address (IP address), a highlighted USB icon when a USB device is inserted (grayed out if no USB inserted), active macro, input status, sample rate, audio meter, and for the CP950A, Dolby Atmos status.

*Figure 2: CP950 FPUI home screen*
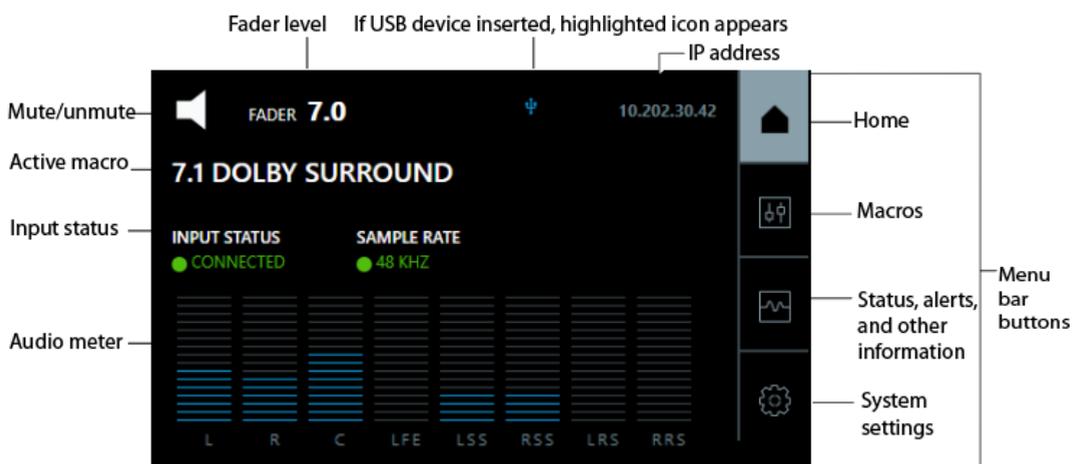
*Figure 3: CP950A FPUI home screen with Dolby Atmos active*
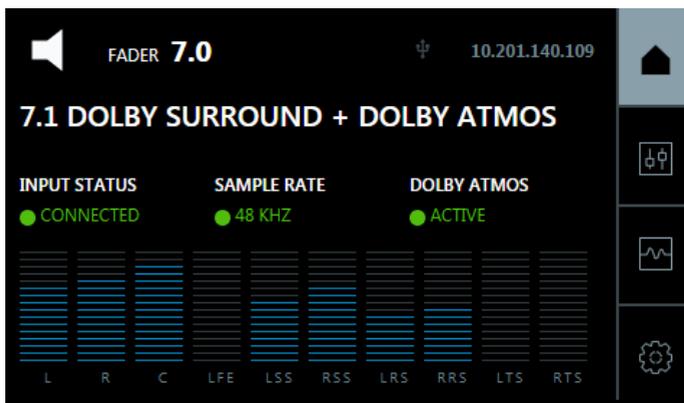


📄 **Note:** You can remove the IP address from this screen through a setting in the web client **preferences** screen, as described in Section 3.5.

## Input status display

If the currently active macro specifies AES3 inputs, the input status displays as follows:

- **Connected** indicates that all expected digital input signals are locked (illuminated in green).
- **Disconnected** indicates that one or more expected digital inputs are not locked (illuminated in red).
- **Check Cables** indicates that one or more expected digital inputs are dropping out intermittently or missing. If the signal is currently bad, the indicator is red. If the signal returns, the indicator turns yellow for a few seconds to allow you to read the error message.

If the currently active macro specifies HDMI inputs, the input status displays as follows:

- **Connected** indicates that the system detects an HDMI connection (illuminated in green).
- **Disconnected** indicates that the system does not detect an HDMI connection (illuminated in red).

If the currently active macro does not specify AES3 inputs or HDMI (as applicable for non-sync and microphone), the input status displays **N/A**.

## Macro display and activation

To display and activate a macro:

1. Press the **macro** button in the menu bar to display a scrollable list of available macros, and then locate and press the macro you want to activate. The current macro is highlighted in green.

*Figure 4: Press macro button on CP950*

*Figure 5: Press macro button on CP950A*
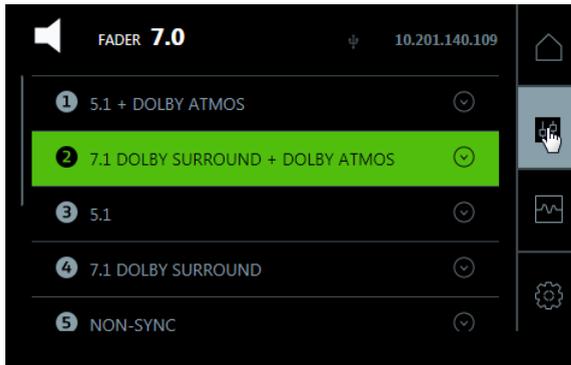


A dialog box appears with two options, **ACTIVATE** and **DETAILS**.

*Figure 6: Activate and details screen*
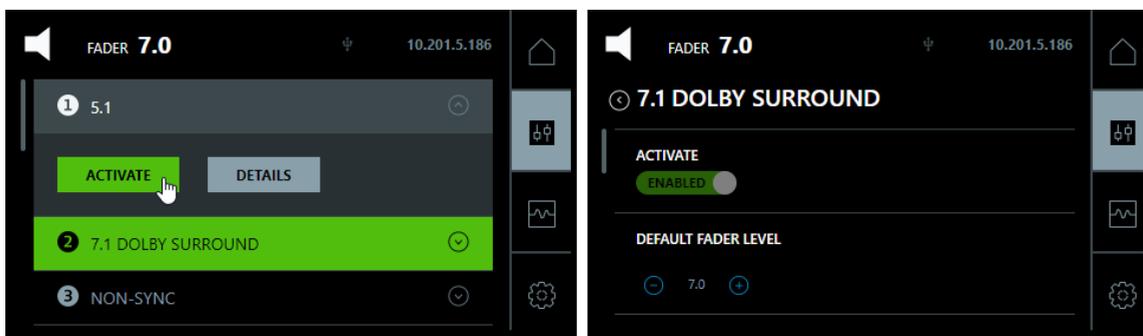


2.  Press **ACTIVATE** to enable the selected macro. Press **DETAILS** to view the parameters for the selected macro. You can set the default fader level when the macro is **ENABLED**.

## Information display

To display alerts, input status, bitstream information, system status, and support contacts, press the **information** button, and then press the desired item, as shown in the following figure.

*Figure 7: System information*
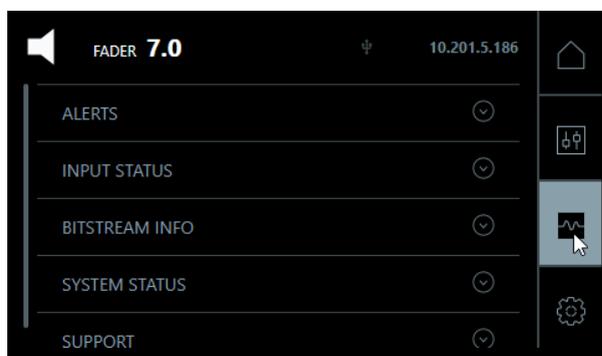


## Alerts

Displays any active system alerts. In some cases, you can suppress these alerts, while higher-priority alerts cannot be suppressed. Additional information may be available in the CP950/CP950A web client user interface.

## Input status for HDMI and 8 × AES

Displays current connected input status.

### Bitstream info

If the selected macro uses a digital input, the system displays the relevant bitstream information. If the selected macro uses a coded digital input (Dolby Digital, Dolby Digital Plus, and so on), the system displays the relevant bitstream information.

### System status

Displays the current temperature of the power supply and CAT1700 main board and the current revolutions per minute (RPMs) of the fans. On a CP950A, the temperature and fan information for the CAT1710 Media Block is also displayed.

### Support

Displays contact information for Dolby Cinema Solutions and Support.

### System settings display and configuration

To configure and display device tools, command network settings, and other device information, press the **system settings** button, and then press the desired item.

*Figure 8: System settings*
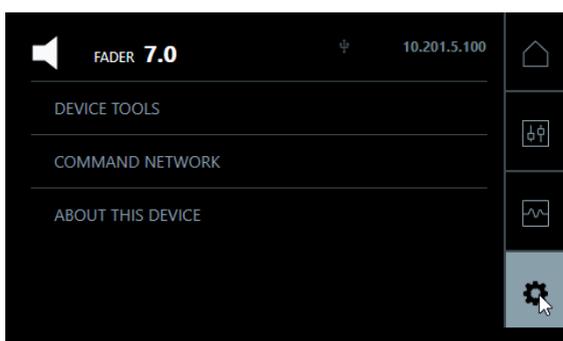


### Device tools

Allows you to change the output of the booth monitor. The default is L,C,R (mixed together). Center channel bypass routes all of the center channel audio to the left and right speakers in the auditorium. This is helpful if there is a bad speaker component in the center channel. In addition, you can activate phantom power for the XLR microphone input, reboot the unit, and enable/disable Dolby Atmos on a CP950A.

### Command network

Allows you to change the **COMMAND** Ethernet port configuration. The **COMMAND** port default IP address is 192.168.1.151. The default subnet mask is 255.255.255.128.

### About this device

This screen displays information regarding the CP950/CP950A, including host name, hardware and software versions, serial numbers, and installation date.

**Related information**

## 1.2.2 Main volume (fader) knob

This large knob on the left side of the front panel allows you to control the auditorium sound level. A fader setting of 7.0 is the normal 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.

The following figure shows the characteristic graph.

*Figure 9: Fader characteristic*
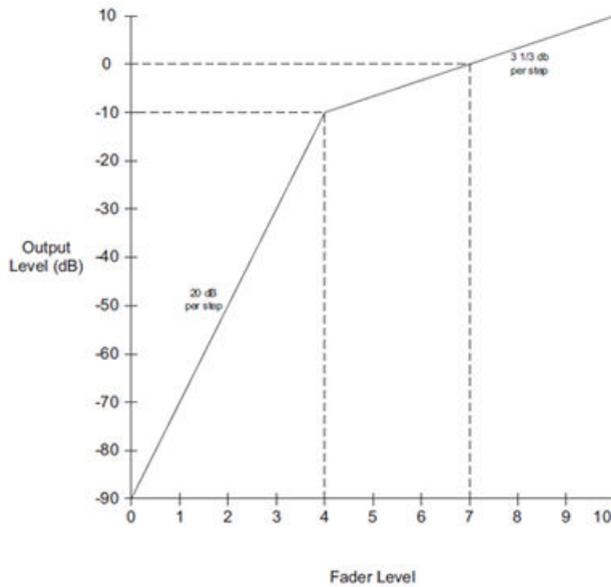


## 1.2.3 Booth monitor speaker

With this front-panel speaker, you can monitor the audio on any active input or speaker channel. The speaker channels are sampled prior to speaker crossovers or the LCR downmix (which mixes Left, Center, and Right channels). The speaker channel is attenuated by 10 dB. Input sampling is not supported with macros that support encoded audio.

The LCR downmix is the default option, which you can change in the FPUI or web UI .

## 1.2.4 Booth monitor speaker volume

With this smaller right-side volume knob, you can adjust the booth monitor speaker volume. The volume range is from 0.0 to 10.0. The speaker fader knob rotates continuously with no end stops. The booth monitor speaker volume defaults to the lowest setting (silent) each time you start up the system. The system does not support automation or remote control of the booth monitor speaker fader.

## 1.2.5 Status indicator LEDs

There are four LEDs on the right side of the FPUI. All of these LEDs illuminate at the same time in a specific color, depending upon the power state.

*Table 1: Power indicator LEDs*

| Color | State |
|---|---|
| Flashes yellow once or twice, and then solid yellow | Unit is powering up but not operating (booting). |
| Solid red | Unit is powered but not operating (fatal error). |
| Solid green | Unit is playing PCM content. |
| Solid blue | Unit is playing Dolby Atmos content. |
| Solid yellow | Unit is powered but there is an error or alert. |

## 1.3 Dolby CP950 and CP950A rear panels

The following figures show the Dolby CP950 and CP950A rear-panel components.

*Figure 10: CP950 and CP950A rear panels*
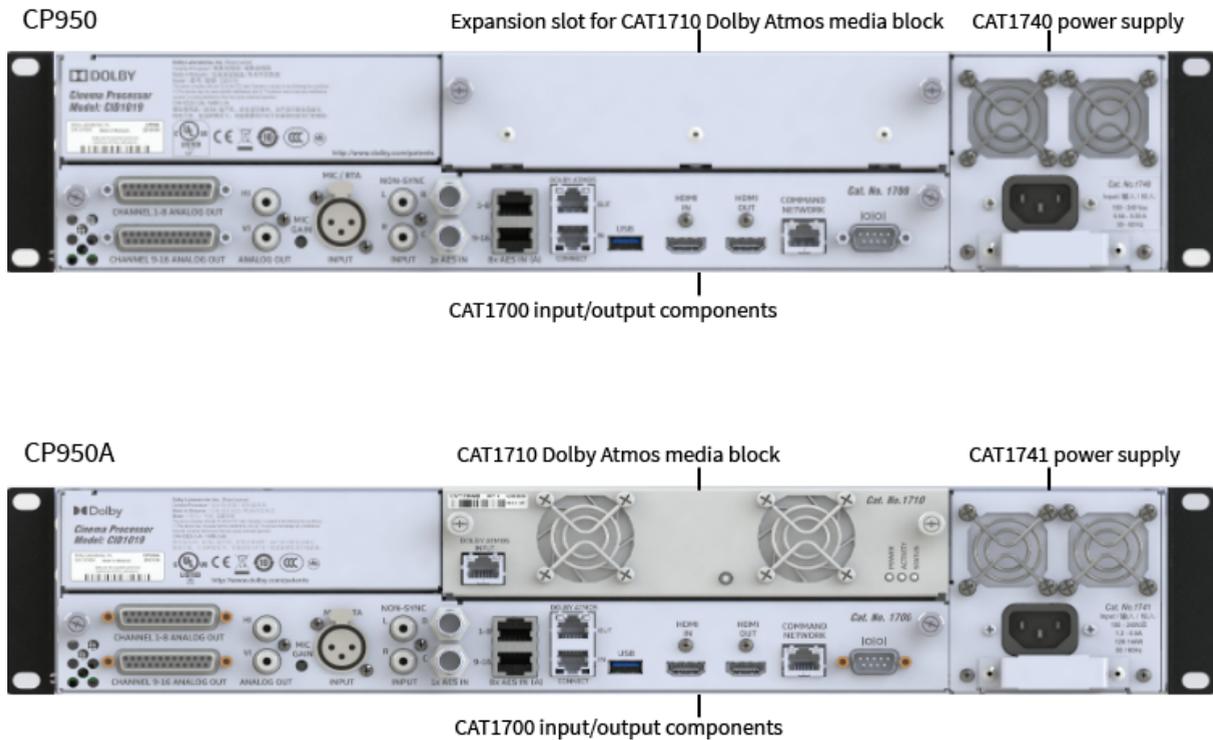


### 1.3.1 CAT1700 input and output connectors

The Dolby CP950 and CP950A receive analog and digital audio through the input connectors. The system processes audio and applies equalization. Audio output is available using the analog or digital connections or a combination of analog and digital. The CP950/CP950A input and output connectors are all located on the CAT1700 main board, except for the CP950A CAT1710 media block, which is a separate board that enables the system to receive and play back Dolby Atmos Digital Cinema Package content.

The Dolby CP950 supports a maximum of 16 channels. The CP950A supports a maximum of 64 channels. You can mix analog and digital outputs, but you cannot exceed the maximum number of channels.

- Analog audio output is transmitted via two DB25 connectors: channels 1–8 on one connector and channels 9–16 on the other connector. Both connectors are female and follow the TASCAM pinout.
- Digital audio output is transmitted via the **Dolby Atmos Connect** ports. These RJ45 Ethernet connectors support audio in either AES67 or BLU Link protocols. The system can use only one Dolby Atmos connect protocol at a time. Mixing AES67 and BLU Link devices on the same network is not possible.

⚠ **Warning:** To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect any RJ45 ports to telephone circuits.

Installing a Dolby CP950 is similar to a Dolby CP750 installation. You can choose between the following default room configurations in the web client user interface.

- 5.1, all analog outputs
- 5.1, all digital outputs (AES67 or BLU Link)
- 7.1, all analog outputs
- 7.1, all digital outputs (AES67 or BLU Link)

When using these default room configurations, the system uses full-range audio to feed external amplifiers or crossovers. If needed, you can use Dolby Atmos Designer software, version 3.3.9 or later, to create more advanced 5.1 or 7.1 room configurations. This includes the use of internal crossover filters and changing the routing parameters to use both analog and digital outputs (which cannot exceed 16 channels on CP950).

Installing a CP950A is similar to a CP850 installation, where you use Dolby Atmos Designer software to create a room configuration with up to 64 channels.

⚠️ **Caution:** You can use all digital channels, or all analog channels, or a mix of analog and digital channels, but you cannot exceed 16 channels of output on a CP950 or 64 channels of output on a CP950A. In addition, if you use crossovers, you cannot split the output of a speaker between analog and digital. For example, if the left speaker is three way, all outputs must be of the same type.

Following is a description of the Dolby CP950/CP950A CAT1700 input/output (I/O) components, from left to right.

## Channels 1-8 analog out/Channels 9-16 analog out

These 25-pin female Tascam output D-connectors can provide up to 16 channels of balanced analog audio output.

## Hearing Impaired (HI) connector

This is an unbalanced analog RCA connector with a 200 mV reference level and 100 Ω output impedance.

You can use this RCA analog audio output for HI, or for any input selectable in the macro editor, although the standard usage is for HI output. By default, the system routes AES channel 7 from a digital cinema playback system to this output. Audio is heard only when activity is present on AES channel 7. You can configure routing to this output using the web client **macro editor**. Changing the AES assignment for channel 7 to **not used** changes the system so that it generates a mix of Left, Center, and Right channels, which is sent to the HI connector. This is useful if you play content that does not have a dedicated HI track (trailers or advertising). You can also enable audio delay changes for the **8× AES IN** connector using the **macro editor**. This can help you to accurately synchronize the HI audio with the auditorium sound when the HI audio is routed through an external device with different audio-delay requirements. Similarly, in the **macro editor** you can use the **HI** output as a more generic analog output by clicking the **analog output selection** tab, selecting the **Analog Output A / HI**, configuration, and unchecking the **Auto** checkbox in the **configure analog output** screen. For more information on this option, see Section 3.2.7. (A link is provided at the end of this section.)

## Visually Impaired (VI) connector

This is an unbalanced analog RCA connector with a 200 mV reference level and 100 Ω output impedance.

You can use this RCA analog audio output for VI narration, or for any input selectable in the macro editor, although the standard usage is for VI output. By default, the system routes AES channel 8 from a digital cinema playback system to this output. Audio is heard only when activity is present on AES channel 8. You can configure routing to this channel using the web client **macro editor**. You can also enable audio delay changes for the **8× AES IN** connector using the **macro editor**. This can help you to accurately synchronize the visually impaired narration audio with the auditorium sound when the VI audio is routed through an external device with different audio-delay requirements. Similarly, in the **macro editor** you can use the **VI** output as a more generic analog output by clicking the **analog output selection** tab, selecting the **Analog Output B / VI**, configuration, and unchecking the **Auto** checkbox in the **configure analog output** screen. For more information on this option, see Section 3.2.7. (A link is provided at the end of this section.)

## Microphone or real-time analyzer input

This is an XLR connector with a standard pinout, 10 kW differential input impedance, 48 V available phantom power, and adjustable gain.

This **MIC / RTA** XLR connector allows you to connect and use a microphone with the Dolby CP950/CP950A for public address announcements. You can also use this connector with a microphone for calibration when using the internal Dolby CP950/CP950A real-time analyzer (RTA).

**Note:** When using the internal RTA, you must not use the **microphone** macro. Feedback could damage the speakers.

**Note:** Some microphones require phantom power (+48 V), which you can enable or disable in the Dolby CP950/CP950A web client or FPUI. You must validate that the phantom power selection of the macro matches that of your microphone before using this connector, otherwise you can cause irreparable damage to your microphone.

### Microphone (MIC) gain

This multiple-turn trimpot allows you to make gross adjustments to the gain of the microphone preamp if there is too much or too little volume in the auditorium. You can also use this trimpot when configuring the internal RTA to adjust the microphone gain for the proper range in the web client **equalization** RTA screen.

### Non-sync input connectors

The non-sync unbalanced input allows connection to a two-channel analog source via the two RCA jacks labeled **L** and **R**. While it is meant for connecting to a consumer line-level audio source (-10 dBu, nominal), it also can accept higher-level sources. The non-sync analog input level gain adjustment of +/-16 dB is accessible through the web client **macro editor**. You can use this adjustment to accommodate a wide range of source levels. You can add surround processing to upmix the signal to 5.1 or higher.

### 1x AES IN connectors (AES3)

Two BNC connectors accommodate PCM audio at 96, 48, 44.1, and 32 kHz (at 16, 20, and 24 bits), and Dolby Digital and Dolby Digital Plus at all data rates and sample rates. These inputs are 75 ohms with a nominal peak-to-peak signal level of 1 volt. You can use the BNC B for BLU Link word clock synchronization. The word clock is nominally a TTL from a 75 ohm source consisting of timed pulses (at the sampling frequency) that the system uses to synchronize with other connected devices.

### 8x AES IN ports

These are AES72 Type 1M RJ45 ports with a 110 Ω termination.

These RJ45 ports can receive eight AES3 digital audio AES (Audio Engineering Society)/EBU(European Broadcasting Union) streams (two channels per stream providing a total of 16 input channels). The eight AES3 input signals must be time aligned with each other.

This connector can be used in three different ways, which you can configure in the CP950/CP950A web client macro editor.

- When you configure a macro to use the **16ch MediaBlock** input, the CP950/CP950A accepts PCM audio at 48 kHz and 96 kHz. Typically, the **16ch MediaBlock** input is used when connecting to the main audio output on a digital cinema playback system.
- When you configure the macro to use the **16ch AES Digital** input, the CP950/CP950A accepts Dolby Digital, Dolby Digital Plus, Dolby E, or PCM audio at 32, 48, 96, or 44.1 kHz sample rates. The decoding of coded audio (Dolby Digital or Dolby E) is restricted to the first AES3 channel pair. This connector has a floating ground. Typically, the **16ch AES Digital** input is used when connecting to consumer playback equipment.
- When you configure the macro to use the **16ch MediaBlock + Dolby Atmos** input (CP950A only), the CP950A accepts PCM audio at 48 kHz and plays back Dolby Atmos when available. Typically, the **16ch MediaBlock + Dolby Atmos** input is used when connecting to the main audio output on a Dolby Atmos enabled digital cinema playback system.

### Dolby Atmos Connect In and Out ports

These two RJ45 Ethernet ports can transmit up to 16 channels (for a CP950) or 64 channels (for a CP950A) of AES67 audio to a Dolby Multichannel Amplifier, Dolby Atmos Connect Interface DAC3202, or another compatible device. BLU Link is also supported.

### USB port

You can use the Dolby CP950/CP950A Universal Serial Bus (USB) port to perform specific functions by inserting a USB storage device (flash drive) that contains a specifically named file or folder in the root of the USB device. Supported file systems are file allocation table (FAT) and FAT32. USB version 3.0 devices are supported, but older USB devices may also function correctly. Mechanical hard drives are not supported, as these devices draw more power than the Dolby CP950/CP950A USB port can provide. Do not use the USB port during normal operations. By doing so, audio playback can be interrupted for a short time. For more detailed information, see Section 2.12.

(A link is provided at the end of this section.)

### HDMI In and Out connectors

The Dolby CP950/CP950A includes one HDMI input port and one HDMI output port for use with alternative content. These ports support HDMI 2.0 and high-bandwidth digital content protection (HDCP) 2.2. In cases where older playback equipment may not work well with HDMI 2.0, there is a setting in the web client **macro editor** that allows you to select HDMI 1.4. For more information, see Section 3.2.

(A link is provided at the end of this section.)

The Dolby CP950/CP950A pass the selected HDMI input video data to the HDMI output connector. Note that if a device (if any) is connected to the HDMI output connector, it will limit the options available to the source device; for example, if a projector connected to the HDMI output supports only HDMI 1.0, you cannot play Doby TrueHD audio and are limited to stereo output.

### Command Network port

This Gigabit Ethernet port connects the Dolby CP950/CP950A to a Dolby Digital Cinema auditorium network. You use this port to access the web client and for automation commands from digital cinema playback systems or other automation devices. The default port that is used for ASCII commands through the Ethernet Telenet protocol is 61408. IPV6 is not supported on this interface.

### RS-232 serial port

You can use this 9-pin port for serial control using ASCII string commands. It uses a D-subminiature DB9 data terminal equipment (DTE) male connector. Use a crossover cable to communicate with another DTE device, such as a PC.

The equipment connected to this port should have its serial port set to 9,600 baud, no parity, one stop bit. For more information and supported commands, see Section 10.2.

(A link is provided at the end of this section.)

**Related information**

## 1.3.2 CP950A CAT1710 media block board

The CAT1710 is a media block board in a CP950A. This board expands the capabilities of a CP950 from 16 channels to 64 channels and can decrypt and render Dolby Atmos content. Use of a CAT1710 requires a CAT1741 power supply and the loading of an enablement (license) to unlock Dolby Atmos playback. The board uses two fans for cooling and includes an advanced battery circuit to maintain its secure identity when powered off. One of the batteries on the card is rechargeable and can operate while on the shelf for approximately 24 months. When placed in a CP950A, you can fully recharge the battery after 72 hours of continuous power. The second battery is nonrechargeable and can maintain the secure identity for over 10

years. This battery takes over when the rechargeable cell is depleted. We recommend recharging any spare CAT1710 battery that is on the shelf every 18 months to provide for the longest lifespan possible. The batteries are soldered in and cannot be replaced in the field. The CAT1710 media block board contains a **Dolby Atmos Input** Ethernet port. This port is used with some digital cinema playback installations to transport Dolby Atmos content from the playback system to the audio processor. Other playback installations do not use this port and instead transfer Dolby Atmos content over the **command**/**auditorium** network.

This board contains three LED indicators (**POWER**, **ACTIVITY**, and **STATUS**).

These LEDs illuminate to indicate their current state as follows:

*Table 2: CP950A CAT1741 LED indicators LEDs*

| LED | Color | State |
| --- | --- | --- |
| **POWER** | Amber | Booting |
| | Green | Booted successfully |
| | Red | Problem: Stop using the unit. (power down, reseat the unit and try again. If the problem persists, contact support). |
| **ACTIVITY** | Amber | Booting |
| | Green or intermittently flashing green | Booted successfully and running OK |
| **STATUS** (security) | Amber | Booting |
| | Green | Booted successfully |
| | Red | Security error, such as tamper or security processor error. Unit cannot play Dolby Atmos. |

### 1.3.3 CAT1740 and CAT1741 AC input

The CP950 uses a CAT1740 power supply module to supply power to the unit. The input is a simple unswitched IEC power inlet module that is typically used in computers. The CAT1740 power supply supports 100-240 VAC and draws 0.64-0.30 Amps. The CAT1740 supports alternating current frequency between 50-60 Hz. If needed, a CAT1741 could power a regular CP950. The CP950A uses a CAT1741 power supply module to supply power to the unit. The input is a simple unswitched IEC power inlet module that is typically used in computers. The CAT1741 power supply supports 100-240 VAC and draws 1.2-0.6 Amps. The CAT1741 supports alternating current frequency between 50-60 Hz. The CAT1741 is the only power supply that works with a CP950A. You cannot use a CAT1740 in a CP950A.

## 1.4 Contacting Dolby

You can contact Dolby Cinema Solutions and Support using email or regional telephone numbers. You can also access documentation by visiting the Dolby customer portal.

**Contact Dolby Cinema Solutions and Support**

- Send an email to cinemasupport@dolby.com.
- Call:

    AMERICAS: +1-415-645-4900
    ASIA, CHINA, and PACIFIC RIM: +86-400-8**10-5850**
    EMEA: +44-33-0808-7700
    JAPAN: +81-3-4520-9798

## Access documentation

Visit https://customer.dolby.com.

## Submit feedback about this documentation

Send an email to documentation@dolby.com.

2

# Installing the Dolby CP950 or CP950A in a Dolby Digital Cinema network

Authorized technicians can install the Dolby CP950/CP950A in a Dolby Digital Cinema. The installation process requires a hardware setup and network configuration.

- Dolby CP950/CP950A packing kit
- Mounting the Dolby CP950 or Dolby CP950A
- Mains power wiring
- Connecting cables
- Dolby CP950 and CP950A wiring diagrams
- Connecting the Dolby CP950 or CP950A to the auditorium (command) network
- Connecting the Dolby CP950 and CP950A to a Dolby Digital Cinema playback system
- Connecting amplifiers
- Updating and configuring the playback system
- Starting up the Dolby CP950/CP950A
- Configuring the network settings
- Performing USB functions
- Logging in with SSH for basic administration functions

## 2.1 Dolby CP950/CP950A packing kit

The Dolby CP950/CP950A packing list identifies the additional components that ship with the system.

The Dolby CP950/CP950A ships with these components:

- North America power cable
- International power cable (nonterminated)
- China (CCC) power cable
- India power cable
- Unpinned RJ45/DB25 adapter (for older media blocks with DB25 audio connectors)
- Potentiometer trimmer tool for microphone gain
- *Dolby CP950/CP950A Quick Start Guide*

## 2.2 Mounting the Dolby CP950 or Dolby CP950A

To avoid heat and hum problems, do not mount the Dolby CP950/CP950A immediately above or below power amplifiers. Always leave a 1U space (43 mm, or 1.75 inch) above and below the Dolby CP950/CP950A to provide adequate ventilation. Install an air guide or baffle to deflect any hot air coming from equipment below the Dolby CP950/CP950A.

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

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

*Figure 11: Star washers and rack-mounting screws*
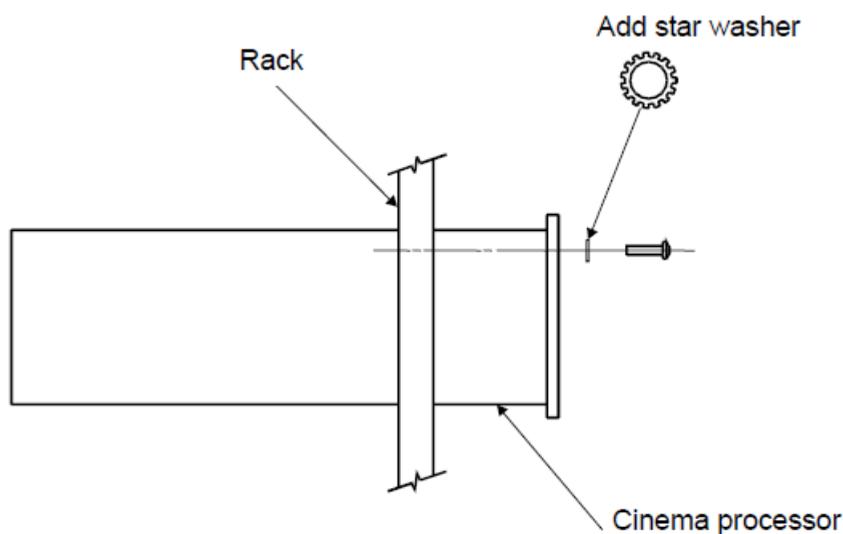


⚠ **Caution:** The mains power disconnect device for this unit is the plug-in mains cord rather than a power switch. The mains cord must remain readily accessible for disconnecting mains power.

⚠ **Caution:** This apparatus must be earthed (grounded) by connecting to a correctly wired and earthed power outlet.

⚠ **Caution:** To ensure proper ventilation, do not block the Dolby CP950/CP950A ventilation cutouts on the right side of the unit. In addition, do not block the rear-panel fans or the air flow exiting the rear section of the unit.

*Figure 12: Ventilation cutout locations*



## 2.3 Mains power wiring

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:

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

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:

- 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.
- The plug must only be installed onto stripped end cords by qualified service personnel.
- The international power cord is not intended for use in North America.

⚠ **Caution:** This apparatus must be earthed (grounded) by connecting to a correctly wired and earthed power outlet.

⚠ **Caution:** Ensure that your mains supply is in the correct range for the input power requirement of the unit.

⚠ **Caution:** If you are uncertain about the wiring of your alternating current (AC) mains outlet, do not use it. Consult a qualified electrician.

## 2.4 Connecting cables

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

**Related information**

Pinouts for Dolby CP950 and CP950A connectors on page 147

## 2.5 Dolby CP950 and CP950A wiring diagrams

These figures show the Dolby CP950 and CP950A wiring diagrams.

*Figure 13: Dolby CP950 wiring diagram*
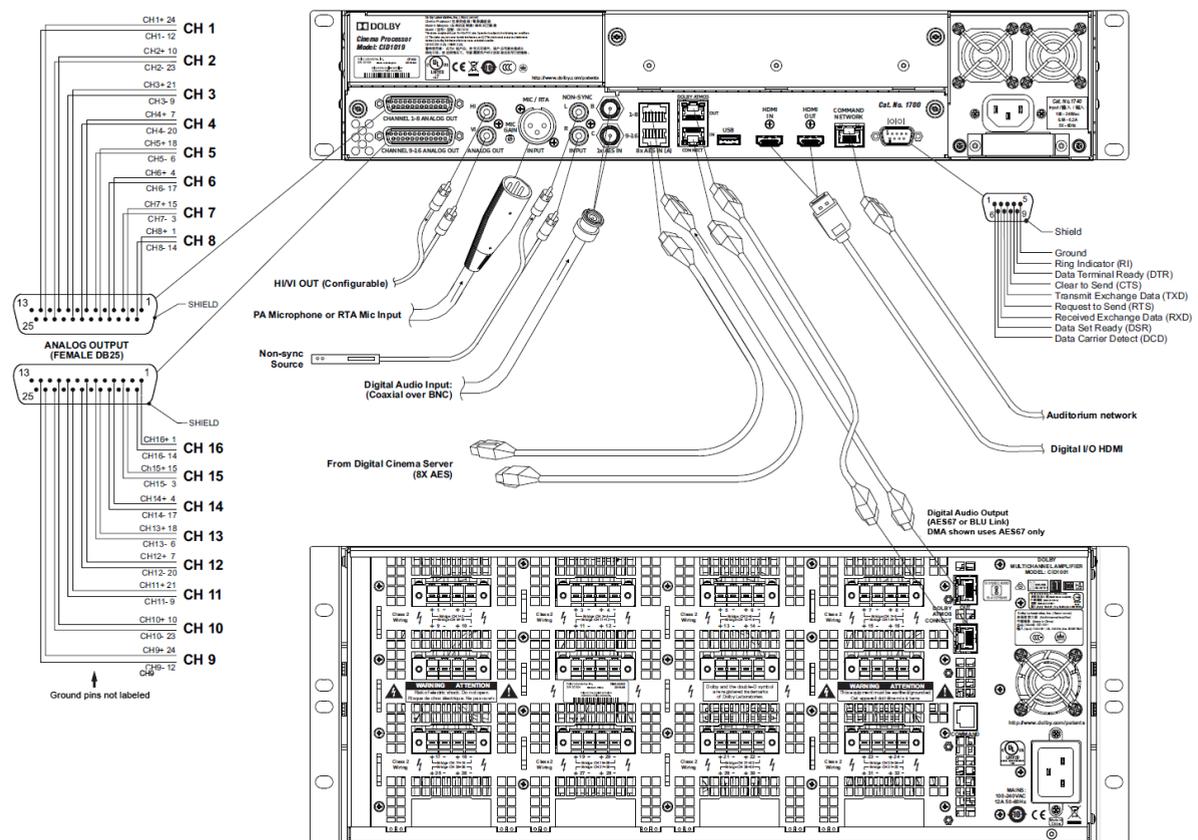
*Figure 14: CP950A wiring diagram*
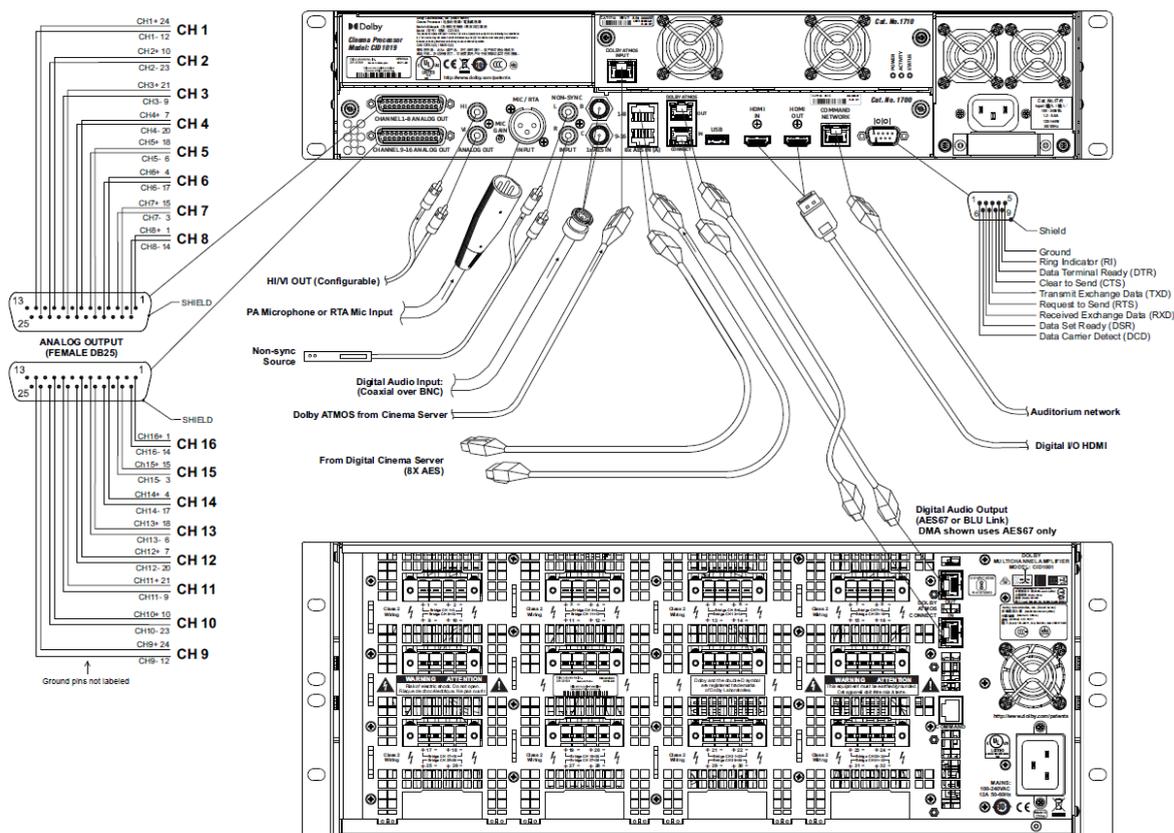


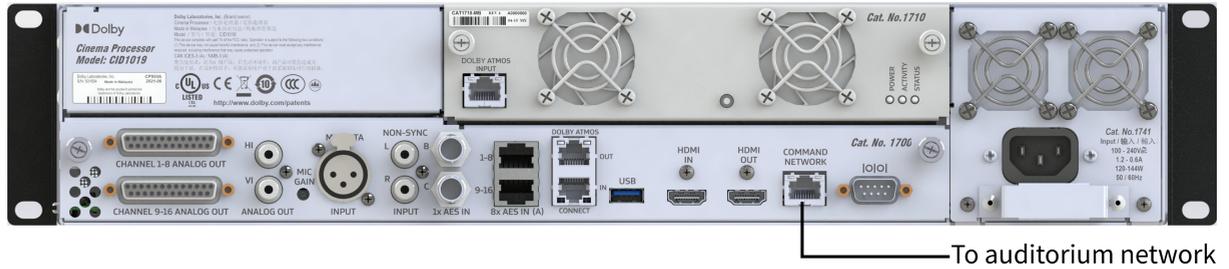## 2.6 Connecting the Dolby CP950 or CP950A to the auditorium (command) network

Use a CAT5e (or greater) Ethernet cable to connect the Dolby CP950 or CP950A rear-panel **COMMAND NETWORK** port to the auditorium network switch. In some environments, where high EMI is present, we recommend the use of shielded cables. We also recommend a 1 Gbps (1,000 mbps) network connection.

*Figure 15: Connecting Dolby CP950 to auditorium network*

*Figure 16: Connecting Dolby CP950A to auditorium network*



To auditorium network

## 2.7 Connecting the Dolby CP950 and CP950A to a Dolby Digital Cinema playback system

This section provides instructions for connecting the Dolby CP950 and CP950A to a Dolby Digital Cinema playback system. Other compatible playback systems require similar connections.

Newer systems (Dolby IMS1000, Dolby IMS2000, Dolby IMS3000, Dolby integrated media block (IMB) with Dolby ShowVault, Dolby CAT745 IMB with Dolby DSS220), output audio to the Dolby CP950/CP950A using RJ45 connecters and standard CAT5e or greater Ethernet cables.

⚠️ **Warning:** To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect the rear-panel RJ45 ports to telephone circuits.

Other systems (Dolby DSS200, Dolby DCP-2000, Dolby DCP-2K4) output audio using a DB25 connector. For these systems, you need to use the provided DB25-to-RJ45 adapter, which ships unpinned so you can pin the adapter for your requirements. Note that for a Dolby DSS200, you also need to use a female-to-female gender changer, which is not included in the other Dolby CP950/CP950A packing kits.

The following sections show you how to connect the ports between a Dolby CP950/CP950A and each Dolby Digital Cinema playback system.

**Related information**

### 2.7.1 Connecting an IMS or IMB to a Dolby CP950 or CP950A

To connect an integrated media server (IMS) or integrated media block (IMB) to a Dolby CP950/CP950A, connect the IMS or IMB AES out ports to the Dolby CP950/CP950A **8x AES INPUT** ports using CAT5e (or greater) Ethernet cables.

The Dolby IMS1000, Dolby IMS2000, Dolby IMS3000, Dolby IMB with Dolby ShowVault, and Dolby CAT745 IMB with Dolby DSS220 use the same type of connections (channels 1-8 on one Ethernet cable, channels 9-16 on another Ethernet cable). For cases where the cable distance is more than 50 feet (15 meters), we recommend that you use CAT5e shielded twisted-pair cables.

The example in the following figure shows a Dolby IMS2000 connection to a Dolby CP950.

*Figure 17: Connecting a Dolby IMS2000 to a Dolby CP950*
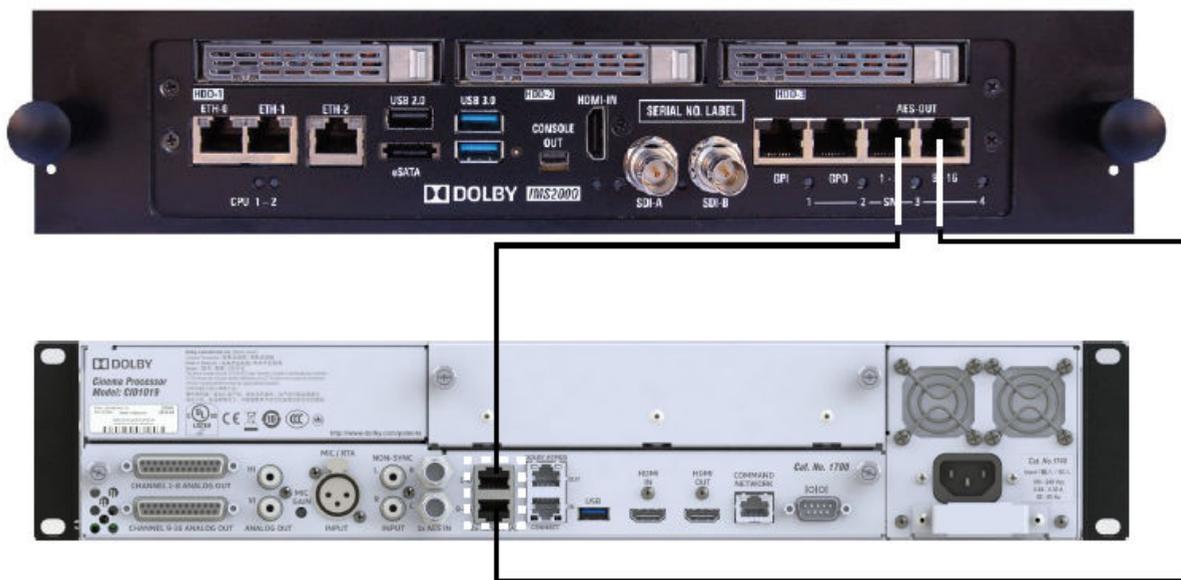


In a CP950A configuration, you can play Dolby Atmos content and a network path to the playback system is now a requirement using the **DOLBY ATMOS INPUT** port or the **COMMAND NETWORK** port. However, we recommend that you connect with the IMS2000/IMS3000 via the CP950A **COMMAND NETWORK** port. The CP950A will automatically handle Dolby Atmos traffic via either port without any special configuration.

In a CP950A, you should connect to the **DOLBY ATMOS INPUT** port only if your cinema server manufacturer explicitly requires that connection for Dolby Atmos and specifies that all other audio processor traffic (for example, automation, SNMP, and so on) should be separated.

The example in the following figure shows a Dolby IMS3000 connection to a Dolby CP950A for Dolby Atmos playback using the **DOLBY ATMOS INPUT** port.

*Figure 18: Connecting a Dolby IMS3000 to CP950A*
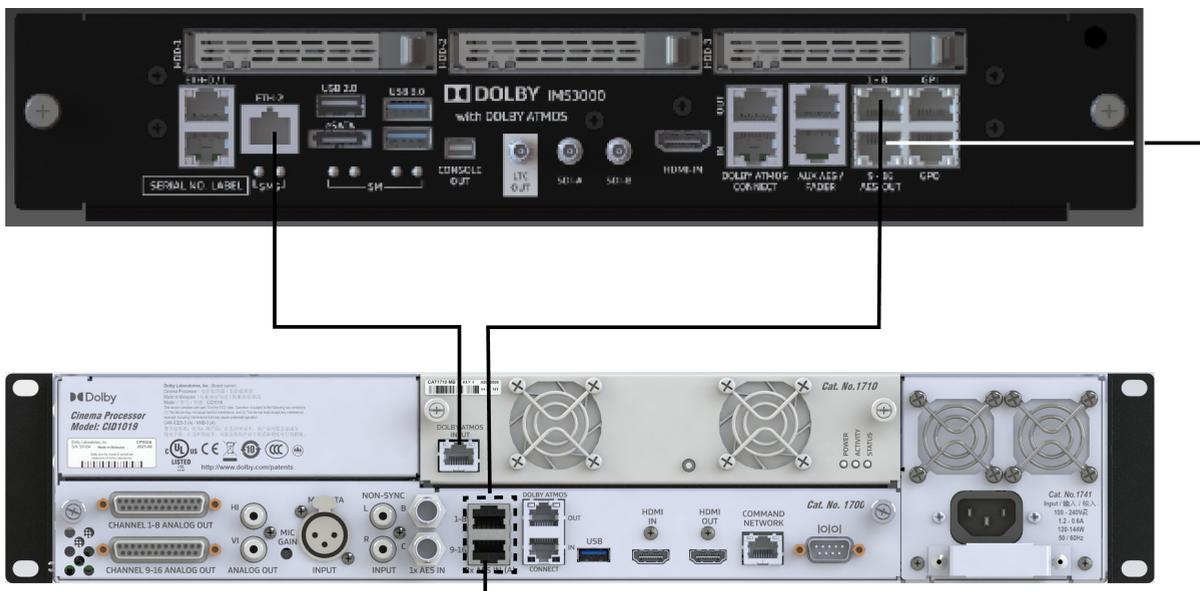
**Note:** In a CP950A configuration, you can play Dolby Atmos content. A network path to the playback system must be established using either the CP950A **COMMAND NETWORK** port or the **DOLBY ATMOS INPUT** port on the CAT1710. There are no configuration changes needed on the CP950A for an IMS or IMB to transmit Dolby Atmos audio on the **COMMAND NETWORK** port or **DOLBY ATMOS INPUT** port. The network automatically adjusts when the CP950A is added as the cinema audio processor in the IMS or IMB **Device Manager**. The previous figure shows the configuration using the **DOLBY ATMOS INPUT** port and also shows the AES output connections from the IMS3000 to the CP950A).

## 2.7.2  Connecting a Dolby DSS200 to a Dolby CP950 and CP950A

Connect the DSS200 **8x AES OUTPUT** port to the CP950 **8x AES INPUT** ports with CAT5e (or greater) Ethernet cables using the provided DB25-to-RJ45 adapter. In addition, you need to use a female-to-female gender changer between the DB25-to-RJ45 adapter and the DSS200 AES audio output port. We recommend connecting the adapter to the DSS200 and then connecting the Ethernet cables to the CP950/CP950A. Reducing the number of connections is useful in preventing electromagnetic interference (EMI). If you are connecting to a CP950A, 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 CP950A CAT1710.

The examples in the following figures show a DSS200 connection to a CP950 and DSS200 connections to a CP950A.

*Figure 19: Connecting a Dolby DSS200 to the Dolby CP950*
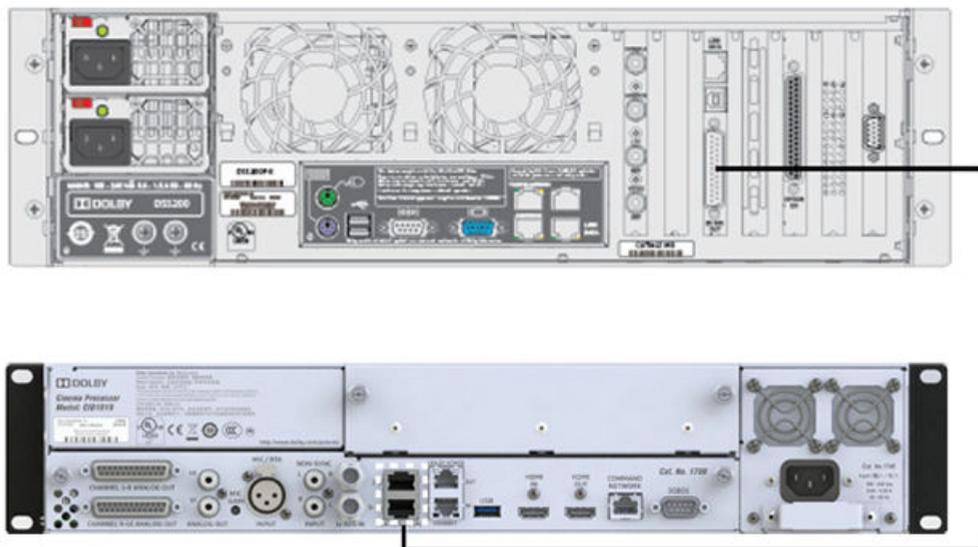
*Figure 20: Connecting a Dolby DSS200 to a Dolby CP950A*
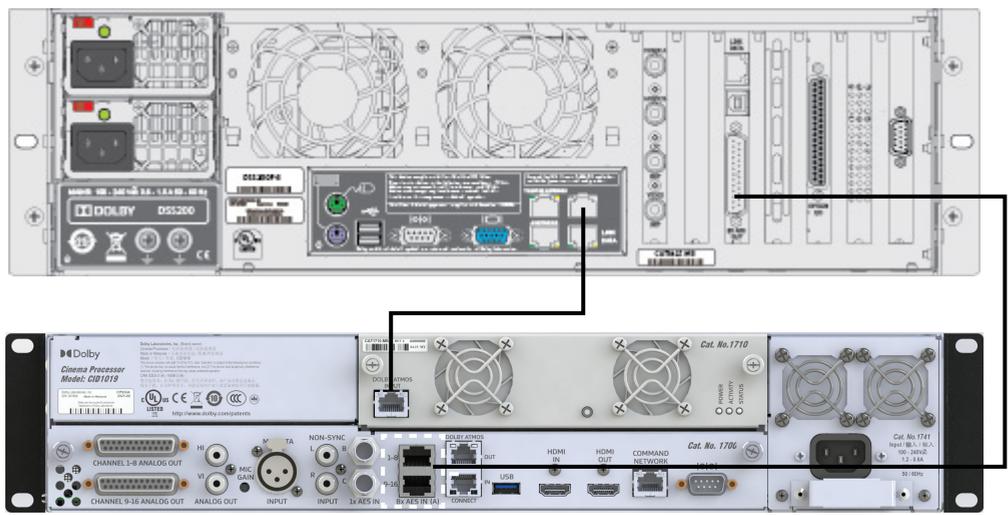


**Note:** There may be a port protector covering the DSS200 Ethernet port. In this case, insert a 3/32-inch Allen wrench into the hole in the protector, turn counterclockwise, and remove the port protector.

**Note:** Some early DSS200 playback systems have two Ethernet ports on one of the vertical cards at the right-rear side of the unit. Use the top port for a Dolby Atmos input.

**Note:** The earliest DSS200 units did not contain an available Ethernet port for connecting a Dolby Atmos input and cannot be upgraded to support a Dolby Atmos input.

**Related information**

Pinouts for Dolby CP950 and CP950A connectors on page 147

## 2.7.3 Connecting a Dolby DSS220 to the Dolby CP950A

You can play back Dolby Atmos content on a C950A by connecting a CAT5e (or greater) Ethernet cable from the **CP DATA** port on the DSS220 to the **DOLBY ATMOS INPUT** port on the CAT1710 expansion card.

*Figure 21: Connecting a Dolby DSS220 to a Dolby CP950A*
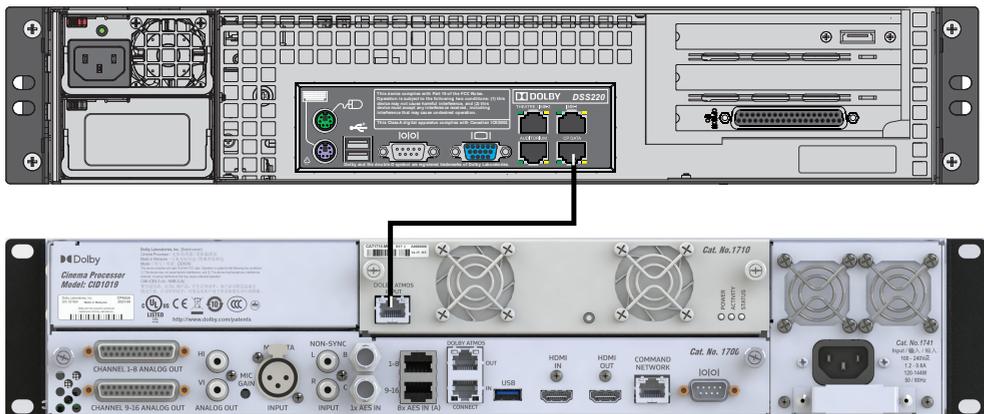
### 2.7.4  Connecting a Dolby DCP-2000 to a Dolby CP950 or CP950A

To connect the Dolby DCP-2000 to the Dolby CP950/CP950A, connect the Dolby DCP-2000 **AES** output port to the Dolby CP950/CP950A **8x AES INPUT** ports with CAT5e (or greater) Ethernet cables using the provided DB25-to-RJ45 adapter. We recommend connecting the adapter to the DCP-2000, and then connecting the Ethernet cables to the CP950/CP950A. Reducing the number of connections is useful in preventing electro-magnetic interference (EMI).

*Figure 22: Connecting a Dolby DCP-2000 to a Dolby CP950*



*Figure 23: Connecting a Dolby DCP-2000 to a Dolby CP950A*



> 📄 **Note:** In this CP950A configuration, you can transport Dolby Atmos content from the playback system via the CP950A **COMMAND NETWORK** port. If there is a valid network route between the devices, there are no configuration changes needed on the CP950A to receive Dolby Atmos audio on the **COMMAND NETWORK** port. The network automatically adjusts when the CP950A is added as the **Cinema Audio Processor** in the DCP-2000 **Device Manager**.

**Related information**
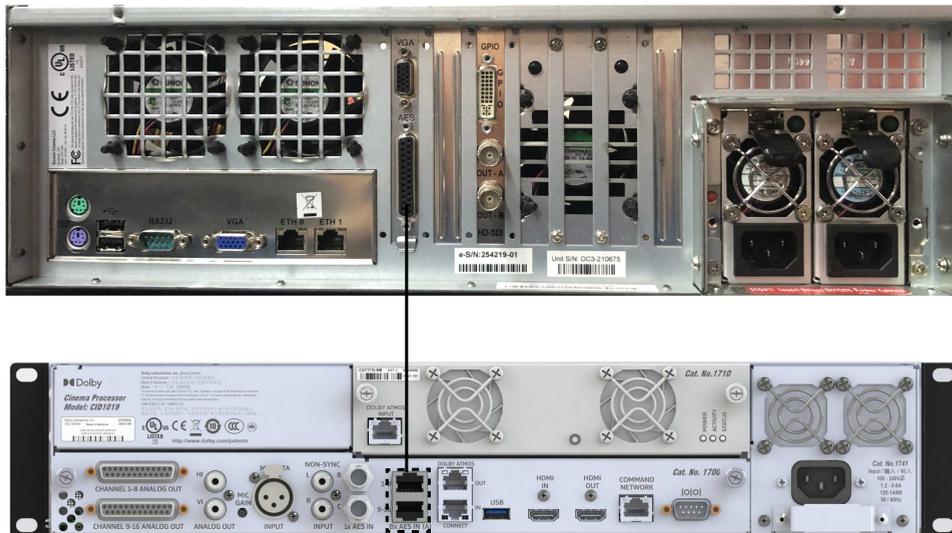
Pinouts for Dolby CP950 and CP950A connectors on page 147

## 2.7.5 Connecting a Dolby DCP-2K4 to the Dolby CP950 or CP950A

To connect the Dolby DCP-2K4 to the Dolby CP950/CP950A, connect the Dolby DCP-2K4 Advanced Encryption Standard (AES) port to the Dolby CP950/CP950A **8x AES INPUT** ports with CAT5e (or greater) Ethernet cables using the provided DB25-to-RJ45 adapter, as shown in the following figure. We recommend connecting the adapter to the DCP-2K4, and then connecting the Ethernet cables to the CP950/CP950A. Reducing the number of connections is useful in preventing electromagnetic interference (EMI).

*Figure 24: Connecting a Dolby DCP-2K4 to the Dolby CP950*



*Figure 25: Connecting a Dolby DCP-2K4 to the Dolby CP950A*
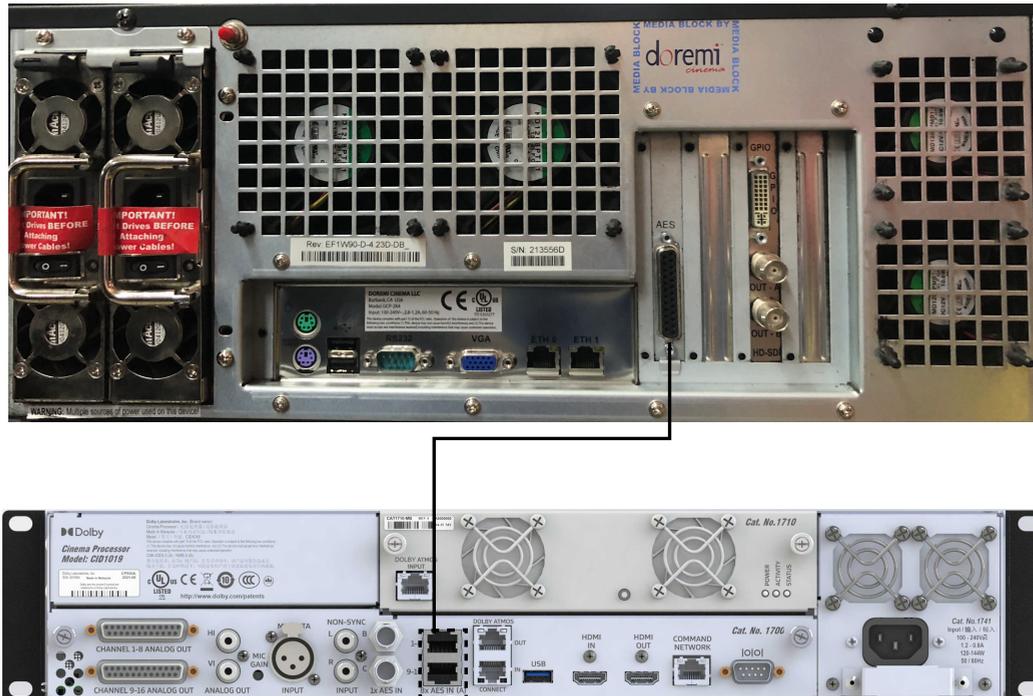
**Note:** : In this CP950A configuration, you can transport Dolby Atmos content from the playback system via the CP950A **COMMAND NETWORK** port. If there is a valid network route between the devices, there are no configuration changes needed on the CP950A to receive Dolby Atmos audio on the **COMMAND NETWORK** port. The network automatically adjusts when the CP950A is added as the **Cinema Audio Processor** in the DCP-2000 **Device Manager**.

**Related information**

## 2.8 Connecting amplifiers

You can connect analog amplifiers and Dolby Multichannel Amplifiers to the Dolby CP950/CP050A.

**Procedure**

1. For analog amplifier installations, connect the required number of channels from the Dolby CP950/CP950A **CHANNEL 1–8 ANALOG OUT** and **CHANNEL 9–16 ANALOG OUT** ports.
2. For Dolby Multichannel Amplifier (or other Dolby Atmos Connect qualified device) installations, use a CAT5e (or greater) Ethernet cable to connect the Dolby CP950/CP950A **DOLBY ATMOS CONNECT OUT** port to the **DOLBY ATMOS CONNECT IN** port on the downstream device. The following figure uses the CP950 as an example. The connections for the CP950A are the same. The system uses AES67 protocol when connecting Dolby Multichannel Amplifiers or Dolby DAC3202s.

*Figure 26: Connecting amplifiers*
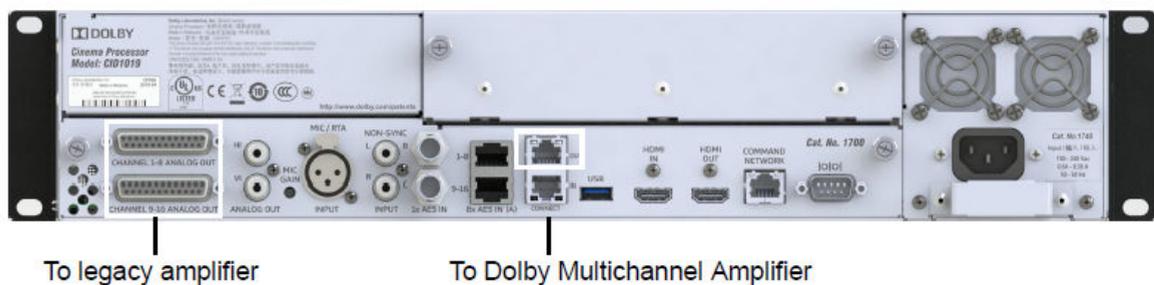


## 2.9 Updating and configuring the playback system

The recommended minimum software versions for Dolby Digital Cinema playback systems that are connected to a CP950 or CP950A are listed in the following tables. If you need to update your playback system software, refer to the respective Dolby Digital Cinema playback system documentation for instructions on how to perform this task. You can download update software at https://customer.dolby.com.

For Dolby Digital Cinema playback systems, we recommend the minimum software versions listed in the following table for use with the CP950:

| Playback system | Software version | Firmware version | Security manager version |
|---|---|---|---|
| DCP-2000 with Dolphin | 2.8.30 | 21.05b | 2.1.107 |
| ShowVault with IMB | 2.8.30 | 30.11g, 30.08q (HFR) | 5.1.116 |
| IMS1000 | 2.6.7 | 4.6.11 | 6.1.135 |
| IMS2000 | 2.8.30 | 4.6.11 | 6.1.135 |
| IMS3000 | Bundle 3.4.11 | | |

| Playback system | Software version | Firmware version | Security manager version |
|---|---|---|---|
| DSS200/DSS220 | 4.9.5.2 | | |
| DSS100/DSP100 | The CP950 is not supported by the DSS100/DSP100 by default. You can load commands and control the system via the serial connection. | | |

For Dolby Digital Cinema playback systems, we recommend the minimum software versions listed in the following table for use with the CP950A. In some cases, you must apply a hotfix. Some older playback systems do not provide automation support for the CP950A. For those systems, we recommend that you use CP850 settings.

| Playback system | Software version | Firmware version | Security manager version |
|---|---|---|---|
| DCP with Dolphin board | Use CP850 settings. | | |
| ShowVault with IMB | 2.8.30* | 30.11g, 30.08q (HFR) | 5.1.117 |
| IMS1000 | Use CP850 settings. | | |
| IMS2000 | 2.8.30* | 4.6.11 | 6.1.136 |
| IMS3000 | Bundle 3.4.11** | | |
| DSS200/DSS220 | 4.9.6.4 | | |
| DSS100/DSP100 | The CP950A is not supported by the DSS100/DSP100. | | |

\* With `hotfix dcp2000_ims2_sw_hotfix_accumulated_updates_2.8.30-1.0.5`.

\*\* With `hotfix ims3_sw_hotfix_accumulated_updates_3.4.11-1.0.1`.

Playback systems from other manufacturers may work with the CP950A while using a CP850 configuration, or new versions of playback software may be available to work directly with the CP950A.

After upgrading your playback system to the recommended version in the previous tables, you can configure the system.

- For the ShowVault/IMB, go to **Menu** > **Doremi Labs** > **Device Manager**. Add an audio processor device, and then select **CP950** or **CP950A** from the drop-down menu.
- For the IMS2000, go **Administration** > **Device Manager**, and then select **CP950** or **CP950A** from the drop-down menu.
- For the IMS3000, go to the **Setup & Maintenance** menu and select the **Device Manager** tab. Add an audio processor device, and then select **CP950** or **CP950A** from the drop-down menu.
- For the DSS200 or DSS220 and CP950, run the Config script and select **CP950** as the cinema processor.
- For the DSS200 or DSS220 and CP950A, run the Config script and select **CP950A** as the cinema processor.

## 2.10  Starting up the Dolby CP950/CP950A

The Dolby CP950/CP950A automatically powers up when you connect the power cable. While the unit is booting, the front-panel status light-emitting diode (LED)s illuminate in amber. After approximately one minute, the unit completes the start-up process.

When the boot process is complete, the LEDs remain green when playing normal PCM audio. On a CP950A, the LEDs change to solid blue when playing Dolby Atmos content. If there is a warning or error displayed on the CP950/CP950A, the LEDs change to yellow or red. The front-panel user interface (FPUI) displays the home screen with the current fader setting, IP address, input status, sample rate, and audio meter, and for the CP950A, Dolby Atmos status, as shown in the following figure.

*Figure 27: CP950A front-panel UI touch screen*
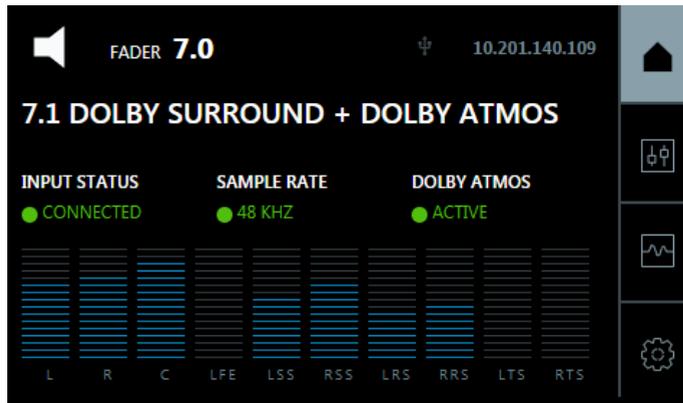


## 2.11 Configuring the network settings

You must configure your network settings after you perform the hardware installation.

**Procedure**

1. Press the **system settings** button, and then press **COMMAND NETWORK**, as shown in the following figures.
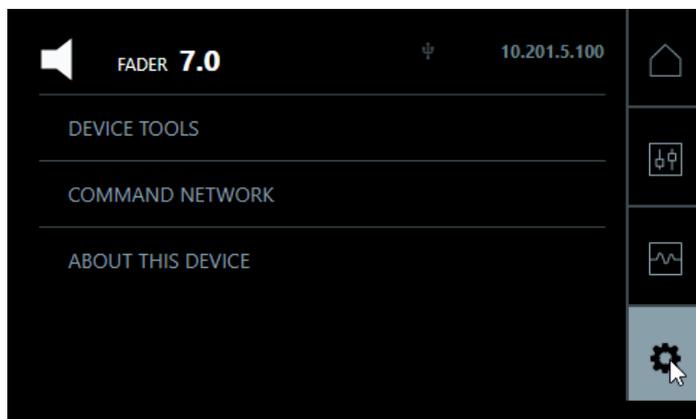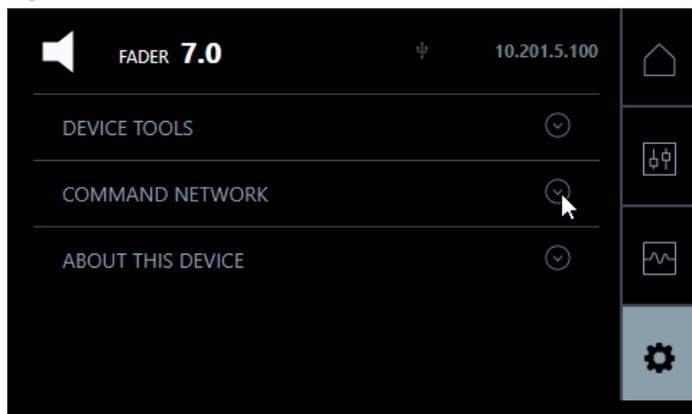
*Figure 28: Press system settings button*



*Figure 29: Press command network*



The **COMMAND** port default IP address is 192.168.1.151. You will need to change the third octet to match your auditorium number, or change the entire IP address (if required).

2. To configure the **COMMAND NETWORK** port, press the small pencil icon next to the IP address.

*Figure 30: Configure command network*
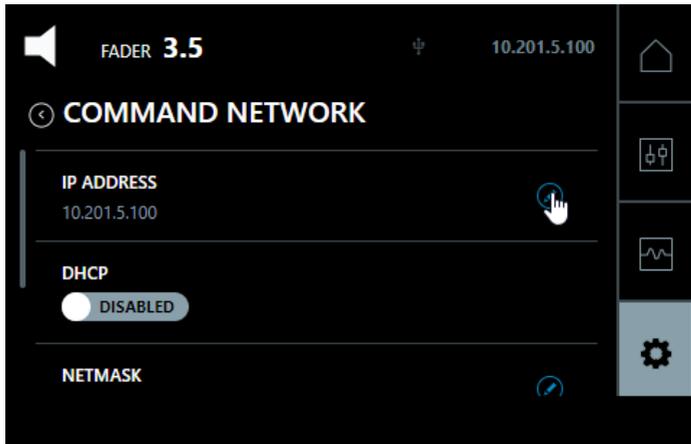


A soft keyboard appears where you can change the Internet Protocol (IP) address, as shown in the following figure.

*Figure 31: Configure ip address*
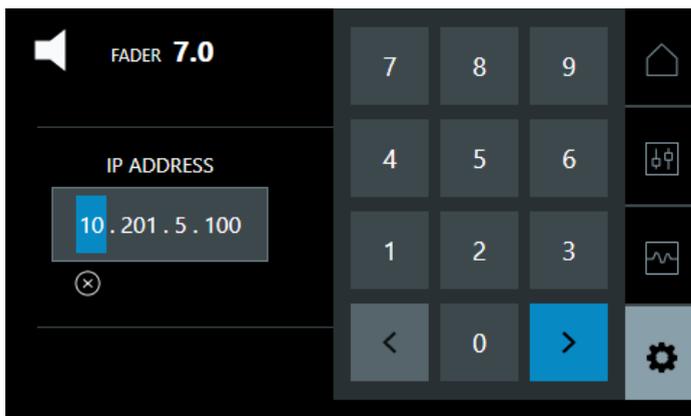


3. Use the soft keyboard to change the third octet to your auditorium number.

📄 **Note:** The CP950 and CP950A perform internal networking within an IP address range of 172.16.x.x. Do not configure the CP950 or CP950A command network IP address into any of the following ranges: 172.16.0.x, 172.16.1.x, 172.16.2.x, or 172.16.3.x.

The right arrow changes from blue to green. Press it to confirm.

4. Repeat steps 3 and 4 for the **Netmask**.
5. Repeat steps 3 and 4 for the **Gateway**.

The system automatically updates these settings after each step. In some cases, you may need to reboot.

**What to do next**
After starting up the system and configuring the network settings, you can use your web browser to connect to the Dolby CP950/CP950A.

**Related information**

## 2.12 Performing USB functions

You can use the Dolby CP950/CP950A USB port to perform specific functions by inserting a USB storage device (flash drive) that contains a specifically named file or folder in the root of the USB device. Supported file systems are FAT and FAT32. USB version 3.0 devices are supported, but older USB devices may also

function correctly. Mechanical hard drives are not supported, as these devices draw more power than the Dolby CP950/CP950A USB port can provide.

> **Note:** Do not use the USB port during normal operations. By doing so, audio playback can be interrupted for a short time.

You can perform the following functions:

### Viewing and downloading system logs

Create a file or folder at the root of a USB device, and name it `extract-logs`. If creating a file, there should be no file extension. Plug the storage device into the USB port on the back of the CP950/CP950A and wait one minute. The system generates the logs and saves them to your USB device in a file named `cp950_logs.tgz`.

### Generating a backup via a USB storage device

Create a file or folder at the root of a USB device, and name it `backup`. If creating a file, there should be no file extension. Plug the storage device into the USB port on the back of the CP950/CP950A and wait one minute. The system generates a log report `cp950_logs.tgz` file and a `dolbyAtmosConfiguration.dac` backup file and saves these files to your USB device.

### Resetting to factory settings via a USB storage device

Create a file folder at the root of a USB device, and name it `factory-reset`. If creating a file, there should be no file extension. Plug the storage device into the USB port on the back of the CP950/CP950A, wait one minute, and then reboot the unit. The system generates a log report `cp950_logs.tgz` file and a `dolbyAtmosConfiguration.dac` backup file and saves these files to your USB device. Then, the system resets to factory settings.

### Upgrading a CP950 or CP950A using a USB storage device

Beginning with system v2.2.0.x or later, you can perform an upgrade locally using a USB storage device (flash drive). Copy the CP950/CP950A `.dlb` upgrade file to a USB storage device. Rename the `.dlb` file to `upgrade.zip`. Insert the USB storage device containing `upgrade.zip` into the USB port on the back of the CP950/CP950A. An auto upgrade message appears on the front-panel user interface (fpui) where you can start the upgrade or cancel it. Select **OK** to start the upgrade. The unit reboots when the upgrade is complete, and then you can remove the USB device.

> **Note:** USB hard drives are not supported.

## 2.13 Logging in with SSH for basic administration functions

You can use the Secure Shell Protocol (SSH) or the command line for the CP950/CP950A.

**About this task**

To perform some CP950/CP950A administrative tasks using SSH or the command line, for example, date, traceroute, and ping:

Connect remotely to the CP950/CP950A **COMMAND NETWORK** IP address using these credentials:

User ID: administrator

Password: dolby

3

# Working with the web client user interface

The Dolby CP950 and CP950A provide a web client user interface (user interface (UI)) that enables you to connect to the unit, operate and monitor the system, and configure settings.

- Connecting to the Dolby CP950 or CP950A
- Configuring macros
- Displaying the equalization screen
- Displaying the auditorium parameters
- Configuring preferences
- Viewing and downloading the system logs
- Setting up user access
- Modifying the network settings
- Performing maintenance tasks
- Rebooting the system
- Downloading CP950 and CP950A essentials
- Contacting Dolby support

## 3.1 Connecting to the Dolby CP950 or CP950A

After you install the Dolby CP950 or CP950A and configure the network settings, connect your computer to the unit. Note that the CP950A performs internal networking on a network with an IP address range of 172.16.0.x-172.16.3.x. Do not set this address range for any external devices.

**Procedure**

1. Connect the Dolby CP950/CP950A and your computer to the auditorium network switch. Alternatively, you can connect your computer directly to the Dolby CP950/CP950A if your computer supports a gigabit Ethernet connection.

2. Open the web browser on your computer. Currently, the Dolby CP950 and CP950A are compatible with Google Chrome v71.x or later. You can use other browsers, but you may experience issues in the Dolby CP950/CP950A web client user interface (UI). If you do experience issues, clearing the browser cache or using incognito mode may help.

3. Connect to your unit by typing its IP address in your web browser.

   An **authenticate** login screen appears requesting a user name and password, as shown in the following figure. 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 3.7.

   *Figure 32: Authenticate login screen*
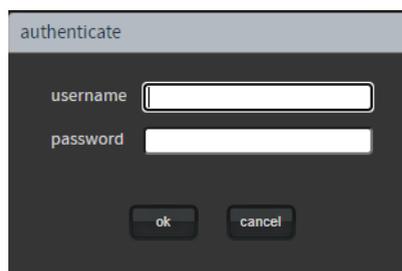
   

4. After you log in, the web client **status** screen appears, as shown in the following figure, which uses a CP950A with a Dolby Atmos enablement installed as an example.

   *Figure 33: CP950A web client status screen*
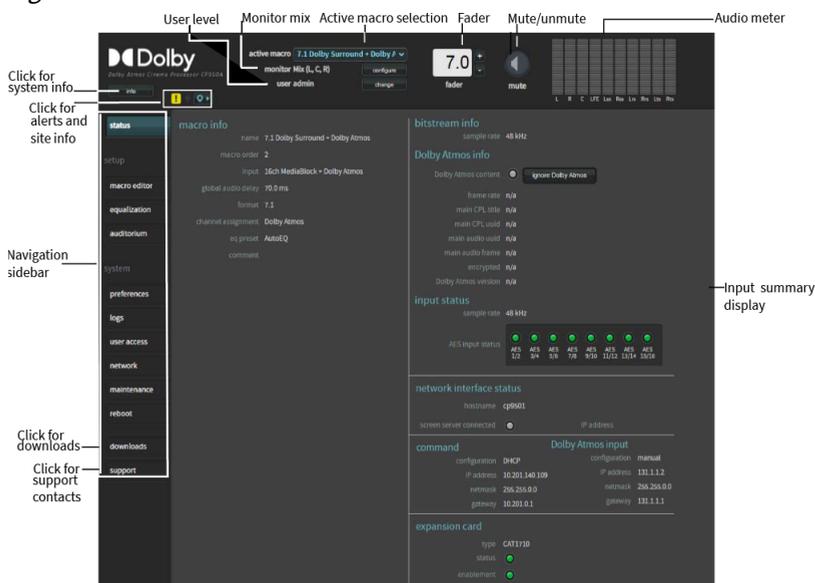
   

   Following is a description of the recurring objects that appear in all of the web client UI screens.

**Related information**

### 3.1.1  Navigation sidebar

The Dolby CP950/CP950A navigation sidebar (shown in the following figure) provides access to the Dolby CP950/CP950A **status**, **setup**, and **system** screens. In addition, you can access **downloads** and **support** information. Click the desired menu option to display the corresponding screen.

*Figure 34: Navigation sidebar*
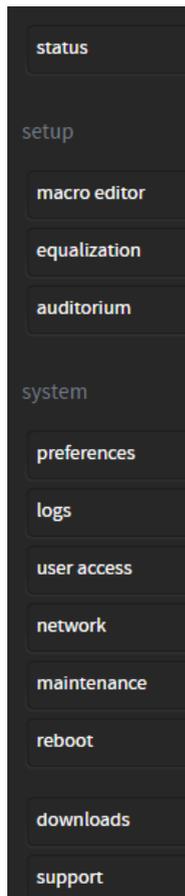


### 3.1.2  Active macro field

In this field, you can select the desired macro to use for your input source. The Dolby CP950 and CP950A require macros to process audio. You can use the default macros that are provided with the system, or you can create your own macros.

*Figure 35: CP950A active macro menu*
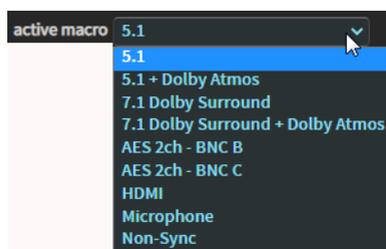
*Figure 36: CP950 active macro menu*
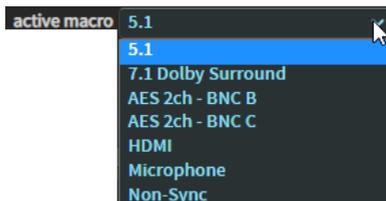


**Related information**

### 3.1.3 Monitor Mix setting

The **monitor MIX** setting allows you to change the operation of the CP950/CP950A front-panel booth monitor. The default **monitor MIX** setting is **(L,C,R)**. Click the **configure** button next to this setting to display the **configure monitor** screen, where you can configure the monitoring source, as shown in the following figures. Alternatively, if you select an individual speaker feed, or active AES input, the current macro sets the input type to **16ch MediaBlock**.

*Figure 37: monitor MIX setting*
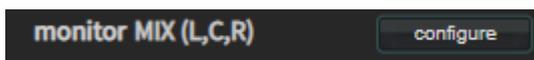


*Figure 38: Configure monitor screen*
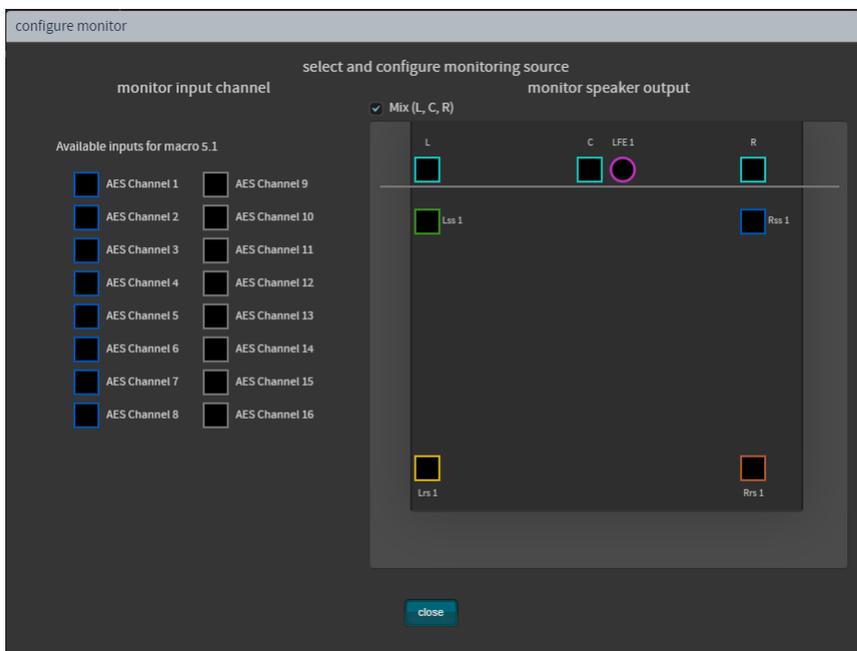


If you change to a macro that does not use an AES 16-channel input, the system defaults to a mix of Left, Center, Right (LCR), and you can select a speaker to monitor. In such a case, the monitor input options shown in the previous figure are not available. Similarly, they are not available if the unit is inputting coded audio (for example, Dolby Digital) rather than the DCI standard, which is PCM.

### 3.1.4 Fader field

Increase or decrease the volume by clicking the plus (**+**) or minus (**-**) buttons or by entering the desired value in this field.

*Figure 39: Fader field*



### 3.1.5 Mute button

Click this button to mute and unmute all outputs from the system. Note that all inputs are still active, and the meters continue to display activity.

*Figure 40: Mute button*



### 3.1.6 AES input status display color indicators

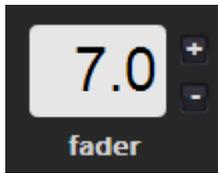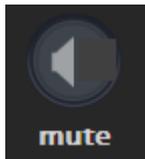In the **AES input status** display, you can check the current state of the Dolby CP950/CP950A input channels, which is indicated in small circles, as shown in the following figure. These indicators represent the **8x AES IN** input or the **1x AES IN** input.

*Figure 41: AES input status display*
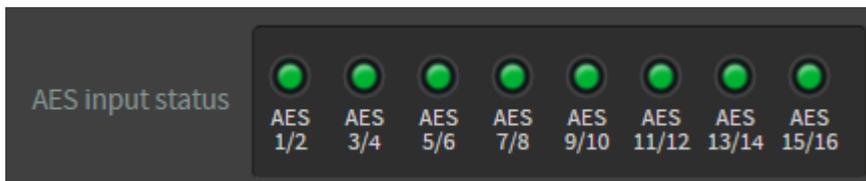


Following are the color indicators that define the current state of the Dolby CP950/CP950A input channels:

• **Green** indicates a good connection. Includes channel pairs required by the active macro with a good connection (defined as an active AES3 input). In addition, it includes channel pairs not required for the active macro with a good connection.

• **Red** indicates no active AES3 connection. Includes channel pairs that are required by the active macro and are not connected.

• **Gray** indicates channel pairs that are not required by the active macro and are not connected (no active AES3 connection).

• **Yellow** indicates an intermittent connection over AES3 that is currently connected. This occurs if the media block was power cycled, or if the cables were unplugged and replugged (or not connected securely). Changing or reselecting a macro (or restarting the CP950/CP950A) returns the status state to green. After 1-2 minutes of constant, stable connection, these indicators return to green. Note that some sources briefly drop out during normal operation, such as a transition between MPEG and JPEG-2000 content, so yellow indicators immediately following clip transitions, or after a source is power cycled, probably do not indicate an issue. If yellow lights are constantly observed during playback, we recommend that you review the connections between the CP950 or CP950A and the source device to validate that all cables and adapters are properly shielded and intact.

By default the CP950 or CP950A shows a warning if the connection is unstable. You can disable these intermittent connection alerts in the **preferences** screen.

### 3.1.7 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. The following figure shows a CP950 audio meter as an example. The CP950A audio meter also displays LTS (Left Top Surround) and RTS (Right Top Surround). Note that the test generator signals are not displayed on the audio meter.

*Figure 42: CP950 Audio output meter*
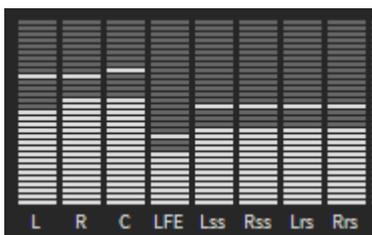


### 3.1.8 Alerts

If the system activates an alert, the alert icon changes to a blinking yellow icon, as shown in the following figure.

*Figure 43: 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 the example in the following figure.

*Figure 44: Alert message*
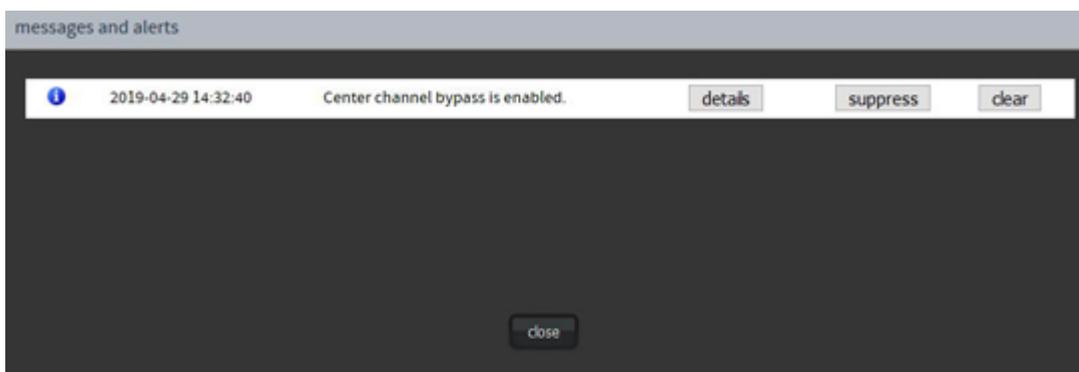


You can stop this type of alert from blinking by selecting it and then clicking the **suppress** button. You can still view the alert in the **messages and alerts** pop-up screen.

You can remove the displayed alert by selecting it and then clicking the **clear** button. The alert disappears from the **messages and alerts** screen and cannot be recalled until the system is rebooted (if the alert condition continues after rebooting).

You cannot remove or suppress a temperature alert. A temperature alert disappears when the temperature returns to normal. There are some additional reports that represent critical errors that are not suppressible or removable. If the CP950 or CP950A is not playing audio correctly, always check the alert status first before you attempt any other troubleshooting.

In most cases, the Dolby CP950 and CP950A provide detailed alerts, which provide additional information and troubleshooting steps to help you resolve problems quickly. Clicking on details opens a new screen in your web browser and displays the alert information. If replacement parts are needed, the **details** screen provides part numbers and Dolby ordering information. For power supply fuse-related alerts, the **details** screen shows you what to source locally.

### 3.1.9  Site information and location

To display the CP950/CP950A chassis serial number, IP address, and other site information, click the **site** button, which is located next to the alert icon at the upper-left side of the screen. This pop-up information enables a remote user to quickly view information regarding the unit and screen. The location information is obtained from a custom room configuration that is created in Dolby Atmos Designer (DAD). If you do not use DAD to set up a CP950/CP950A, some of the location information is blank or generic.
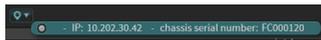
*Figure 45: Site information pop-up*



### 3.1.10  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.

**Related information**

### 3.1.11  Info

To view system information, click the **info** button at the upper-left corner of the screen to display the CP950 or CP950A **info** pop-up list, as shown in the following figure for a CP950A with a Dolby Atmos playback enablement.

*Figure 46: CP950A information*
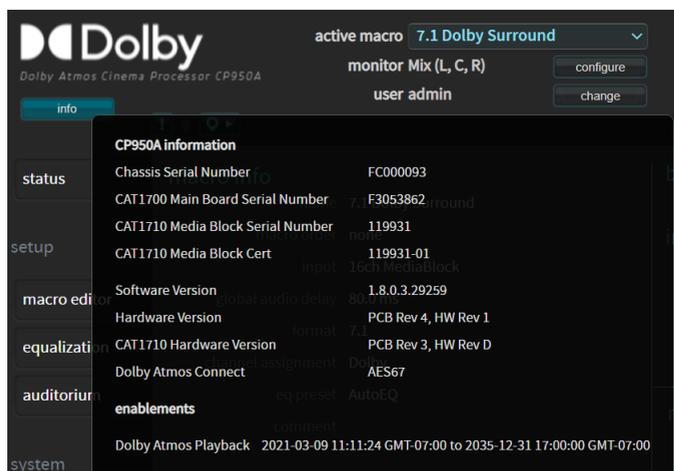


It can be helpful to understand some of the information that is displayed in the **info** pop-up list.

**Chassis Serial Number**: The hardware serial number associated with the entire CP950/CP950A audio processor. When applying for an RMA, this is the number that is required.

**CAT1700 Main Board Serial Number**: The board with all input/output connections. If applying for an RMA for the CAT1700, this number is required.

**CAT1710 Media Block Number**: The CAT1710 Dolby Atmos expansion card hardware serial number. If applying for a CAT1710 RMA, this number is required, and does not change after an RMA is completed for the device.

**CAT1710 Media Block Cert**: The CAT1710 Dolby Atmos expansion card electronic serial number. If a board is repaired by Dolby, it is returned with a new extension: -01, -02, and so on. As shown previously in figure 45, the **CAT1710 Media Block Serial Number** and **CAT1710 Media Block Cert** are different, which indicates that a repair was completed by Dolby for the respective board and the board was returned to the customer. KDMs targeting the CAT1710 use the CAT1710 Media Block Cert number.

## 3.2 Configuring macros

The CP950 and CP950A require macros to process audio. The system provides you with these default macros that you can use, edit, or discard.

- **5.1**: Processes a 5.1 signal from a digital cinema playback system through the **8× AES IN** connector.
- **7.1 Dolby Surround**: Processes a 7.1 signal from a digital cinema playback system through the **8× AES IN** connector.
- **5.1 + Dolby Atmos** (CP950A only): Processes Dolby Atmos content and a 5.1 signal from a digital cinema playback system through the **8× AES IN** connector.

  **7.1 Dolby Surround + Dolby Atmos** (CP950A only): Processes Dolby Atmos content and a 7.1 signal from a digital cinema playback system through the **8× AES IN connector**.
- **AES 2ch BNC B**: Processes PCM, clock, or a coded input signal through the **1× AES IN B** connector. Supports Dolby Digital, Dolby Digital Plus, Dolby E, and PCM at up to 192 kHz physical transport. Note that the 8 × AES input (sometimes referred to as AES input A) is limited to 96 KHz. During processing, the system converts all audio signals to 48 kHz, as the CP950 and CP950A have a fixed output of 48 kHz.
- **AES 2ch-BNC C**: Processes PCM or a coded input signal through the **1× AES IN C** connector. Supports Dolby Digital, Dolby Digital Plus, Dolby E, and PCM. Supports Dolby Digital, Dolby Digital Plus, Dolby E, and PCM at up to 192 kHz physical transport. Note that the **8× AES IN** input (sometimes referred to as AES input A) is limited to 96 KHz. During processing, the system converts all audio signals to 48 kHz, as the CP950 and CP950A have a fixed output of 48 kHz.
- **HDMI**: Accepts audio from an HDMI source. Supports PCM, Dolby Digital, Dolby Digital Plus, or Dolby True HD. If the system detects a video signal on the **HDMI IN** connector, it can repeat it on the **HDMI OUT** connector.
- **Microphone**: For public address/announcements. A CP950 can process the microphone to output from the center speaker or all of the surround speakers. A CP950A can additionally process the microphone to output from the overhead speakers. For best results, reduce latency as much as possible. Note that for some microphones, you need to turn on **phantom power** (at +48 V) in the web client UI **macro editor** screen or in the front-panel user interface (FPUI).

  > **Note:** You can damage your microphone if the macro setting is wrong. In addition, do not hot plug a microphone when phantom power is enabled. (It could damage the microphone circuitry.)

- **Non-Sync**: Accepts left and right analog signals. You can add surround processing (upmixing) to this stereo input, and turn on **derive LFE** (for low-frequency effects) to change these signals to 5.1 or 7.1.

In addition, you can create macros from scratch by selecting **macro editor** in the **setup** menu, as shown in the following figure. You can configure macros and assign the order in which they are displayed in the FPUI.

*Figure 47: Select macro editor in setup menu*
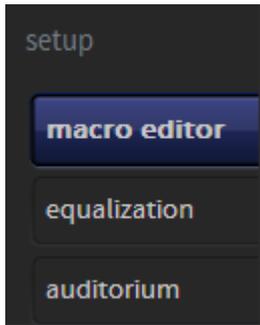


The **macro editor** screen appears, as shown in the following figure. In this screen, you can create or edit a macro by clicking the plus (**+**) or **edit** buttons and entering the desired parameters. This example shows a CP950A screen with the Dolby Atmos enablement installed.

*Figure 48: Macro editor screen*
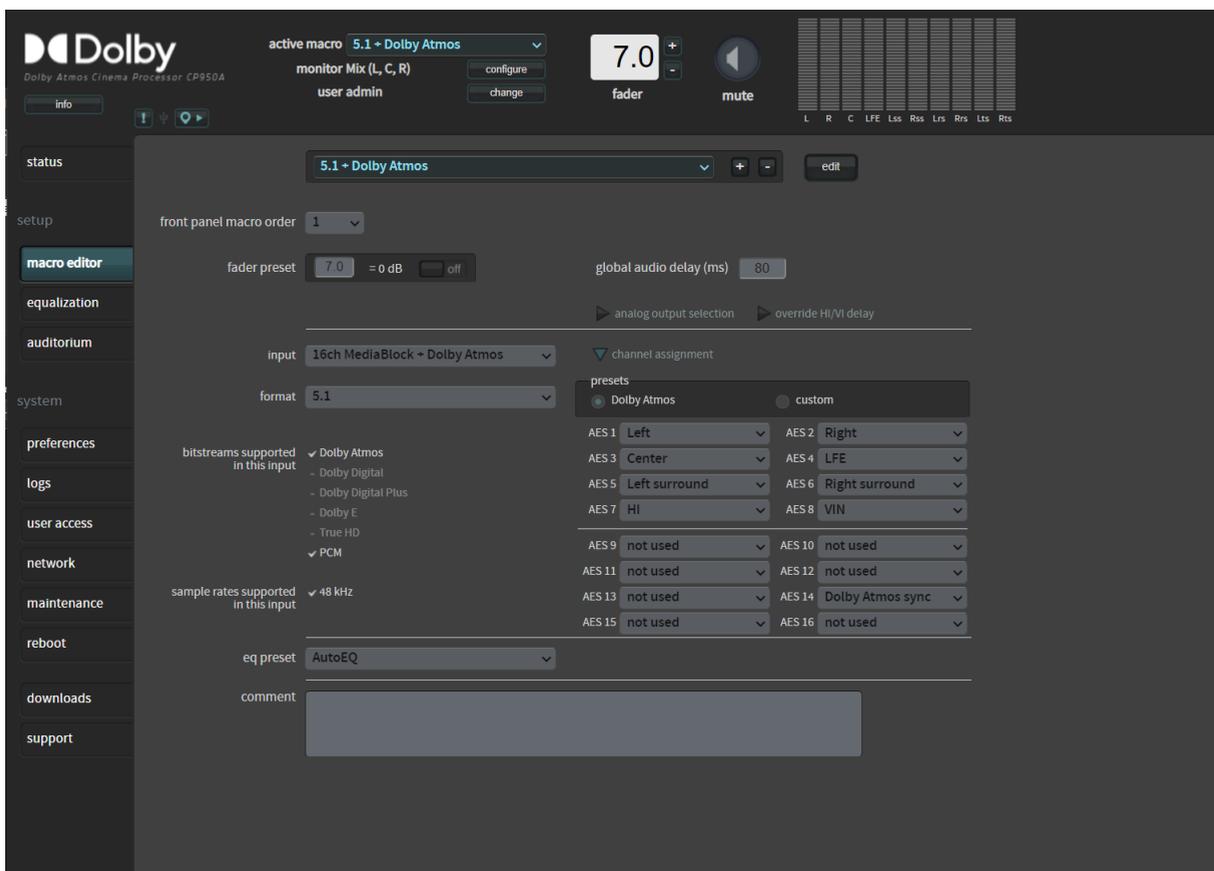


When using the **8x AES IN** connector, there are two macro input options and a third for Dolby Atmos:

1. When connecting to a digital cinema media block (IMS, IMB, or external) use the **16ch MediaBlock** input option. This option processes audio correctly for such a device.
2. In cases where you are not using a digital cinema source or if the CP950 or 950A is receiving coded audio on AES pair 1/2, use the **16ch AES Digital** input option for best results.

The following figure shows the parameters in the **macro editor** screen for a **16ch MediaBlock** input source, while the next figure shows parameters for a **16ch AES Digital** input source. These examples show how the parameters change for these two inputs. The available parameters can also change when selecting other input sources.

*Figure 49: Configure input source for 16ch MediaBlock*
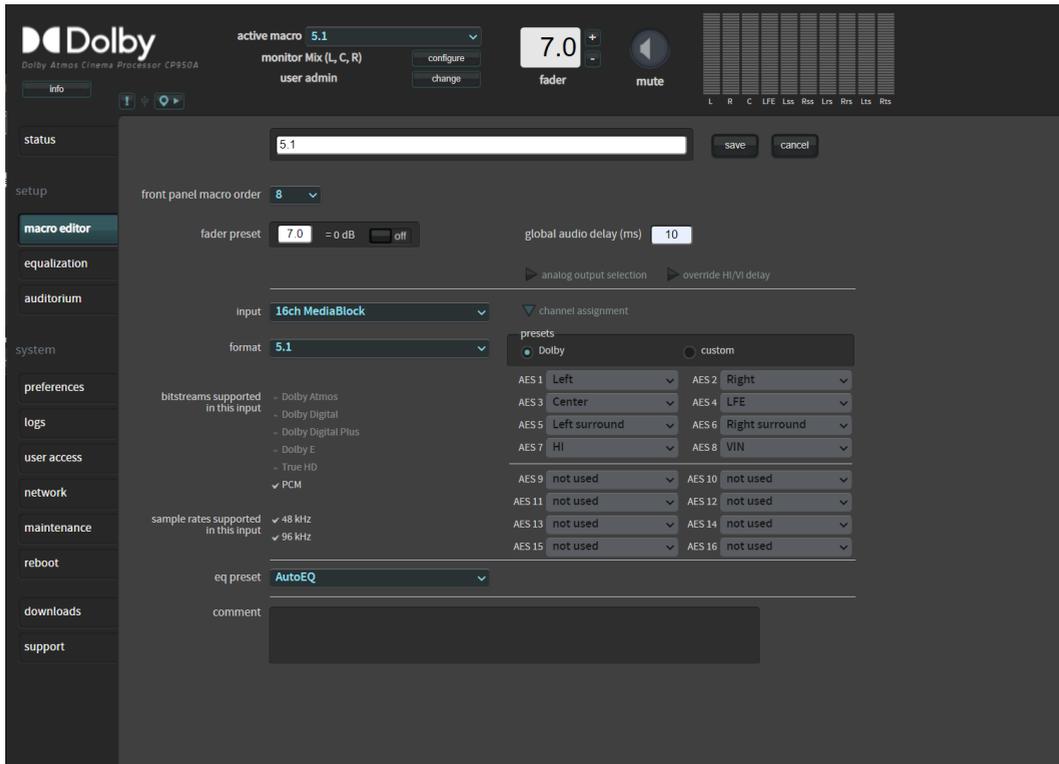


*Figure 50: Configure input source for 16ch AES Digital*
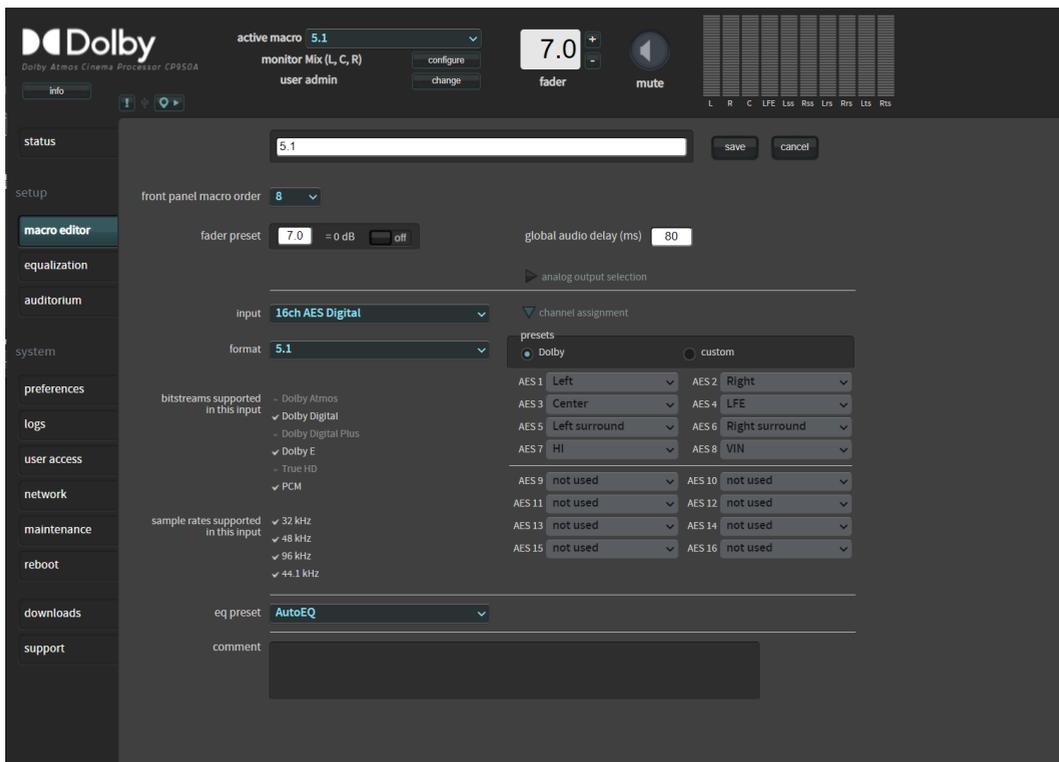


Note that you can use surround processing for nondigital cinema audio such as coded audio (Dolby Digital), non-sync inputs, HDMI, and other consumer audio to upmix the input signal with a low channel count into a multichannel surround signal. The available parameters can change when selecting different input sources.

The following figure shows a **1x AES3** input. The **surround processing** section shows that when receiving a two-channel input, 5.1 input, or 7.1 input, the system does not upmix. Green arrows define that no surround processing is used.

*Figure 51: Configure macro surround processing and upmixing*
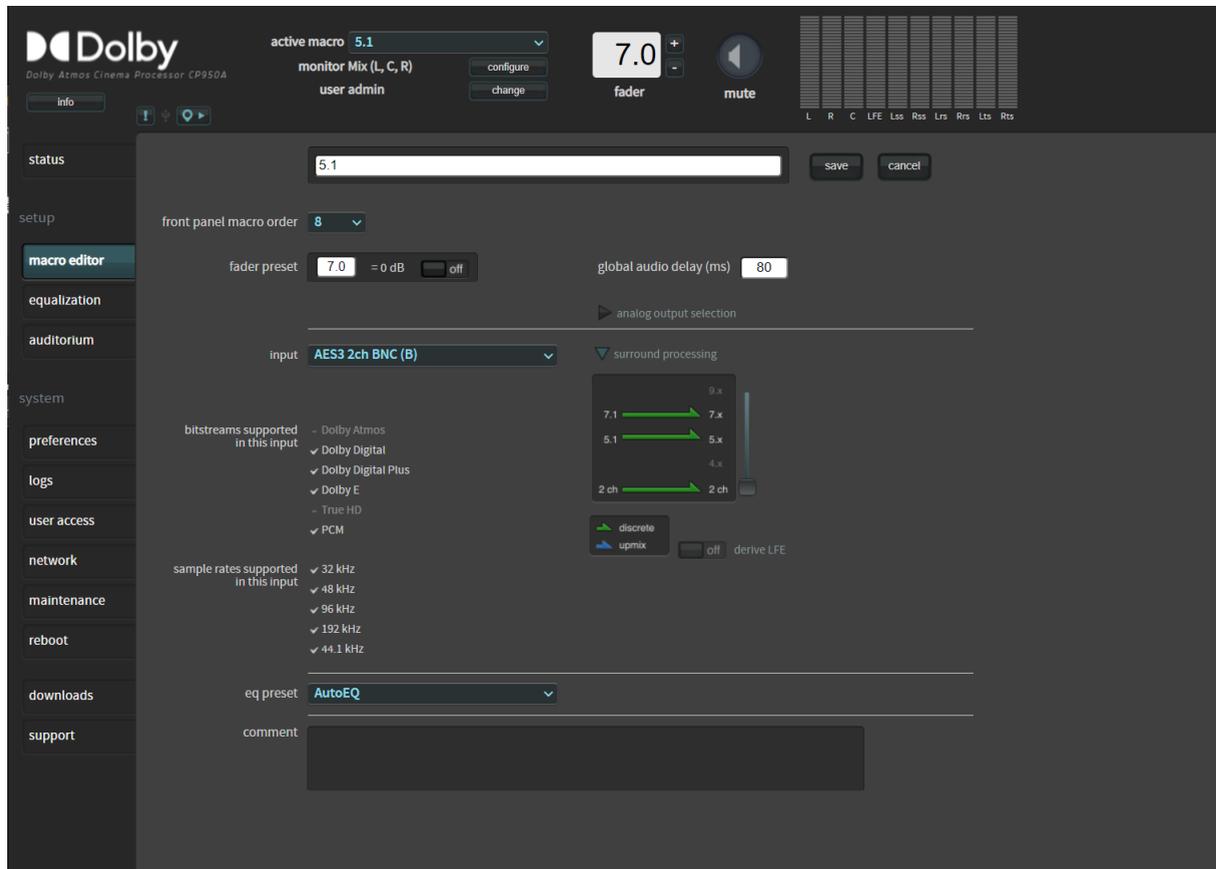


The following figure shows the parameters for the **Non-sync** input where the slider was moved up to process a two-channel input into a 5.x signal. A blue arrow indicates that surround processing is used in this situation. 5.1 and 7.1 audio are passed normally without surround processing in this macro. You can enable/disable subwoofer signal processing by clicking the **derive LFE button**, which toggles the signal between 5.1 (enabled) and 5.0 (disabled). You cannot upmix digital cinema content by moving the slider.

*Figure 52: Upmix non-sync input source*
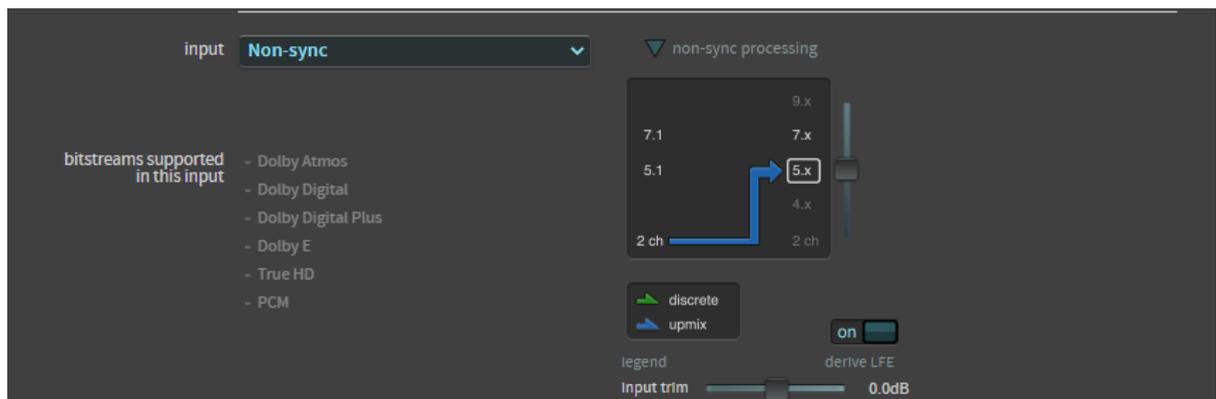


For the **Microphone** macro, you can specify that audio is transmitted from the center, surrounds, or from CP950A overheads. You can also enable or disable phantom power (+48 V).

### 3.2.1 Creating or editing a macro

You can create or edit a macro. We recommend that you do not edit a macro that is currently in use. When saving settings, audio may be lost until the macro is reconfigured and reselected.

**Procedure**

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

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

### 3.2.2 Selecting a macro

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

If you click the plus (**+**) or **edit** button, you can create a new macro, or edit a macro. The following figures show the CP950A and CP950 menu options. For a CP950A, you must have an enablement installed to use a Dolby Atmos macro.

*Figure 53: Select a CP950A macro to configure*
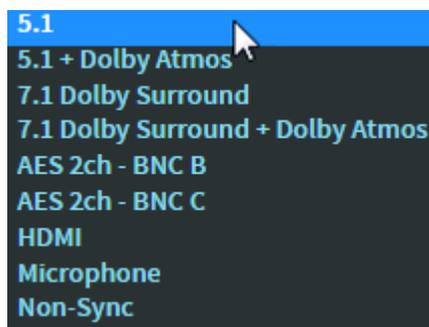


*Figure 54: Select a CP950 macro to configure*
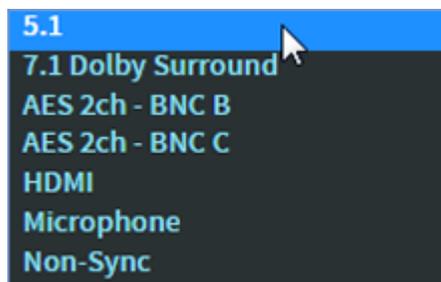


### 3.2.3 Deleting a macro

You can delete a macro.

Click the minus (**-**) button to delete the selected macro.

### 3.2.4 Macro order

Click in this field to assign a macro number for your macro, as shown in the following figure. Your selection appears in numerical order for the macros displayed on the FPUI.

📄 **Note:** Many automation systems assume that 5.1 (also known as 5.1 + Dolby Atmos) is at macro number 1, and Dolby Surround 7.1 (also known as Dolby Surround 7.1 + Dolby Atmos) is at macro number 2. In these automation systems, the macro order may be referred to as button # instead of position/macro order. For this reason, we recommend leaving macro # 1 as 5.1 (or 5.1 Dolby Atmos for the CP950A) and macro #2 as Dolby Surround 7.1 (or Dolby Surround 7.1 + Dolby Atmos for CP950A).

*Figure 55: Assign macro number*
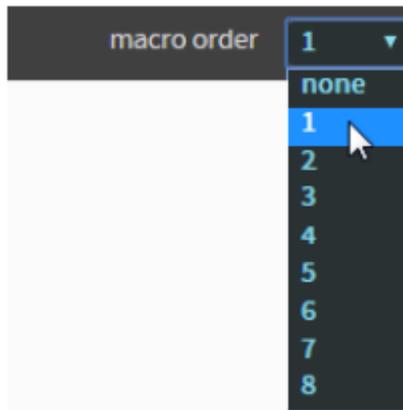


### 3.2.5 Fader preset

You can enter a default fader value that is enabled when the macro is activated.

Click in this field to enter a default fader value for your macro, as shown in the following figure. When enabled, the system uses this value when you (or automation) select the macro. Click the **on/off** button to enable or disable this function.

*Figure 56: Enter fader preset*



### 3.2.6 Global audio delay

You can enter a global audio delay for a macro.

Click in this field to enter a global audio delay (in milliseconds) for your macro. In some cases, you may need to change the audio delay in the media block (MB) when using a 16-channel input. The minimum global audio delay for Dolby Atmos content is 80 milliseconds. If you enter a delay that is not in the range for your selected input, red text appears next to this field indicating the required range for the delay, as shown in the following example for a CP950A.

*Figure 57: Enter global audio delay*
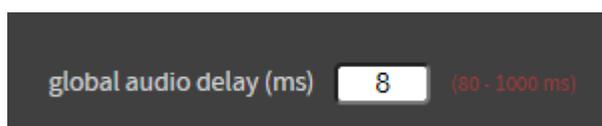


In some situations, you may need to adjust the global audio delay on your Image Media Block. For details, refer to the media-block setup instructions in your *Dolby Cinema System Manual*.

### 3.2.7 Analog output selection (for HI and VI)

You can configure the **HI** and **VI** analog outputs. This is useful if you want to use an external booth monitor or output alternative audio for nonstandard installations.

Click this tab to activate the **configure** buttons for the **HI** and **VI** analog outputs. If these analog outputs are not used to provide audio to an accessibility system, you can repurpose them for other functions. These settings override the setup described in Section 3.2.11.

*Figure 58: Activate analog output configuration*
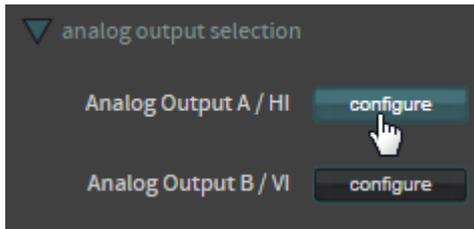


When you click a **configure** button, the **configure analog output** screen appears, as shown in the following figure, which uses a CP950A as an example. In this screen, you can configure the source that the system routes to the hearing impaired (**HI**) or visually impaired (**VI**) analog output connectors on the Dolby CP950/CP950A rear panel. You can configure the output for any speaker feed (or LCR mix) by clicking in the desired box.

*Figure 59: Configure analog output*
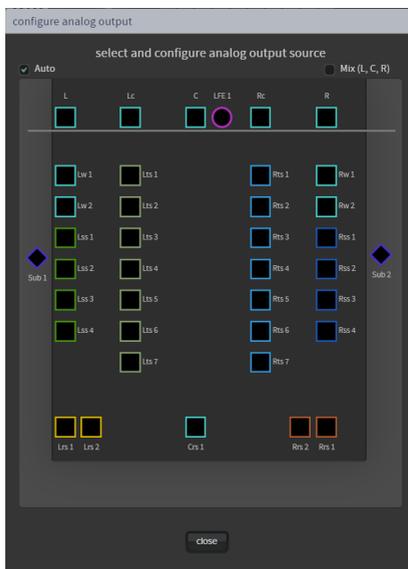


### 3.2.8 Override HI/VI delay

You can control the timing of the hearing impaired and visually impaired narration.

When you select **16ch MediaBlock** or **16ch MediaBlock + Dolby Atmos** as the input for your macro, the **override HI/VI delay** parameter appears as shown in the following figure. Click this tab to independently control the timing of the hearing impaired and visually impaired narration. This is useful for the hearing-impaired timing so that it matches the main audio in the auditorium, or more precisely controls the visually impaired audio so that it does not interfere with dialogue from the main audio. The system applies the resulting values to the **HI** and **VI** analog outputs. These parameters are independent delay controls and are not related to the global audio delay, other than sharing the same minimum and maximum available values.

Figure 60: Override HI/VI delay
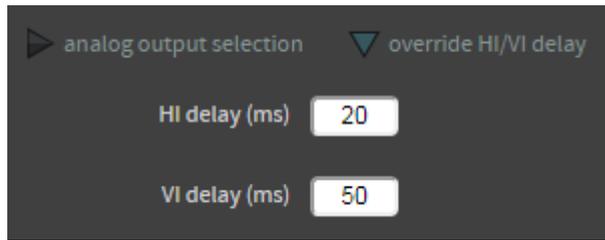


### 3.2.9 Input

You can select the desired input source.

1. Click in the **input** field to display the drop-down menu where you can select the desired option.

Figure 61: Select CP950A input source
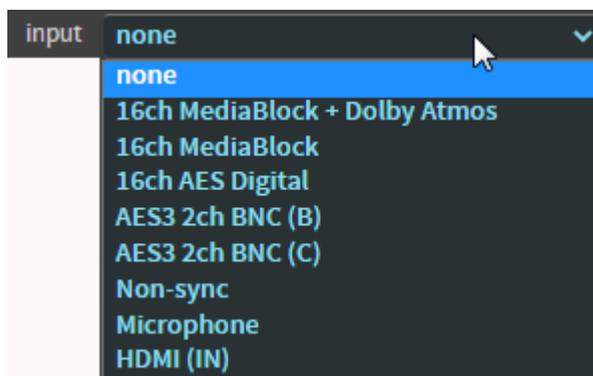


Figure 62: Select CP950 input source
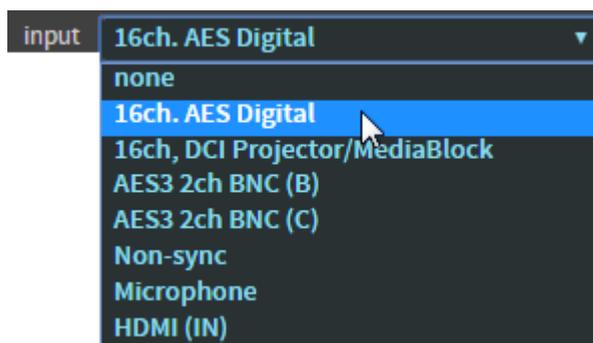


When using the **8x AES IN** input, there are three input options:

- When connecting to a digital cinema media block (IMS, IMB, or external) use the **16ch MediaBlock** input option. This option processes audio correctly for such a device.
- When connecting a CP950A to a media block with Dolby Atmos capability, use **16ch MediaBlock +Dolby Atmos**. The system automatically applies an 80 ms minimum global audio delay.
- In cases where you are not using a digital cinema source or if you are transmitting coded audio to AES pair 1/2, use the **16ch AES Digital** input option for best results.

### 3.2.10 Format

You can select the desired audio format and channel assignments.

This parameter appears for 16-channel inputs, where you can click in this field to select the desired audio format. Typical presets (for example, **5.1** and **7.1**) are defined by default. You can customize your audio format by selecting **custom**. For a CP950A with the **16ch MediaBlock + Dolby Atmos** input selection, this

does not affect the Dolby Atmos data, but only affects the PCM data sent by the MediaBlock. This parameter also sets the default channel assignment presets in the **Channel assignment** pane on the right side of this screen.

*Figure 63: Select audio format*
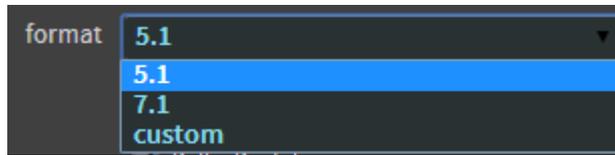


**Related information**

## 3.2.11 Channel assignment

For 16-channel inputs, you can view the Dolby channel assignment presets by clicking the **channel assignment** tab. For **16ch MediaBlock + Dolby Atmos** AES Digital, the system automatically sets the presets when the input format is set to 7.1 or 5.1.

*Figure 64: Dolby Preset Channel Assignments*
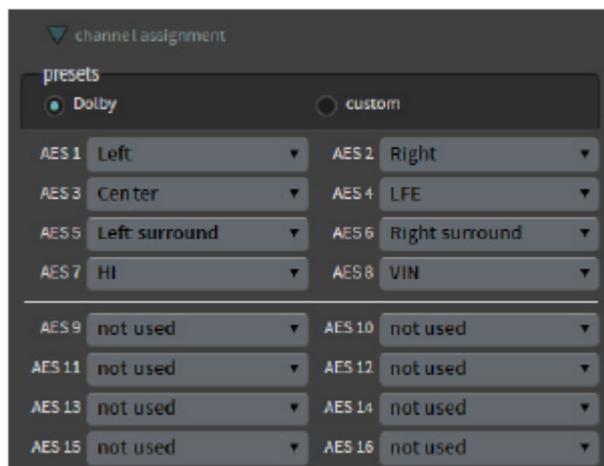


> **Note:** To play back Dolby Atmos content in a CP950A, the macro must have **Dolby Atmos sync** assigned to channel 14.

> **Note:** The Dolby CP950/CP950A actively monitors any AES3 channels that are in use for the current macro and sends alerts if the system detects that one or more channels is intermittent or disconnected. If you are using Dolby Fidelio or another accessibility system that removes channels 7 and 8, you must edit your 5.1 and 7.1 Dolby Surround macros to prevent false alerting. To edit these macros, change from the **Dolby** preset to the **custom** preset, and then change channels 7 and 8 to **not used**.

To change the Dolby presets, click on the **custom** button, and then click in the respective fields to select the desired channel assignments, as shown in the following figure, which uses a CP950A as an example.

*Figure 65: Customize channel assignments*
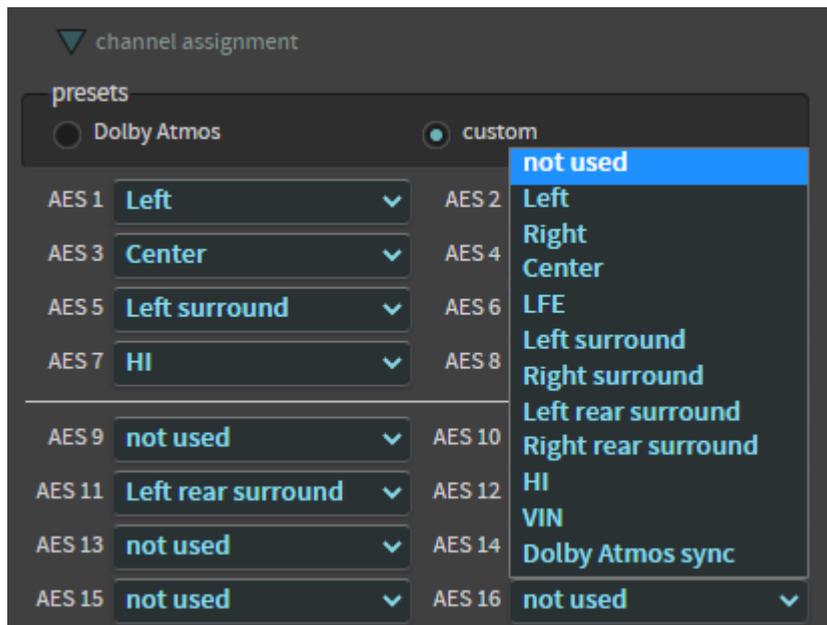


## 3.2.12 EQ preset

If one or more EQs is loaded in the system, you can select the EQ preset parameters.

Click on this field to select the equalization **eq preset** parameters you want to use for your macro. These parameters are either the automated equalization (**AutoEQ**) settings or any custom settings that were created.

*Figure 66: Select an EQ Preset*
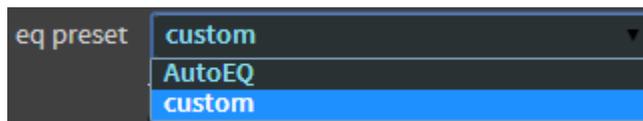


**Related information**

Displaying the equalization screen on page 58

## 3.3 Displaying the equalization screen

The **equalization** screen enables you to calibrate the CP950/CP950A to reproduce audio in a unique auditorium sound field.

You can do this as a stand-alone operation in the Dolby CP950/CP950A web client, or in conjunction with Dolby Atmos Designer (DAD) version 3.3.7 or later. DAD is a separate application that allows advanced users to configure speakers, crossovers, outputs, amplifiers, and so on. Authorized users can download the current version of DAD software, release notes, and manual at https://customer.dolby.com. You can also access the manual from the DAD software **Help** menu.

This section provides a brief overview of some of the parameters in the **equalization** screen. For additional descriptions of these and other equalization (EQ) parameters and instructions for configuring equalization, see Chapter 4.

To access EQ in the web client, select **equalization** in the **setup** menu, as shown in the following figure.

*Figure 67: Select equalization in setup menu*
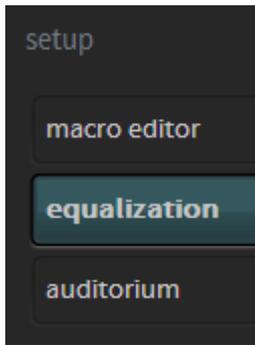


The real-time analyzer appears in the **equalization** screen, as shown in the following figure.

The default EQ preset is **AutoEQ**. 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 to create a new preset, as described in Chapter 4 (see link at end of this chapter). You can push a specific EQ preset to all macros. This saves time after creating a new EQ preset and having to manually update every macro. Select the **push EQ to all macros** button and the system pushes the highlighted (active) EQ preset to all macros.

*Figure 68: Real-Time Analyzer equalization screen*



## Test-signal generator and microphone phantom power

The Dolby CP950/CP950A provides a test-signal generator to play out different audio test files that are used for calibrating a cinema audio system. You can select a test signal from the drop-down menu. Click the respective **on**/**off** button to turn the selected signal on and off.

The CP950A provides additional **rotate** and **snap** functions. The **rotate** function pans the test signal through the speakers in a predefined pattern. The **snap** function jumps the test signal through the speakers in the same predefined pattern.

You can select an option from the test-signal generator drop-down menu, as shown in the following figure.

Figure 69: Real-Time Analyzer test-signal generator and microphone phantom Power



The default output level for thump and sine signal tones is -30 decibels referenced to full-scale digital (dBFS). The default output level for the sweep signal tone is -40 dBFS.

Pink noise is slightly different, as it is configured via Society of Motion Picture and Television Engineers (SMPTE) standard ST2095-1:2015 Section 6.2, which states that the level should be -33.74 dBFS.

Analog levels are affected by the EQ being used. You should follow the instructions provided in this manual for calibrating a room.

## Speakers and array feeds

Select **speakers** or **arrays**, and then click in this field to select the respective output. You can view the EQ for each output or make changes. To move between outputs, select from the drop-down menu shown in the following figures (examples) or use the arrow buttons to scroll through the list.

Figure 70: CP950 speaker and arrays feeds
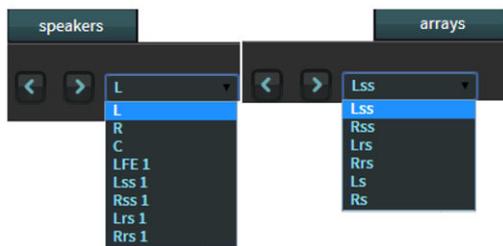


Figure 71: CP950A speaker and array feeds
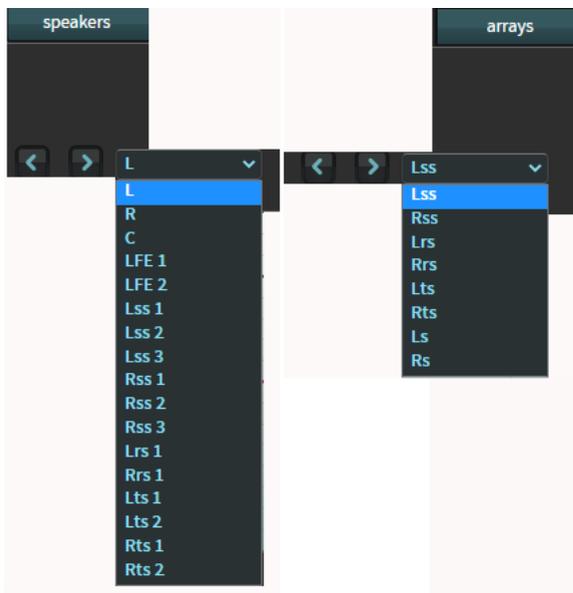


## Real-Time Analyzer mic input level

The **RTA mic input level** represents the average power received by the microphone input, which is the average power measured for input frequencies between 50 Hz and 2 KHz. If you are using the internal RTA

you should calibrate this level before beginning the equalization process. You can perform this adjustment by using the **MIC GAIN** input level trimpot on the CP950/CP950A rear panel, or through the **RTA mic input level adjust**, which is located below the **RTA mic input level** display in the **equalization** screen. You should adjust the **RTA mic input level** so it is as close as possible to 50% of full range (playing pink noise at 85 dBC from the center channel). Logically, this calibrates the microphone level for use in the equalization process. For a more detailed description of this procedure, see Chapter 4.

## Bypass AutoEQ

Click this **on**/**off** toggle button to **on** to bypass all **AutoEQ** audio calibration. If an **AutoEQ** preset is uploaded to the Dolby CP950/CP950A and you turn **bypass AutoEQ** to **on**, the system processes only manual equalization (entered in the one-third octave equalization or Grossman eq). If you are not using **AutoEQ** and no **AutoEQ** preset is uploaded, the **bypass AutoEQ** button does not function in any way.

*Figure 72: Bypass AutoEQ*
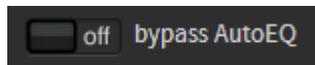


📄 **Note:** When you select **on**, the system bypasses **AutoEQ** only for the speaker you are currently editing (as specified in the speaker feeds drop-down menu, shown in Figure 57).

## All output levels

Click this button to display and adjust the output levels for each speaker or array in your preset, as shown in the following figure. 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. To change output levels, move the slider with the mouse or the up/down arrow keys. In addition, you can test with content or generate test signals in this screen. Click **ok** to confirm your entries.

*Figure 73: All output levels speakers and arrays*
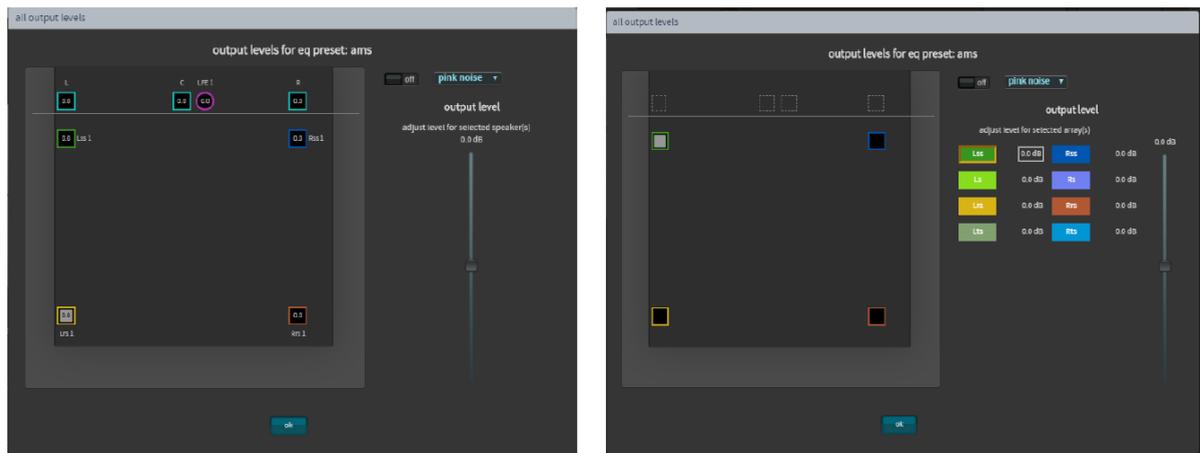


## Copy speaker EQ

Click this button to copy manual speaker EQ settings from one source to one or more destinations, as shown in the following figure. 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 74: Manual speaker EQ
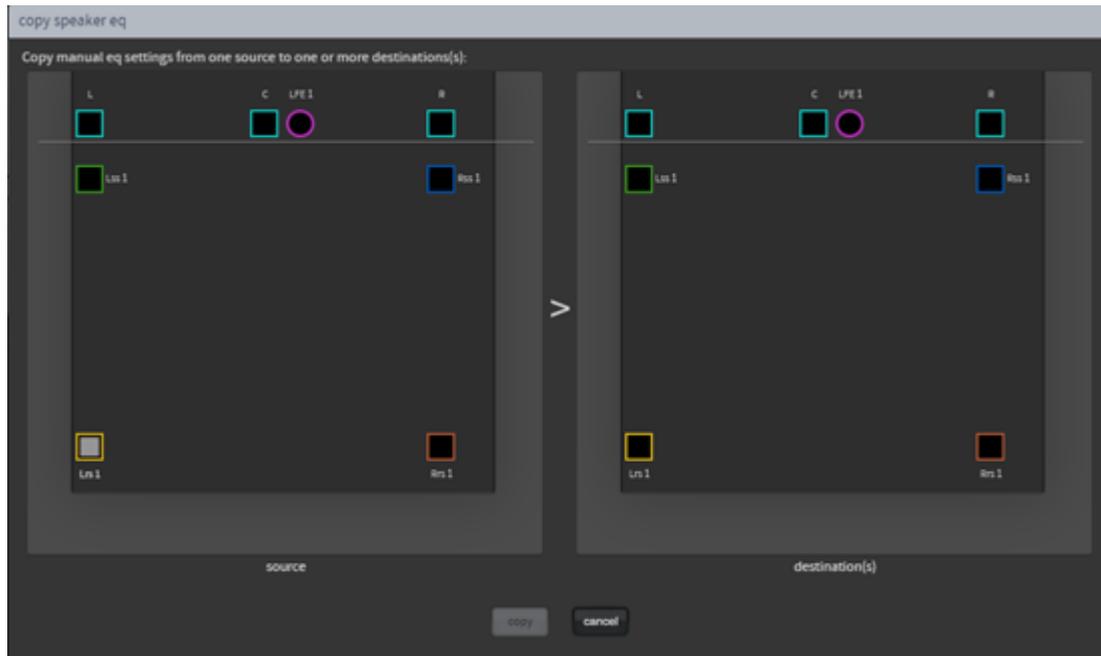


## Real-time analyzer EQ display slider

Drag the slider or click the up and down arrow buttons (shown in the following figure) to zoom in on areas of the real-time analyzer EQ display.

Figure 75: Real-Time Analyzer EQ display slider
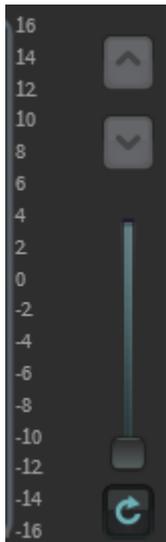


## Graphic equalizer

Click on the **graphic eq** button, as shown in the following figure, and drag each slider to adjust the gain throughout the range of frequencies, as shown on the real-time analyzer EQ display. This is the standard one-third octave EQ. Click the **flatten** button to flatten the curve.

*Figure 76: Graphic Equalizer*



## Bass and treble

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

*Figure 77: 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 78: Output level*
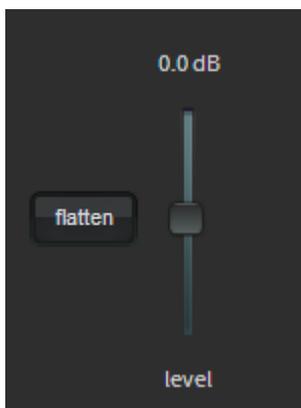
**Related information**

### 3.3.1 Fine tuning with the Grossman eq

You can use Grossman eq to fine-tune room settings.

**About this task**

Grossman eq is an equalization tool that enables finer room tunings. It is provided for technician- or admin-level users. As you zoom in on the display, it allows you to control a narrower band EQ. This tool displays an interface that provides users with the ability to utilize the one-twelfth octave capabilities of the Dolby CP950/CP950A equalizer. The existing bass, treble, and one-third octave controls provide broadband equalization at fixed frequencies that limit equalization flexibility. Grossman eq provides controls that allow users to narrowly or broadly adjust the frequency response at any point from 20 Hz to 20 kHz.

**Procedure**

1. When you click **equalization** in the navigation bar, and then click the **edit** button to edit equalization for a custom preset, a **Grossman eq** button appears in the **equalization** screen (to the left of the **graphics eq** button), as shown in the following figure.

*Figure 79: Grossman eq button*



2. When you click the **Grossman eq** button, the Grossman eq screen appears, which is shown in Chapter 4 along with a complete description of the Grossman eq parameters.

## 3.4 Displaying the auditorium parameters

You can display the auditorium configuration summary and routing information.

**Procedure**

Select **auditorium** in the **setup** menu, as shown in the following figure.

*Figure 80: Select auditorium*
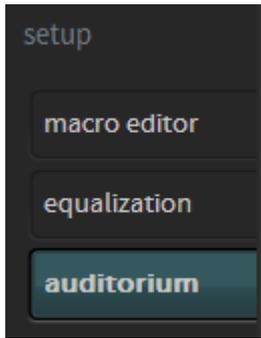


The **auditorium** screen appears. In room view (under the **summary** tab), the speakers are displayed according to their x and y coordinates with the corresponding configuration summary. The following three figures show a CP950 configuration with no crossovers, a CP950A configuration that includes two crossovers (designated by ✗ icons), and a CP950A configuration with no crossovers. The icon with four small squares at the center channel indicates that there are multiple speaker feeds with the same positional data in that location (center and LFE). When you click on this icon, it expands to show the speakers that share this positional data. As a reminder, the CP950 cannot use top surrounds.

*Figure 81: CP950 auditorium summary display (room view with no crossovers)*
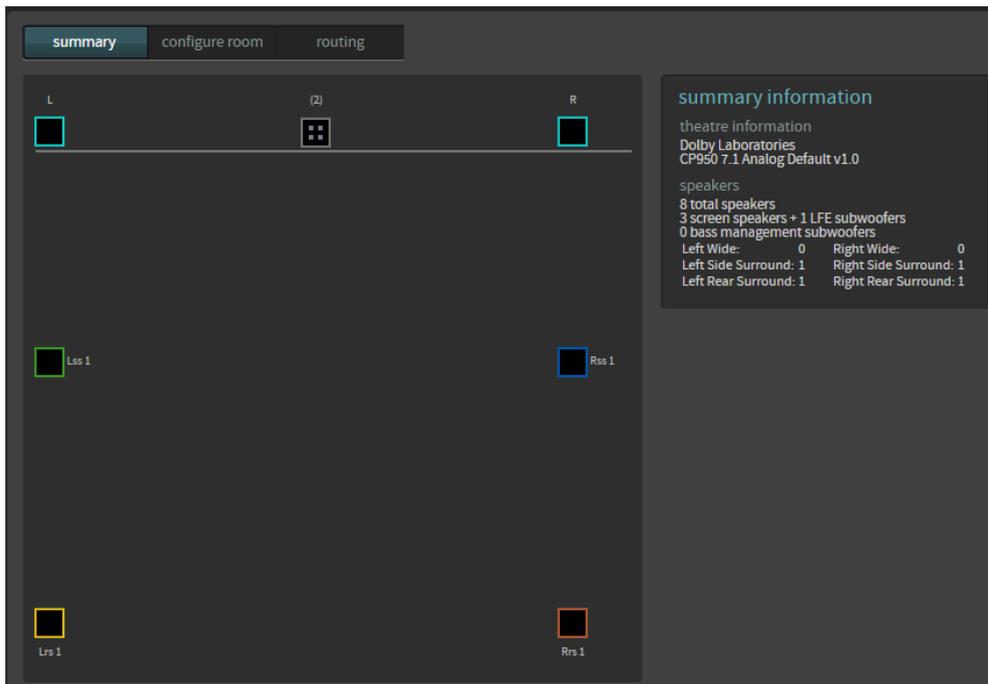
Figure 82: CP950A auditorium summary display (room view with crossovers)
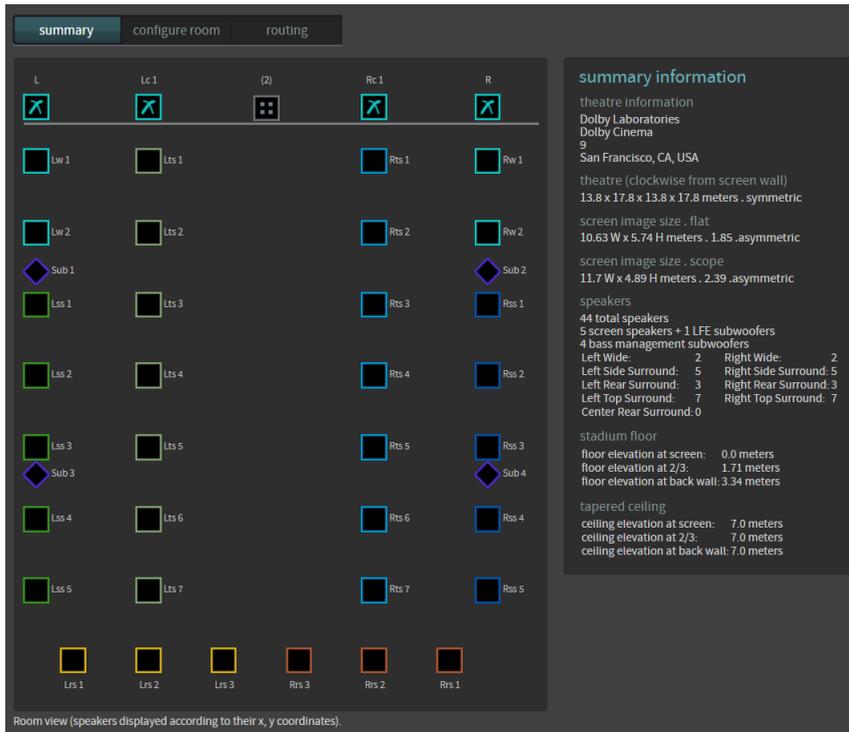


Figure 83: CP950A auditorium summary display (room view with no crossovers)
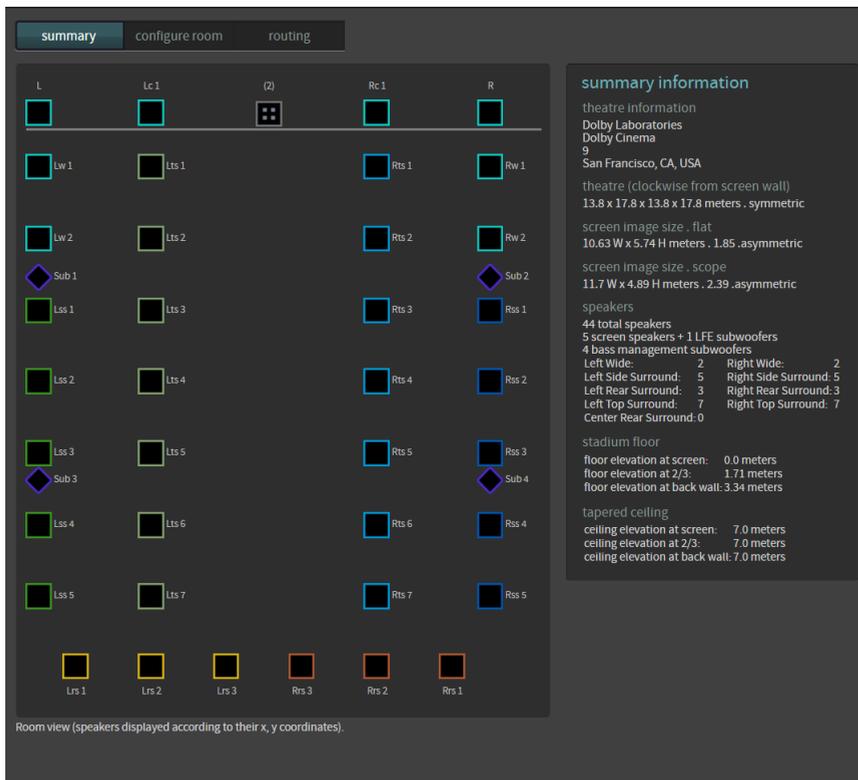


When you hover your mouse on any of the solid-colored icons, information appears, as shown in the following figure. This information includes: channel name, position, array (if assigned to an array), routing, speaker data (if populated), and bass management assignment (indicating the BM speaker used to help the highlighted speaker) if bass management is applied.

*Figure 84: Hover mouse over icon to display additional information*
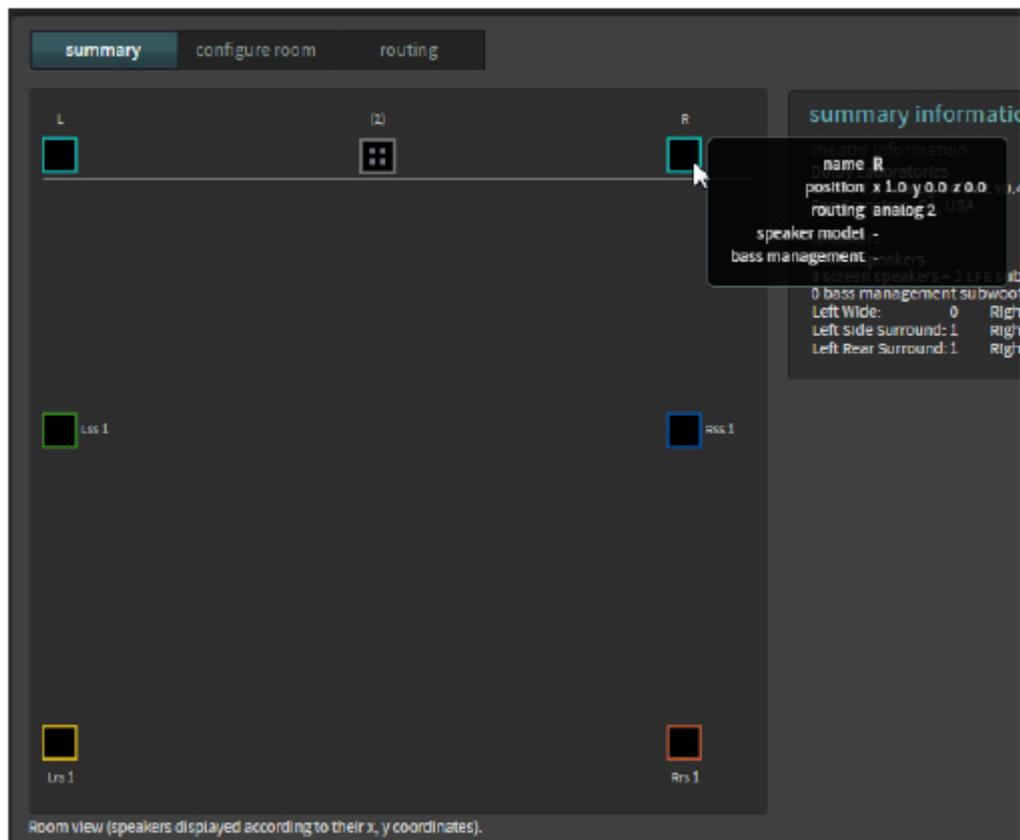


If you have multiple speaker feeds with the same positional data, an icon with four small squares appears. When you click on this icon, it expands to show the speakers that share this positional data.

## 3.4.1 Configuring a room

You can configure a room using predefined room configurations (CP950 in standard 5.1 or Dolby Surround 7.1 rooms) or Dolby Atmos Designer (DAD). You should always configure CP950A Dolby Atmos rooms with DAD. You select the desired room configuration using the **configure room** tab.

**Procedure**

1. Click the **configure room** tab to select how the CP950/CP950A defines the room size and surround speaker delay arrays. The **configure room** screen appears, as shown in the following figure using the CP950A as an example with Dolby Atmos Designer selected for the **room configuration**. When you select **Dolby Atmos Designer**, the system does not use the other values in this screen.

*Figure 85: Configure room screen*



2. To configure an auditorium without DAD, click in the **room configuration** field to display a drop-down menu, as shown in the following figure, which uses the CP950 as an example.
3. Select the desired room configuration, and then use the distance fields to enter the appropriate distances so the system can calculate the surround delays, and then click **apply**. Note that the surround delays are stored and calculated in meters, so if measurement units are set to feet there may be slight changes after the configuration is saved and reloaded.
4. To manually override the system-calculated delays, toggle the **use configure room values** field to the **off** position, and then enter the required array delays, and click **apply**. This provides you with a fine control that is not normally required. In most cases, you should use the information entered in DAD or the system-calculated values.

*Figure 86: CP950 room configuration with drop-down menu*

When using DAD to define your room configuration, after uploading the DAD room configuration to the CP950/CP950A, Dolby Atmos Designer is automatically selected for the room configuration and the system uses the DAD room configuration. Dolby Atmos Designer appears in the drop-down list only after a room configuration is uploaded from DAD. When using DAD to configure an auditorium, you cannot make entries in the distance fields.

📄 **Note:** When using a 5.1 or Dolby Surround 7.1 default room configuration (described in detail in Section 4.1), the placement of the speakers in the web client does not need to be accurate for surround delay compensation settings to work properly. Only the entered values on the page must be correct.

**Related information**

Configuring equalization with the CP950 real-time analyzer on page 88

## 3.4.2 Displaying the routing configuration

You can view the routing configuration using the **routing** tab.

**Procedure**

1. To view the routing configuration, click the **routing** tab.

   In this screen, the output routing channel is identified within each icon, as shown in the following figure. If it is a digital output, the routing icon is a square. If it is an analog output, the routing icon is a circle. The number inside each icon indicates the output channel number assigned to that speaker position.

   *Figure 87: View routing configuration*
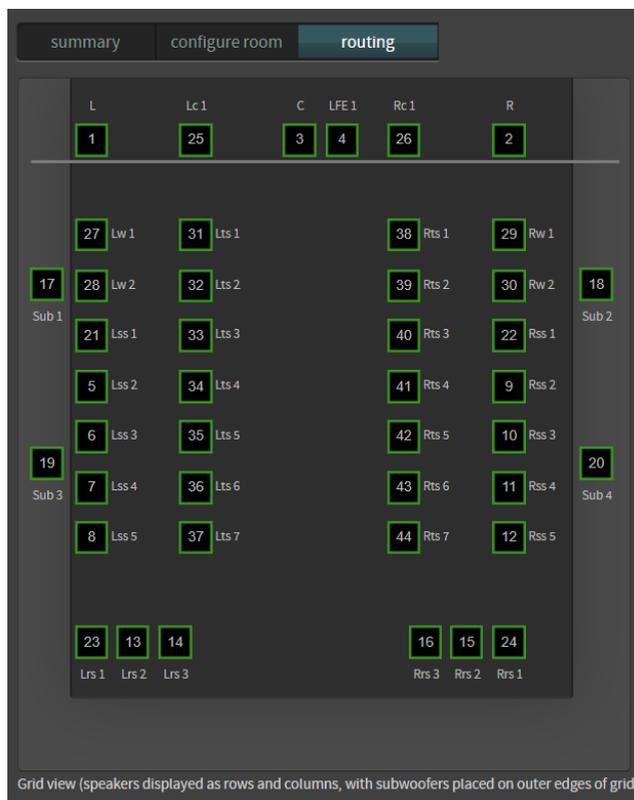
   

2. When you hover your mouse on any of the icons, the following information appears (as shown in the following figure):
   - Channel name.
   - Position in the room in x,y,z coordinates. The position shown is not critical for surround speakers in 5.1 or 7.1 rooms.

- Array (if assigned to an array).
- Routing.
- Speaker data (if populated using Dolby Atmos Designer).
- Bass management assignment (indicates which subwoofer receives low frequency audio for the highlighted speaker). This information appears only if bass management is applied in Dolby Atmos Designer.

*Figure 88: Hover mouse to display channel information*
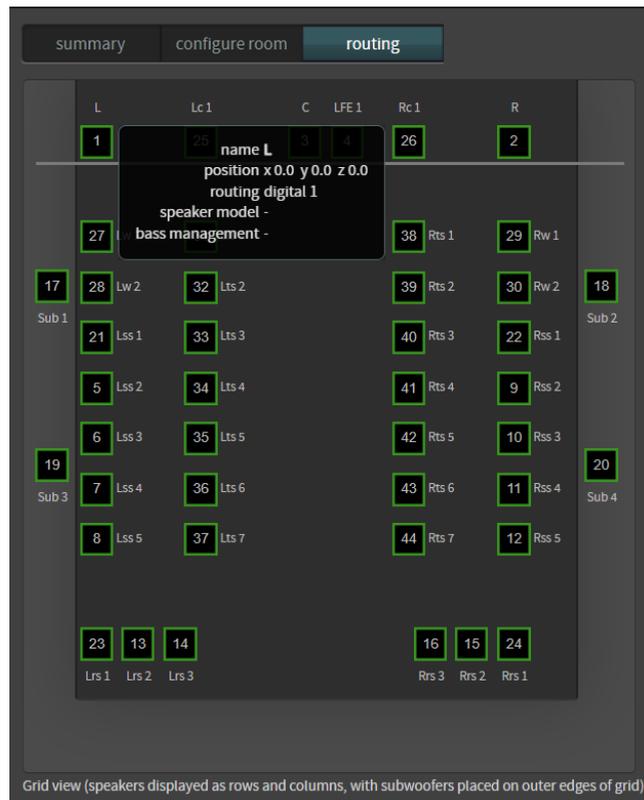


## 3.5 Configuring preferences

You can configure preferences using the **system** menu.

**Procedure**

1. Select **preferences** in the **system** menu, as shown in the following figure.

*Figure 89: Select preferences in system menu*
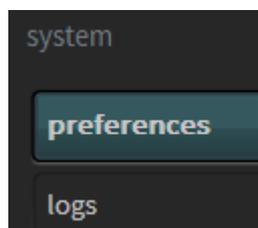


The **preferences** screen appears, as shown in the following figure.

*Figure 90: Preferences screen*
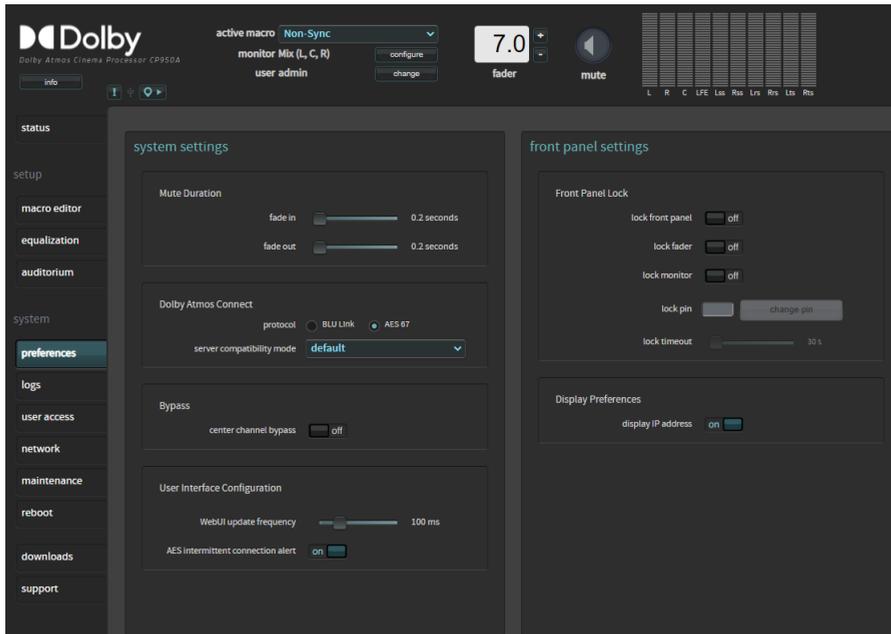


2. Enter the Dolby CP950/CP950A **fade in** and **fade out** values when switching macros (or muting) under **mute duration**. Each **fade in** and **fade out** setting has a range of 0.2 to 5 seconds, in 0.1-second increments. You can set these values by moving the respective sliders.

   📄 **Note:** Changing this setting from one value to another may cause a brief loss of sound in the auditorium, as the system realigns to the new setting. We do not recommend changing this setting while guests are in the auditorium.

3. Under **Dolby Atmos Connect protocol**, select between **AES67** or **BLU Link** protocols for the Dolby CP950/CP950A digital outputs. You can use only one of these protocols at a time.

   📄 **Note:** The system takes several minutes to complete this operation and automatically reboots when switching between AES67 and BLU Link.

   📄 **Note:** If you select **BLU Link**, you can use the **1x AES IN B** BNC input for a word clock. When you select a current macro, the valid 48 kHz word clock signal must be present on this BNC input. The word clock signal must be a square wave at 48 kHz, not an AES3 signal. If the system drops or interrupts the word clock for more than one period, internal clocking returns and the word clock does not resume until you reselect the macro with the word clock present. The system provides the word clock state in the logs, but not in the FPUI or web client.

4. Under the **Dolby Atmos Connect protocol** field, select a **server compatibility mode** based on type of server you are using. We recommend the settings that correspond to specific servers, which are listed in the following table. All mode changes take effect immediately.

   For the CP950A, the protocols used to communicate with servers not manufactured by Dolby may require the CP950A to operate in a special mode. The CP950 does not require any special setting.

*Table 3: Dolby Atmos Connect protocol server compatibility modes*

| Server compatibility mode | Server manufacturer | Notes |
|---|---|---|
| Default | Dolby servers and any server manufacturer not specifically listed here. | If playback issues occur using the default mode, you can use mode 2. |
| Mode 1 | Barco servers | |

*Table 3: Dolby Atmos Connect protocol server compatibility modes (continued)*

| Server compatibility mode | Server manufacturer | Notes |
|---|---|---|
| Mode 2 | Sony servers | |
| Mode 3 | Qube servers | If playback issues occur with Qube servers using mode 3, you can use the default mode. |

**Note:** Server compatibility is subject to change, as Dolby and other digital cinema playback system manufacturers make changes to systems.

5. If there is a problem with the center channel speaker, enable **center channel bypass** by clicking its **on/off** button, which toggles between **on** and **off**.

   Enabling the bypass (**on**) sends center channel audio to the left and right speakers. You can run in this mode until the center channel speaker problems are resolved.

6. If your network connection is slow, specify the **interface update frequency** by moving the respective slider. This setting allows you to indicate how many updates per second the web client UI sends.

   If your network connection is slow, you can increase this value using the slider, which has a range of 50 ms (fast updates) to 10,000 ms (slow updates). Slower updates result in a more responsive user interface, but fewer updates to the audio meters. Connecting over the network to the CP950/CP950A (locally or remotely) results in a web client update at the specified frequency.

7. To enable or disable the **AES intermittent connection** alert, move the respective slider to **on** or **off**. This setting defaults to **on**, which functions the same as in previous software versions. If the AES3 connection to the playback system is lost intermittently, an alert appears. With some media blocks, the AES3 connection is reset often, causing false positives so you can now set the **AES intermittent connection** alert to **off**.

8. If you want to specify whether the FPUI displays the CP950/CP950A IP address, click the **front panel configuration** > **display IP address on/off** button, which toggles between on and off. This option is provided because some customers do not want the IP address displayed.

9. To lock the CP950/CP950A front panel from unauthorized access, you need to use a four-digit pin code. You must have manager-level privileges or higher to access this feature. In the **Front Panel Lock** pane, there are separate options: **lock front panel**, **lock fader**, **lock monitor**, and **lock pin**. When you click **on** for one of these options, a dialog box prompts you to enter a numeric four digit pin to lock or unlock the front panel interface. All options are all set to **off** by default. You can also change the pin and set a pin timeout interval.

## 3.6 Viewing and downloading the system logs

The logs display information regarding the Dolby CP950/CP950A system. You can view the logs by clicking **logs** in the **system** menu at the left side of the screen, as shown in the following figure, or download the logs to review them offline or to send to your support team. The system may take several minutes to compile a complete set of logs.

*Figure 91: Select logs*
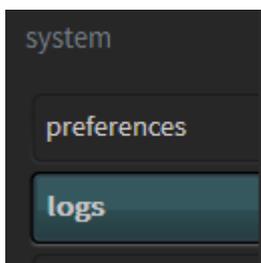


The **logs** screen appears, as shown in the following figure.

You can download the logs in a `.tgz` file by clicking **download** in the lower-right corner of the **logs** screen, as shown in the following figure. When downloading logs, the system gathers all information, regardless of the filters you set in the web client. At the root of the file is a `report.txt` file that contains basic system information. This single file provides helpful information on the versions, configuration, and Dolby CP950/CP950A status. Note that gathering logs can take some time, from 30 seconds to (rarely) 5 minutes.

You can use the Dolby Log Analyzer (http://loganalyzer.dolbycustomer.com/) to import log files and obtain useful information to diagnose common problems.

You can filter the logs by **level**, **category**, or **start time**/**end time** by clicking the respective area and making the desired selection, or by clicking **show all** to remove all filters.

*Figure 92: Event logs screen (all levels, all categories selected)*
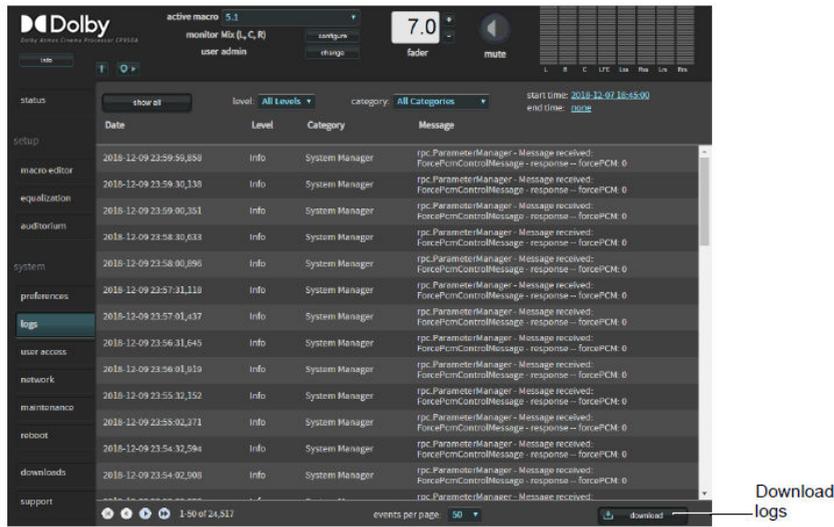


When you click the **level** field, the corresponding drop-down menu appears, where you can select the user log display level, as shown in the following figure.

*Figure 93: Level menu*



You can display all or only one of these user log levels:

- **Info** specifies the lowest level of severity and is generally informative.
- **Warning** specifies medium severity and is highlighted in yellow.
- **Error** specifies an alert of high importance and is highlighted in red.

## Category

When you click the **category** field, the corresponding drop-down menu appears, where you can select a user log display category, as shown in the following figure. These items allow you to display events from a specific system component.

*Figure 94: Category menu*
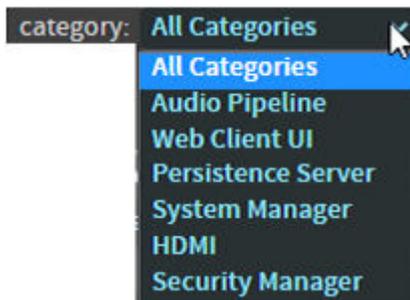


## Start time/end time

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 check mark to display the specified log. If you click the x, the system displays all time frames (same as **All**). However, when you download logs, the system does not use these time frames. All logs are downloaded, regardless of time frames.

*Figure 95: Start time/end time fields*



# 3.7 Setting up user access

You can set up user access for your login and other users' logins.

**About this task**

You need administrator privileges to set up user access.

**Procedure**

1. Select **user access** in the **system** menu, as shown in the following figure.

   *Figure 96: Select user access*
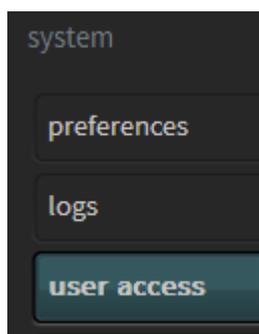
   

   The **user access** screen appears. In this screen, if you are a system administrator, you can change (or reset) the default administrator password (`admin`) and set up (or reset) user access and passwords for all other users. The other access levels have default passwords that match their logins (**technician**/**technician**, **manager**/**manager**, **operator**/**operator**).

*Figure 97: User access screen*
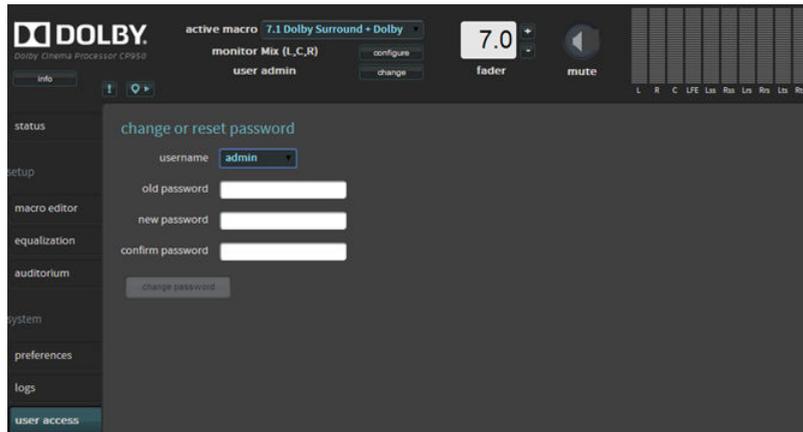


2. Click the **username** field.

   The **username** menu appears with a list of all user levels, as shown in the following figure.

*Figure 98: Username menu*
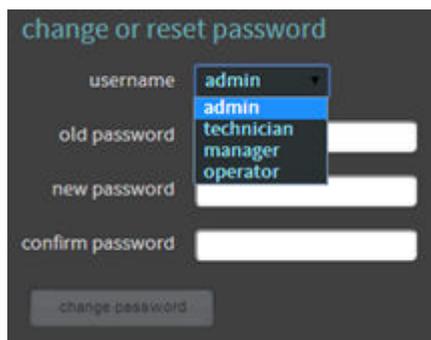


3. Select a user name, enter the old password, enter the new password, and then confirm the new password in the respective fields.

   - 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. 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, and change the operator- and manager-level passwords.

   - **admin**: Access all technician-level tasks, and change the operator-, manager-, and technician-level passwords.

## 3.8 Modifying the network settings

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

*Figure 99: Select network*
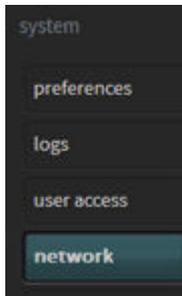


The **network** screen appears, as shown in the following figures. In this screen, you can change the host name, specify a Network Time Protocol (NTP) server, and modify the IP configuration for the **command** network port by clicking on **manual** and entering the desired settings. In addition, you can click on the tabs for modifying the **Dolby Atmos Connect** settings, as described later in this section, and modifying the **SNMP** settings. For complete details on SNMP and its settings, see Section 10.3. (A link is provided at the end of this section.)

> **Note:** The CP950 and CP950A perform internal networking within an IP address range of 172.16.x.x. Do not configure the CP950 or CP950A command network IP address into any of the following ranges: 172.16.0.x, 172.16.1.x, 172.16.2.x, or 172.16.3.x.

*Figure 100: CP950 network settings screen*
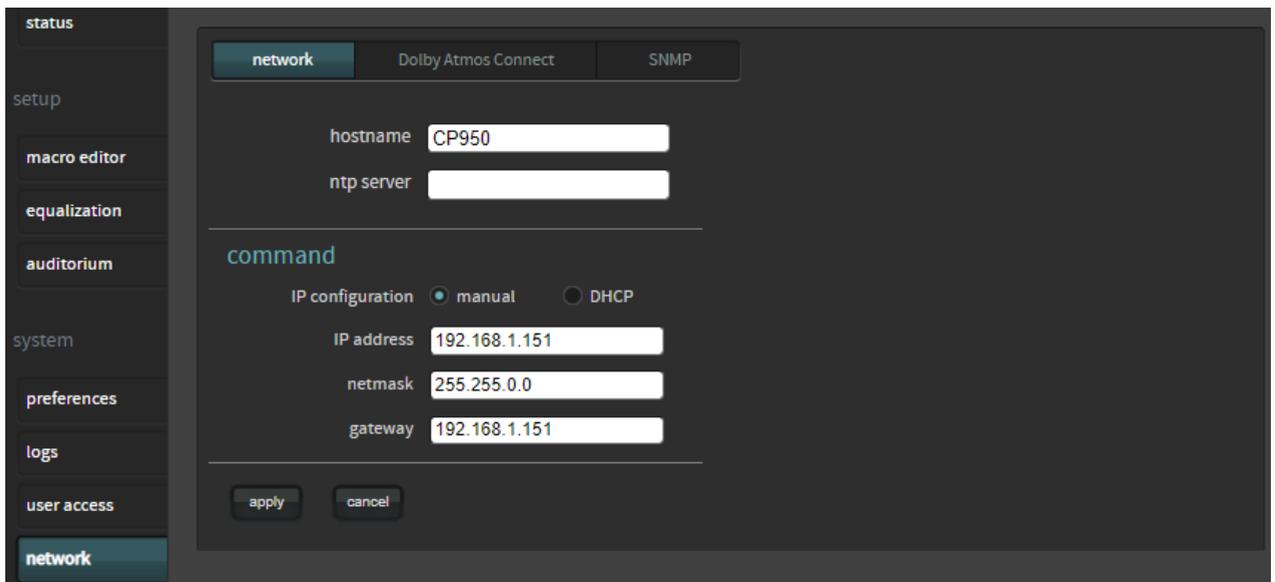


The CP950A has an additional configuration. You can enter the **Dolby Atmos input** port network settings, as shown in the following figure.

*Figure 101: CP950A network settings screen*



If you click the **Dolby Atmos Connect** tab, you can change the Dolby CP950 or CP950A digital output settings. This is the most efficient method for connecting to other digital devices, for example, a Dolby Multichannel Amplifier or Dolby DAC3202 using AES67.

The following figure shows the default AES67 settings.

*Figure 102: Setting up Dolby Atmos Connect for CP950/CP950A*



If you are integrating with devices supplied by any party other than Dolby, you can check **advanced mode** and enter source and destination Real-time Transport Protocol (RTP) settings for channels 1-8 and 9-16 on a CP950 and channels 1-8, 9-16, 17-24, 25-32, and 33-40, 41-48, 49-56, and 57-64 on a CP950A, as shown in the following figures.

*Figure 103: Setting up Dolby Atmos Connect advanced mode for CP950*



*Figure 104: Setting up Dolby Atmos Connect advanced mode for CP950A*



Following is a description of the **Dolby Atmos Connect** parameters.

## Static source IP address

In this field, you can change the default Dolby Atmos Connect static IP address. You do not need to change this default value. However, all other devices in the audio chain should have similar IP addresses within the same subnet, except for the last octet, which you need to change so there are no IP address conflicts.

## PTP domain number and priority

PTP (precision time protocol) maintains the audio synchronization between the playback device and any connected devices within an auditorium, such as a Dolby Multichannel Amplifier or Dolby DAC3202. The default setting is **109**. If only one auditorium within a facility has a Dolby Multichannel Amplifier installed, we recommend that you retain this default value.

If more than one auditorium in a cinema complex has a Dolby Atmos Connect Network, we recommend keeping the networks separate, so you can use the same PTP parameters for the screen in each network.

In some cases, you may have more than one auditorium interconnected on the same network. We do not recommend such a configuration. In such cases, you must enter unique PTP values for each auditorium. The

PTP domain number in this field must match the PTP domain number in the other connected devices in the auditorium. For example, you can set one auditorium to 109, the next auditorium to 110, and so on.

PTP priority specifies the most trusted clock. A lower-number device is trusted more than a higher number. You should set **PTP priority 1** to 127. This is the default setting and correctly sets the DolbyCP950/CP950A as the highest priority clock in the AES67 network with other Dolby devices that use 128 or a higher priority. You can use **PTP priority 2** to specify the higher-priority clock if there is a tie with more than one device in **PTP priority 1**. Normally, you can just rely on the **PTP priority 1** value, and **PTP priority 2** can remain at the default value of 128.

## Destination multicast IP

The destination multicast IP address identifies the main IP address used in audio transmission. The Dolby CP950/CP950A and any downstream devices in the auditorium should use the same exact IP address.

The default IP address is 239.81.83.67 for the Dolby CP950/CP950A, Dolby Multichannel Amplifier, and Dolby DAC3202.

If more than one auditorium has a Dolby Atmos Connect Network, we recommend keeping the networks separate so you can use the same destination multicast parameters for the screen in each network.

In some cases, you may have more than one auditorium interconnected on the same network. We do not recommend such a configuration. In such cases, you must enter a different unique destination multicast IP address for each auditorium.

## RTP source and RTP destination UDP ports

The system transmits audio in streams of eight channels. The Dolby CP950 is a 16-channel audio processor, which provides two streams of eight channels. The CP950A is a 64-channel audio processor, which provides eight streams of eight channels.

The system sends audio packets with two important values: RTP source and RTP destination User Datagram Protocol (UDP) ports. Downstream devices with matching values accept these audio packets and ignore packets with no matching values. Dolby devices have a default schema for these ports.

The default channels 1-8 are:

- Source = 6518
- Destination = 6517

The default channels 9-16 are:

- Source = 6519
- Destination = 6517

The default channels 17-24 are:

- Source = 6520
- Destination = 6517

The default channels 25-32 are:

- Source = 6521
- Destination = 6517

The default channels 33-40 are:

- Source = 6522
- Destination = 6517

The default channels 41-48 are:

- Source = 6523
- Destination = 6517

The default channels 49-56 are:

- Source = 6524

- Destination = 6517

The default channels 57-64 are:

- Source = 6525
- Destination = 6517

If you hover over these fields, you can enter the desired UDP settings for each channel bank.

You can manually change the source and destination RTP ports by checking the **advanced mode** box. This enables you to easily set up a configuration for a device supplied by any party other than Dolby.

For more information on Dolby Devices and AES67, please visit our Vimeo web page that includes a specific video on AES at https://vimeo.com/435856534.

**Related information**

Simple network management protocol on page 167

## 3.9 Performing maintenance tasks

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

*Figure 105: Select maintenance*
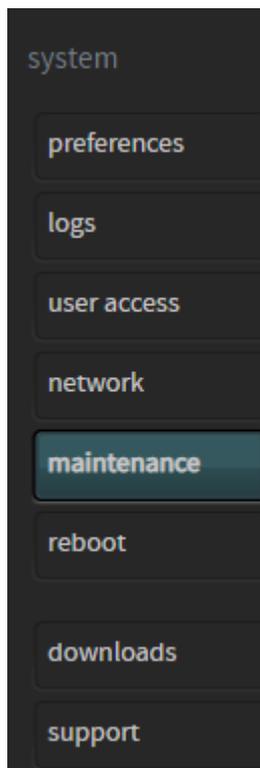


The **maintenance** screen appears with the **status** tab activated in the **system management** pane, as shown in the following figures for a CP950 and CP950A. When the **status** tab is selected, you can check the system status for current component temperatures, and the state of CP950/CP950A power supply fans 1 and 2 and CP950A CAT1710 fans 3 and 4. Green illumination is good, while red indicates an error. In addition, you can upgrade the system by clicking the **upgrade** tab in the **system management** pane, and back up, restore, and reset system settings in the **settings management** pane.

The CP950A has three additional functions in this screen. You can install a Dolby Atmos enablement using the **enablements** tab, set the secure time, and download security logs, as described in the following sections.

**Note:** The security logs are available only when used in a dual-KDM system (Dolby IMS3000 or Barco Alchemy).

*Figure 106: CP950 maintenance screen*
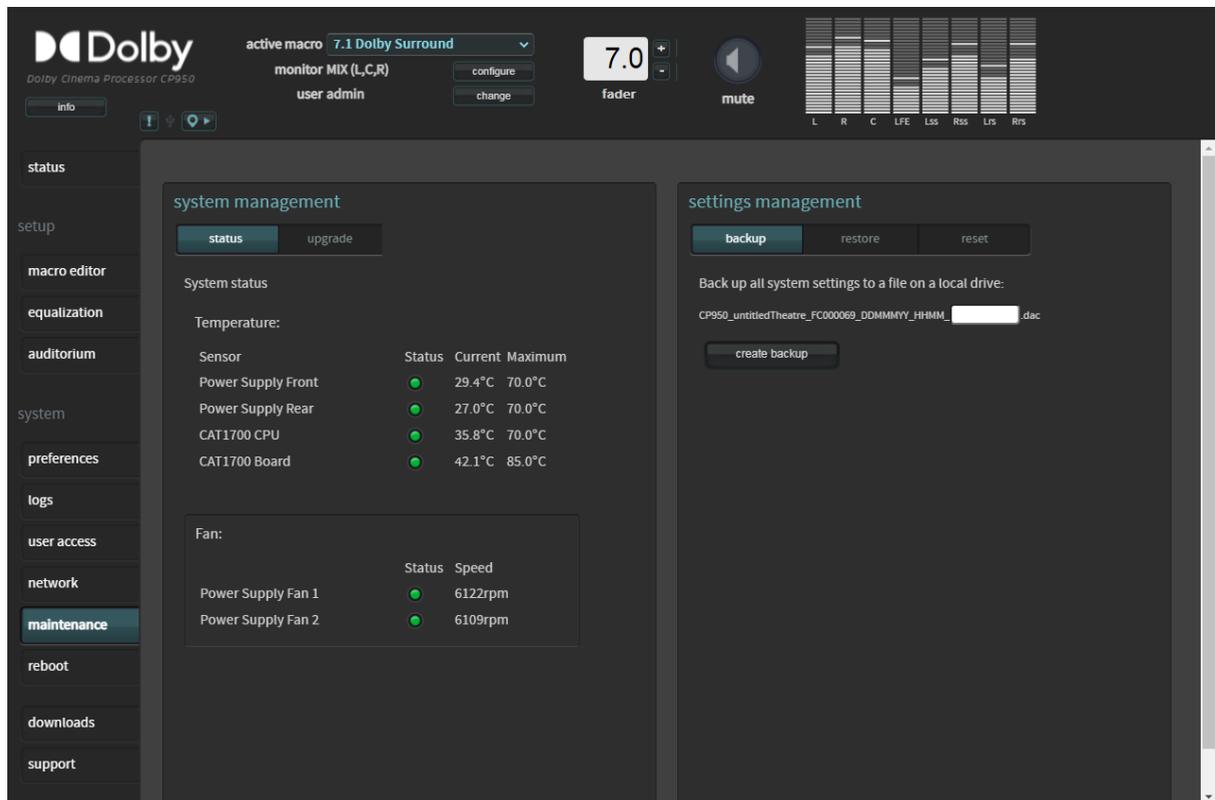
*Figure 107: CP950A maintenance screen*
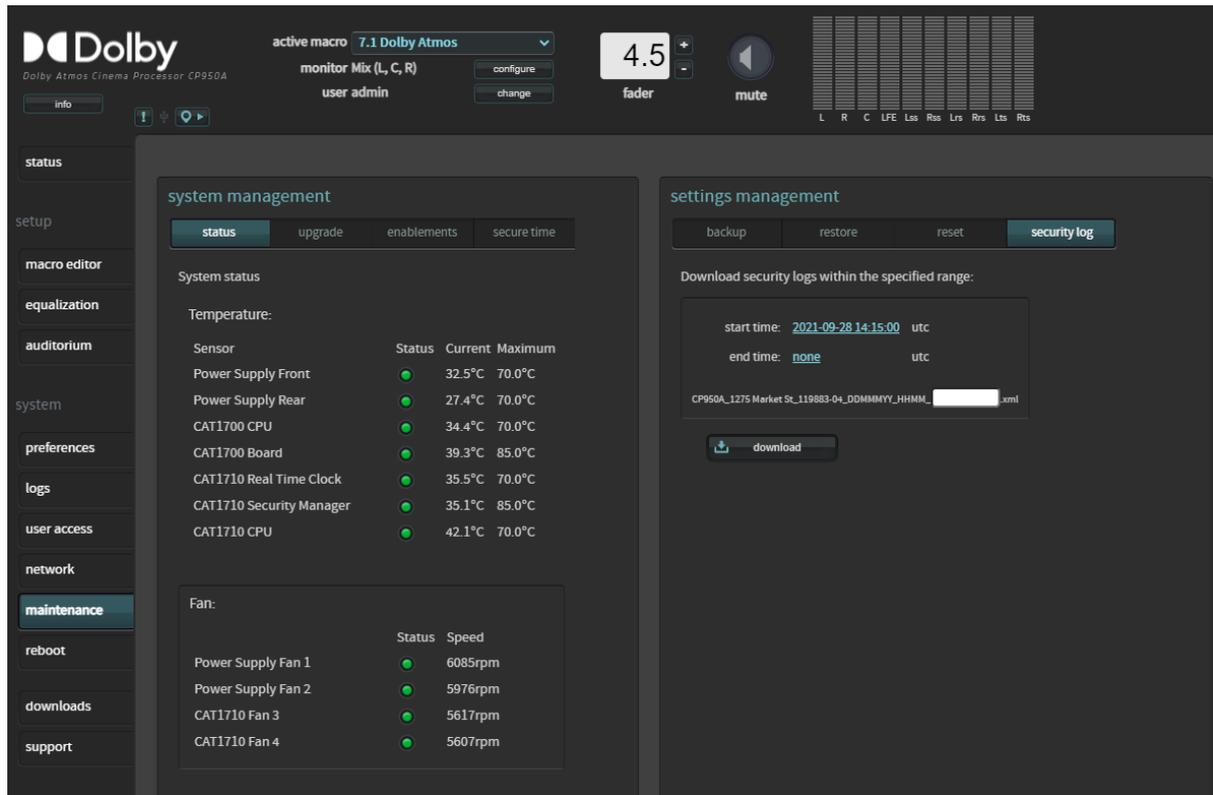


## 3.9.1 Upgrading the CP950 or CP950A system software

You can upload your Dolby CP950/CP950A system software upgrade in the **maintenance** screen. Alternatively, you can perform the upgrade locally using a USB storage device.

**Upgrading the CP950 or CP950A system software in the maintenance screen**
You can upload your Dolby CP950/CP950A system software upgrade in the **maintenance** screen.

**Procedure**

1. Obtain the `.dlb` upgrade file from Dolby Laboratories at https://customer.dolby.com.
2. Copy the upgrade file to your local disk.
3. Click the **upgrade** tab in the **maintenance** > **system management** pane.
4. Click **choose file**, select the upgrade file on your local disk, and 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 Dolby CP950 when the upgrade is completed.

   **Note:** If you are upgrading from system version 1.0.0, 1.0.2, or 1.0.3, you must upgrade to system 1.0.4.2 first before performing upgrades at a higher version.

   **Note:** In some situations, the memory on the CP950/CP950A may be full and the system will not have enough space to load and run the upgrade. If this occurs, you may see a **Bad Format** error displayed. In such a case, hard power cycle the CP950/CP950A to allow the upgrade to proceed.

### Upgrading the CP950 or CP950A system software locally

Beginning with system v2.2.0.x or later, you can perform an upgrade locally using a USB storage device (flash drive). USB hard drives are not supported.

**Procedure**

1.  Copy the CP950/CP950A `.dlb upgrade` file to a USB storage device.
2.  Rename the `.dlb` file to `upgrade.zip`.
3.  Insert the USB storage device containing `upgrade.zip` into the USB port on the back of the CP950/CP950A. The front-panel user interface (fpui) displays an **auto upgrade** message where you can start the upgrade or cancel it.
4.  Select **OK** to start the upgrade. The unit reboots when the upgrade is complete, and then you can remove the USB device.

## 3.9.2 Installing an enablement (CP950A only)

To allow a CP950A to play back Dolby Atmos content, you must install an enablement (license) in the **maintenance** screen. Without a valid enablement installed, Dolby Atmos playback from a Digital Cinema package (DCP) is not possible.

**Procedure**

1.  Click the **enablements** tab in the **maintenance** > **system management** pane.
2.  Click **Choose File**, browse to the file that you want to upload, click **upload**, confirm the upload file, and then click **apply enablement**. The system installs the enablement, and the installed enablement appears at the bottom of the **enablements** pane. You can also verify a successful upgrade by clicking **info** at the top-left side of the web client.

## 3.9.3 Setting the secure time

The CAT1710 is a secure media block with a real-time clock (RTC). Clocks can drift over time. If needed, you can adjust the CP950A secure time forward or back by up to six minutes in the **maintenance** screen.

**Procedure**

1.  Click the **secure time** tab in the **maintenance** > **system management** pane.
2.  Click in the **enable secure time update** box to check that box, enter the desired time (the valid range is displayed), and then click **apply**.

## 3.9.4 Backing up system settings

You can back up your system settings in the **maintenance** screen. During a backup, all system settings are saved to a file.

**About this task**

The backup tool enables you to back up all of the Dolby CP950/CP950A system settings, which includes:

*   Auditorium configuration: Size and shape of room, channel routing, and EQ presets
*   Current macros and delays
*   Preferences and network settings
*   Current system state (active macro, fader level, alerts, and so on) at the time of the backup (collectively called operational state snapshot)

**Procedure**

1.  Click the **backup** tab in the **maintenance** > **settings management** pane.

    The system defines the name of the backup file, but you can add additional information in the provided box.
2.  Click the **create backup** button to save the `.dac` restore file in the designated directory on your PC.

### 3.9.5 Restoring system settings

You can restore your system settings in the **maintenance** screen.

**About this task**

The restore tool enables you to restore all of the Dolby CP950/CP950A system settings (except user access) or select specific settings (by clicking in the corresponding boxes).

**Procedure**

1. Click the **restore** tab in the **maintenance** > **settings management** pane, and then click **Choose File** to select a `.dac` restore file.
2. Click the **restore** button at the lower-left side of the **settings management** pane to run the restoration process.

   **Note:** If you are copying settings from a failed cinema processor to a new/replacement unit, the error from the failed unit may persist on the new unit. If this occurs, reset the operational state snapshot as described in the next section.

### 3.9.6 Resetting the system settings

You can reset your system settings in the **maintenance** screen.

**About this task**

The reset tool enables you to clear the current Dolby CP950/CP950A settings and start over in different parts of the system. Resetting the current system state (collectively called operational state snapshot) may help to clear false alerts.

**Procedure**

1. Click the **reset** tab in the **maintenance** > **settings management** pane.

   You can reset your system to the factory defaults (except for user access) or reset specific factory settings (by clicking in the corresponding boxes).
2. Click the **reset** button at the lower-left side of the **settings management** pane to run the reset operation.

### 3.9.7 Downloading security logs

You can download CP950A security logs in the **maintenance** screen.

**About this task**

The CP950A security log contains a playback log of all encrypted content. This log is available only when the CP950A is used in a dual-KDM system (Dolby IMS3000 or Barco Alchemy are currently the only two systems using this protocol). When paired with other servers, this security log is blank.

**Procedure**

1. Click **security log** in the **maintenance** > **settings management** pane.
2. Enter a **start time** and **end time** for the logs you want to download.
3. Enter a name for the security logs file.
4. Click the **download** button to save a security logs `.xml` file to the **downloads** folder on your computer.

## 3.10 Rebooting the system

You can reboot the system from the **system** menu.

**Procedure**

If you have technician- or administrator-level access, you can reboot the Dolby CP950/CP950A by clicking **reboot** in the **system** menu, as shown in the following figure, and then clicking the displayed **reboot** button.

A prompt appears where you need to enter your password. Note that this is a soft system reboot and may not fix some problems that you may experience. In some situations, a hard reboot (removing the power cord for 10 seconds) can be very useful if you are troubleshooting a system lockup.

*Figure 108: Reboot*
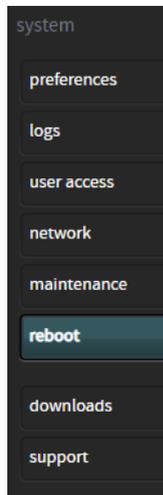


## 3.11 Downloading CP950 and CP950A essentials

You can access essential items by clicking **downloads** in the **system** menu.

You can access:

- This CP950/CP950A manual.
- Software documentation.
- Dolby Atmos Designer software (Microsoft Windows and Apple Macintosh versions).
- Web services WSDL/SOAP document that provides information for controlling the CP950/CP950A using an application programming interface (API). With the release of the CP950A, there is a new version of the web services API. There is still some support for version 1.1, which is backward compatible with the CP850, but we highly recommend using the newest API. Commands and polling information are included in this web services file.
- SNMP management information base (MIB) files for remote monitoring.
- CP950A Certificate. This public key certificate is used to create Dolby Atmos playback keys for the CP950A when configured with an IMS3000 or other devices that use dual KDM protocols. (Not available on the CP950.)
- End-user License Agreement (EULA).

*Figure 109: Select downloads in system menu*
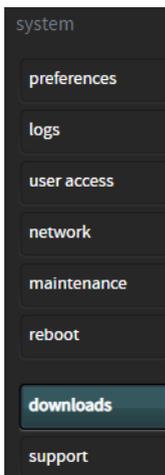


## 3.12  Contacting Dolby support

To find information on how to contact the Dolby Cinema Solutions and Support team, click **support** in the **system** menu.

*Figure 110: Support in system menu*

4
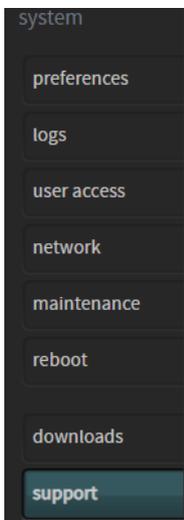
# Configuring the equalization parameters

This chapter describes three methods for configuring the Dolby CP950/CP950A equalization (EQ) parameters. You can use any of these methods, depending on your requirements:

1. Equalize an auditorium with the Dolby CP950 real-time analyzer by using a default room configuration, and then use the standard one-third octave EQ (internal real-time analyzer), which is similar to the Dolby CP750 EQ (or the Grossman eq, which allows you to zoom in and make finer adjustments).
2. Configure an auditorium with crossovers or a mix of analog and digital outputs using Dolby Atmos Designer (DAD), and then upload that room configuration to the Dolby CP950/CP950A, and use the standard one-third octave EQ, which is similar to the Dolby CP750 EQ (or the Grossman eq, which allows you to zoom in and make finer adjustments).
3. Create a room configuration using DAD and use Dolby AutoEQ, which is similar to the Dolby CP850 EQ, to equalize the room.

   **Note:** To use internal crossovers or both analog and digital outputs at the same time, you must use the DAD software.

Before using any of these methods:

- Use the front panel UI (FPUI) to change the default IP address to your cinema networking standard and connect to the Dolby CP950/CP950A web client using Google Chrome version 71.x or later (for best results).
- Check the Dolby CP950/CP950A software version by clicking **info** at the upper left corner of the web client. If the version is not up to date with the current Dolby CP950/CP950A software on https://customer.dolby.com, download and install the current version. This provides the best environment for performing the installation.

  If you want to use DAD for the installation, you must use DAD version 3.3.7 or higher.

  After upgrading the CP950/CP950A to the latest version, you can download the current version of DAD software by clicking **downloads** in the Dolby CP950/CP950A navigation bar. You can also download the current version of DAD software, release notes, and manual at https://customer.dolby.com. In addition, you can access the DAD manual from the DAD software **Help** menu.

  Select the method you are using to configure the equalization parameters.

- Configuring equalization with the CP950 real-time analyzer
- Using Dolby Atmos Designer and one-third octave EQ
- Configuring a room using Dolby Atmos Designer and AutoEQ
- CP950A failover room configuration

# 4.1 Configuring equalization with the CP950 real-time analyzer

This section explains how to use the CP950 web client to configure a room and equalize the auditorium. Following the steps in this section will help you configure a room that does not use any internal crossovers and is very similar to a CP750 configuration and equalization.

> **Note:** Selecting and using a predefined 5.1 or 7.1 room is designed for use with the CP950. Installations with a CP950A are expected to use Dolby Atmos Designer to define the room and load it to the CP950A as defined in section 4.2.

## 4.1.1 Configuring a room

You can configure a room with the Dolby CP950 real-time analyzer.

**Procedure**

1. Click **auditorium** in the navigation bar at the left side of the screen, and then click the **configure room** tab to display the **configure room** screen.
2. Click in the **room configuration** field to display the drop-down menu, and then select the room configuration you want to use.

*Figure 111: CP950 configure room screen drop-down menu*
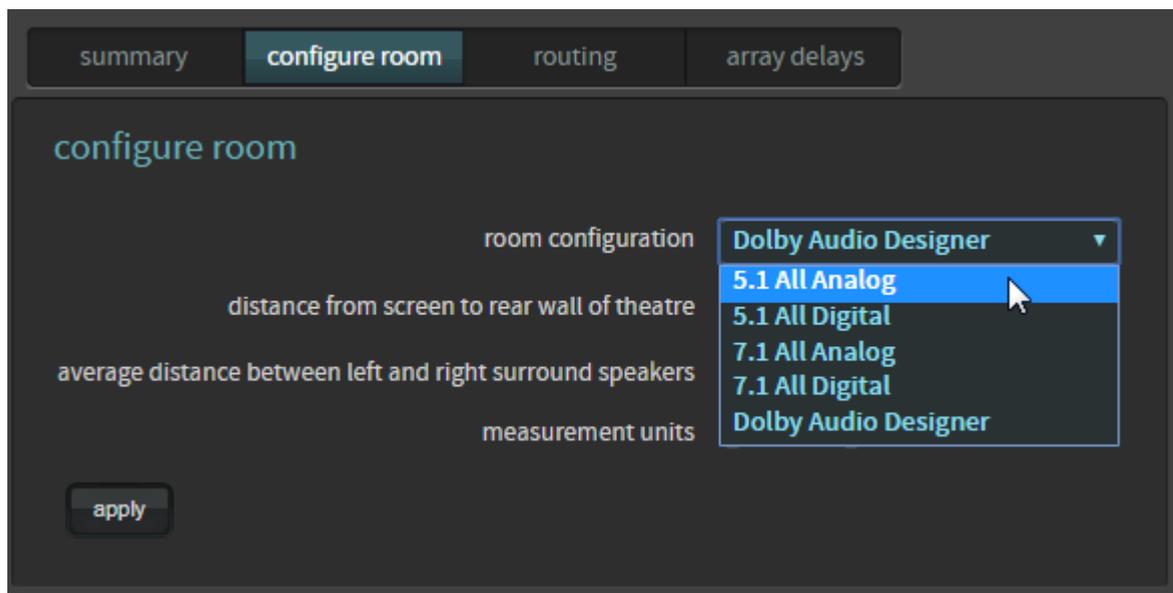


When you use the Dolby CP950 real-time analyzer, you can select a room configuration for:

- **5.1 All Analog**: Three screen channels (L, C, R), one subwoofer (Low-Frequency Effects [LFE]), and two surround zones (LSS, RSS). The system uses the top DB25 connector (**CHANNEL 1-8 ANALOG OUT**) to output all channels as analog audio.
- **5.1 All Digital**: Three screen channels (L, C, R), one subwoofer (Low-Frequency Effects (LFE)), and two surround zones (LSS, RSS). The system uses the **DOLBY ATMOS CONNECT OUT** port to output all channels as digital audio.
- **7.1 All Analog**: Three screen channels (L, C, R), one subwoofer (LFE), and four surround zones (LSS, RSS, LRS, RRS). The system uses the top DB25 connector (**CHANNEL 1-8 ANALOG OUT**) to output all channels as analog audio.
- **7.1 All Digital**: Three screen channels (L, C, R), one subwoofer (LFE), and four surround zones (LSS, RSS, LRS, RRS). The system uses the **DOLBY ATMOS CONNECT OUT** port to output all channels as digital audio.

For analog and digital 5.1 configurations, the system outputs are listed in the following table.

*Table 4: Outputs for analog and digital 5.1 configurations*

| Speaker | Analog (top connector) | Digital |
|---|---|---|
| Left | Channel 1 | Channel 1 |
| Right | Channel 2 | Channel 2 |
| Center | Channel 3 | Channel 3 |
| LFE | Channel 4 | Channel 4 |
| Left side surround (side and back walls) | Channel 5 | Channel 5 |
| Right side surround (side and back walls) | Channel 6 | Channel 6 |

For analog and digital 7.1 configurations, the system outputs are listed in the following table:

*Table 5: Outputs for analog and digital 7.1 configurations*

| Speaker | Analog (top connector) | Digital |
|---|---|---|
| Left | Channel 1 | Channel 1 |
| Right | Channel 2 | Channel 2 |
| Center | Channel 3 | Channel 3 |
| LFE | Channel 4 | Channel 4 |
| Left side surround | Channel 5 | Channel 5 |
| Right side surround | Channel 6 | Channel 6 |
| Left rear surround | Channel 7 | Channel 7 |
| Right rear surround | Channel 8 | Channel 8 |

Switching between room configurations can take up to one minute.

You may notice that the surround speaker positions are not located exactly where you have physical speakers. This is normal, as the speakers are spread across a wall surface and a precise display of the speakers is not needed. The speaker icon primarily shows the output channel. You can see an example in the following figure.

Figure 112: Default speaker positions for 7.1 room



3. After selecting the room configuration, enter the distance from the screen to the rear wall of the theatre and the average distance between left and right surround speakers.

This is similar to the method used when entering a Dolby CP750 room configuration. This enables the system to determine the correct surround-speaker delay. You can toggle this entry between feet and meters and can enter only whole numbers (no fractions or decimals).

Figure 113: Enter distances
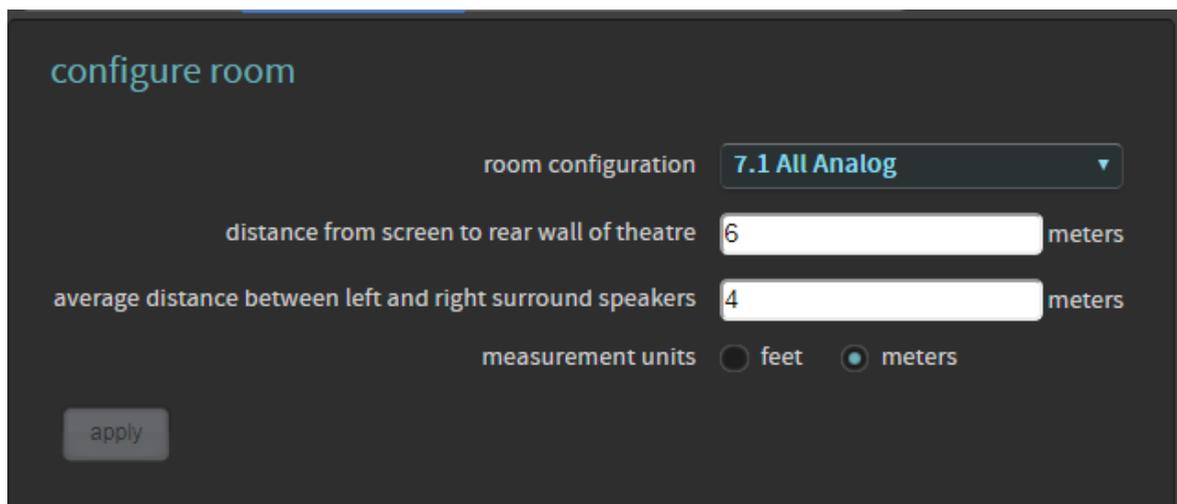


Digital users proceed to the next section (Section 4.1.2). Analog users can skip the next section and proceed to Section 4.1.3.

**Related information**

## 4.1.2 Configuring a digital output

You can configure a digital output.

**Procedure**

1. If you selected a digital-output room configuration, the system default is **AES67**, which enables an easy connection to a Dolby Multichannel Amplifier or DAC3202.
2. If you need BLU Link, select **preferences** in the navigation bar at the left side of the screen, as shown in the following figure, and then switch from **AES67** to **BLU Link**.

*Figure 114: Preferences screen*



> 📄 **Note:** You may also need to make additional changes by clicking **network** in the navigation bar, and then clicking the **Dolby Atmos Connect** tab.

**Related information**

## 4.1.3 Using the Internal or External Real-Time Analyzer

You can use the Dolby CP950 internal real-time analyzer (RTA) or an external RTA supplied by any party other than Dolby to achieve a frequency response that closely matches the x curve overlay (SMPTE 202M-2010).

Following is the RTA equalization sequence:

1. Coarse adjusting of each channel using the **bass & treble** sliders in the web client **equalization** screen.
2. Fine adjusting of each band using the 27-band one-third octave equalizer.
3. If necessary, fine-tune adjusting using **Grossman eq**, as described later in this chapter.

4. Setting frequency Q (width) for LFE channel equalization and level of cut using the single-band parametric equalizer.

**Required tools**

- An RTA with four or more microphone inputs and averaging/multiplexing technology. A single microphone can be used instead, but it will not produce a result as effective as a four-microphone system. The Dolby CP950/CP950A can accept a single microphone input and can display the basic 1/3 octave EQ.
- A handheld sound pressure level (SPL) meter or another device that can produce accurate SPL measurements. Measurements must be taken two-thirds of the way back in the room, slightly off axis from center, and at ear height.
- High-quality microphones that should all be the same make and model. The microphones should be from the same batch (similar serial numbers) so that they all produce similar sound results.

### Setting up the real-time analyzer for 1-4 microphones

1. Position a microphone multiplexer in the center of the auditorium listening area.
2. Place each microphone in the reverberant field, not in an area that receives the most direct energy from the speakers. In addition, avoid perfect symmetry.
3. Arrange the microphones so that they do not form a square or rectangle parallel to the sides of the room, as shown in the following figure (microphones are represented by blue circles). Be sure not to place any of the multiplexing microphones on the auditorium center line. Standing waves and nodes can cause measurement errors.

*Figure 115: Position four microphones*
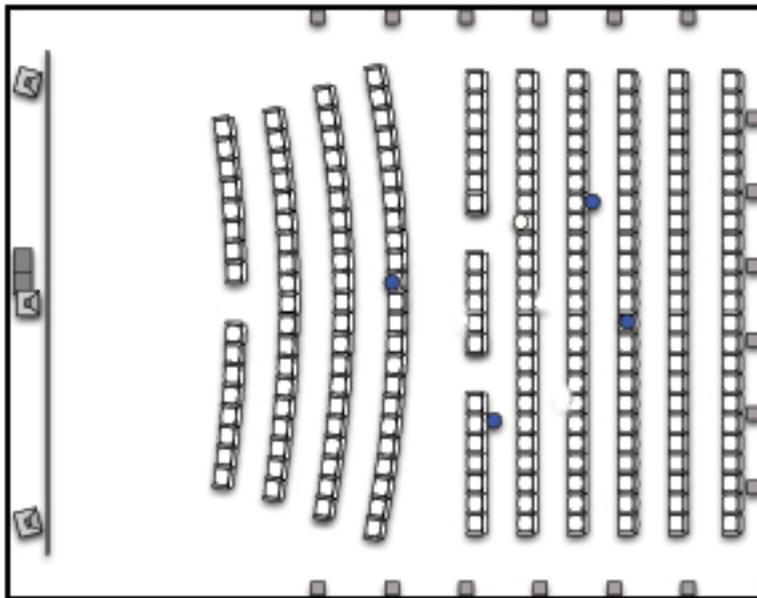


4. During final SPL calibration, use the handheld meter at the reference listening position (RLP) that is along the center line of the image, at a point that is approximately two-thirds the length of the room.

### Real-time analyzer equalization

1. Begin with the system in the **7.1 Dolby Surround** macro (or if the auditorium is configured for 5.1, use the **5.1 macro**).
2. Change the CP950/CP950A fader level to 7.0.
3. Select **equalization** in the web client navigation bar **setup** menu at the left side of the screen.

The real-time analyzer appears in the equalization screen, as shown in the following figure.

*Figure 116: Real-time analyzer equalization screen*



The CP950 RTA displays several lines that can help you equalize each loudspeaker.

- The yellow arrow points to a line that indicates the applied EQ filter. This line will change as you apply gain or cut to the frequencies in the equalizer.
- The green arrows point to a magenta line that represents the x-curve, the target frequency response specified in SMPTE 202. Note that when you EQ larger rooms it may be necessary to adjust your target frequency response established in the SMPTE standard.
- The red arrow points to the target frequency response for the Low-Frequency Effects (LFE) channel that is located behind the screen. This represents 10 dB of in-band gain over the center channel. Note that the red arrow is displayed only when you select the LFE channel.

> **Note:** The default EQ preset is **AutoEQ**. 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.

To add a new EQ preset:

1. Click the plus (**+**) button.

*Figure 117: EQ preset buttons*



You are prompted to base your new preset on either the **AutoEQ** preset or a copy of a previously created custom preset, as shown in the following figure. In either case, you must also enter a name for your new preset. Alternatively, you can create a new custom preset by following the instructions after step 4.

*Figure 118: 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** button. The **edit** button changes to a **save** button, and a **cancel** button appears, which allows you to cancel your entries.

   The EQ parameters are now activated for editing, as shown in the figure on the next page.

4. Configure the desired parameters in the **equalization** screen.

   After configuring all the desired parameters, click the **save** button to create your new preset.

   📄 **Note:** You can delete a custom preset by clicking the minus (**-**) button (shown previously in Figure 115). You cannot delete the **AutoEQ** preset.

## Loading or editing an EQ preset

To load an existing preset:

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

   *Figure 119: Load an EQ preset*
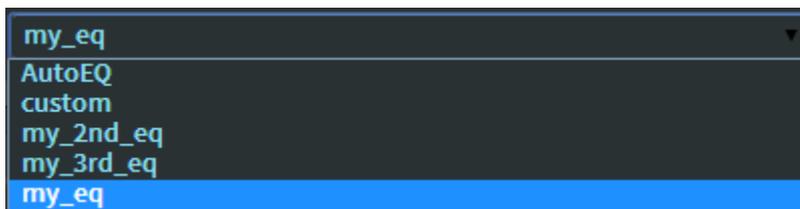
   

   You can use the loaded preset for EQ, or you can edit the parameters for one of your custom presets, as described next.

   📄 **Note:** To edit one of your custom presets, click the edit button. You cannot edit the AutoEQ preset. Save a copy of the AutoEQ preset under a different name.

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

   *Figure 120: Editing EQ warning message*
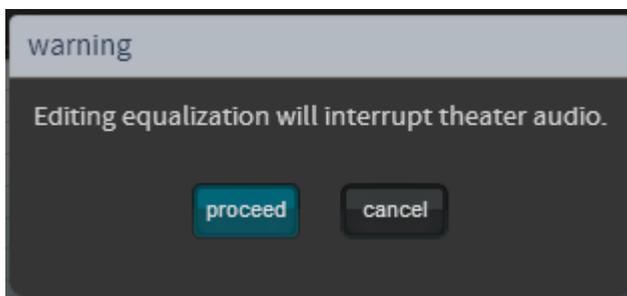
   

2. Click **proceed** to edit your preset.

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

   The EQ parameters are now activated for editing, as shown in the following figure. Note that this example uses **ams** as the preset name.

*Figure 121: EQ parameters activated for editing*



3. Configure the desired parameters in the **equalization** screen.

4. After configuring the desired parameters, click the **save** button to finalize your changes to the existing preset.

   📄 **Note:** You can delete a custom preset by clicking the minus (**-**) button. You cannot delete the **AutoEQ** preset.

5. Click the **all output levels** button and verify that all speakers are set to 0.0.

*Figure 122: All output levels screen (speakers and arrays)*



At this point, it is time to play pink noise from the speakers in the auditorium and set some basic levels. You may want to start with the amplifier inputs turned down.

1. Select **pink noise** from the signal generator, and turn the signal generator **on** at the upper- right side of the screen. The selected speaker will output the test signal.

2. Take the SPL measurement at a location that is two-thirds of the way back in the room and centerline from the image. View the SPL on your meter, and then proceed to the next step.

3. Increase the gains on all stage and surround speakers to 85 dBFS (slow) average. You should do this on each speaker or group of speakers on a wall.

> 📄 **Note:** For CP750 (or earlier) users, this is a small change from what you normally do, which sets the surrounds to 82 dBFS. In the CP950/CP950A, all speakers are set to 85 dBFS (C-weighted). During playback of 5.1 or Dolby Surround 7.1, the processor compensates the surround speakers to 82 dB.

With multiway speakers, you should add crossover filters at this time, reference the RTA, and then adjust the high and low frequencies to the same level for a more representative x-curve.

> 📄 **Note:** If using a Dolby Multichannel Amplifier, first increase the outputs of the CP950, and then, if needed, increase the amplifier gains above 0 dB.

- Change the amplifier gains for the subwoofer to 91 dB, C-weighted, slow average. Note that in some instances, with subwoofers that include bandpass filtering, the SPL level could be different (89 dB).
- If you have more than one speaker feed on a wall (as shown in the following figure), you can press and hold the <Ctrl> key and select multiple speakers for pink noise output. This allows you to average the audio across the units in an array.

*Figure 123: More than one speaker feed*



- You should now set basic SPL levels for each speaker or group of speakers using analog amplifier gains.
- Turn off the signal generator and close the **Output levels** window.
- To use the internal CP950/CP950 RTA, calibrate the **RTA mic input level** using your SPL meter. Take the SPL measurement at a location that is two-thirds of the way back in the room and centerline from the image.

To adjust the **RTA Mic input level**:

1. Set the fader level to 7.0.
2. Turn on **pink noise** in the signal generator. (Pink noise is heard in the auditorium.)

3. Using the previously described output levels control, adjust the output level for the center channel so 85 dBFS (slow) is measured on the external SPL meter.

4. The **RTA mic input level** meter has reference marks. The **target range** is marked between 40 and 60%. The 50% level is marked as the center of this range.

5. When the level is within the target range, increase or decrease the **RTA mic input level adjust** slider until the reading is as close to the 50% mark as possible. This is equal to the center channel output level at 85 dBFS (slow) and represents the overall reference level of 0 on the CP950 RTA display graph.

> 📄 **Note:** If your microphone has electronics that require +48 V, to see activity on the CP950 RTA, you may need to click **on** for **RTA mic phantom power**.

*Figure 124: CP950 RTA microphone level adjustment*
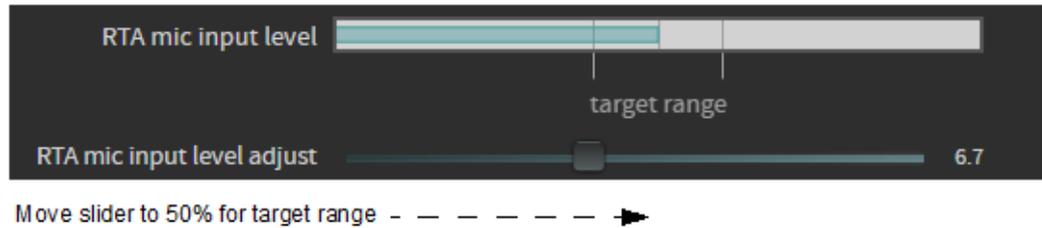


• The RTA should display results, as shown in the following figure.

*Figure 125: Real-time analyzer display graph*



> 📄 **Note:** On multiway speakers, you can adjust amplifiers to match the highs, mids, or lows to the x-curve as closely as possible.

• The **RTA mic input level** should show some activity. If the activity is low or does not appear, adjust the **MIC GAIN** on the CP950 rear panel to a level that is within the target range. The CP950 ships with a potentiometer trimmer, as shown in the following figure.

*Figure 126: Potentiometer trimmer*



- The web client UI also includes a digital trim that allows you to make fine adjustments.

- The system automatically saves the **RTA mic input level adjust** value in its last position and performs calibration at that level. You can now proceed with the EQ.

- You can now perform EQ for each individual speaker (or group of speakers on a single output). Refer to the RTA and adjust the 1/3 octave graphic EQ to bring the measured frequencies close to the x-curve line. Use industry best practices to make calibration decisions.

> **Note:** For some multiway speakers, it may be better to adjust the amplifier gains. In some cases, a speaker may not be capable of producing very low or very high frequencies. For improved low frequencies on surround speakers, you can apply bass management. If the correct level on high frequencies is not reachable, you could add too much boost and wear out the drivers.

- After calibrating the individual speakers, you may need to calibrate speakers in an array. If you have only one speaker feed per wall, this is not needed (as shown previously for the output levels).

## 4.1.4 Fine tuning with the Grossman eq

You can use the Grossman eq to fine tune room settings.

**About this task**

Grossman eq is an equalization tool that enables finer room tunings. It is provided for technician- or admin-level users. As you zoom in on the display, it allows you to control narrowband EQ. This tool displays an interface that provides users with the ability to utilize the one-twelfth octave capabilities of the Dolby CP950 equalizer. The existing bass, treble, and one-third octave controls provide broadband equalization at fixed frequencies that limit equalization flexibility. Grossman eq provides controls that allow users to narrowly or broadly adjust the frequency response at any point from 20 Hz to 20 kHz.

**Procedure**

1. When you click **equalization** in the navigation bar, and then click the **edit** button to edit equalization for one of your custom presets, a **Grossman eq** button appears in the **equalization** screen (to the left of the **graphics eq** button), as shown in the following figures.

*Figure 127: Grossman eq button*



2. When you click the **Grossman eq** button, the Grossman eq screen appears.

The example in the following figure shows a graph that displays a Grossman eq frequency curve (in green) that a user can create by utilizing the specialized Grossman eq tools that are shown in the figure (and

described in the following sections). In addition, the graph displays the resulting sum of all input to the eq curve (in black), which includes auto eq, Grossman eq, graphic eq, bass and treble, and output level. The x-curve is displayed in magenta (as it is in the other equalization screens).

*Figure 128: Grossman EQ Screen*



Following is a description of the controls in the **Grossman eq** screen, as shown in the previous figure.

## Grossman equalizer sliders

You can drag the Grossman equalizer sliders to adjust the gain throughout the range of frequencies shown on the graph.

The number above each of these sliders represents the position of the slider from -10 dB gain to +10 dB gain. This corresponds with the center band of all bands that the slider represents. The number below each of these sliders denotes the frequency (Hz) of the center band of all bands represented by that slider.

## Horizontal slider

The horizontal zoom slider affects the number of one-twelfth octave EQ bands that you control with the Grossman equalizer sliders.

When you move a slider slowly to the right, the number of bands decreases by 1. At its leftmost position, the slider corresponds to 15 bands per slider, and at its rightmost position, it corresponds to one band per slider. Note that each slider may affect more than this precise number of bands, due to smoothing of the EQ curve. You can zoom in and out to keep the center band of the graph constant as far as possible. (It must also adjust for either end of the graph while zooming out.)

Panning affects which bands the sliders manipulate. You can also pan around (when not fully zoomed out) by dragging the graph left and right, or by using the arrow buttons next to the slider. The arrow buttons move the graph left or right one band at a time.

The **refresh** button resets the zoom slider back to 15 bands per slider.

## Replace and add buttons

These buttons denote two modes of operation.

When you click **replace** and move an equalizer slider to a different position to change a setting, this replaces the Grossman band gains (the green plot only) with the new setting. When you click **add** and move a slider to a different position, this adds the new changes to the existing Grossman band gains. Note that in add mode, it is possible to set band gains beyond the range of the sliders, that is, beyond the [-10 dB, +10 dB] range. In such a case, the Grossman band gains (only the green plot) are saturated at +10 dB or -10 dB. Grossman eq remembers the shape of the curve before it was saturated, so if you reduce the level (which desaturates), the original shape is retained.

**Flatten button**

You can use the **flatten** button to set all visible bands to 0 dB gain.

When you click **flatten**, Grossman eq sets all of the visible bands to 0 dB gain by flattening only the area of the EQ range that is currently visible on the graph, based on the zoom slider setting.

**Grossman eq results**

You can view the results of the Grossman EQ.

After using the above controls, be sure to click **save** at the top of the screen to retain your changes (or **cancel** to discard your changes). After saving your settings, the main **equalization** screen should now display the resulting 20 Hz to 20 kHz curve (without the markup of the Grossman eq contribution).

After configuring the desired parameters, click the **save** button to create your new preset. You can delete a customized preset by clicking the minus (**-**) button. You cannot delete the **AutoEQ** preset.

## 4.1.5 Configuring the macro editor

When your new EQ preset is finalized, you can manually configure it in the **macro editor** for any or all macros. Note that if you want to configure the same EQ for all macros, you can use the **push to all macros button** in the **equalization** screen.

**Procedure**

1. After equalizing the auditorium, click **macro editor** in the navigation bar to display the **macro editor** screen.

*Figure 129: Macro editor screen*
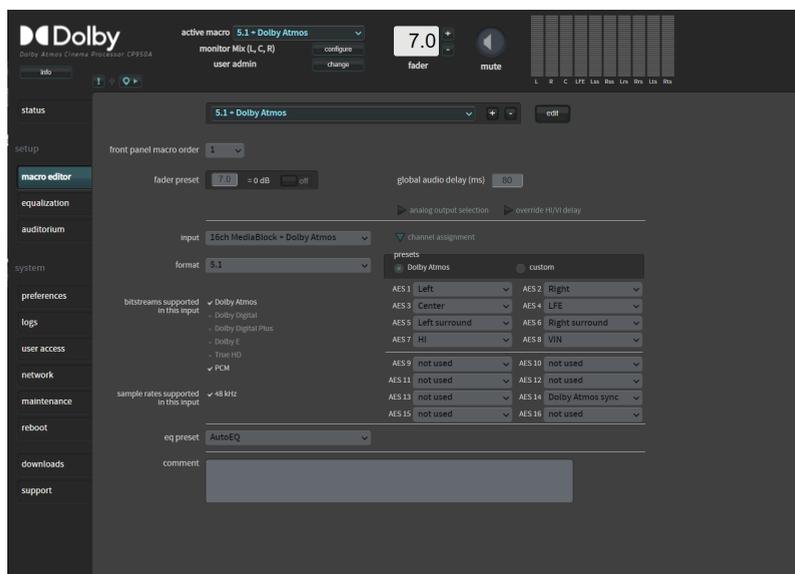


2. At the bottom of the **macro editor** screen, you can change the **eq preset** setting for all of your current macros to the new preset you created.

   Alternatively, you can also push a specific EQ preset to all macros in the **equalization** screen, (shown in the following figure). This saves time after creating a new EQ preset and having to manually update every macro. When you select the **push to all macros** button, the system pushes the highlighted (active) EQ preset to all macros.

Figure 130: Equalization screen



## 4.1.6 Finalizing the equalization

You can finalize the equalization.

**Procedure**

Test the Dolby CP950 audio playback to ensure proper operation and sound, and then click **maintenance** in the navigation bar, back up your system settings, and save the backup in a safe place for future use.

## 4.2 Using Dolby Atmos Designer and one-third octave EQ

You can use Dolby Atmos Designer (DAD) and standard one-third octave EQ (internal real-time analyzer) to configure a room.

This section explains how to use DAD to configure a room with a mix of analog and digital outputs or internal crossovers, and then use the standard one-third octave EQ. This configuration does not use the Dolby AutoEQ system.

You can connect to the Dolby CP950/CP950A in DAD software version 3.3.7 or higher by entering its IP address. To ensure the correct device configuration, you must change the **target device** field under the **DAD define** > **routing** tab to **CP950** or **CP950A** depending on your respective unit, as shown in the following figure.

Figure 131: Select CP950 or CP950A as target device in Dolby Atmos Designer
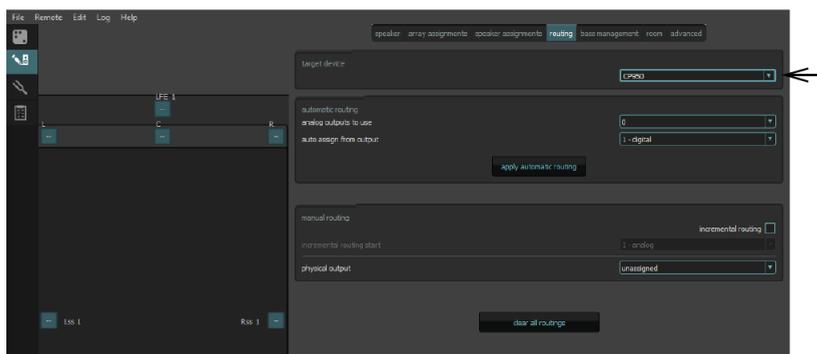
**Note:** Using one CP950/CP950A output channel in digital or analog disables that channel for the other output type. For example, if you output from digital channel 1, analog channel 1 is disabled as an output channel. If you output from analog channel 9, digital channel 9 is disabled.

You can download the current version of DAD software by clicking **downloads** in the Dolby CP950/Dolby CP950A navigation bar. Authorized users can also download the current version of DAD software and manual at https://customer.dolby.com.

**Note:** We provide a Dolby Atmos Designer video tutorial at: https://vimeo.com/280122204.

Follow the instructions in the *Dolby Atmos Designer User's Manual* to set up a room configuration. This includes room dimensions, speakers, amplifiers, and so on. When you complete this setup, upload the room configuration to the Dolby CP950/CP950A. The system is then ready for you to start the equalization process.

**Related information**

## 4.2.1 Creating a room in Dolby Atmos Designer

You can create a room in Dolby Atmos Designer.

**About this task**

To create a room and perform DAD operations, see the instructions in the *Dolby Atmos Designer User's Manual*. You can mix analog and digital outputs, but you cannot exceed 16 channels for a Dolby CP950 or 64 channels for a CP950A. In DAD, it is not possible to mix different routing types (analog and digital) for multiway speakers.

**Note:** To correctly set the surround speaker delays, your room configuration must use accurate measurements and speaker placements. If you are using one CP950/CP950A processor output to drive all speakers on a wall, use a point that is the average distance between the speakers.

After you create a room, save a copy of the DAD .dac file to your computer, and then follow these steps.

**Procedure**

1. Push the room configuration to the Dolby CP950/CP950A using DAD.
2. Click **auditorium** in the Dolby CP950/CP950A navigation bar, and then click the **configure room** tab.
   **Dolby Atmos Designer** should be the selected for the **room configuration**. This confirms that the system is using the room you created.
3. To confirm that your settings are correct, click the **summary** or **routing** tab.

*Figure 132: Dolby Atmos Designer selected for room configuration*
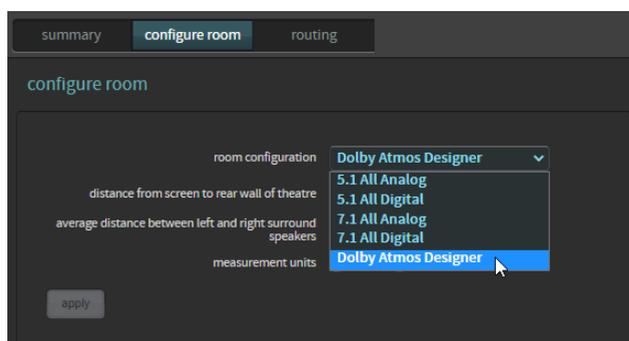


Digital users proceed to the next section (Section 4.2.2). Analog users can skip the next section and proceed to Section 4.2.3.

## 4.2.2 Configuring a digital output

You can configure a digital output.

**Procedure**

1. If you selected a digital-output room configuration, the system default is **AES67**, which enables an easy connection to a Dolby Multichannel Amplifier.
2. If you need BLU Link, select **preferences** in the navigation bar at the left side of the screen, and then switch from **AES67** to **BLU Link** in the **preferences** screen under **Dolby Atmos Connect protocol** (refer to the following figure).

*Figure 133: Preferences screen*
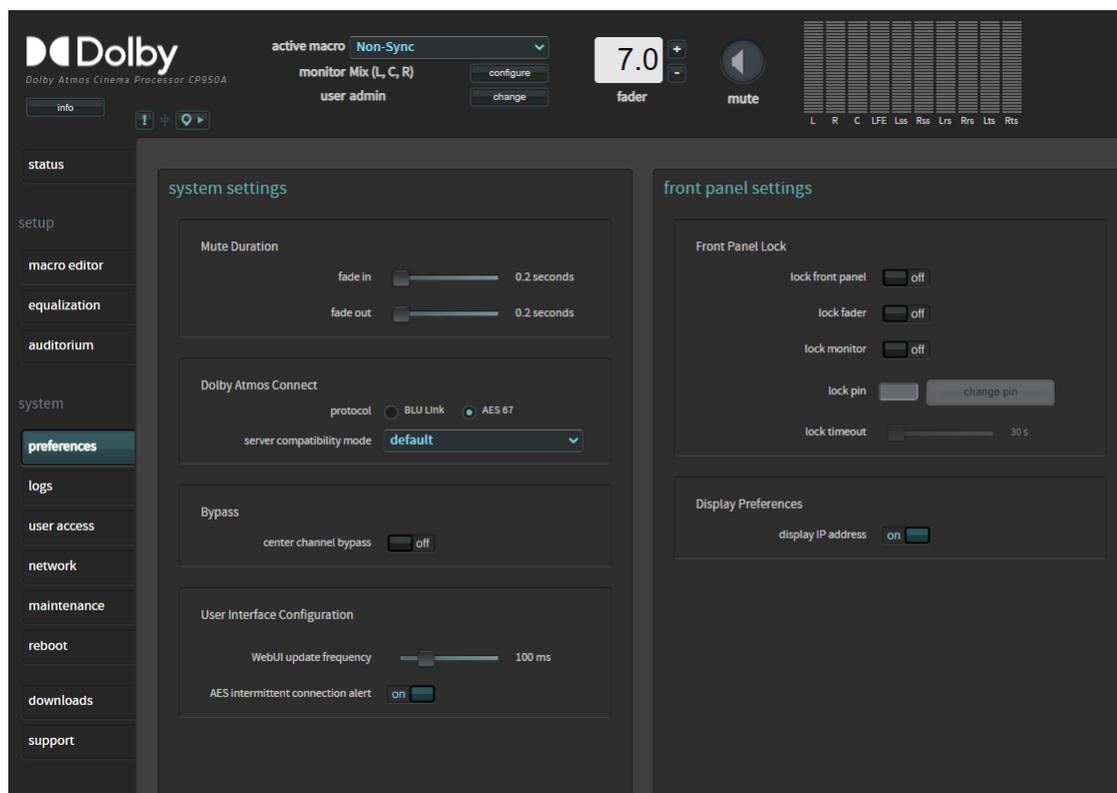


> **Note:** You may also need to make additional changes by clicking **network** in the navigation bar, and then clicking the **Dolby Atmos Connect** tab. For related information, see Section 3.8.
>
> (See the link below.)

**Related information**

## 4.2.3 Using the Internal or External Real-Time Analyzer

You can use the Dolby CP950 internal real-time analyzer (RTA) or an external RTA supplied by any party other than Dolby to achieve a frequency response that closely matches the x curve overlay (SMPTE 202M-2010).

Following is the RTA equalization sequence:

1. Coarse adjusting of each channel using the **bass & treble** sliders in the web client **equalization** screen.
2. Fine adjusting of each band using the 27-band one-third octave equalizer.
3. If necessary, fine-tune adjusting using **Grossman eq**, as described later in this chapter.
4. Setting frequency Q (width) for LFE channel equalization and level of cut using the single-band parametric equalizer.

**Required tools**

- An RTA with four or more microphone inputs and averaging/multiplexing technology. A single microphone can be used instead, but it will not produce a result as effective as a four-microphone system. The Dolby CP950/CP950A can accept a single microphone input and can display the basic 1/3 octave EQ.
- A handheld sound pressure level (SPL) meter or another device that can produce accurate SPL measurements. Measurements must be taken two-thirds of the way back in the room, slightly off axis from center, and at ear height.
- High-quality microphones that should all be the same make and model. The microphones should be from the same batch (similar serial numbers) so that they all produce similar sound results.

### Setting up the real-time analyzer for 1-4 microphones

1. Position a microphone multiplexer in the center of the auditorium listening area.
2. Place each microphone in the reverberant field, not in an area that receives the most direct energy from the speakers. In addition, avoid perfect symmetry.
3. Arrange the microphones so that they do not form a square or rectangle parallel to the sides of the room, as shown in the following figure (microphones are represented by blue circles). Be sure not to place any of the multiplexing microphones on the auditorium center line. Standing waves and nodes can cause measurement errors.

*Figure 134: Position four microphones*
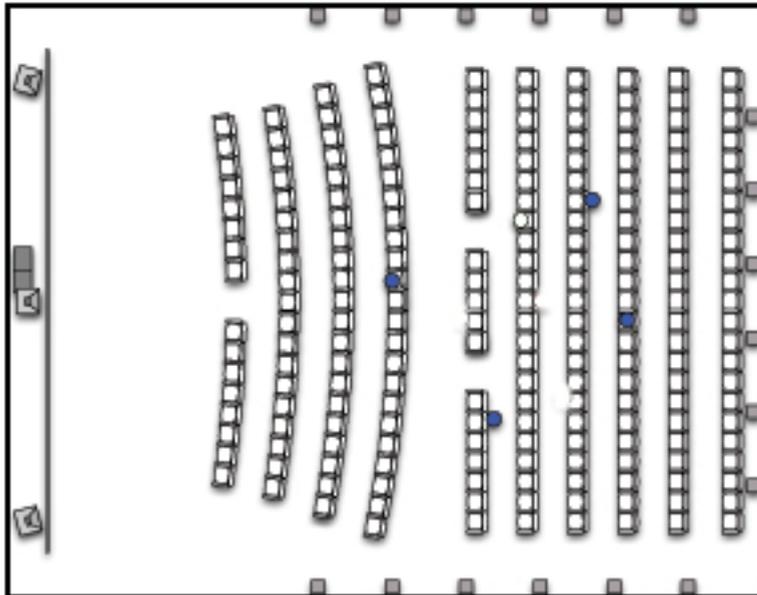


4. During final SPL calibration, use the handheld meter at the reference listening position (RLP) that is along the center line of the image, at a point that is approximately two-thirds the length of the room.

### Real-time analyzer equalization

1. Begin with the system in the **7.1 Dolby Surround** macro (or if the auditorium is configured for 5.1, use the **5.1 macro**).
2. Change the CP950/CP950A fader level to 7.0.
3. Select **equalization** in the web client navigation bar **setup** menu at the left side of the screen.

The real-time analyzer appears in the equalization screen, as shown in the following figure.

*Figure 135: Real-time analyzer equalization screen*



The CP950 RTA displays several lines that can help you equalize each loudspeaker.

- The yellow arrow points to a line that indicates the applied EQ filter. This line will change as you apply gain or cut to the frequencies in the equalizer.
- The green arrows point to a magenta line that represents the x-curve, the target frequency response specified in SMPTE 202. Note that when you EQ larger rooms it may be necessary to adjust your target frequency response established in the SMPTE standard.
- The red arrow points to the target frequency response for the Low-Frequency Effects (LFE) channel that is located behind the screen. This represents 10 dB of in-band gain over the center channel. Note that the red arrow is displayed only when you select the LFE channel.

> **Note:** The default EQ preset is **AutoEQ**. 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.

To add a new EQ preset:

1. Click the plus (**+**) button.

*Figure 136: EQ preset buttons*
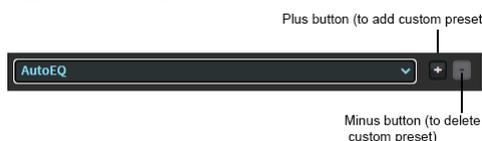


You are prompted to base your new preset on either the **AutoEQ** preset or a copy of a previously created custom preset, as shown in the following figure. In either case, you must also enter a name for your new preset. Alternatively, you can create a new custom preset by following the instructions after step 4.

*Figure 137: 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** button. The **edit** button changes to a **save** button, and a **cancel** button appears, which allows you to cancel your entries.

   The EQ parameters are now activated for editing, as shown in the figure on the next page.

4. Configure the desired parameters in the **equalization** screen.

   After configuring all the desired parameters, click the **save** button to create your new preset.

   📄 **Note:** You can delete a custom preset by clicking the minus (**-**) button (shown previously in Figure 115). You cannot delete the **AutoEQ** preset.

## Loading or editing an EQ preset

To load an existing preset:

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

   *Figure 138: Load an EQ preset*
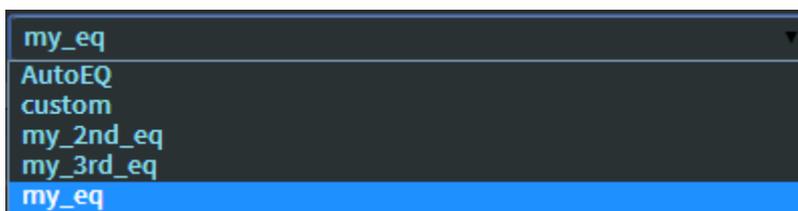
   

   You can use the loaded preset for EQ, or you can edit the parameters for one of your custom presets, as described next.

   📄 **Note:** To edit one of your custom presets, click the edit button. You cannot edit the AutoEQ preset. Save a copy of the AutoEQ preset under a different name.

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

   *Figure 139: Editing EQ warning message*
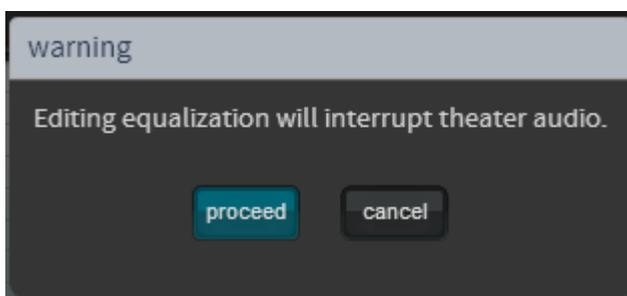
   

2. Click **proceed** to edit your preset.

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

   The EQ parameters are now activated for editing, as shown in the following figure. Note that this example uses **ams** as the preset name.

*Figure 140: EQ parameters activated for editing*



3. Configure the desired parameters in the **equalization** screen.

4. After configuring the desired parameters, click the **save** button to finalize your changes to the existing preset.

> **Note:** You can delete a custom preset by clicking the minus (**-**) button. You cannot delete the **AutoEQ** preset.

5. Click the **all output levels** button and verify that all speakers are set to 0.0.

*Figure 141: All output levels screen (speakers and arrays)*



At this point, it is time to play pink noise from the speakers in the auditorium and set some basic levels. You may want to start with the amplifier inputs turned down.

1. Select **pink noise** from the signal generator, and turn the signal generator **on** at the upper- right side of the screen. The selected speaker will output the test signal.

2. Take the SPL measurement at a location that is two-thirds of the way back in the room and centerline from the image. View the SPL on your meter, and then proceed to the next step.

3. Increase the gains on all stage and surround speakers to 85 dBFS (slow) average. You should do this on each speaker or group of speakers on a wall.

> 📄 **Note:** For CP750 (or earlier) users, this is a small change from what you normally do, which sets the surrounds to 82 dBFS. In the CP950/CP950A, all speakers are set to 85 dBFS (C-weighted). During playback of 5.1 or Dolby Surround 7.1, the processor compensates the surround speakers to 82 dB.

With multiway speakers, you should add crossover filters at this time, reference the RTA, and then adjust the high and low frequencies to the same level for a more representative x-curve.

> 📄 **Note:** If using a Dolby Multichannel Amplifier, first increase the outputs of the CP950, and then, if needed, increase the amplifier gains above 0 dB.

- Change the amplifier gains for the subwoofer to 91 dB, C-weighted, slow average. Note that in some instances, with subwoofers that include bandpass filtering, the SPL level could be different (89 dB).
- If you have more than one speaker feed on a wall (as shown in the following figure), you can press and hold the <Ctrl> key and select multiple speakers for pink noise output. This allows you to average the audio across the units in an array.

*Figure 142: More than one speaker feed*



- You should now set basic SPL levels for each speaker or group of speakers using analog amplifier gains.
- Turn off the signal generator and close the **Output levels** window.
- To use the internal CP950/CP950 RTA, calibrate the **RTA mic input level** using your SPL meter. Take the SPL measurement at a location that is two-thirds of the way back in the room and centerline from the image.

To adjust the **RTA Mic input level**:

1. Set the fader level to 7.0.
2. Turn on **pink noise** in the signal generator. (Pink noise is heard in the auditorium.)

3. Using the previously described output levels control, adjust the output level for the center channel so 85 dBFS (slow) is measured on the external SPL meter.

4. The **RTA mic input level** meter has reference marks. The **target range** is marked between 40 and 60%. The 50% level is marked as the center of this range.

5. When the level is within the target range, increase or decrease the **RTA mic input level adjust** slider until the reading is as close to the 50% mark as possible. This is equal to the center channel output level at 85 dBFS (slow) and represents the overall reference level of 0 on the CP950 RTA display graph.

> 📄 **Note:** If your microphone has electronics that require +48 V, to see activity on the CP950 RTA, you may need to click **on** for **RTA mic phantom power**.

*Figure 143: CP950 RTA microphone level adjustment*



• The RTA should display results, as shown in the following figure.

*Figure 144: Real-time analyzer display graph*



> 📄 **Note:** On multiway speakers, you can adjust amplifiers to match the highs, mids, or lows to the x-curve as closely as possible.

• The **RTA mic input level** should show some activity. If the activity is low or does not appear, adjust the **MIC GAIN** on the CP950 rear panel to a level that is within the target range. The CP950 ships with a potentiometer trimmer, as shown in the following figure.

*Figure 145: Potentiometer trimmer*



- The web client UI also includes a digital trim that allows you to make fine adjustments.

- The system automatically saves the **RTA mic input level adjust** value in its last position and performs calibration at that level. You can now proceed with the EQ.

- You can now perform EQ for each individual speaker (or group of speakers on a single output). Refer to the RTA and adjust the 1/3 octave graphic EQ to bring the measured frequencies close to the x-curve line. Use industry best practices to make calibration decisions.

> **Note:** For some multiway speakers, it may be better to adjust the amplifier gains. In some cases, a speaker may not be capable of producing very low or very high frequencies. For improved low frequencies on surround speakers, you can apply bass management. If the correct level on high frequencies is not reachable, you could add too much boost and wear out the drivers.

- After calibrating the individual speakers, you may need to calibrate speakers in an array. If you have only one speaker feed per wall, this is not needed (as shown previously for the output levels).

## 4.2.4 Fine tuning with the Grossman eq

You can use the Grossman eq to fine tune room settings.

**About this task**

Grossman eq is an equalization tool that enables finer room tunings. It is provided for technician- or admin-level users. As you zoom in on the display, it allows you to control narrowband EQ. This tool displays an interface that provides users with the ability to utilize the one-twelfth octave capabilities of the Dolby CP950 equalizer. The existing bass, treble, and one-third octave controls provide broadband equalization at fixed frequencies that limit equalization flexibility. Grossman eq provides controls that allow users to narrowly or broadly adjust the frequency response at any point from 20 Hz to 20 kHz.

**Procedure**

1. When you click **equalization** in the navigation bar, and then click the **edit** button to edit equalization for one of your custom presets, a **Grossman eq** button appears in the **equalization** screen (to the left of the **graphics eq** button), as shown in the following figures.

*Figure 146: Grossman eq button*



2. When you click the **Grossman eq** button, the Grossman eq screen appears.

   The example in the following figure shows a graph that displays a Grossman eq frequency curve (in green) that a user can create by utilizing the specialized Grossman eq tools that are shown in the figure (and

described in the following sections). In addition, the graph displays the resulting sum of all input to the eq curve (in black), which includes auto eq, Grossman eq, graphic eq, bass and treble, and output level. The x-curve is displayed in magenta (as it is in the other equalization screens).

*Figure 147: Grossman EQ Screen*



Following is a description of the controls in the **Grossman eq** screen, as shown in the previous figure.

### Grossman equalizer sliders

You can drag the Grossman equalizer sliders to adjust the gain throughout the range of frequencies shown on the graph.

The number above each of these sliders represents the position of the slider from -10 dB gain to +10 dB gain. This corresponds with the center band of all bands that the slider represents. The number below each of these sliders denotes the frequency (Hz) of the center band of all bands represented by that slider.

### Horizontal slider

The horizontal zoom slider affects the number of one-twelfth octave EQ bands that you control with the Grossman equalizer sliders.

When you move a slider slowly to the right, the number of bands decreases by 1. At its leftmost position, the slider corresponds to 15 bands per slider, and at its rightmost position, it corresponds to one band per slider. Note that each slider may affect more than this precise number of bands, due to smoothing of the EQ curve. You can zoom in and out to keep the center band of the graph constant as far as possible. (It must also adjust for either end of the graph while zooming out.)

Panning affects which bands the sliders manipulate. You can also pan around (when not fully zoomed out) by dragging the graph left and right, or by using the arrow buttons next to the slider. The arrow buttons move the graph left or right one band at a time.

The **refresh** button resets the zoom slider back to 15 bands per slider.

### Replace and add buttons

These buttons denote two modes of operation.

When you click **replace** and move an equalizer slider to a different position to change a setting, this replaces the Grossman band gains (the green plot only) with the new setting. When you click **add** and move a slider to a different position, this adds the new changes to the existing Grossman band gains. Note that in add mode, it is possible to set band gains beyond the range of the sliders, that is, beyond the [-10 dB, +10 dB] range. In such a case, the Grossman band gains (only the green plot) are saturated at +10 dB or -10 dB. Grossman eq remembers the shape of the curve before it was saturated, so if you reduce the level (which desaturates), the original shape is retained.

### Flatten button

You can use the **flatten** button to set all visible bands to 0 dB gain.

When you click **flatten**, Grossman eq sets all of the visible bands to 0 dB gain by flattening only the area of the EQ range that is currently visible on the graph, based on the zoom slider setting.

### Grossman eq results

You can view the results of the Grossman EQ.

After using the above controls, be sure to click **save** at the top of the screen to retain your changes (or **cancel** to discard your changes). After saving your settings, the main **equalization** screen should now display the resulting 20 Hz to 20 kHz curve (without the markup of the Grossman eq contribution).

After configuring the desired parameters, click the **save** button to create your new preset. You can delete a customized preset by clicking the minus (**-**) button. You cannot delete the **AutoEQ** preset.

## 4.2.5 Configuring the macro editor

When your new EQ preset is finalized, you can manually configure it in the **macro editor** for any or all macros. Note that if you want to configure the same EQ for all macros, you can use the **push to all macros button** in the **equalization** screen.

**Procedure**

1. After equalizing the auditorium, click **macro editor** in the navigation bar to display the **macro editor** screen.

*Figure 148: Macro editor screen*
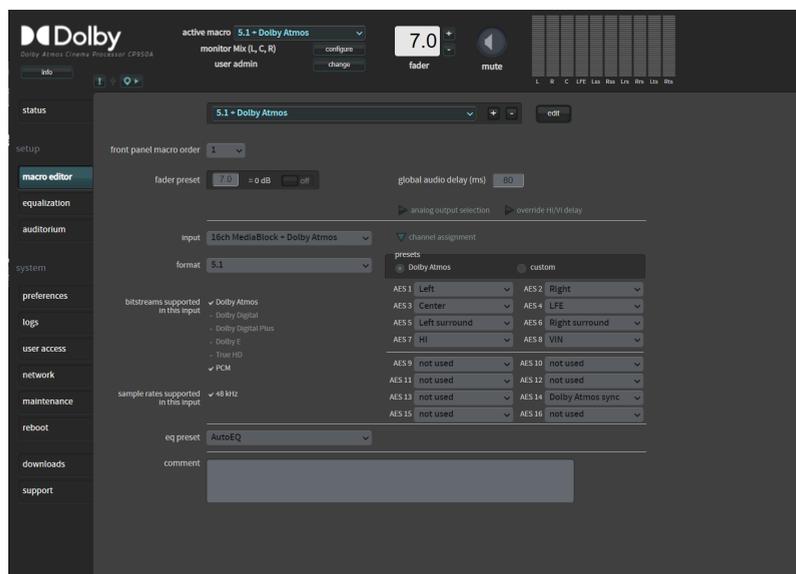


2. At the bottom of the **macro editor** screen, you can change the **eq preset** setting for all of your current macros to the new preset you created.

   Alternatively, you can also push a specific EQ preset to all macros in the **equalization** screen, (shown in the following figure). This saves time after creating a new EQ preset and having to manually update every macro. When you select the **push to all macros** button, the system pushes the highlighted (active) EQ preset to all macros.

*Figure 149: Equalization screen*



## 4.2.6 Finalizing the equalization

You can finalize the equalization.

**Procedure**

1. Test the Dolby CP950/CP950A audio playback to ensure proper operation and sound.
2. Click **maintenance** in the navigation bar and back up your system settings.
3. Save the backup in a safe place for future use.

## 4.3 Configuring a room using Dolby Atmos Designer and AutoEQ

This section shows you how to use Dolby Atmos Designer (DAD) to configure a room and then use Dolby AutoEQ.

You can connect to the Dolby CP950/CP950A in DAD version 3.3.7 or higher by entering its IP address. To ensure the correct device configuration, you must change the **target device** field under the DAD **define** > **routing** tab to **CP950** or **CP950A** depending on your respective unit, as shown in the following figure for a CP950.

*Figure 150: Select Dolby CP950 or CP950A as target device in Dolby Atmos Designer*
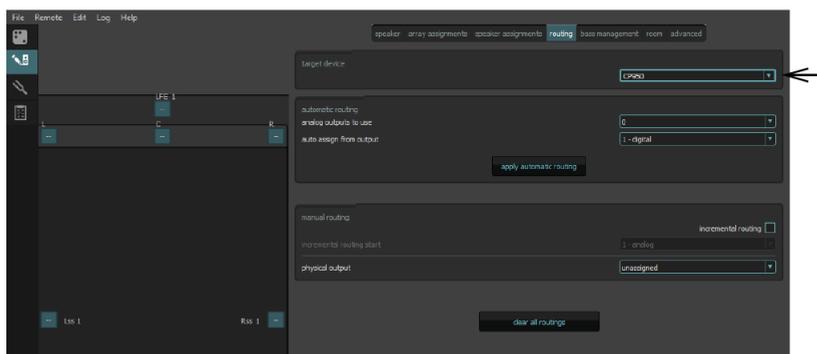


You can download the current version of DAD software by clicking **downloads** in the Dolby CP950/CP950A navigation bar. You can also download the current version of DAD software, release notes, and manual at https://www.customer.dolby.com. In addition, you can access the DAD manual from the DAD software **Help** menu.

Digital users proceed to the next section (Section 4.3.1). Analog users can skip this next section and proceed to Section 4.3.2.

## 4.3.1 Configuring a digital output

You can configure a digital output.

**Procedure**

1. If you will be using a digital-output room configuration, the system default is **AES67**, which enables an easy connection to a Dolby Multichannel Amplifier.
2. If you need BLU Link, select **preferences** in the navigation bar at the left side of the screen, as shown in the following figure, and then switch from **AES67** to **BLU Link**.

*Figure 151: Preferences screen*
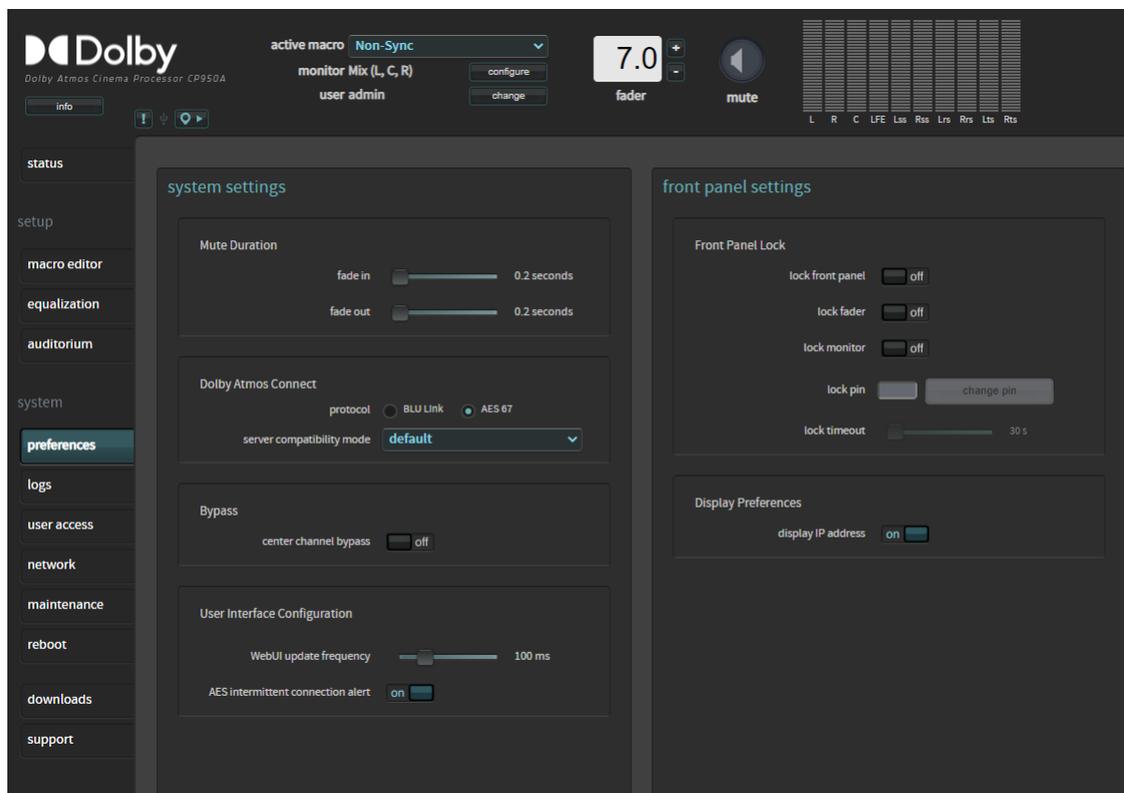


> **Note:** You may also need to make additional changes by clicking network in the navigation bar, and then clicking the **Dolby Atmos Connect** tab.

**Related information**

## 4.3.2 Creating a room in Dolby Atmos Designer and running AutoEQ

You can create a room in Dolby Atmos Designer and run AutoEQ.

**About this task**

To create a room and run AutoEQ in DAD, see the instructions in the *Dolby Atmos Designer User's Manual*. You can mix analog and digital outputs but cannot exceed 16 channels for the CP950 or 64 channels for a CP950A. In DAD, it is not possible to mix different routing types (analog and digital) for multiway speakers. After you create a room and run AutoEQ, save a copy of the DAD `.dac` file, and then follow these steps.

**Procedure**

1. Complete the room configuration and AutoEQ in Dolby Atmos Designer. For detailed information, see the instructions in the *Dolby Atmos Designer User's Manual*.
2. Push the room configuration to the Dolby CP950/CP950A using DAD.
3. Click **auditorium** in the Dolby CP950/CP950A navigation bar, and then click the **configure room** tab.

   **Dolby Atmos Designer** should be selected for the **room configuration**, as shown in the following figure. This confirms that the system is using the room you created.

   To confirm that your settings are correct, click the **summary** or **routing** tab.

*Figure 152: Dolby Atmos Designer selected for room configuration*
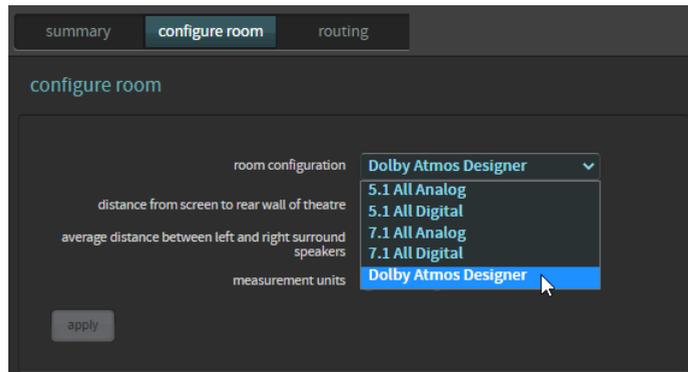


## 4.3.3  Configuring the macro editor

When your new EQ preset is finalized, you can manually configure it in the **macro editor** for any or all macros. Note that if you want to configure the same EQ for all macros, you can use the **push to all macros button** in the **equalization** screen.

**Procedure**

1. After equalizing the auditorium, click **macro editor** in the navigation bar to display the **macro editor** screen.

*Figure 153: Macro editor screen*
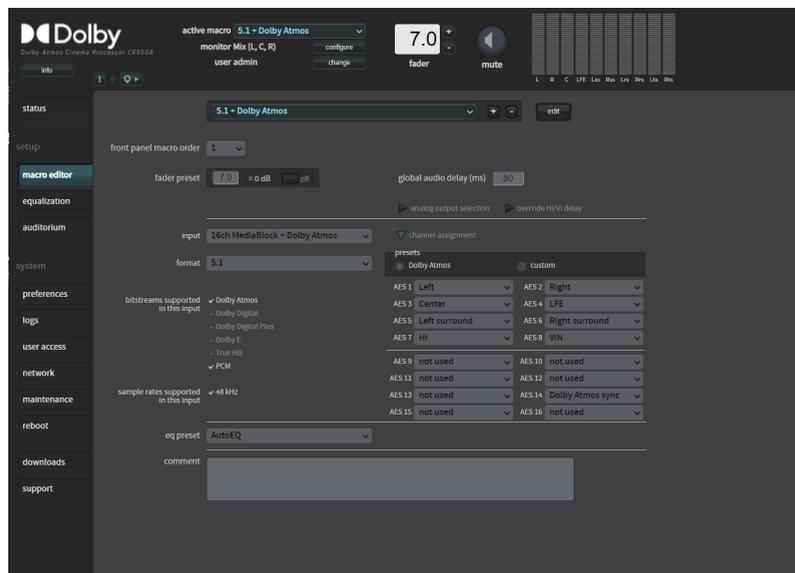


2. At the bottom of the **macro editor** screen, you can change the **eq preset** setting for all of your current macros to the new preset you created.

Alternatively, you can also push a specific EQ preset to all macros in the **equalization** screen, (shown in the following figure). This saves time after creating a new EQ preset and having to manually update every macro. When you select the **push to all macros** button, the system pushes the highlighted (active) EQ preset to all macros.

*Figure 154: Equalization screen*



## 4.3.4 Finalizing the equalization

You can finalize the equalization.

**Procedure**

1. Test the Dolby CP950/CP950A audio playback to ensure proper operation and sound.
2. Click **maintenance** in the navigation bar, back up your system settings, and then save the backup in a safe place for future use.

# 4.4 CP950A failover room configuration

The Dolby CP950A introduces a new concept of failover room configuration.

In the event of a CAT1710 failure (or removal of the board), the CP950A cannot playback Dolby Atmos or use more than 16 channels. The system can automatically revert its configuration to a specific failover routing that is defined in Dolby Atmos Designer (DAD) during the setup. When building the room in DAD, the configuration assigns the first 16 channels (analog or digital) to the most important speakers in the room. If needed, the system falls back to an operation that is similar to a CP950 and uses this failover room configuration to continue playing the show until the problem is fixed or a replacement CAT1710 is installed. As a result, the system can play only 5.1 or 7.1 audio (no Dolby Atmos). Screen speakers, LFE, and surrounds near the reference position should be prioritized. Automatic routing excludes speakers from the failover configuration that are not active in 5.1 or 7.1. For more detailed information, see the *Failover Configurations* section in the *Dolby Atmos Designer User's Manual* (Issue 2 and later).

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5

# Servicing the Dolby CP950 and CP950A

The Dolby CP950/CP950A architecture is a modular design that enables ease of maintenance and future upgrades. This chapter shows you how to troubleshoot any problems you may encounter, and if necessary, replace Dolby CP950/CP950A parts. You can order replacement parts from Dolby. (Applicable part numbers are provided throughout this chapter.)

⚠️ **Warning:** To prevent electrical shock hazard, disconnect the Dolby CP950/CP950A mains power connection before troubleshooting or replacing parts. Place the Dolby CP950/CP950A on a stable and clutter-free service. Do not place the Dolby CP950/CP950A in any area where it may become wet. Avoid servicing the Dolby CP950/CP950A during extreme dust, humidity, or temperature conditions. Follow static-electricity discharge protocols (use an antistatic strap).

- Reseating or replacing the CAT1700 main board
- Installing or replacing the CAT1710 media block and fans
- Replacing CAT1740 and CAT1741 power supplies
- Replacing the CAT1720 front-panel assembly board
- Upgrading a Dolby CP950 to a CP950A
- Replacing a CP850 with a CP950A

## 5.1 Reseating or replacing the CAT1700 main board

If there is a problem with inputs, outputs, Ethernet communication, or other basic operations, we recommend reseating the CAT1700 before replacing this board.

This section shows you how to reseat the CAT1700, and how to replace it (part number CAT1700), if necessary.

⚠️ **Warning:** To reduce the risk of electrical shock, you must disconnect the power cord before proceeding.

### 5.1.1 Reseating or replacing the CAT1700 main board

You can reseat or replace the CAT1700 main board. This procedure is the same for both the CP950 and CP950A.

**Procedure**

1. Power down the unit by disconnecting the power cord, and then disconnect all other connections.
2. Locate the CAT1700 and the two thumbscrews that secure the board to the chassis on the back of the CP950/CP950A. The following figure uses a CP950 as an example.

*Figure 155: Cat1700 and thumb screws*



3. Unscrew the thumbscrews in a counterclockwise direction. These screws are locked into the board chassis and do not come out completely.
4. When the thumbscrews are no longer securing the CAT1700 to the chassis, carefully pull on the thumbscrews to remove the board.

*Figure 156: CAT1700 removed*
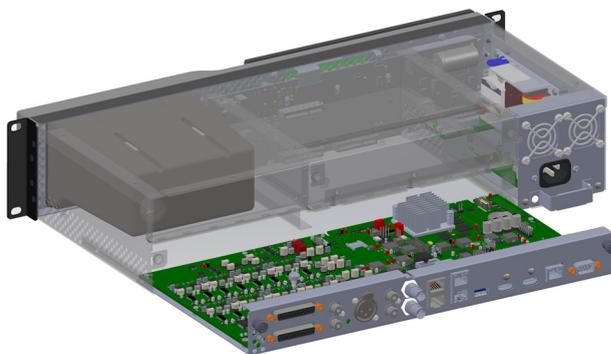


5. Inspect the CAT1700 main board for signs of damage to its components or the edge connector that plugs into the CAT1720 front-panel board. If there is damage, you may need to replace the CAT1700 or CAT1720.

6. To reseat or replace the existing CAT1700, align the circuit board with the guide rails on both sides. The CAT1700 sheet-metal tray will slide into the unit below the guide rails, as shown in the following figure.

*Figure 157: Align CAT1700 with guide rails*
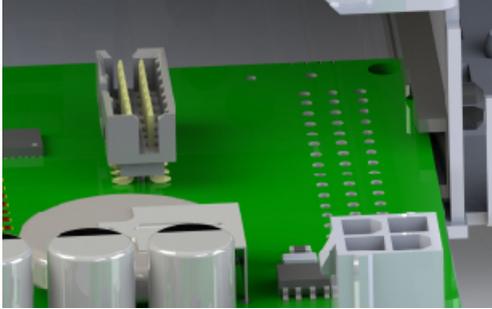


7. Push in the CAT1700 carefully and slowly using the guide rails until you feel the PCI connectors start to engage, and then push the CAT1700 into its final position with your thumbs.
8. Use the thumbscrews to secure the board to the Dolby CP950/CP950A chassis, and then reconnect all cables.
9. If you are replacing the CAT1700 with a new board, you can now power up the CP950/CP950A, upgrade the software to the latest version, and then push a backup file to the unit.
10. The procedure is now complete.

## 5.2 Installing or replacing the CAT1710 media block and fans

You can install or replace a CP950A Media Block (CAT1710). You must follow antistatic protocols when working with these electronic devices.

**Procedure**

1. Power down the unit by disconnecting the power cord, and then (only if needed), disconnect all other connections.

   ⚠ **Caution:** Equipment damage: Sensitive electronics inside the equipment can be destroyed by static electricity. Be sure to discharge any static electricity built up before touching the equipment, and wear appropriate protective gear.

2. If the unit is a CP950, look for a blank plate with two thumbscrews on the rear panel, as shown in the following figure.

*Figure 158: CP950 rear panel with blank plate*
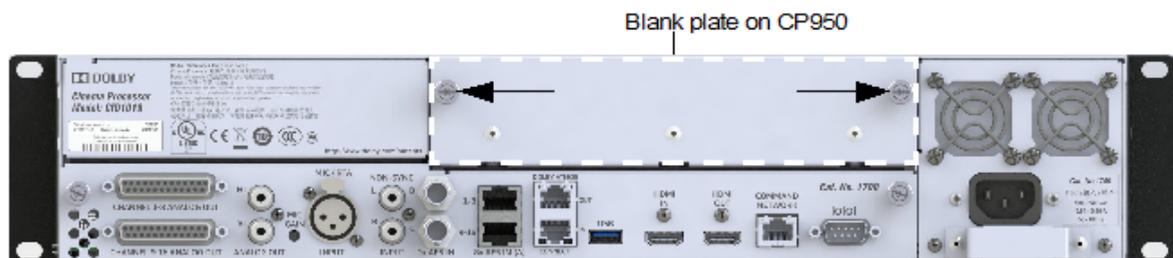
3. If the unit is a CP950A, look for the CAT1710 Media Block with two thumbscrews on the rear panel, as shown in the following figure.

*Figure 159: CP950A rear panel with CAT1710 media block*
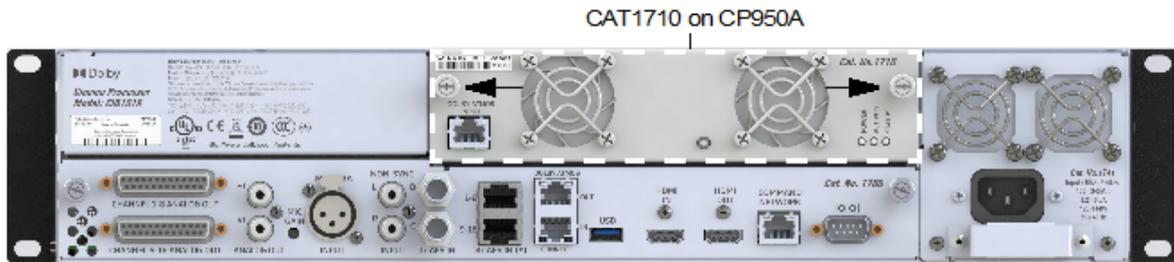


> ⚠️ **Caution:** If you are replacing an existing CAT1710 Media Block, remove the Ethernet cable connected to the **Dolby Atmos Input** port if the cable is attached.

4. Unscrew the thumbscrews in a counterclockwise direction. These screws are locked into the board chassis and do not come out completely.

5. When the thumbscrews are no longer securing the CAT1710 or blank plate to the chassis, carefully pull on the thumbscrews to remove the board.

6. Align the new/replacement CAT1710 into the plastic guide rails on the left and right sides of the chassis.

7. Slide the CAT1710 board into the unit carefully and slowly using the guide rails until you feel the PCI connectors start to engage, and then push the CAT1710 into its final position with your thumbs.

*Figure 160: Slide in the CAT1710*
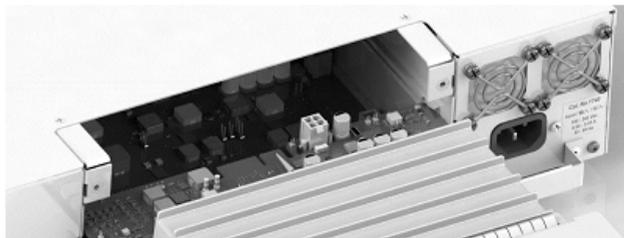


8. Tighten the thumbscrews by rotating them clockwise into the CP950A chassis.

9. Reconnect the power cord to the power supply.

10. Reconnect the Ethernet cable to the Dolby Atmos Input port if you removed it earlier in the process. When upgrading a CP950 to a CP950A, or replacing a failed CAT1710 Media Block, it is important to upgrade to the latest software. If the system is already upgraded to the latest software, you must reinstall that software, as the replacement CAT1710 may be running older software/firmware. Failure to complete this step may result in errors or performance issues.

11. In addition, the CAT1710 requires a license to allow Dolby Atmos playback. You can activate a license at the Dolby Activation Portal: http://www.dolby.com/softwarefeatureactivation using the certificate on the CAT1710 and an activation code. If you have questions regarding the activation procedure, read the activation portal manual at: http://www.dolbycustomer.com/cinema/Content/ActivationPortal/ Dolby_Activation_Portal_Quick_Reference_Guide_v3.3.pdf.If you do not have an activation code, you can use the certificate on the CAT1710 to download a temporary key on the activation portal. This allows you to get onscreen quickly in an emergency.

This completes the replacement/upgrade procedure.

> 📄 **Note:** The Dolby Atmos Cinema Processor CP950A must have a CAT1741 power supply to operate correctly. Section 5.3 shows you how to replace/upgrade a power supply.

## 5.2.1 Replacing CAT1710 fans

You can replace CAT1710 fans.

### Required tools

A small Phillips screwdriver and flat-head screwdriver are required to perform this task.

### Replacing the CAT1710 Fans

You can troubleshoot and replace the fans in a CP950A CAT1710. If the CP950A CAT1710 is overheating or you see system fan alerts, you should check the fans and replace as necessary. This section explains how to remove and replace CAT1710 fans (part number 8322692).

### Procedure

1. Power down the unit by disconnecting the power cord, and then (only if needed), disconnect all other connections. You must follow antistatic protocols when working with these electronic devices.

   ⚠ **Caution:** Equipment Damage: Sensitive electronics inside the equipment can be destroyed by static electricity. Be sure to discharge any static electricity built up before touching the equipment and wear appropriate protective gear.

2. Look for the CAT1710 Media Block with two fans (fan 3 and fan 4) and two thumbscrews on the rear panel, as shown in the following figure.

   *Figure 161: CP950A rear panel with CAT1710 media block*
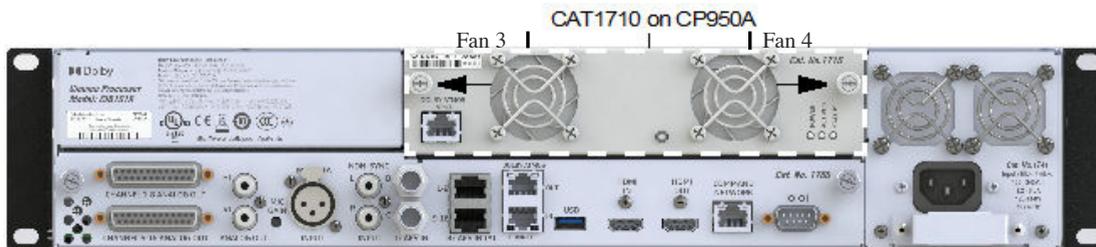
   

   ⚠ **Caution:** Remove the Ethernet cable connected to the Dolby Atmos Input port if the cable is attached.

3. Unscrew the thumbscrews in a counterclockwise direction. These screws are locked into the chassis and cannot be removed completely.

4. When the thumbscrews are no longer securing the CAT1710 or blank plate to the chassis, carefully pull on the thumbscrews to remove the board.

   *Figure 162: Remove CAT1710*
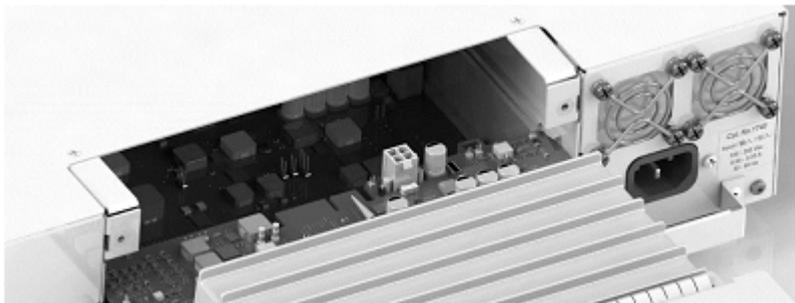
5. Remove the three screws that secure the sheet metal fan assembly to the CAT1710 main board (from the bottom side of the CAT1710), as shown in the following figure.

*Figure 163: Remove three screws securing fan assembly to CAT1710*
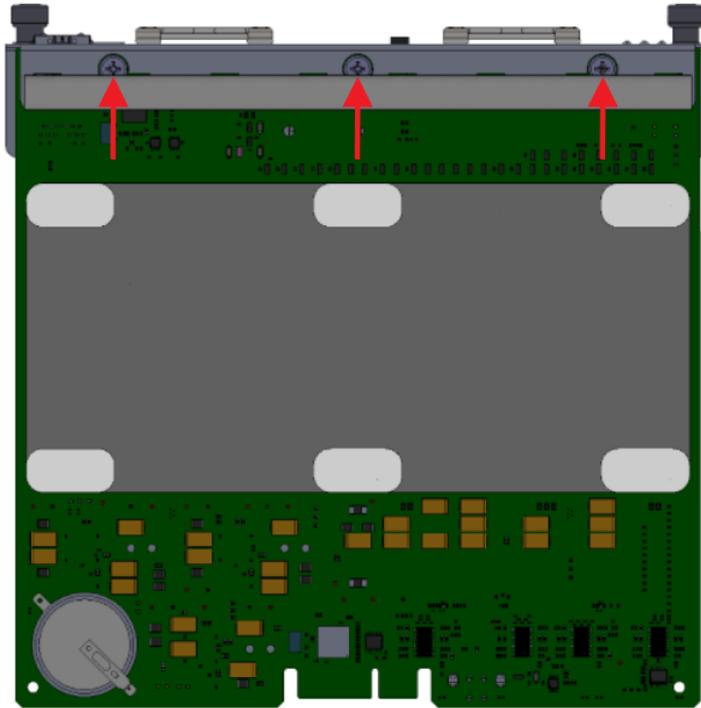


6. Flip the board over so that it is right-side up, and then carefully lift the top edge of the sheet metal fan assembly and push it toward the back of the CAT1710 main board (in the direction of the fans) to unhook it from the plastic air diverter. Use a flat-head screwdriver to aid in lifting and move the top flange above the air diverter manifold (black pieces).

*Figure 164: Lift top edge of sheet metal fan assembly and push it up and away from air diverter*
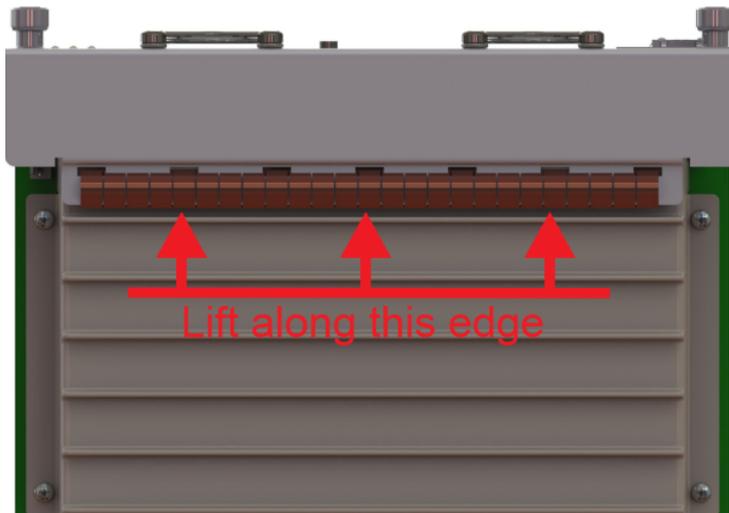


7. Carefully slide the fan assembly away from the CAT1710 main board and rotate the fan assembly away from back edge of the board so you can access the fan cable plugs.
8. Disconnect the fan plugs from J1 (fan 4) and J2 (fan 3) on the CAT1710 main board (shown in the following figure). Now the entire fan assembly is accessible.

*Figure 165: Disconnect J1 and J2*
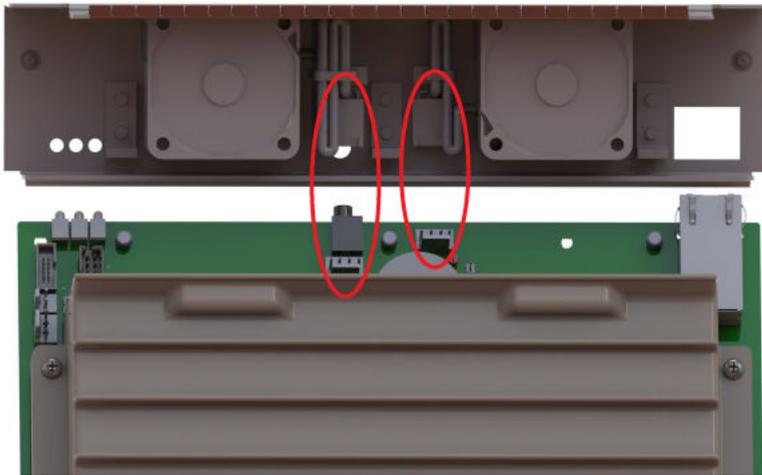


9. Remove the four screws that secure the faulty fan and fan guard, and then remove the fan.

*Figure 166: Remove four screws securing faulty fan and fan guard*
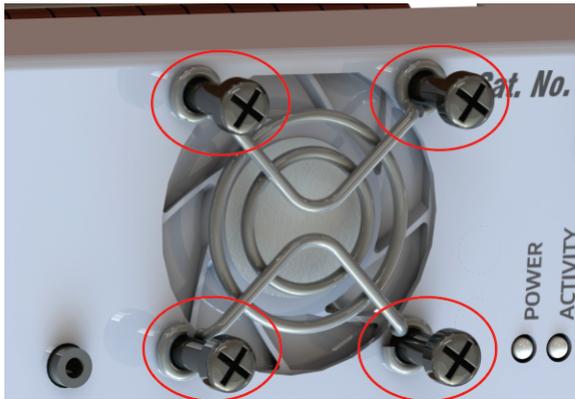


10. Bend the new fan cable assembly exactly the way the old one was (and use 1 or 2 of the provided cable zip ties on the cables).
11. Install the new fan with the correct airflow orientation (exactly like the old fan, with the fan labels showing through the fan cutouts).
12. Reinstall the fan guard and secure it with the four screws you previously removed.
13. Re-attach the cable plugs to J1 (fan 4) and J2 (fan 3).
14. Carefully insert the bottom portion of the fan assembly into the CAT1710 main board and align the screw holes.
15. Slowly push the top portion of the fan assembly to hook it in place on the plastic air diverter, as shown in the following figure.

*Figure 167: Slowly push fan assembly in place on air diverter*
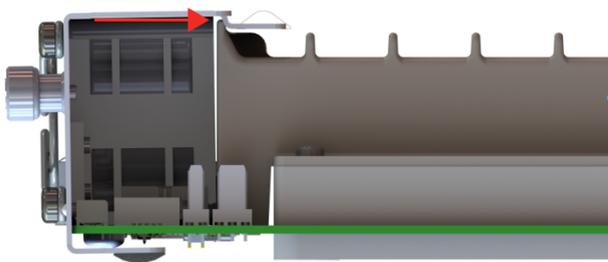
16. Reinstall the three screws you previously removed to secure the fan assembly to the CAT1710 main board.

*Figure 168: Reinstall three screws to secure fan assembly*
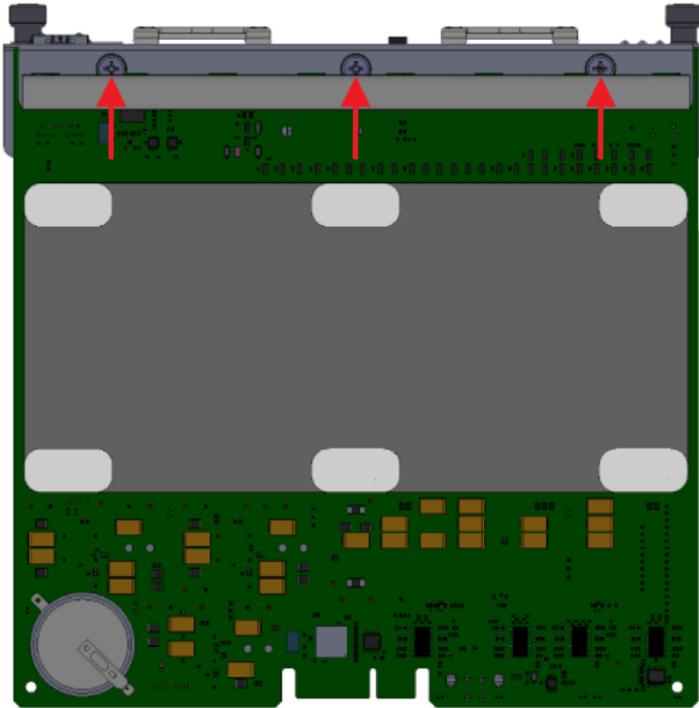


17. Align the CAT1710 into the plastic guide rails on the left and right sides of the chassis.
18. Slide the CAT1710 board into the unit carefully and slowly using the guide rails until you feel the PCI connectors start to engage, and then push the CAT1710 into its final position with your thumbs, as shown in the following figure.

*Figure 169: Slide CAT 1710 into chassis*
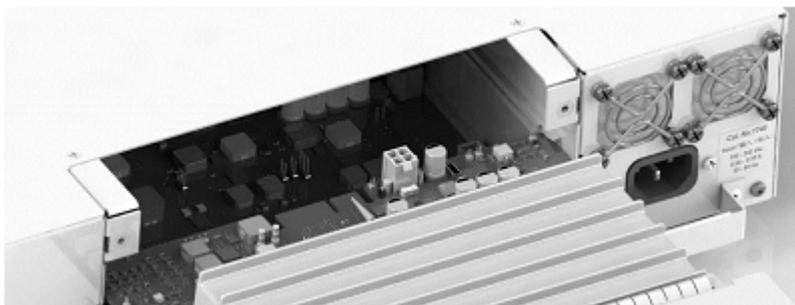


19. Tighten the thumbscrews by rotating them clockwise into the CP950A chassis.
20. Reconnect the power cord to the power supply.
21. Reconnect the Ethernet cable to the Dolby Atmos Input port if you removed it earlier in the process.

    This completes the replacement procedure.

## 5.3 Replacing CAT1740 and CAT1741 power supplies

If the system is not booting/powering up, the power supply may be the cause. We recommend troubleshooting the power supply before you replace it. This section shows you how to troubleshoot and reseat a CP950 CAT1740, or CP950A CAT1741 power supply and how to replace it (part numbers CAT1740, CAT1741), if required.

⚠️ **Warning:** Double pole, neutral fusing. Disconnect the Dolby CP950/CP950A mains power before proceeding. To reduce the risk of electrical shock, you must disconnect the power cord before removing the power supply assembly.

### 5.3.1 Required tool

A small Phillips screwdriver is required to perform this procedure.

### 5.3.2 Troubleshooting, reseating, or replacing CAT1740 and CAT1741 power supplies

You can troubleshoot, reseat, or replace the CAT1740 power supply.

#### Troubleshooting a CAT1740 power supply in a CP950
**Procedure**

1. Power down the unit by disconnecting the power cord, and then (only if needed), disconnect all other connections, and locate the CAT1740 power supply module on the rear panel.
2. Find the two screws that secure the power supply to the chassis, which are located on the left and right sides of the handle, as shown in the following figure.

*Figure 170: CP950 rear-panel with power supply module and chassis screws*



3. Use a small Phillips screwdriver to remove the two screws that secure the power supply to the CP950 chassis.
4. Use the handle on the power supply to pull the power supply out of the chassis, as shown in the following figure.

⚠️ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components.

*Figure 171: Remove power supply*



You can see several components on the power supply, as shown in the following figure.

*Figure 172: CAT1740 power supply components*
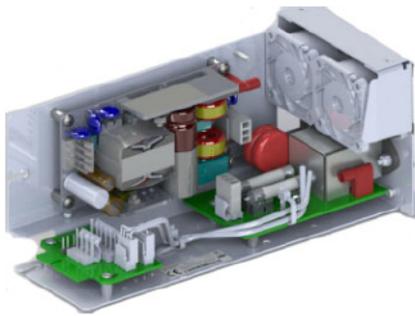


The power moves through the AC input into two fuses on the power supply. Fuse 1 (F1), a 10-amp fuse, is closest to the exposed side of the power supply. Fuse 2 (F2), a 2-amp fuse, is located behind fuse 1. For your convenience, each fuse receptacle supports two fuse sizes, which makes it easier to purchase replacement fuses locally.

*Figure 173: CAT1740 Power supply two fuses*
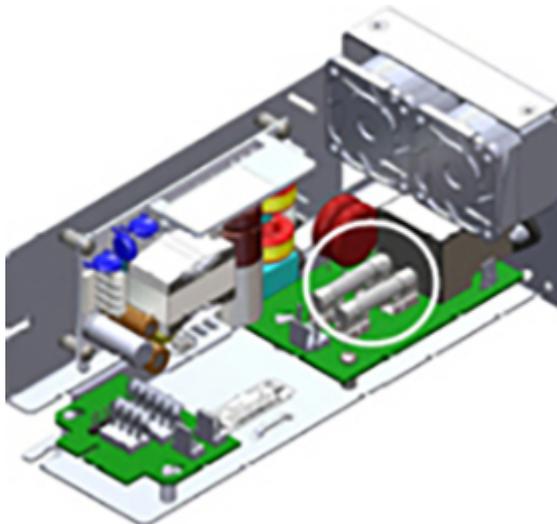
5. Use a multimeter (with the fuses installed) to determine if one or both fuses failed. If you need to remove and replace fuses, we recommend that you use a fuse puller. Dolby does not sell fuses. For failed fuses, use the following specifications to locate a suitable replacement locally:

- Fuse 1 (labeled **F1**) on the printed circuit board)

  - Rating: 10 A 250 VAC
  - Type: Ceramic time lag
  - Small size: 5 × 20 mm
  - Large size: 6.3 × 32 mm

- Fuse 2 (labeled **F2**) on the printed circuit board)

  - Rating: 2 A 250 VAC
  - Type: Ceramic time lag
  - Small size: 5 × 20 mm
  - Large size: 6.3 × 32 mm

6. If both fuses are good, look for disconnected cables or damaged components. In some cases, it is good to remove and replace cables. After this inspection, reseat the power supply in the Dolby CP950/950A, secure it with the two screws you removed, and try to power up the system.

   If the Dolby CP950 still does not power on, the problem is most likely related to a power supply component. If you have more than one Dolby CP950, you can double check a problem power supply by swapping power supplies between units.

   If you need to replace a problem CAT1740 power supply, you can order a new one from Dolby.

7. The procedure is now complete.

## Troubleshooting a CAT1741 power supply in a CP950A

**Procedure**

1. Locate the CAT1741 power supply module on the rear panel.
2. Find the two screws that secure the power supply to the chassis, which are located on the left and right sides of the handle, as shown in the following figure.
3. Use a small Phillips screwdriver to remove the two screws that secure the power supply to the CP950A chassis (shown in the following figure).

*Figure 174: CP950A rear-panel with power supply module and chassis screws*



4. Use the handle on the power supply to pull the power supply out of the chassis, as shown in the following figure.

   ⚠️ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components.

*Figure 175: Remove power supply*



You can see several components on the CAT1741 assembly, as shown in the following figure. The CAT1741 power supply board is mounted on top of the fuses you need to access.

*Figure 176: CAT1741 Assembly*
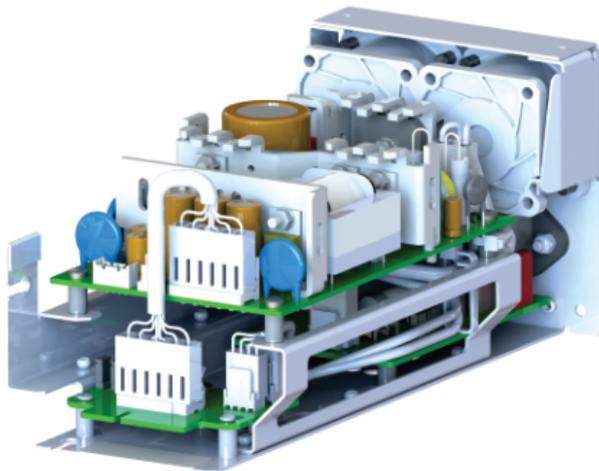


The following figure shows the CAT1741 without the main power supply card installed to help you identify the location of the fuses. You may be able to see that the fuses are labeled on the green circuit board as **F1** and **F2**. Fuse 1 is a 10 A 250 VAC slow blow (time lag) fuse. Fuse 2 is a 2 A 250 VAC slow blow (time lag) fuse.

*Figure 177: CAT1741 without main power supply card installed with fuse 1 and fuse 2*

5. You can test the fuses without removing the main power supply card. Turn the power supply over and look for the openings holes in the sheet metal. You can insert multimeter probes through the sheet metal to test the fuses. In the orientation shown in the following figure, the probes are testing fuse 1. Moving to the lower holes allows you to test fuse 2.

*Figure 178: Power supply turned over to test fuse 1 through holes with multimeter probes*



6. If you determine that one or both fuses are bad, you need to remove the power supply card to access the fuses.

7. Detach the DC power cables (both plugs), as shown in the following figure.

*Figure 179: Detach CAT1741 DC cables*



8. Detach the AC power cables (both plugs), detach the safety ground plug, and then remove the four screws that secure the power supply to the CAT1741 assembly. You can now remove the power supply from the sled, as shown in the following figures.

*Figure 180: CAT1741 assembly top view in sled*
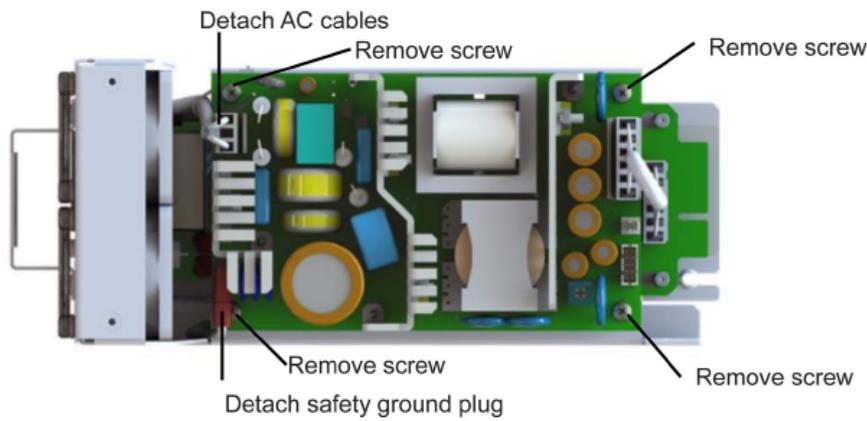


*Figure 181: CAT1741 power supply removed from CAT1741 assembly*
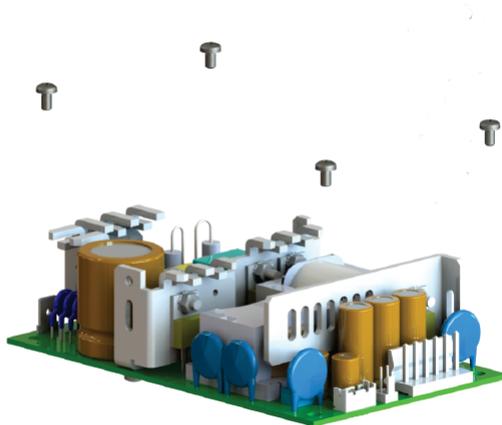


The power moves through the input into two fuses on the power supply. Fuse 1 (F1), a 10-amp fuse, is closest to the exposed side of the power supply. Fuse 2 (F2), a 2-amp fuse, is located behind fuse 1. For your convenience, each fuse receptacle supports two fuse sizes, which makes it easier to purchase replacement fuses locally.

*Figure 182: CAT1741 power supply assembly with two fuses after removing power supply from sled*
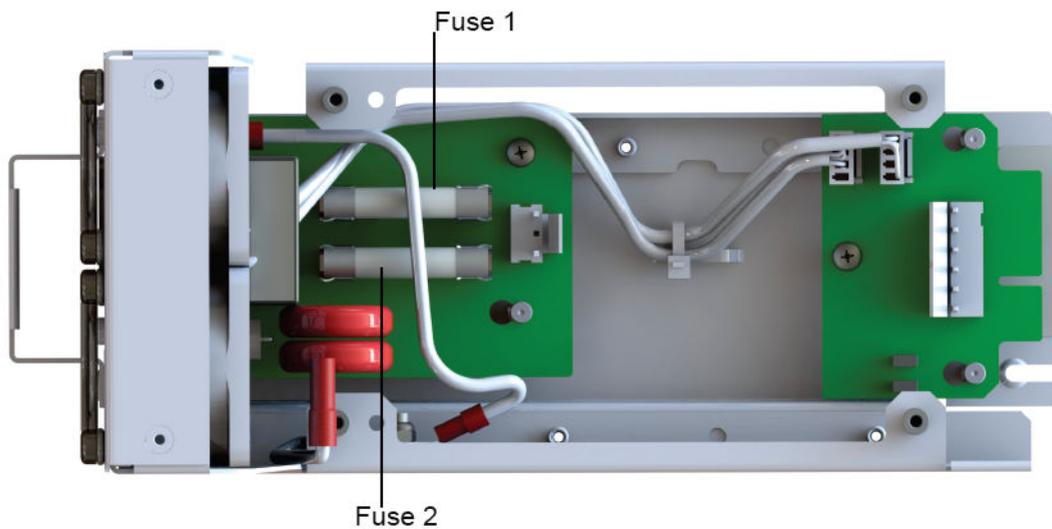
9. Use a multimeter (with the fuses installed) to determine if either or both fuses failed. If you need to remove and replace fuses, we recommend that you use a fuse puller. Dolby does not sell fuses. For failed fuses, use the following specifications to locate a suitable replacement locally:

   - Fuse 1 (labeled **F1**) on the printed circuit board)

     - Rating: 10 A 250 VAC
     - Type: Ceramic time lag
     - Small size: 5 × 20 mm
     - Large size: 6.3 × 32 mm
   - Fuse 2 (labeled **F2**) on the printed circuit board)

     - Rating: 2 A 250 VAC
     - Type: Ceramic time lag
     - Small size: 5 × 20 mm
     - Large size: 6.3 × 32 mm

10. If both fuses are good, look for disconnected cables or damaged components. In some cases, it is good to remove and replace cables.

11. Reattach the DC power cable plug to the DC board.

12. Reattach the AC power cable plug to the power supply.

13. Reattach the safety ground plug to the power supply.

14. Reverse the steps you performed to remove the power supply assembly, and then insert the power supply assembly into the chassis.

15. If the CP950A still does not boot up, the problem is most likely related to a power supply component. If you have more than one CP950A, you can double check a problem power supply by swapping power supplies between units. If you need to replace a problem power CAT1741 power supply, you can order a new one from Dolby

16. The procedure is now complete.

## 5.3.3 Troubleshooting and replacing power supply fans

You can troubleshoot and replace the fans in a Dolby CP950/CP950A power supply.

If the Dolby CP950/CP950A is overheating and you see system fan alerts, you should check the fans and replace as necessary. We recommend that you troubleshoot a fan problem before replacing. This section explains how to troubleshoot, remove, and replace CAT1740 or CAT1741 fans (part number 8322692).

### Required tools
These tools are required for this procedure.

   - Small Phillips screwdriver
   - Small zip tie

### Troubleshooting and replacing fans
**Troubleshooting and replacing fans in a CP950 CAT1740 power supply.**

**Procedure**

1. Look at the fans on the rear panel to identify any fans that are not turning.

   It is possible, but not likely, that power cycling the Dolby CP950 can restore fan operation.

   ⚠ **Caution:** Do not touch a spinning fan with your finger or any tools. The fans operate at a very high speed and can cause injury or damage.

2. Power down the unit by disconnecting the power cord, and then if needed, disconnect all other connections.

3. Locate the CAT1740 power supply module containing two fans on the rear panel.

If the system sent a warning error message, you can identify each fan on the rear panel, as shown in the following figure.

4. Find the two screws that secure the power supply to the chassis, as shown in the following figure.

*Figure 183: CP950 Rear panel*



5. Use a small Phillips screwdriver to remove the two screws that secure the power supply to the chassis.
6. Use the handle on the power supply to pull the power supply out of the chassis, as shown in the following figure.

*Figure 184: Remove power supply*



7. ⚠ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components after removing.

8. Check the fan connection for the fan wires.

The wires for the fans are plugged into a small circuit board labeled CAT1740-DC. Fan 1 (on the left when viewed from the back of the power supply module) connects to the J2 connector. Fan 2 (on the right) connects to the J3 connector, as shown in the following figure. Reseat the fan connections, then use a flashlight to check if the fan seized up due to obstructions. With the fan off, you can rotate it carefully to see if it is bound up. Do not touch the fan when it is spinning.

*Figure 185: CAT1740 power supply fans and connectors*



9. If you believe that you found the problem and want to test the fan again, reinstall the power supply in the Dolby CP950, then power up the system. If operation is not restored, you need a new fan. Contact Dolby to order fan part number 8322692. If you are not comfortable replacing fans, you can order a new power supply which is part number CAT1740.

   The steps that follow show how to replace fan 1. The steps for replacing fan 2 are identical.

10. Disconnect the CAT1740 power cable from the power source.

11. ⚠ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components after removing.

    Use a small Phillips screwdriver to remove the four screws that secure the fan to the CAT 1740 (shown partially unscrewed in the following figure).

*Figure 186: Remove screws from fans*



12. Locate and cut the zip tie around the fan cables (see zip tie in Figure 179).

13. Unplug the fan cable from the circuit board, then remove the fan.

14. Connect and install the replacement fan. Note that the fan label should be facing out and match the routing of the fan cables. Add a new provided zip tie to secure the cabling. If needed, you can order a new Dolby CAT1740 power supply.

15. The procedure is now complete.

**Troubleshooting and replacing fans in a CP950A CAT1741 power supply.**

**Procedure**

1. Look at the fans on the rear panel to identify any fans that are not turning.

   It is possible, but not likely, that power cycling the CP950A can restore fan operation.

   ⚠️ **Caution:** Do not touch a spinning fan with your finger or any tools. The fans operate at a very high speed and can cause injury or damage.

2. Power down the unit by disconnecting the power cord, and then if needed, disconnect all other connections.

3. Locate the CAT1741 power supply module containing two fans on the rear panel.

   If the system sent a warning error message, you can identify each fan on the rear panel, as shown in the following figure.

4. Find the two screws that secure the power supply to the chassis, as shown in the following figure.

*Figure 187: CP950A rear panel*



5. Use a small Phillips screwdriver to remove the two screws that secure the power supply to the chassis.

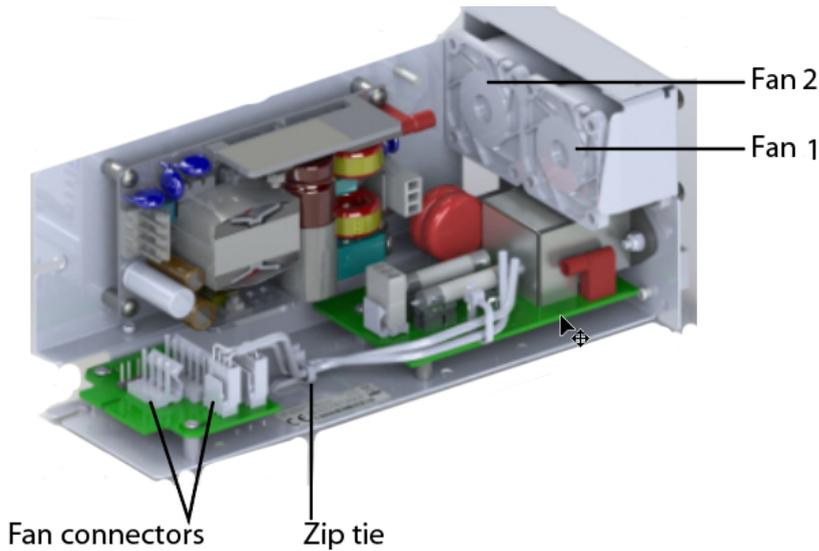6. Use the handle on the power supply to pull the power supply out of the chassis, and then

7. ⚠️ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components after removing.

*Figure 188: Remove power supply*

8. Detach the DC power cables (both plugs) from the CAT1741 power supply assembly.

*Figure 189: Detach CAT1741 DC cables*
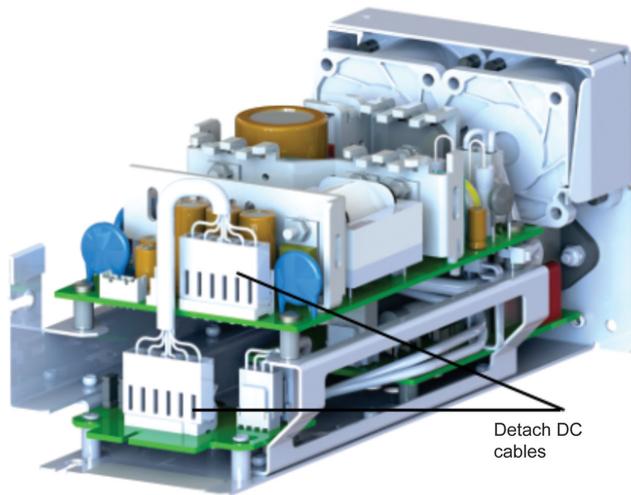


Detach DC
cables

9. Detach the AC power cables (both plugs), detach the safety ground plug, and then remove the four screws that secure the power supply to the CAT1741 assembly. You can now remove the power supply board from the sled, as shown in the following figures.

*Figure 190: CAT1741 assembly top view in sled*



Detach AC cables
Remove screw
Remove screw
Remove screw
Detach safety ground plug
Remove screw
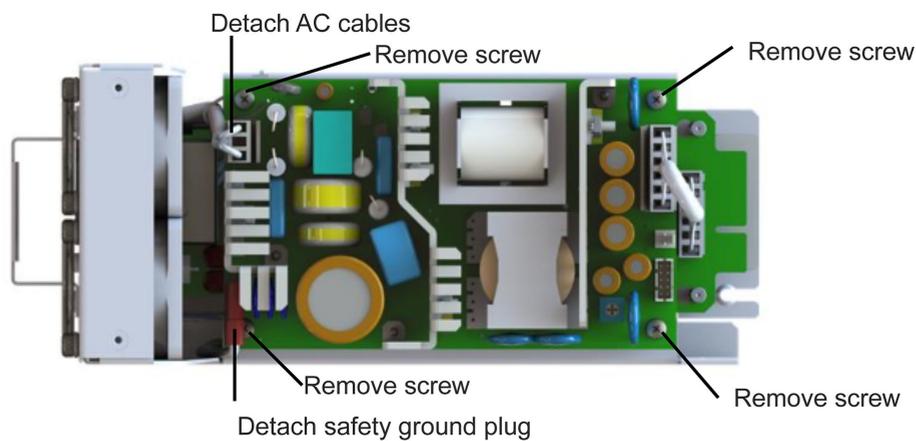
*Figure 191: CAT1741 power supply fans and connectors after removing power supply from sled*
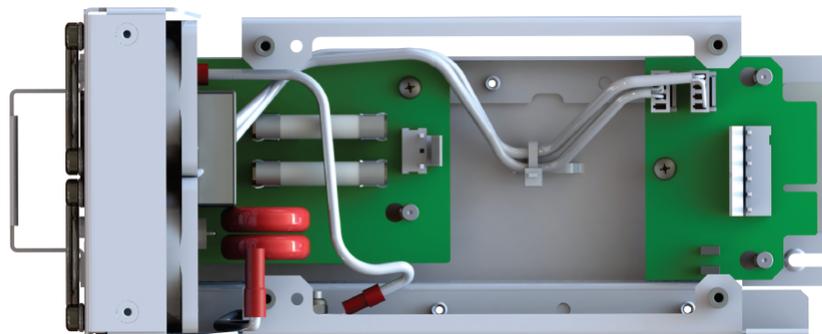


The wires for the fans are plugged into a small circuit board labeled CAT1741-DC. Fan 1 (on the left when viewed from the back of the power supply module) connects to the J2 connector. Fan 2 (on the right) connects to the J3 connector. Reseat the fan connections, then use a flashlight to check if the fan seized

up due to obstructions. With the fan off, you can rotate it carefully to see if it is bound up. Do not touch the fan when it is powered and spinning.

*Figure 192: CAT 1741 power supply fans and connectors*
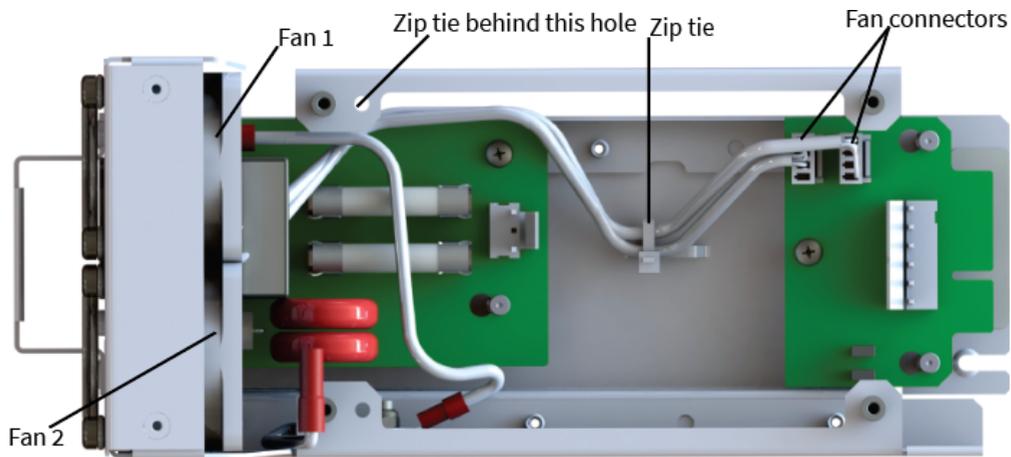


If you believe that you have found the issue and want to test a fan again, reinstall the power supply card, reconnect the wires, reinstall the power supply in the CP950A, and then power up the system. If operation is not restored, it is likely that you need a new fan. (part number 8322692). If you are not comfortable replacing fans, you can order a new power supply which is part number CAT1741.

The steps that follow show how to replace fan 1. The steps for replacing fan 2 are identical.

10. Disconnect the CAT1741 power cable from the power source.

11. ⚠️ **Warning:** The power supply may retain high voltage after removing. Wait at least 15 minutes before touching power supply components after removing.

12. Use a small Phillips screwdriver to remove the four screws that secure the fan to the power supply (shown partially unscrewed in the following example, which shows a CAT1740 power supply). The instructions for removing fan screws are the same for both a CAT1740 and CAT1741.

*Figure 193: Remove screws from fans*



13. Locate and cut the zip ties around the fan cables (see zip ties in Figure 186).
14. Unplug the fan cable from the circuit board, and then remove the fan.

15. Connect and install the replacement fan. Note that the fan label should be facing out and match the routing of the fan cables. Add two of the provided new cable zip ties to secure the cabling. If needed, you can order a new Dolby CAT1741 power supply.

16. The procedure is now complete.

## 5.4 Replacing the CAT1720 front-panel assembly board

If there is a problem with the front-panel user interface (FPUI) screen, fader knobs, or booth monitor, you should start troubleshooting by reseating the CAT1700 main board before replacing the CAT1720 board.

This section shows you how to reseat the CAT1700 or replace the entire CAT1720 assembly, if necessary (part number CAT1720).

> **Note:** If the CAT1720 is the only part that is replaced on a CP950 or CP950A, no system upgrade (or reupgrade) is required. There is no software that runs on the CAT1720 that requires an upgrade.

> **Warning:** To reduce the risk of electrical shock, you must disconnect the power cord before proceeding.

### 5.4.1 Required tool

A small Phillips screwdriver is required to perform this procedure.

### 5.4.2 Troubleshooting and replacing the CAT1720

You can troubleshoot and replace the CAT1720 front-panel assembly. This procedure is the same for both the CP950 and CP950A.

**Procedure**

1. Power down the unit by disconnecting the power cord, and then disconnect all other connections.

2. Locate the CAT1700 and the two thumbscrews that secure the board to the chassis on the back of the Dolby CP950/CP950A. The following figure uses a CP950 as an example.

*Figure 194: CAT1700 and Thumbscrews*



3. Unscrew the thumbscrews in a counter-clockwise direction. These screws are locked into the board chassis and do not come out completely.

4. When the thumbscrews are no longer securing the CAT1700 to the chassis, carefully pull on the thumbscrews to remove the board, as shown in the following figure.

*Figure 195: CAT1700 Removed*

5. Inspect the CAT1700 main board for signs of damage to its components or the edge connector that plugs into the CAT1720 front panel. If there is damage, you may need to replace the CAT1700 or CAT1720.

6. To reseat or replace the existing CAT1700, align the circuit board with the guide rails on both sides, as shown in the following figure. The CAT1700 sheet metal tray will slide into the unit below the guide rails, as shown in the following figure.

*Figure 196: Align CAT1700 with Guide Rails*
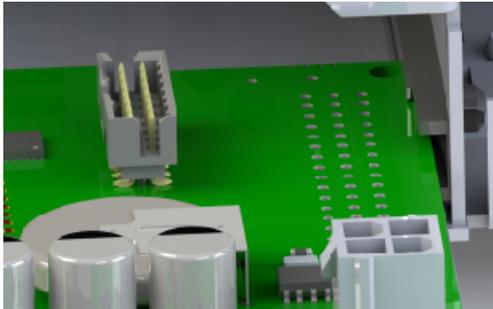


7. Push the CAT1700 carefully into its final position using the guide rails, and then use the thumbscrews to secure the board to the Dolby CP950CAT1710 chassis.

8. If reseating or replacing the CAT1700 did not restore function, power down and remove the CAT1700 again.

9. Locate the power supply module on the back of the unit and identify the two screws that secure the power supply to the chassis. In addition, find the blank expansion-board cover plate on a CP950 or the CAT1710 on a CP950A and their two thumbscrews, as shown in the following figure, which uses a CP950 as an example. The CP950A CAT1710 has thumbscrews in a similar location as the CAT950 blank cover plate.

⚠️ **Warning:** Double pole, neutral fusing. Disconnect mains before servicing. To reduce the risk of electrical shock, you must disconnect the power cord before removing the power supply assembly.

*Figure 197: CAT1740 Power supply module with chassis screws and cover plate with screws*
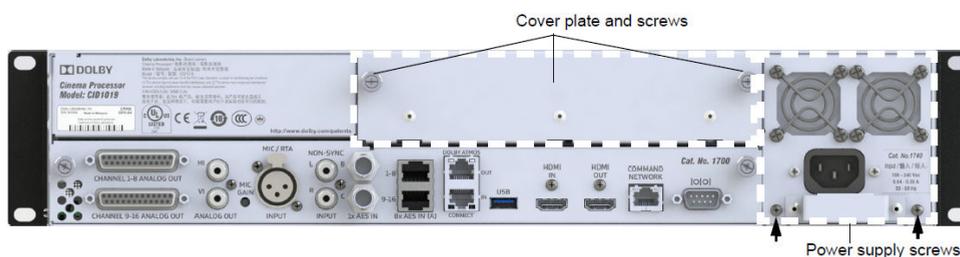


10. Use a small Phillips screwdriver to remove the two screws that secure the power supply to the chassis.

11. Use the handle on the power supply to pull the power supply out of the chassis.

12. Locate the thumbscrews on the CP950 expansion board cover plate or the CP950A CAT1710 Media Block.

13. For a CAT1710 Media Block, remove the Ethernet cable connected to the **Dolby Atmos Input** port if the cable is attached.

14. Unscrew the thumbscrews in a counterclockwise direction. These screws are locked into the board chassis and cannot be removed completely.

15. When the thumbscrews are no longer securing the CAT1710 or blank plate to the chassis, carefully pull on the thumbscrews to remove the blank plate or CAT1710.

16. Remove the top and bottom screws that are located behind each rack ear on both sides of the unit, as shown in the following figure. Do not remove the two middle screws.

Figure 198: Remove Top and Bottom Screws Behind Rack Ears



17. Pull on the rack ears to remove the front panel straight out of the chassis, as shown in the following figure.

Figure 199: Remove Front Panel from the Chassis



18. Check the CAT1720 circuit board for damage. If you had problems with the booth monitor speaker, check the connection on the left side of the board, as shown in the following figure.

Figure 200: CAT1720 Circuit Board with Booth Monitor Speaker Connection Shown



19. If you are experiencing a problem with the front-panel touch screen, check and reseat the two small ribbon cables at the top of the circuit board (gold colored ribbons).
20. If the CAT1720 needs to be returned and replaced, note the serial number that is on the white sticker attached to the printed circuit board.
21. Move the chassis so that the empty front-panel slot is facing up toward you, as shown in the following figure.

Figure 201: Empty Front-Panel Slot
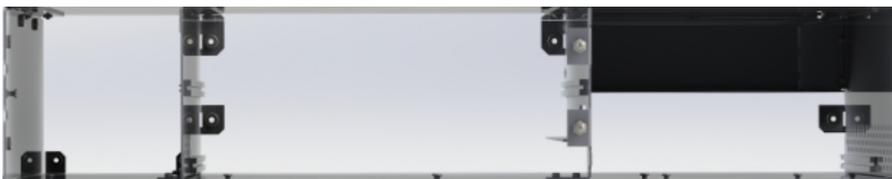


22. Hold the new front panel by the rack ears and level it as much as possible.

There are guiding slots on the chassis that match up with the front panel. When properly seated, the screw holes on the left and right sides behind the rack ears should match up.

23. Reinstall the screws behind the rack ears.
24. Reinstall the power supply in the unit, securing it with the two screws you previously removed.
25. Reinstall the CAT1700 main board in the chassis, securing it with the two thumbscrews.
26. Reinstall the expansion-board cover plate or CAT1710 in the chassis, securing it with the two thumbscrews.
27. The procedure is now complete.

## 5.5 Upgrading a Dolby CP950 to a CP950A

You can upgrade the Dolby Cinema Processor CP950 to a Dolby Atmos Cinema Processor CP950A. For a successful upgrade, the CP950 requires softwae version 1.0.4.2 or later, otherwise the upgrade to the latest version of the cinema processor software will fail. Perform the CP950 to CP950A upgrade by following these instructions to update the software, replace the power supply, and install the CAT1710.

**Procedure**

1. Start with the CP950 in its normal operating state, and then create a backup and perform a full power cycle (unplug power for 10 or more seconds), and then (only if needed), disconnect all other connections.
2. Obtain the latest CP950/CP950A cinema processor `.dlb` upgrade file from Dolby Laboratories at https://customer.dolby.com and update the CP950 to the latest software version. The latest software package(s) are compatible with both the Dolby Cinema Processor CP950 and Dolby Atmos Cinema Processor CP950A. For detailed instructions on upgrading, see Section 3.9.1. (A link is provided at the end of this section.)
3. Power down the unit by disconnecting the power cord and, if applicable, disconnect all other connections.
1. ⚠️ **Warning:** Double pole, neutral fusing. You must disconnect the Dolby CP950/CP950A mains power before proceeding. To reduce the risk of electrical shock, you must disconnect the power cord before removing the power supply assembly.

4. Locate and remove the two screws at the base of the CP950 CAT1740 power supply by unscrewing them in a counterclockwise direction.

*Figure 202: Remove screws from CAT1740 power supply*



5. Pull gently on the handle at the base of the CAT1740 power supply and slide it out of the slot in the CP950 chassis.
6. Align the new CAT1741 power supply with the empty slot and slide it into the slot where the previous power supply was located.
7. Use the two screws provided with the CAT1741 packaging to lock the new power supply into the chassis. Screw in a clockwise direction to tighten the screws so that the new power supply is securely connected to the chassis.
8. Align the new CAT1710 into the plastic guide rails on the left and right sides of the chassis.
9. Slide the CAT1710 board into the unit carefully and slowly using the guide rails until you feel the PCI connectors start to engage, and then push the CAT1710 into its final position with your thumbs.

*Figure 203: Slide in the CAT1710*
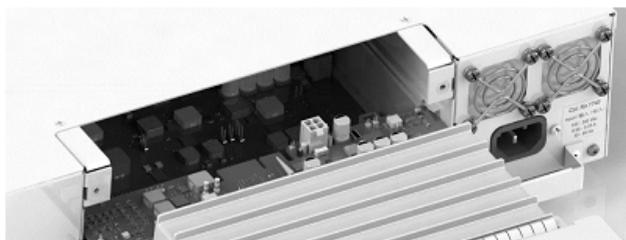


10. Tighten the thumbscrews by rotating them clockwise into the chassis.

*Figure 204: CAT1710 installed*
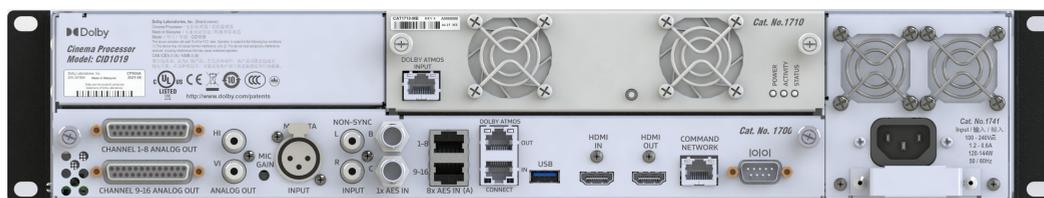


11. Reconnect the power cord to the power supply, and then reconnect all connections that were present before starting the upgrade process.

12. Upgrade to the latest software. If the system is already upgraded to the latest software, you must reinstall that software, as the replacement CAT1710 may be running older software/firmware. Failure to complete this step may result in errors or performance issues.

13. Once the software upgrade has successfully completed, perform a power cycle of the unit by unplugging it and waiting 10 seconds before reconnecting the power.

14. After the power cycle has completed connect the Ethernet cable on the **Dolby Atmos Input** port to the configurable port on the cinema playback system. See section 2.7 for instructions on how to connect to your cinema playback system. (A link is provided at the end of this section).

15. Power up the CP950A with its new hardware. Allow the system to fully boot up, and then log in to the web UI and click **maintenance** in the navigation bar, and then perform a factory reset. Audio will not function correctly after a CP950A upgrade if you do not perform a factory reset.

16. After the factory reset, upgrade the software again to the current version. This ensures that the CAT1710 is using the same version of the software as the other CP950A components. Once the software upgrade is complete, the CP950A may require one full power cycle.

17. In addition, the CAT1710 requires a license to allow Dolby Atmos playback. You can activate a license at the Dolby Activation Portal: http://www.dolby.com/softwarefeatureactivation using the certificate on the CAT1710 and an activation code. If you have questions regarding the activation procedure, read the activation portal manual at: http://www.dolbycustomer.com/cinema/Content/ActivationPortal/Dolby_Activation_Portal_Quick_Reference_Guide_v3.3.pdfIf you do not have an activation code, you can use the certificate on the CAT1710 to download a temporary key on the activation portal. This allows you to get onscreen quickly in an emergency.

This completes the upgrade procedure.

**Related information**

## 5.6 Replacing a CP850 with a CP950A

To replace a CP850 with a CP950A you need to create a CP850 backup file and use that file to restore (transfer) all of the applicable CP850 settings to the CP950A. For this operation, you do not need to reconfigue the room calibration.

**About this task**

The following equipment is required:

- CP850 with software version 2.3.1.0 or later installed

- CP950A with software version 2.1.0.2 or later installed

- PC with at least one Ethernet port available

📄 **Note:** If CP850 version 2.3.1.0 or later is not installed when the backup is performed, some settings will not transfer to the CP950A correctly.

📄 **Note:** If CP950A software version 2.1.0.2 or later is not installed, the CP850 backup will not be recognized by the CP950A.

During this process the following settings are transferred from the CP850 to the CP950A:

- AutoEQ
- Dolby Atmos Designer room configuration and array delays
- User created local EQs presets
- Preferences
- Network settings including hostname, NTP server, Command IP settings, and Dolby Atmos Input IP settings
- Dolby Atmos Connect settings

During this process the following settings are not transferred from the CP850 to the CP950A:

- Macros: Due to the many changes between the macros in the CP850 and CP950A, the macros are not transferred.
- Network settings including the default gateway (which is always the command IP configuration gateway on the CP950A), jumbo frames, and the Dolby Atmos input IP configuration manual settings, which cannot use DHCP.

📄 **Note:** Only digital routing for all speaker channels is supported, as shown in the following example. A mixed digital and analog output room configuration cannot be transferred due to architectural differences between the CP850 and CP950A. If you attempt to transfer a CP850 backup file with a mixed digital and analog routing configuration to a CP950A, the CP850 to CP950A transition will fail.

*Figure 205: CP850 all digital routing configuration example*
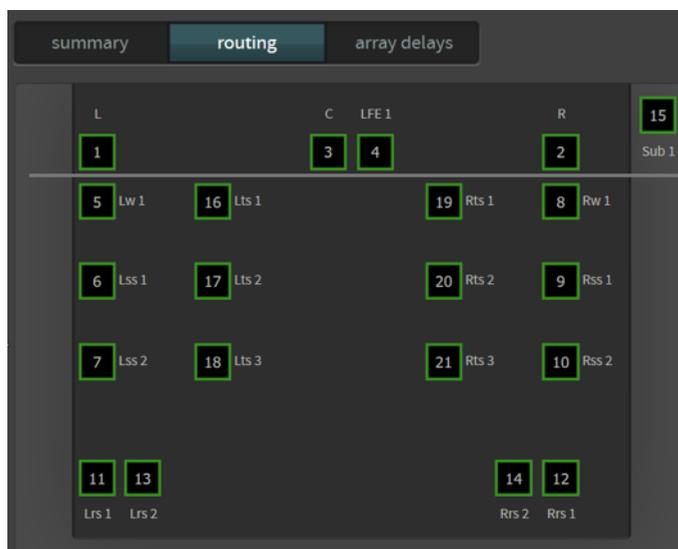


The following procedure shows you how to create a CP850 backup file, and then transfer the appropriate settings from that backup file to a CP950A:

**Procedure**

1. Log in to the CP850 web UI using the CP850 **COMMAND** port IP address (default login is admin/admin).
2. Click **maintenance** in the CP850 navigation bar, and then select the **backup** tab in the **settings management** pane.

*Figure 206: Click backup tab in CP850 maintenance screen*



3. Click the **create backup**, button in the **settings management** pane, and then enter a name for the CP850 backup file.
4. At the prompt, select the directory where you want to save the backup file, and then click **save**.

   If you do not have network access to the CP850, we recommend that you click **macro editor** in the CP850 navigation bar, and then note the CP850 macro information that you want to transfer, such as **fader preset**, **eq preset**, and **ch. assignment**. You can do this while the backup operation is running.
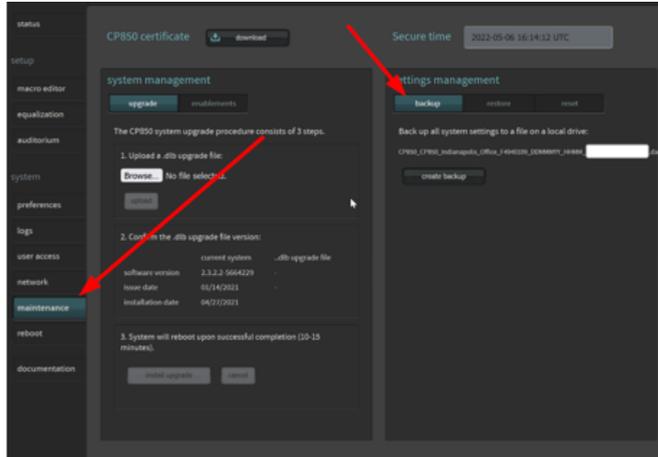5. Log in to the CP950A web UI using the CP950A **COMMAND NETWORK** port IP address (default login is admin/admin).

1. 📄 **Note:** The CP950A **COMMAND NETWORK** IP address changes to the CP850 IP address when the CP850 backup is completed on the CP950A. If the IP addresses will be the same on the two devices, proceed with step 6. If the CP950A has a different IP address than the CP850, then log in to the CP950A using the old CP850 IP address and change the CP950A IP address using the CP950A front-panel user interface (fpui). For information on changing the IP address, see Section 2.11. (A link is provided at the end of this section.)

6. Click **maintenance** in the CP950A navigation bar, and then click the **restore** tab in the **settings management** pane. For detailed information on the CP950A **maintenance** functions, see Section 3.9. (A link is provided at the end of this section.)
7. Click the **Choose File** button.
8. At the prompt, select the CP850 backup file you created earlier, and then click **Open**.
9. In the **restore** pane, click (check) in the boxes for **auditorium configuration**, **eq and level presets**, **array delays**, **preferences**, **operational state snapshot**, and **network**.
10. Click **restore**. An **authenticate** log in prompt appears (use the same log in that you used for the web UI). A **settings management** caution message indicates that partially restoring system settings can affect other settings, as some settings depend on other settings.

2. *Figure 207: Restore warning message*
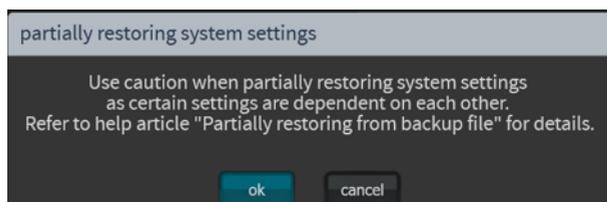
11. Click **ok** and the restore process begins. When the restore process is completed, a confirmation message appears.

*Figure 208: Settings restored confirmation message*
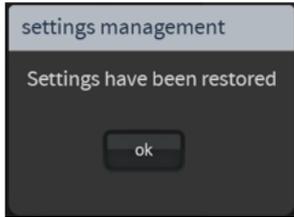


12. Click **ok**.

📄 **Note:** If you select **Restore all system settings (except user access)** or **macros** in the **restore** pane, and then attempt to restore the backup, an error message appears that indicates that the system does not support the restore operation from a CP850 when you check the boxes for those settings and the backup is not restored. To perform the restore, uncheck those boxes or use a different restore file.

Following a successful backup restore, you can apply the local EQ presets that were created on the CP850 to the CP950A. There are two ways to do this, push the EQ to all of the macros or apply the EQ to individual macros.

To push to all macros:

a. Select **equalization** in the navigation bar, and then select the EQ preset that you want to use from the EQ drop-down menu.

*Figure 209: Select EQ preset to apply to all macros*
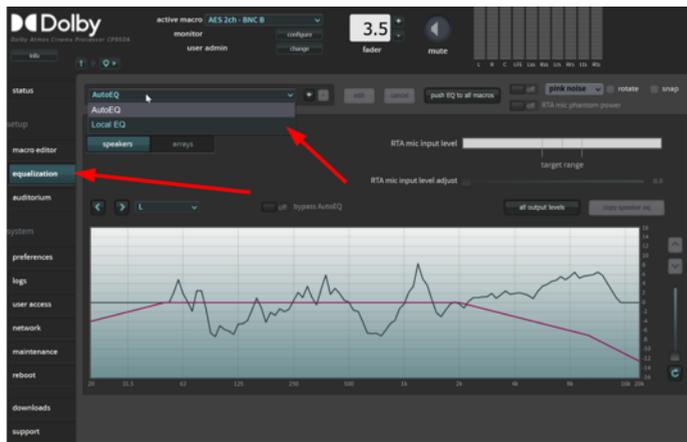


b. Click the **push EQ to all macros** button, and then click **ok**. A message indicates that the selected EQ preset will be pushed to all macros and asks you to confirm.

*Figure 210: Push EQ to all macros*
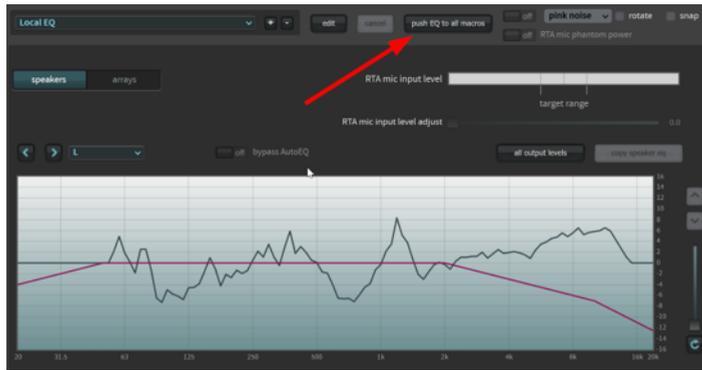


c. Click **ok** when a **push eq warning** appears (or click **cancel** if you do not want to proceed). A confirmation dialog indicates that the selected EQ preset was pushed to all macros.

d. Click **ok** in the confirmation dialog.

To push to an individual macro:

a. Select **macro editor** in the navigation bar.

b. Click the **edit** button to activate the editable settings.

c. In the **eq preset** drop-down menu, select the EQ that you want to apply, and then click **save**. The eq preset is now applied to the macro. If you click **status** in the navigation bar, the selected eq preset is now displayed in the **status** screen.

*Figure 211: Select eq preset to apply to individual macro*
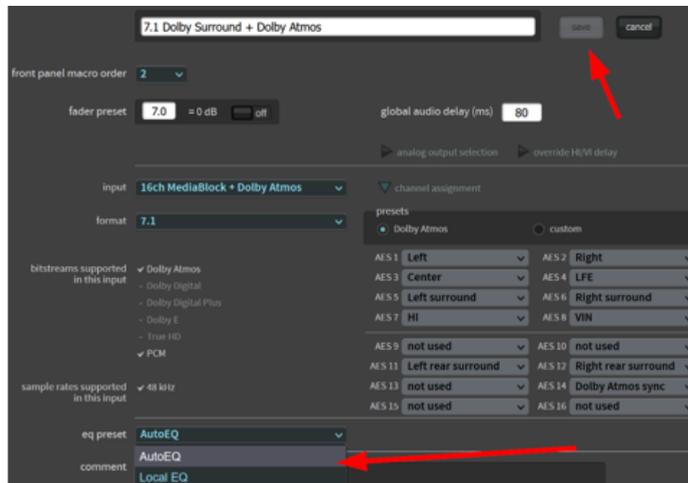
*Figure 212: EQ preset displayed in status screen*
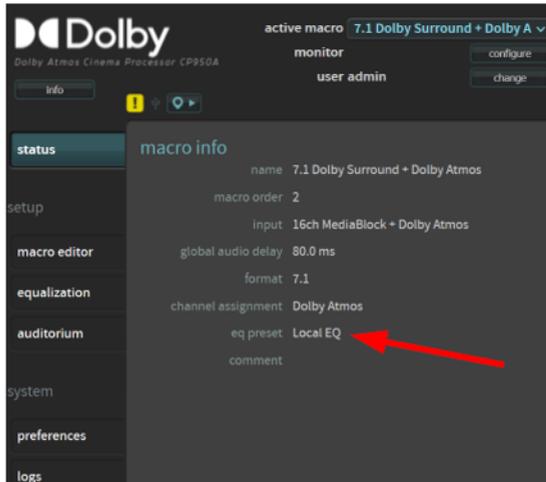


The procedure is now complete.

**Related information**

*6*

# Pinouts for Dolby CP950 and CP950A connectors

The pinouts provide useful information to help you connect the Dolby CP950/CP950A to external devices.

- Dolby CP950 and CP950A HDMI input and output pinouts
- Dolby CP950 and CP950A 16-Channel analog outputs
- Dolby CP950 and CP950A serial port pinouts
- Dolby CP950 and CP950A RJ45 AES3 pinouts

## 6.1 Dolby CP950 and CP950A HDMI input and output pinouts

The Dolby CP950 and CP950A have one HDMI input and one HDMI output. The HDMI input and output use type A connectors.

*Table 6: Dolby CP950 and CP950A HDMI input and output pinouts*

| Pin | Description |
| --- | --- |
| 1 | Transition-minimalized differential signaling (TMDS) data 2 + |
| 2 | TMDS data 2 shield |
| 3 | Transition-minimized differential signaling (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 Display Data Channel (DDC) (SCL) |
| 16 | Serial DataLine for DDC (SDA) |
| 17 | DDC/Consumer Electronics Control (CEC) ground |
| 18 | +5 V power |
| 19 | Hot plug detect |

## 6.2 Dolby CP950 and CP950A 16-Channel analog outputs

The Dolby CP950 and CP950A have 16 electronically balanced, floating analog output channels with nominal 50 Ω output impedance. The outputs are split between two 25-pin subminiature D-connectors (female). The maximum root mean square (RMS) output level for the analog output level is +21 dBu (8.7 V). The pinout conforms to the TASCAM standard.

Following are the Dolby CP950/CP950A pinouts for analog output channels 1–8:

*Table 7: 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 |

Following are the Dolby CP950/CP950A pinouts for analog output channels 9-16:

*Table 8: Analog output 2 channels 9-16 pinouts*

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

## 6.3 Dolby CP950 and CP950A serial port pinouts

The Dolby CP950 and CP950A have one RS-232 serial port. It uses a D-subminiature DE-9 data terminal equipment (DTE) male connector. Use a crossover cable to communicate with another DTE device, such as a PC.

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

*Table 9: Dolby CP950 and CP950A 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) |

## 6.4 Dolby CP950 and CP950A RJ45 AES3 pinouts

The Dolby CP950 and CP950A have two RJ45 AES3 ports, channels 1-8 on one connector and channels 9-16 on the other connector, as shown in the following tables. These are AES72 Type 1M ports with a 110 Ω termination.

*Table 10: Dolby CP950 and CP950A RJ45 AES3 Channels 1-8 pinouts*

| | |
|---|---|
| 1 | Channels 1 and 2 + |
| 2 | Channels 1 and 2 - |
| 3 | Channels 3 and 4 + |
| 4 | Channels 5 and 6 + |
| 5 | Channels 5 and 6 - |
| 6 | Channels 3 and 4 - |
| 7 | Channels 7 and 8 + |
| 8 | Channels 7 and 8 - |

*Table 11: Dolby CP950 RJ45 AES3 Channels 9-16 pinouts*

| | |
|---|---|
| 1 | Channels 9 and 10 + |
| 2 | Channels 9 and 10 - |
| 3 | Channels 11 and 12 + |
| 4 | Channels 13 and 14 + |
| 5 | Channels 13 and 14 - |

Table 11: Dolby CP950 RJ45 AES3 Channels 9-16 pinouts (continued)

| | |
|---|---|
| 6 | Channels 11 and 12 - |
| 7 | Channels 15 and 16 + |
| 8 | Channels 15 and 16 - |

7

# Pinouts for Dolby playback systems with a DB25 audio output

This chapter provides information for playback systems that use DB25 audio output.

• Dolby DSS200 with CAT862 MB 8 x AES output pinouts
• Dolby DCP-2000 and Dolby DCP-2K4 Dolphin MB 8 × AES output pinouts

## 7.1 Dolby DSS200 with CAT862 MB 8 x AES output pinouts

This table provides the Dolby DSS200 (with CAT862) **8 × AES** output pinouts and descriptions.

*Table 12: DSS200 8 x AES output 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 + |

## 7.2 Dolby DCP-2000 and Dolby DCP-2K4 Dolphin MB 8 × AES output pinouts

The following table provides the Dolby DCP-2000 and Dolby DCP-2K4 media block (MB) 8 x AES output pinouts and descriptions:

*Table 13: Dolby DCP-2000 and Dolby DCP-2K4 Dolphin MB 8 × AES Output Pinouts*

| Pin | Description |
| --- | --- |
| 1 | Channels 15/16 + |
| 2 | Channels 15/16 ground |
| 3 | Channels 13/14 - |
| 4 | Channels 11/12 + |
| 5 | Channels 11/12 ground |
| 6 | Channels 9/10 - |
| 7 | Channels 7/8 + |
| 8 | Channels 7/8 ground |
| 9 | Channels 5/6 - |
| 10 | Channels 3/4 + |
| 11 | Channels 3/4 ground |
| 12 | Channels 1/2 - |
| 13 | No connection |
| 14 | Channels 15/16 - |
| 15 | Channels 13/14 + |
| 16 | Channels 13/14 ground |
| 17 | Channels 11/12 - |
| 18 | Channels 9/10 + |
| 19 | Channels 9/10 ground |
| 20 | Channels 7/8 - |
| 21 | Channels 5/6 + |
| 22 | Channels 5/6 ground |
| 23 | Channels 3/4 - |
| 24 | Channels 1/2 + |
| 25 | Channels 1/2 ground |

8

# Wiring the DB25/RJ45 adapter

This chapter provides instructions for wiring the provided DB25-to-dual-RJ45 adapter for Dolby Digital cinema playback systems that output 16-channel audio via a DB25 connecter.

Instructions are provided for the Dolby DSS200 (equipped with a CAT862 MB), and the Dolby DCP-2000 and Dolby DCP-2K4 (equipped with a Dolphin MB).

📄 **Note:** Dolby DSS playback systems provide two MB options, the CAT862 and CAT745. The CAT745 option outputs 16-channel audio via RJ45 Ethernet connections and does not require an adapter.

⚠️ **Warning:** To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect the rear-panel RJ45 ports to telephone circuits.

- [Required parts](#)
- [Using the correct pinouts for the DB25-to-Dual-RJ45 adapter](#)

## 8.1 Required parts

Use these parts to wire the DB25-to-dual-RJ45 adapter.

- An unpinned male DB25-to-dual-RJ45 adapter. One adapter ships with the Dolby CP950/CP950A (Dolby part number 7501670).
- For Dolby DSS200 CAT862 configurations only: A female-to-female DB25 gender changer. This gender changer is not provided with the Dolby CP950/CP950A. You must obtain it from a vendor other than Dolby.

*Figure 213: Adapter and Gender Changer*



- In addition, you need two CAT5e or greater Ethernet cables. One of these cables is required for channels 1-8, and a second cable is required when using channels 9-16.

## 8.2 Using the correct pinouts for the DB25-to-Dual-RJ45 adapter

You must use the correct pinouts on the provided DB25-to-RJ45 adapter to transmit the incoming audio channels from the playback system to the Dolby CP950 and CP950A.

To wire the adapter for your playback system, you need to connect its colored wires to the correct numbered pin holes, as specified in the following tables. The pinouts for the Dolby DSS200 CAT862 are different than those for the Dolby DCP-2000 and Dolby DCP-2K4, so the adapter wiring pinouts are also different. Be sure to use the correct table for your unit. Insert the specified wire into its corresponding pin hole until you feel the pin latch.

*Table 14: Dolby DSS200 CAT862 Port-A Adapter Pinouts for Channels 1-8*

| RJ45 port-A wire color | Pin hole number | AES pair |
|---|---|---|
| Blue | 14 | Channels 1 and 2 + |
| Orange | 2 | Channels 1 and 2 - |
| Black | 3 | Channels 3 and 4 + |
| Red | 17 | Channels 5 and 6 + |
| Green | 5 | Channels 5 and 6 - |
| Yellow | 16 | Channels 3 and 4 - |
| Brown | 6 | Channels 7 and 8 + |
| White | 19 | Channels 7 and 8 - |

*Table 15: Dolby DSS200 CAT862 Port-B Adapter Pinouts for Channels 9-16*

| RJ45 port-B wire color | Pin hole number | AES pair |
|---|---|---|
| Blue | 8 | Channels 9 and 10 + |
| Orange | 21 | Channels 9 and 10 - |
| Black | 22 | Channels 11 and 12 + |
| Red | 11 | Channels 13 and 14 + |
| Green | 24 | Channels 13 and 14 - |
| Yellow | 10 | Channels 11 and 12 - |
| Brown | 25 | Channels 15 and 16 + |
| White | 13 | Channels 15 and 16 - |

*Table 16: Dolby DCP-2000 and Dolby DCP-2K4 Port-A Adapter Pinouts for Channels 1-8*

| RJ45 port-A wire color | Pin hole number | AES pair |
|---|---|---|
| Blue | 24 | Channels 1 and 2 + |
| Orange | 12 | Channels 1 and 2 - |
| Black | 10 | Channels 3 and 4 + |
| Red | 21 | Channels 5 and 6 + |
| Green | 9 | Channels 5 and 6 - |
| Yellow | 23 | Channels 3 and 4 - |
| Brown | 7 | Channels 7 and 8 + |
| White | 20 | Channels 7 and 8 - |

*Table 17: Dolby DCP-2000 and Dolby DCP-2K4 Port-B Adapter Pinouts for Channels 9-16*

| RJ45 port-B wire color | Pin hole number | AES pair |
|---|---|---|
| Blue | 18 | Channels 9 and 10 + |
| Orange | 6 | Channels 9 and 10 - |
| Black | 4 | Channels 11 and 12 + |
| Red | 15 | Channels 13 and 14 + |
| Green | 3 | Channels 13 and 14 - |
| Yellow | 17 | Channels 11 and 12 - |
| Brown | 1 | Channels 15 and 16 + |
| White | 14 | Channels 15 and 16 - |

**Related information**

9

# Required cabling changes when replacing a Dolby CP750

You need to make cabling changes when replacing a Dolby CP750 with a Dolby CP950.

- Cabling changes required when replacing a Dolby CP750
- Pinout information for replacing a CP750 with a CP950

## 9.1 Cabling changes required when replacing a Dolby CP750

You must change the cabling when replacing a Dolby CP750 with a Dolby CP950.

This section describes the required cabling changes when replacing a Dolby CP750 with a Dolby CP950.

The pinout on the Dolby CP750 **Main Audio Output** is different from the pinout on the Dolby CP950 **Channel 1-8 Analog Out**. The Dolby CP750 uses a THX pinout, but the Dolby CP950 pinout conforms to the TASCAM standard. The DB25 connector is male on the Dolby CP750 and female on the Dolby CP950.

Dolby sells a cable designed to quickly adapt the CP750 wiring to a CP950. The part number for this cable is 8322890.01.

## 9.2 Pinout information for replacing a CP750 with a CP950

This section provides pinout information for the changes you must make when replacing a Dolby CP750 with a Dolby CP950.

There are three wiring change options:

- Changing the Dolby CP750 wiring to use a male connector with a different pinout.
- Removing the Dolby CP750 wiring and installing a new cable.
- Plugging a short adapter cable or DB25-DB25 adapter into the end of the Dolby CP750 wiring.

  The required wiring pinouts are shown in the following table:

*Table 18: Dolby CP750 to Dolby CP950 or CP950A wiring pinouts*

| Dolby CP750 cable pin number (must be male) | Dolby CP950/CP950A cable pin number (must be male) | Channel |
|---|---|---|
| 1 | 2 | Ground |
| 2 | 24 | L+ |
| 3 | 3 | BsL- |
| 4 | 5 | Ground |
| 5 | 21 | C+ |
| 6 | 14 | BsR- |
| 7 | 8 | Ground |
| 8 | 10 | R+ |
| 9 | 11 | Ground |
| 10 | 6 | Ls- |
| 11 | 17 | Rs- |
| 12 | 20 | SW- |
| 13 | 13 | Ground |
| 14 | 12 | L- |
| 15 | 16 | Ground |
| 16 | 15 | BsL+ |
| 17 | 9 | C- |
| 18 | 19 | Ground |
| 19 | 1 | BsR+ |

*Table 18: Dolby CP750 to Dolby CP950 or CP950A wiring pinouts (continued)*

| Dolby CP750 cable pin number (must be male) | Dolby CP950/CP950A cable pin number (must be male) | Channel |
|---|---|---|
| 20 | 23 | R- |
| 21 | 22 | Ground |
| 22 | 25 | Ground |
| 23 | 18 | Ls+ |
| 24 | 4 | Rs+ |
| 25 | 7 | SW+ |

10

# Remote control, monitoring, and automation

The Dolby CP950 and CP950A provide several ways to control and monitor the system.

- Web user interface to control fader and mute functions remotely
- Web services API
- ASCII serial commands
- Simple network management protocol
- Important Dolby Atmos playback information

## 10.1 Web user interface to control fader and mute functions remotely

Beginning with software v2.2.0.x, you can access a simple web-user interface (web UI) to control the CP950/CP950A fader and mute functions remotely. This interface scales for all mobile devices and provides fader and mute controls from any device connected to the same network as the CP950/CP950A.

To use the remote fader:

- Mute/unmute by clicking on the speaker icon.
- Change the fader level by dragging the blue circle icon up and down from 0.0 to 10.0 using a mouse or touchscreen.

*Figure 214: Fader and mute web UI*
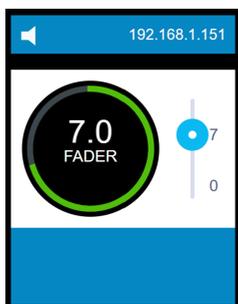


## 10.2 Web services API

The Dolby CP950 and CP950A use a rich web services API. You can use this API to control the CP950/CP950A or obtain information and system status.

The use of web services requires the following files that contain the configuration, which you can access in a `.zip` file (`Dolby_CP950_WSDL_FILES.zip`) by clicking **downloads** in the Dolby CP950/CP950A web client navigation bar or via the Dolby customer portal at https://customer.dolby.com.

- `SystemManagement.wsdl`: Core functions of web services; References the other files
- `SystemManagement_PortTypes.wsdl`: Contains instructions for using the different commands; Use a text editor to view.
- `System_Management_DataTypes.xsd`: Schema definition file

The web services contained in the `.zip` file is a new version with added functionality. The CP950 and CP950A continue to support version 1.1 (initially released with the CP950), which is backward compatible with the CP850. For the best results, we recommend using the latest version.

You can import the web services into your control system or use a program, such as SoapUI to inspect and test operations. Due to the different types of systems and interfaces, this section provides guidance to help you get started with web services.

1. Unzip the files to a single folder so that all three files are in the same directory, as shown in the example in the following figure.

*Figure 215: Unzip files into single folder*
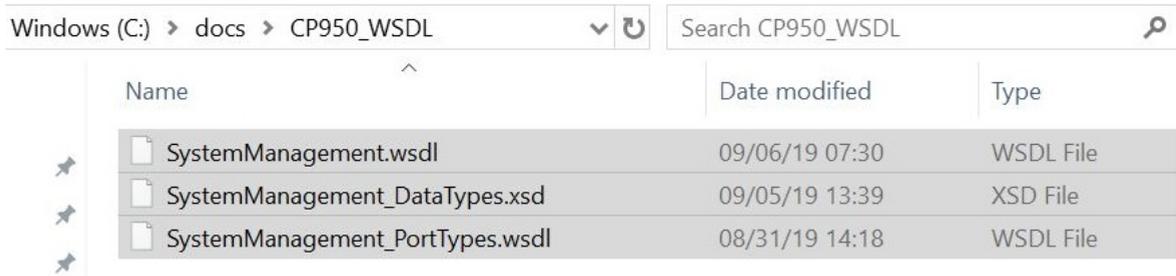


2. Once unzipped, you can modify the `SystemManagement.wsdl` file using a text editor (WordPad, Notepad++, and so on) to correctly set up the connection. Locate the **wsdl:import** statement near the top of the file, and the **location=** parameter, as shown in the following figure. This parameter tells the web services client where to find the `SystemManagement_PortTypes.wsdl` file. You will see that the instruction indicates that this information is at www.dolby.com. This is a placeholder and not a reference to www.dolby.com on the internet. You must make changes to correctly locate the file.

*Figure 216: Unzip and set up location*



- If you are connected to a CP950/CP950A the network, replace www.dolby.com for **location=** with the CP950/CP950A IP address, as shown in the following figure. Be sure to save the configuration after making the change, and then proceed to step 3.

*Figure 217: Setup for CP950/CP950A network*



- If you are not connected to a CP950/CP950A network and want to explore web services using only the files on your computer (with SoapUI or similar software), replace the http request in **location=** with information that enables the `SystemManagement.wsdl` to locate the `SystemManagement_PortTypes.wsdl` file on your local system. Change "http://www.dolby.com:9090/cp/ws/smi/systemmanagement/schemas/SystemManagement_PortTypes.wsdl" to: "./SystemManagement_PortTypes.wsdl", as shown in the example in the following figure.
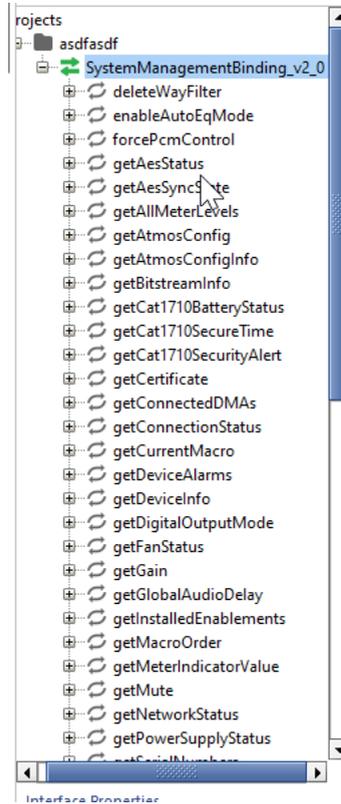
*Figure 218: Setup if not on CP950/CP950A network*

Be sure to save the configuration after making the change.

**3.** For both of the previous setups, you can load the WSDL files into your automation system, SoapUI, or a similar program. Each of the functions is shown in a list. See the list of loaded file functions in the following figure.

*Figure 219: WSDL files loaded*



**Note:** Each of the functions in the WSDL file includes the "www.dolby.com" address. This remains only a placeholder. For the commands to work correctly, be sure that "www.dolby.com" is replaced for your CP950/CP950A network setup or non-CP950/CP950A network IP address (in **location=**), as described in the two previous setups.

## 10.3 ASCII serial commands

The Dolby CP950 and CP950A can receive simple ASCII commands over the RS232 Serial Port or Ethernet (port 61408). The following table lists the Dolby CP950 /CP950A ASCII commands.

*Table 19: ASCII serial commands*

| Parameter name | Description | Argument/value | Usage |
|---|---|---|---|
| **sys.macros** | Read list of macro names and numbers | ? | **"sys.macros ?"** |
| **sys.macro_preset** | Read current macro number | ? | **"sys.macro_preset ?"** |
| | Change to a macro by number (activates the third macro as mapped in **macro editor**) | Integer (1-8) | **"sys.macro_preset 3"** |
| **sys.macro_name** Note that macro names are case sensitive | Read current macro name | ? | **"sys.macro_name ?"** |
| | Change to a macro by name (activates the non-sync macro) | <macro name> | **"sys.macro_name non-sync"** |
| | Change to a macro by name (activates the HDMI macro) | <macro name> | **"sys.macro_name hdmi"** |
| **sys.fader** | Read current fader level (represented as Dolby fader level 0-100; default 70) | ? | **"sys.fader ?"** |
| | Set a new fader level (sets fader to 7.0) | Integer (1-100) | **"sys.fader 70"** |
| | Set a new fader level (sets a fader to 5.5) | Integer (1-100) | **"sys.fader 55"** |
| **ctrl.fader_delta** | Increase current fader level (increases fader level by .1) | (Integer 1-100) | **"ctrl.fader_delta 1"** |
| | Decrease current fader level (decreases fader level by .1) | (Integer 1-100) | **"ctrl.fader_delta -1"** |
| | Increase current fader level (increases fader level by .5) | (Integer 1-100) | **"ctrl.fader_delta 5"** |
| **sys.mute** | Read current mute state ("0" = unmuted; "1" = muted) | ? | **"sys.mute ?"** |
| | Mute system | 1 | **"sys.mute 1"** |
| | Unmute system | 0 | **"sys.mute 0"** |

*Table 19: ASCII serial commands (continued)*

| Parameter name | Description | Argument/value | Usage |
|---|---|---|---|
| **sys.ip_settings** | Read the IP address of the CP950/CP950A | ? | **"sys.ip_settings ?"** |
| **sys.audio_status** | Read the status of the current CP950/CP950A audio playback from a media block<br><br>Possible responses<br><br>pcm 5.1: Indicates that the content on a CP950/950A is pcm only and is playing in pcm mode using a 5.1 macro<br><br>pcm 7.1: Indicates that the content on a CP950/950A is pcm only and is playing in pcm mode using a 7.1 macro<br><br>atmos: Indicates the content is Dolby Atmos and the CP950A is playing correctly in Dolby Atmos (CP950A only)<br><br>reverted: Indicates that the content is Dolby Atmos but the CP950A cannot process that content so it is playing in pcm mode (CP950A only) | ? | **"sys.audio_status ?"** |

## 10.4 Simple network management protocol

Simple Network Management Protocol (SNMP) allows you to remotely monitor different Dolby CP950/CP950A operational functions and overall health of the device. However, you cannot use SNMP to change settings or configurations. You can download a SNMP `.zip` file by clicking **downloads** in the web client navigation bar.

You can monitor these basic variables for the Dolby CP950/CP950A:

- Dolby product name (CP950 or CP950A)
- CP1700 hardware version
- Dolby CP950/CP950A chassis serial number
- CAT1700 main board serial number
- CAT1710 Dolby Atmos expansion card serial number (CP950A only)
- CAT1710 Dolby Atmos expansion card Cert number (used in playback key generation for CP950A only)
- Main software version
- Fans 1 and 2 status
- Fans 3 and 4 status (CP950A only)
- Temperature status (several sensors)
- Power supply status
- CAT1700 main board battery voltage
- CAT1710 battery status
- Current input and format in the active macro

- Current EQ preset in the active macro
- Current global audio delay in the active macro
- Current fader level
- Mute status
- Digital output mode (Dolby Atmos Connect AES67 or Blu-Link)
- Current bitstream format (when using a coded digital input)
- Decode mode (5.1, 7.1, and so on)
- Current AES sync state status
- Current 8 x AES input status
- Hearing impaired (HI) and Visually-impaired narration (VI) delay values when using the 8 x AES input
- Center channel bypass status (on/off)
- Enablement expiration date
- Bitstream Encrypted (Whether the Dolby Atmos content currently playing is encrypted)
- Meter levels for channels
- Any active system alerts (For more detailed information, connect to the CP950/CP950A web client UI)
- Network status
- Current NTP address, status, and hostname
- List of the connected Dolby Multichannel Amplifiers (Dolby Atmos Connect only, status not available for analog connections)
- Current site information (from information provided in the Dolby Atmos Designer software)
- CP950 uptime (CP950 or CP950A)

A comprehensive list of monitorable objects and their values is contained in the DOLBY-CP950.mib, which you can view with a text editor. Note that this file also contains support for the CP950A (Dolby Atmos and the CAT1710 Media Block).

**SNMP traps**

In addition to remotely monitoring the available variables, you can configure the CP950/CP950A to send notifications of specific events using SNMP traps.

To get started with SNMP traps, the CP950/CP950A must be running software version 2.1.0.13 or higher. To perform this setup, you will need:

- The .mib files from the cinema processor, as stated previously
- A .mib browser application installed on a host PC (Windows, MacOS, and so on)

> **Note:** For the cinema processor to send alerts to the receiver (host), the trap receiver (host PC) and cinema processor must be on the same network, so it can trap the alerts.

To perform this function:

1. On the cinema processor web UI, go to the **network** screen and select the **SNMP** tab on the right side.
2. In the **SNMP trap host IP** field, enter the trap host IP address.
3. Turn the **advertise SNMP traps switch** to **on**, so the system can send traps, and then click **apply**.

*Figure 220: SNMP traps screen*
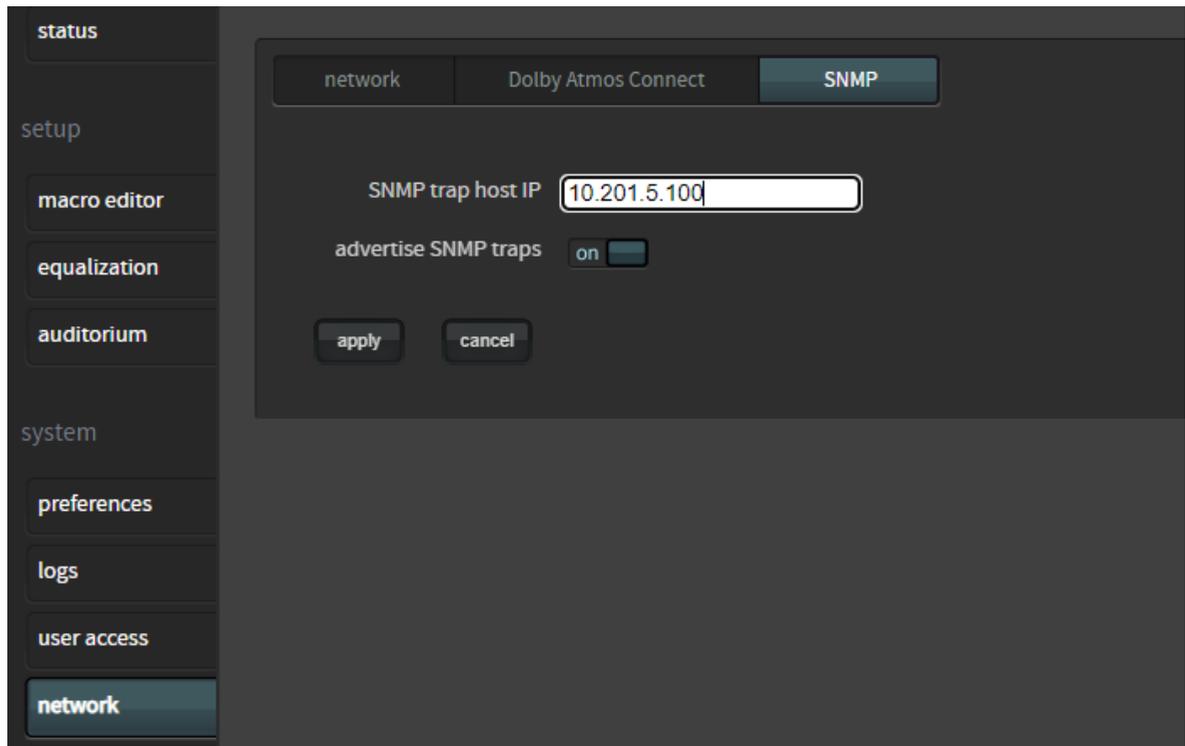


4.  Launch the `.mib` browser application on the host PC (your program may look different than the examples below), and then load the `mib` files, by going to `File>Load mib`.

    A prompt appears where you can select the necessary `.mib` files to be loaded onto the application.

    In addition to the six Dolby `.mib` files, the `IF-mib` file is required for linkup and linkdown traps. (This and other standard `.mib` files are located in the `<program files>\ireasoning\mibbrowser\mibs` folder.)

    📄 **Note:** `IF-MIB` is a standard file that should be available from the library of available .mib files in any mib browser. This file is not provided by Dolby.

The system loads the SNMP `.mib` files and you can view them in the **iReasoning MIB Browser** screen **.MIB Tree**, as shown in the following figure.

*Figure 221: View .mib files in iReasoning MIB Browser screen*
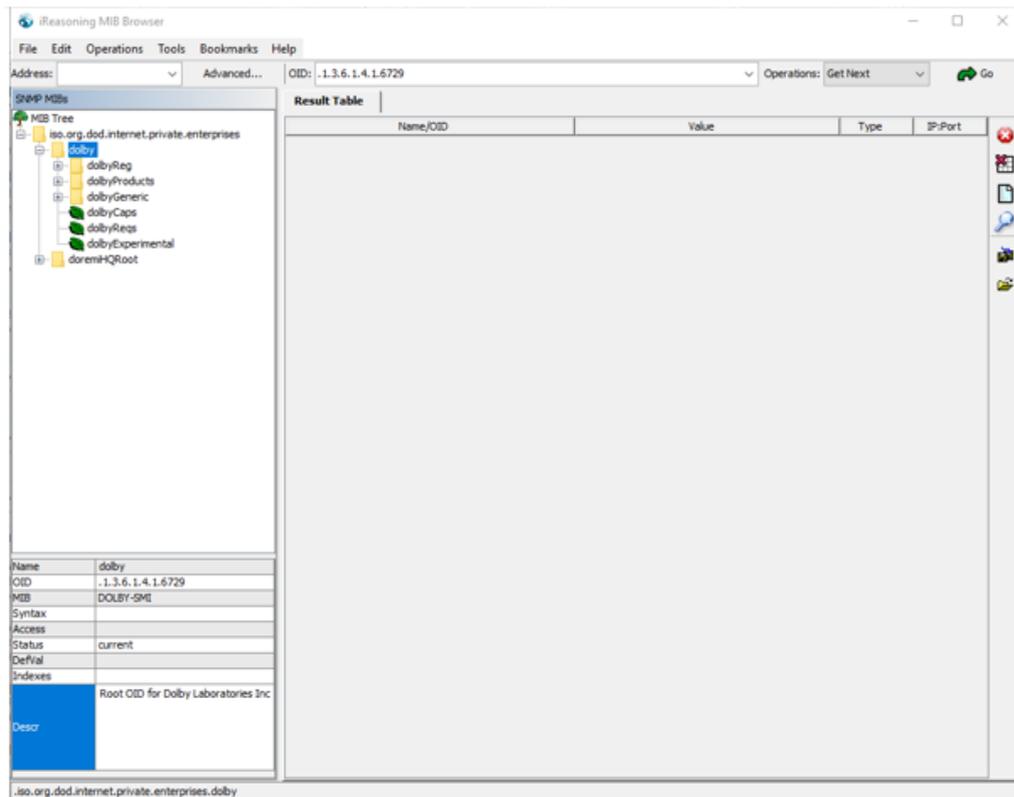


- In the **Address** field enter the IP address of the cinema processor that will send traps, and then then press <Enter> to establish the link between that cinema processor and the `.mib` browser.

You are now ready to trap alerts from the cinema processor.

- On the **iReasoning MIB Browser**, select **Tools** >**Trap Receiver**. You can view the **Trap Receiver** screen next to the result table and you can view any trap received from the cinema processor.

*Figure 222: View Trap Receiver Screen*
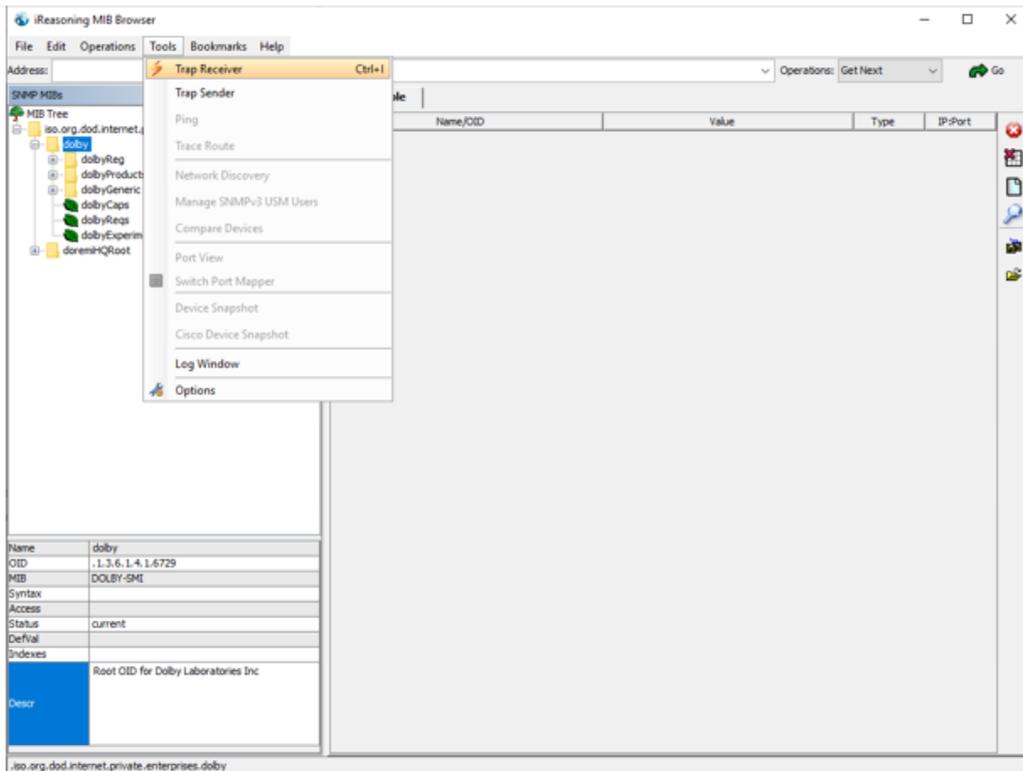


To test the trap receiver, click the **preferences** tab in the CP950/CP950A web UI, and then switch **center channel bypass** to **on**. The event should now be trapped and viewable in the **Trap Receiver** screen. The **center channel bypass** switch is the easiest way to test and validate trap connections. When testing is complete, change the **center channel bypass** switch back to **off**.

*Figure 223: Event trapped in Trap Receiver screen*
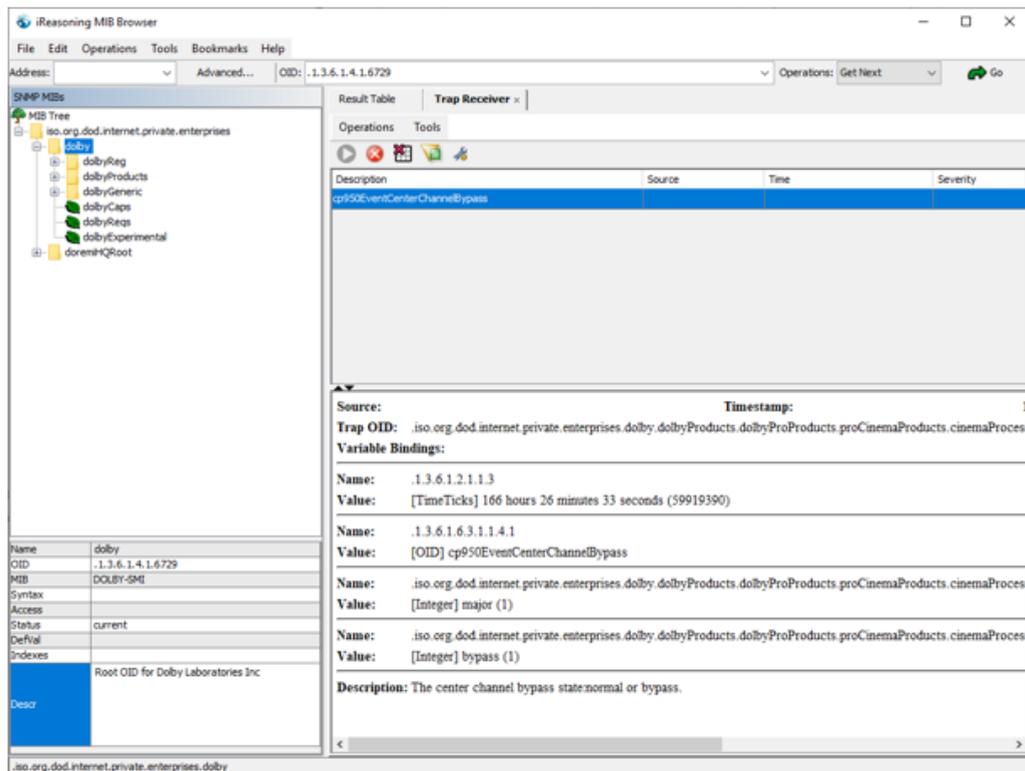
## 10.5 Important Dolby Atmos playback information

This section provides important information regarding Dolby Atmos keys, connections, and playback issues.

### 10.5.1 Dolby Atmos key delivery issues

The CP950A and Dolby Atmos playback require an additional configuration and may change the way that keys are delivered to the auditorium. With older systems (DSS, DCP, IMS1000, IMS2000, IMB with ShowVault), a single Key Delivery Message (KDM) is delivered to the playback system.

With the IMS3000 and some playback systems supplied by a party other than Dolby (Barco Alchemy), two KDMs are delivered to the playback system. This mode, called dual KDM, allows the playback system to provide the CP950A KDM when it is time to decrypt content and start the show. If the CP950A KDM is not loaded to the playback system, encrypted Dolby Atmos playback is not possible.

If the system uses a TMS to distribute KDMs to playback system, the CP950A KDM may not be sent because this function is new and may not be implemented. In such a situation, we recommend manual loading of the KDM to the playback system.

### 10.5.2 Dolby Atmos watermarking issues

For Dolby Atmos playback to be successful, the playback system and the CP950A need to be configured correctly, but there are outside issues that can impact playback.

The packaged Dolby Atmos audio tracks are hosted on the playback system and transferred to the CP950A in advance of playback. If needed, the content is decrypted. The audio is then rendered for the specific room defined in the CP950A. When the content is played, there is a synchronization signal on AES channel 14. This signal provides clip information and timing information to match the video and audio.

As part of digital cinema content security, audio is forensically watermarked with data that can be extracted from pirated copies of movies. This watermark data can cause problems on channel 14, resulting in Dolby Atmos rendering that reverts to PCM (standard 5.1 or Dolby Surround 7.1). If you find that Dolby Atmos is failing on a specific encrypted title, test it with other encrypted Dolby Atmos content or unencrypted Dolby Atmos trailers to confirm if the problem occurs on only one title.

Keys for content have a special flag that disables audio forensic watermarking above channel 12, allowing the sync signal to pass correctly while continuing to watermark audio played in the auditorium. If you determine that this issue occurs on one title only, contact the distributor of the content and ask for a key with audio forensic marking disabled above channel 12. Note that you may have to delete the existing key before the system can use any new key.