AP25 Audio Processor

Installation and Operating Guide

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Datasat Digital Entertainment
4596 Ish Drive #210, Simi Valley, CA
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Notices

Copyright

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Record of Changes

Manual Version / Date	Description
0.91 / January 2018	Preliminary version
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Regulatory Notices

EMI NOTICE

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 the 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.

Canadian Department of Communications compliance statement:

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada:

Cet Equipment ne dépasse pas les limites de Classe A D'émission de bruits radioélectriques pour les appareils numériques telles que perscrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entrainer le brouillage des réceptions radio et télévision, ce qui obligerait le propriétaire ou l'operateur a prendre les dispositions nécessaires pour en éliminer les causes.

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Introduction

This manual explains the AP25 Audio Processor setup and operation. It contains full instructions for installing hardware and software, setting up audio playback, configuring the system, performing maintenance and troubleshooting, and setting up and operating optional functions.

How to Use this Guide

The guide is divided into three parts. The first part covers operations for the projectionist or "operator". The second part covers the installation, setup and other technical functions. The third part consists of appendices with technical details such as connector and wiring diagrams.

> **NOTE:** Technical adjustments should only be performed by a qualified theater technician. The appendices provide detailed information for the theater technician.

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About AP25 Audio Processor

The AP25 audio processor has been engineered to deliver precise reproduction of both analog and digital sources, using the power of 6 Analog Devices 400MHz DSPs. The standard AP25 offers 16 channels of digital and 8 channels of analog inputs coupled to the 16 digital and 16 analog outputs. In addition to 1 S/PDIF and 2 TOSLINK inputs, the AP25 features 4 HDMI 2.0 inputs with Blu-ray HD decoding and active loudspeaker crossovers.

☑ An 8 channel version of the AP25 is also available. Please see appendix E, in this manual, for more information.

Each of the 16 channels includes:

- 31 bands of 1/3 octave equalization
- 3 bands of parametric equalization
- Channel gain & phase inversion control
- Individual Bass & Treble controls
- Variable delay line adjustable from 0ms to 1000ms

One of the most compelling features of the AP25 is the optional Dirac Live® room optimization technology. Dirac Live® is a state-of-the-art digital room correction technology that improves the listener experience by correcting for room modes and anomalies using high-resolution filter technology. Configure once and never touch again. The result - improved musical staging, clarity of dialogue and an enhanced listener experience.

For even greater flexibility, the AP25 Audio Processor has three product expansion slots that are removable from the back of the unit while racked. All internal control and data lines are available to expansion cards to service future user needs.

To get the most out of your AP25, we suggest that you review this manual and keep it available during system installation and initial operation.

Limited Warranty

Datasat Digital Entertainment software is warranted against defects for a period of 90 days from the date of the original purchase. AP25 hardware is warranted against defects in material and workmanship for a period of one year from the date of the original purchase. This warranty includes parts and labor.

THIS WARRANTY EXCLUDES UNITS THAT HAVE BEEN MODIFIED, REPAIRED BY UNAUTHORIZED PERSONNEL, OR DAMAGED BY ABUSE, IMPROPER OPERATION, DIRT, MOISTURE OR STATIC ELECTRICITY. PROPER OPERATION OF THIS EQUIPMENT REQUIRES THE USE OF A SURGE PROTECTOR. SUPPLYING POWER TO THE AP25 UNIT WITHOUT THE USE OF A PROPERLY FUNCTIONING SURGE PROTECTOR WILL VOID THIS WARRANTY.

Using an uninterruptible power supply (UPS) is highly recommended.

Products being returned under warranty should be sent to Datasat Digital Entertainment freight prepaid in the original or equivalent packaging. Please contact Datasat Digital Entertainment prior to shipping any parts or merchandise to receive a Return Merchandise Authorization number. Datasat Digital Entertainment's shipping address is:

Datasat Digital Entertainment
Attn: RMA #
4596 Ish Drive #210
Simi Valley, CA 93063
U.S.A.

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To receive notification about upgrades or bulletins that may become available from time to time, please complete the enclosed Warranty Card and mail or fax it to Datasat Digital Entertainment.

FACTORY WARRANTY INFORMATION

Please fill in the necessary information for every location where the AP25 system is installed.

THEATER NAME/CIRCUIT:			
THEATER LOCATION:			
SCREEN NUMBER:			
THEATER CONTACT/TELE No.:			
LOCAL TECH/TELE No.:			
AP25 SERIAL NUMBER:			
CROSSOVERS:	☐ External	☐ Internal	ohms

SPEAKER SYSTEMS SOUND AMPLIFIERS		
Screen (model):		
Screen Amp (model):		
Surrounds (model):		
Surrounds Amp (model):		
Subwoofer (model):		
Subwoofer Amp (model):		
Surrounds:		
Subwoofer: self-powered?	☐ Yes	☐ No

Datasat Digital Entertainment requires the above information to provide proper and timely technical support. Please fill out this page and send to:

> Datasat Digital Entertainment Customer Service
> 4596 Ish Drive #210
> Simi Valley, CA 93063
> U.S.A.
> USA +1.818-531-0003
> Fax: +1 805-306-8029
> www.datasatdigital.com

Thank you for choosing Datasat Digital Entertainment!

Contact Information

To contact Datasat Digital Entertainment's Technical Support staff:

Telephone: +1.818.401.4253 or toll free in USA and Canada: 1(888) 428-2268

Customer Service: customerservice@ati-amp.com
Technical Support: techsupport@ati-amp.com

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Unpacking

The packaging is designed to handle normal shipping and handling. Upon receipt of shipment, check for signs of damage before opening and report all damage to the carrier. All shipments made from Datasat Digital Entertainment are customer responsibility once they leave our premises.

Before installation begins, we suggest that a complete inventory be taken to minimize problems or questions during installation. Additionally, save all packing material until installation is complete in the unlikely event that a component(s) requires return to the factory. Use the packing slip that came with your unit to verify received inventory.

The following is a standard packing list for the AP25 Audio Processor:

Table 1. AP25 Standard Packing Kit

ITEM KEY	ITEM DESCRIPTION	QTY
2501000100	Power cord, straight detachable, (17250) standard Volex 17250 10 B1 blk	1
9003E11901	Screw Kit, Rack, Truss head screw & Washer (E119-01)	1
9332H80600	Flash Drive, AP25 document	1

Important Safety Instructions

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

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

9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11) Only use attachments/accessories specified by the manufacturer.

12) (Not applicable to this product)

13) Unplug this apparatus during lightning storms or when unused for long periods of time.

14) 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 Notices

Power Cord to the AP25 rear panel: The power cord is the main disconnect device. It should be plugged into an easily accessible outlet with surge protection. The power cord is to be used in a minimum type SVT 18/3 rated 250 Volts AC, 10 Amps with a maximum length of 4.5 M, with one end terminated in an IEC 320 attachment plug and the other end terminated in a NEMA 5-15P Plug.

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

This apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases shall be placed on the apparatus

WARNING: This apparatus is a Class I product. This product must be connected to a mains socket outlet with a protective earthing connection.

Only use at altitude not exceeding 2000m. This requirement is for China only under China national differences GB 8898-2011.

警告"选用同型号规格的锂电池"

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，可能需要用户对其干扰采取切实可行的措施。

Part 1: Operation

This part of this manual contains information the user needs to operate the AP25 Audio Processor on a day-to-day basis.

1.0   Operating AP25

1.1   How-To Procedures – Operations

ACTIVITY	INSTRUCTIONS
Turn Power ON	Press and release the power button on the front panel. If the unit will not power up, be sure that the rear panel power switch is ON and the unit is plugged into a working AC outlet protected by a surge protector. See *Powering ON the AP25 Processor*, page 16.
Turn Power OFF	Press and release the power button on the front panel.
Adjust volume	Turn the master fader knob on the front panel to adjust volume on all channels. Turn clockwise to increase volume. See *Adjusting the Fader*, page 18.
Select a format	Touch the desired format in the bottom row of the AP25 display. If the format you want is not shown, then that format is not available. See *The Home Screen,* page 17.
Identify the selected format	The current format is highlighted in the bottom row of the AP25 display.
Mute the AP25	Touch the MUTE button. If successful, the MUTE button will change to "MUTED" and its background color will change to red. See *Adjusting the Fader*, page 18.
Unmute the AP25	Touch the red MUTED button. If successful, the button will change to "MUTE" and its background color will be gray.
View monitor settings	Touch the MONITOR button. The Monitor window will display. It will automatically disappear after 30 seconds. See *Booth Monitor Volume*, page 19.
Select monitor channel(s)	Touch the MONITOR button. The Monitor window will display. Then touch the MIX button and select the channel(s) you want to hear in the monitor. When finished, touch the CLOSE button. See *Booth Monitor Volume*, page 19.
Change monitor volume	Touch the MONITOR button. The Monitor window will display. Then touch the + or – button until the desired volume is set. The window will automatically disappear after 30 seconds. See *Booth Monitor Volume*, page 19
Mute the monitor	Touch the MONITOR button. The Monitor window will display. Then touch the MUTE button in the monitor window. The MUTE button will turn red. Note that the Monitor button to the left of the window also turns red to indicate a muted state. The window will automatically disappear after 30 seconds.
Unmute the monitor	Touch the MONITOR button. The Monitor window will display. Then touch the MUTE button in the monitor window. The MUTE button will turn from red to gray. Note that the Monitor button to the left of the window also turns gray to indicate the unmuted state. The window will automatically disappear after 30 seconds

1.2   Front Panel Controls and Indicators
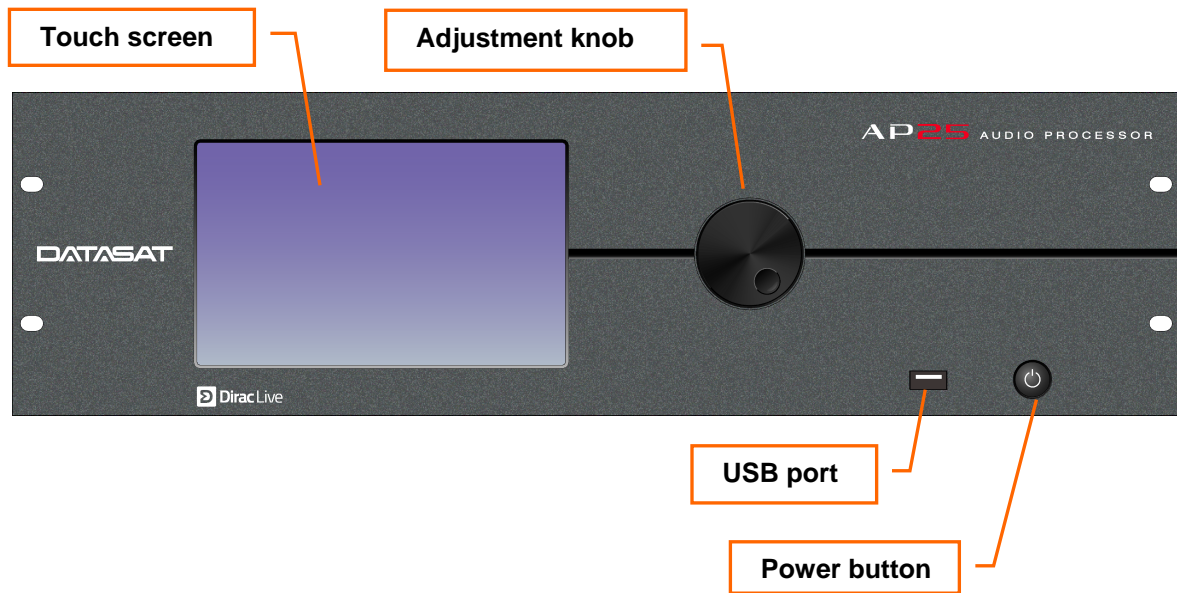
Figure 1: Front Panel Controls and Indicators

The front panel contains the following controls and indicators for operating AP25.

- **Power button**: Push button switch puts the AP25 in and out of standby power mode.
- **LCD/Touch Screen**: Displays theater system configuration and status and allows configuration changes. Most selections can be made by touching the screen with your finger or by using a stylus.

    The LCD screen operates in two modes:

    - o **Home screen**. The projectionist can select formats and mute volume from this screen. They can also change the monitor volume and execute manual automation commands via the popup windows. During playback, the screen displays information about the content currently being played.

    - o **Menu (Setup) mode**. In menu mode, the screen displays menus for viewing and adjusting operational settings by the cinema technician. The projectionist does not need to enter these menus.

- **Adjustment knob**: Used for fader control and parameter adjustments. On the Home screen, this knob adjusts the fader level. However, it is used within the setup screens to adjust values, EQ filter faders, and other values. When the setup screen contains many controls, first set the focus by touching the control on the display. Then move the knob clockwise to increase the value, or counterclockwise to decrease the value.
- **USB port**: Use for software updates and for loading and saving of configurations. See topic *Update System Software From USB Device* on page 56 for more details.

1.3 Powering ON the AP25 Processor

The main power switch for the AP25 is located on the rear panel. A "hard boot" (cycling the power at the power entry module on the rear panel) typically takes the system one minute to initialize. When the main power switch is on, the AP25 can be switched in and out of standby power mode by the pushbutton power switch on the front panel. A "soft boot" (pressing the power button on the front panel when power has not been cycled) typically takes about 10 seconds.

While the system is initializing, status messages will appear on the AP25 touch screen.
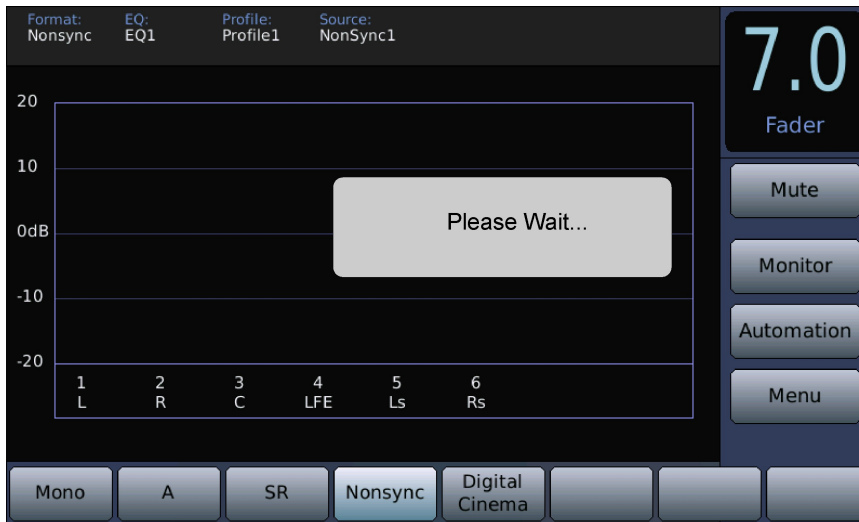
Figure 2. Initial screen

When the screen messages in the box disappear and the fader value appears, the AP25 is ready.
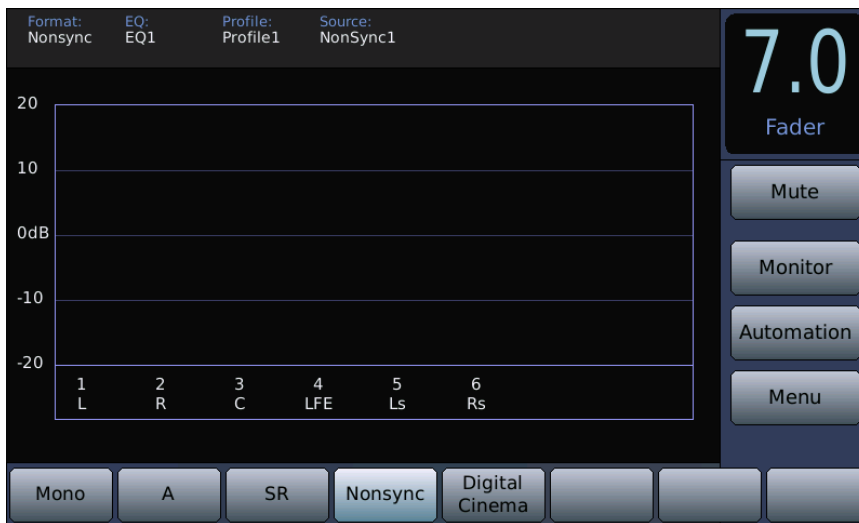
Figure 3. Home Screen

☑ If no messages appear on the touch screen after you have turned on the power switch, check the following:

- ▪ Is the power to the sound rack on? Has the circuit breaker to the audio rack been tripped?
- ▪ Is the power cable connected?
- ▪ Is the front panel power switch lighted?

Navigating through the Menus

Since the AP25 is equipped with a touch screen display, you can navigate easily through the menus by touching any button with your finger. A non-abrasive stylus, that will not scratch the screen, may also be used.

Figure 4 below shows the Operations menu selections on the Home screen.
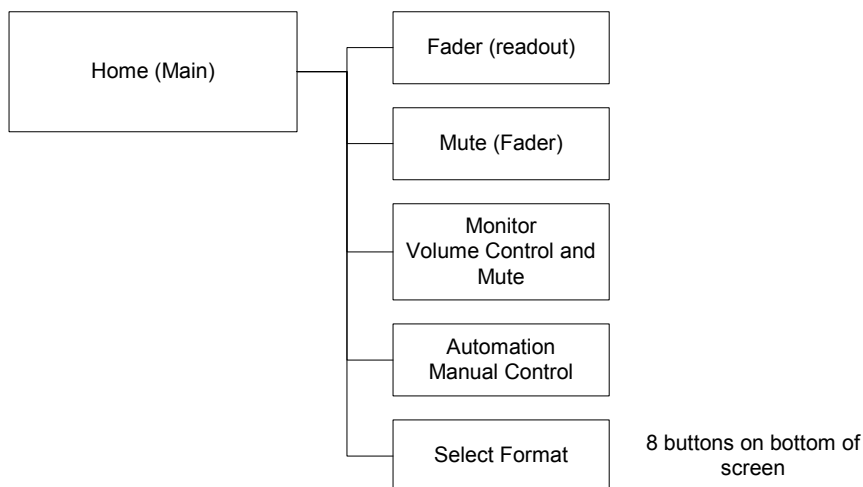
Figure 4. Operations Menus

1.4   The Home Screen
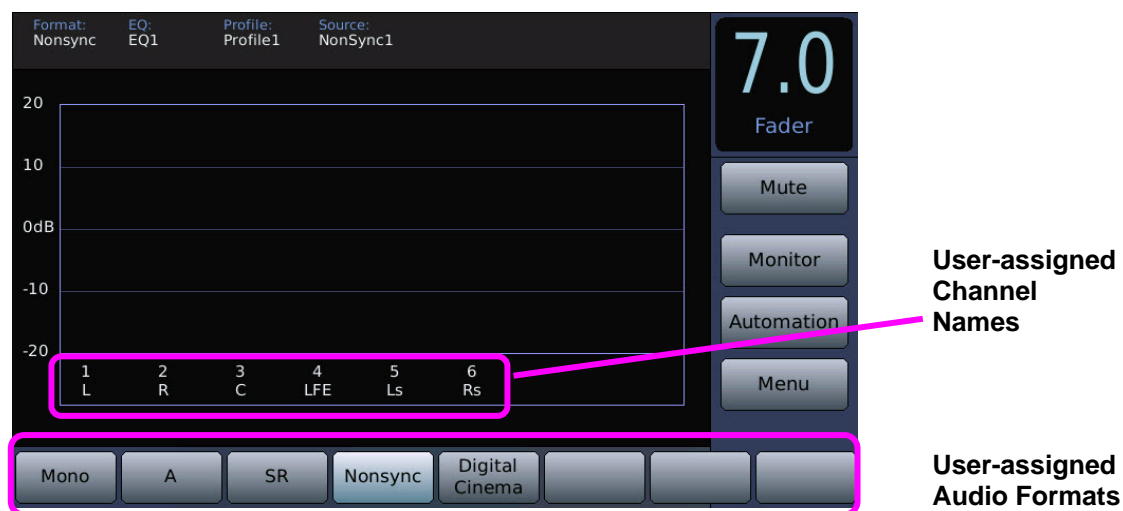
Figure 5. Home Screen

When the system has finished booting up, the Home Screen will appear, as shown in the above example. Your Home Screen may look somewhat different, due to user-configurable channel names and audio formats.

The Home Screen of the AP25 provides one-touch access to the following features:

- Fader Volume/Mute
- Audio Formats
- Booth Monitor Volume/Mute

- Manual Automation Control
- Setup Menu
- VU bars for all output channels associated with the current audio format.

1.4.1 Adjusting the Fader

Adjust the fader volume by using the control knob on the front panel. To mute the fader, touch the **Mute** button. The button label will turn red and change to "Muted".

Unmute the AP25 by touching the mute button again, or changing formats. If in the Home Screen, increasing the fader volume using the control knob will also unmute.
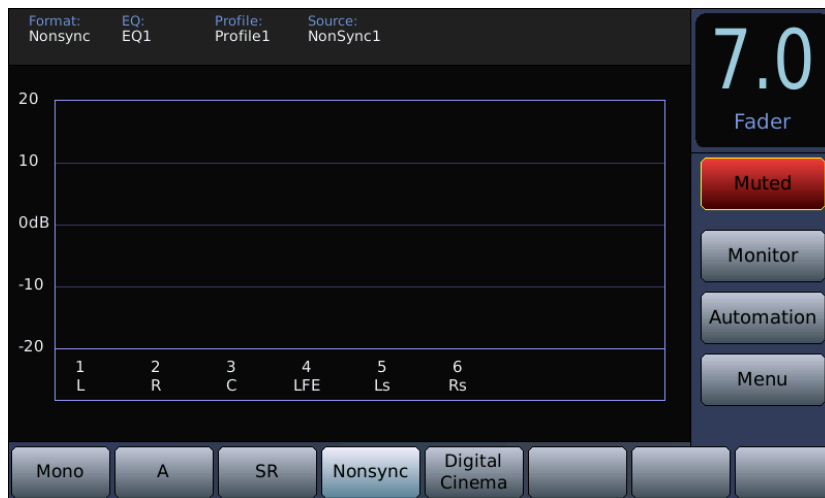
Figure 6. Fader Muted

Fader reference level is 7.0. Table 2 below shows dB relative to the AP25 fader settings.

Fader	dB	Fader	dB	Fader	dB	Fader	dB	Fader	dB	Fader	dB
10.0	15.0	8.3	6.5	6.6	-2.0	4.9	-10.5	3.2	-20.0	1.5	-54.0
9.9	14.5	8.2	6.0	6.5	-2.5	4.8	-11.0	3.1	-22.0	1.4	-56.0
9.8	14.0	8.1	5.5	6.4	-3.0	4.7	-11.5	3.0	-24.0	1.3	-58.0
9.7	13.5	8.0	5.0	6.3	-3.5	4.6	-12.0	2.9	-26.0	1.2	-60.0
9.6	13.0	7.9	4.5	6.2	-4.0	4.5	-12.5	2.8	-28.0	1.1	-62.0
9.5	12.5	7.8	4.0	6.1	-4.5	4.4	-13.0	2.7	-30.0	1.0	-64.0
9.4	12.0	7.7	3.5	6.0	-5.0	4.3	-13.5	2.6	-32.0	0.9	-66.0
9.3	11.5	7.6	3.0	5.9	-5.5	4.2	-14.0	2.5	-34.0	0.8	-68.0
9.2	11.0	7.5	2.5	5.8	-6.0	4.1	-14.5	2.4	-36.0	0.7	-70.0
9.1	10.5	7.4	2.0	5.7	-6.5	4.0	-15.0	2.3	-38.0	0.6	-72.0
9.0	10.0	7.3	1.5	5.6	-7.0	3.9	-15.5	2.2	-40.0	0.5	-74.0
8.9	9.5	7.2	1.0	5.5	-7.5	3.8	-16.0	2.1	-42.0	0.4	-76.0
8.8	9.0	7.1	0.5	5.4	-8.0	3.7	-16.5	2.0	-44.0	0.3	-78.0
8.7	8.5	7.0	0.0	5.3	-8.5	3.6	-17.0	1.9	-46.0	0.2	-80.0
8.6	8.0	6.9	-0.5	5.2	-9.0	3.5	-17.5	1.8	-48.0	0.1	-82.0
8.5	7.5	6.8	-1.0	5.1	-9.5	3.4	-18.0	1.7	-50.0	0.0	-84.0
8.4	7.0	6.7	-1.5	5.0	-10.0	3.3	-18.5	1.6	-52.0		

Table 2: Fader setting referenced to dB

1.4.2 Booth Monitor Volume

When an external powered speaker is connected to the AP25, the level can be controlled using the monitor volume. To adjust the booth monitor volume, touch the **Monitor** button. The screen shown in Figure 7 will appear. Touch the + or – buttons to raise or lower the volume.

- Touch the **Mute** button to mute/un-mute the booth monitor.
- Touch the **Mix** button to select a channel and adjust the volume from 0 to 10. See Figure 8, below.
- Touching the **Close** button will close this screen. The Monitor Volume window will close if not used within 30 seconds.

Figure 7. Monitor Volume

Figure 8. Monitor Mix

- Select channel(s), then touch the + or – button to adjust volume from 0 to 10.
- Touch the small button next to a channel to select it for monitoring.
- Touch Close to close the Mix window. It also closes automatically after 30 seconds of inactivity.

1.4.3 Manual Automation

The **Automation** button opens the automation manual control screen.
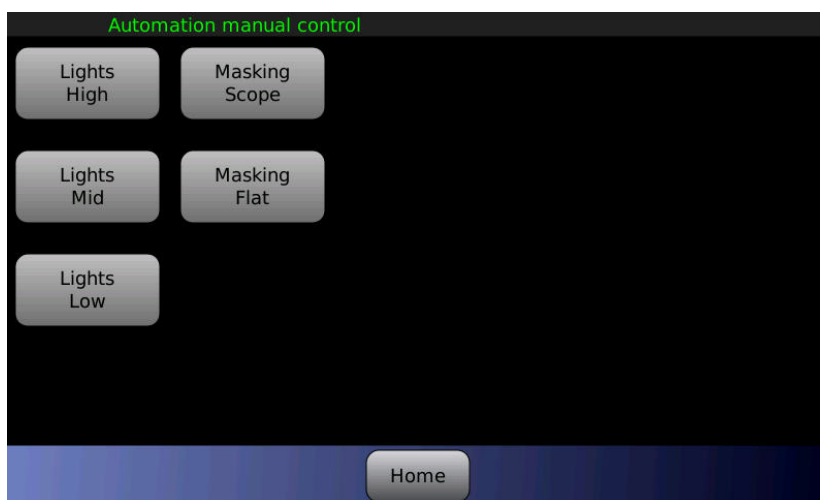
Figure 9. Automation Manual Control screen

This screen allows for direct control of automation events. These are setup by the theater technician. A maximum of twenty buttons can be assigned. If no buttons are visible, or there is a need for additional buttons, please contact your theater service technician.

For details about using macros see the topic *Macros*, page 97.

1.5   Troubleshooting (Operation)

The following table provides troubleshooting data for the AP25.

PROBLEM	SOLUTION
AP25 will not power ON	Press and release the power button on the front panel. If the unit will not power up, be sure the rear panel power switch is ON and the unit is plugged into a working AC outlet protected by a surge protector. See *Powering ON the AP25 Processor*, page 16.
	If the AP25 is mounted in a rack and a breaker is used for the rack, make sure the breaker is ON.
	Verify the surge protector is powered and is working.
	Try changing the AP25 power cord.
	If power is getting to the AP25 but it still will not power ON, maybe the fuse above the AC In connector (on the rear panel) is blown. Call a theater technician to check it.
AP25 front panel display is too dim	The front panel display automatically dims when not touched for a few seconds. Gently touch the display screen to brighten it.
No sound in auditorium	On the front panel display, verify the Mute button is not muted. If it is muted, touch it to unmute it.
	Be sure the fader level is not zero (0). If it is zero, then turn the knob to increase the volume.
	Verify the AP25 is in the correct format.

Volume is too low or high in the auditorium	Turn the fader knob to achieve proper volume.
Volume is too low or high in the booth	Touch the Monitor button to open the Monitor window, then touch the + or – to adjust the monitor volume.
No sound in booth	Verify the Monitor is not muted (red). To unmute, touch the Monitor button, then touch the red Muted button. Verify a powered speaker is connected to the AP25 rear panel. Verify the speaker's power is ON. Adjust the monitor volume (see previous entry). Check monitor mix menu (see section 1.4.2)
Wrong sound in auditorium	Verify the AP25 is in correct format. (The current format is highlighted in the bottom row of the display.) Touch a different format to select. If the format you want is not listed, it has not been set up – contact your theater technician.
Front panel fader not functioning	Use touch screen work around until fader can be repaired (see section 5.2) and contact your theater technician.

1.5.1 Over Temperature Alert

If the internal temperature of the AP25 reaches a critical level of 50°C or greater, a red flashing alert indicator will appear.

Figure 10. Over Temperature Alert message

The alert message appears only on the Home screen. The AP25 will remain operational and the menus can be accessed as usual. The actual circuit board temperatures appear on the System Info page (Menu > System Info). The alert condition overrides, or temporarily disables the screensaver mode if it is set. The alert will stop if the temperature cools below 50°C.

☑ *Note*: This alert message often indicates that there is a problem with proper airflow through the vent holes on both sides of the AP25 chassis. Check that there is nothing obstructing these air vents. Be sure that the fan is spinning (you will feel air blowing out of the AP25 from the fan). If the vents are clear and the fan is spinning, yet the temperature alert does not stop, call Datasat Technical Service or your technician.

Part 2: Installation and Setup

This part of this manual contains information the theater technician needs to set up and configure the AP25 Audio Processor.

2.0   Installation and Set Up

2.1   Installation Checklist

This checklist summarizes the installation and setup procedures for the AP25.

Table 3: AP25 Installation and Setup

Completed	Task Description	Refer to:
☐	Install AP25 in Equipment Rack	Chassis Rack Mounting and Connection, page 26
	CONNECT CABLING:	
☐	Power Cable	
☐	Audio input cables to AP25	(Depends on audio sources)
☐	Audio output cable from AP25 Analog Out to Audio Power Amps	Appendix B, Interface Wiring Diagrams.
☐	Automation cabling	Appendix B, Interface Wiring Diagrams.
	ADJUST AND TEST	
☐	Theater Equipment Check	Check speakers, amplifiers, auditorium conditions Theater Equipment Check, page 34
☐	Assign channels	On AP25: Menu (System) > Format > Channel Profile > Channel Names Assign Channels on AP25, page 34
☐	Verify channel assignments	Listen in auditorium Verify Channel Assignments in Auditorium, page 36
☐	Set levels to establish a baseline	Set levels to establish a baseline, page 38
☐	Perform the EQ	Perform the EQ, page 39
☐	Perform Subwoofer Parametric EQ	Subwoofer EQ – Parametric EQ, page 41
☐	Final Adjustments (fine tuning)	Final Adjustments, page 42
☐	Verify Sound Performance	Listen in auditorium
☐	Set up macros for automation	Creating a Macro, page 97
	SYSTEM SECURITY	
☐	Save AP25 configuration to USB flash drive	Saving and Restoring Configuration Files, page 56
☐	Set Password to Prevent Unauthorized Access, if Appropriate.	Access Control, page 58

2.2   Unpacking System Components

See the list of standard components for an AP25 shipment, on page 11. The exact contents may vary, depending on the options you have ordered.

☑   **Note:** Refer to the actual packing slip from your order to verify the contents of your shipment. Contact Datasat Digital Entertainment immediately if items listed on your packing slip are missing.

2.2.1 Preliminary Inspection

Note: Before installing the AP25 unit, take a complete inventory of system components to minimize problems or questions during installation. Additionally, save all packing materials until installation is complete in case you need to return parts to the factory.

2.3   Installation Overview

The AP25 chassis is the main component of the AP25 system. Installation procedures include:

- Mounting the AP25 chassis in a rack
- Connecting the AP25 unit to other equipment
- Connecting the AP25 unit to a power supply

⚠ **Device Disconnect:** The power outlet shall be installed near the equipment and shall be easily accessible, in order to quickly disconnect power.

2.4   AP25 Rear Panel Connections

Figure 11 shows the rear panel of the AP25.
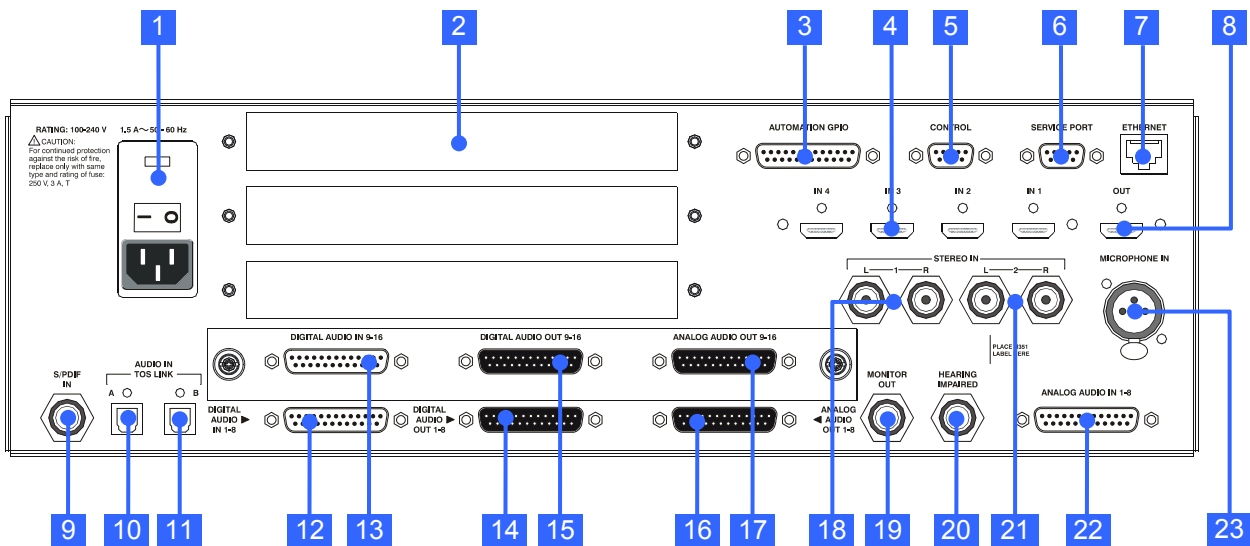
Figure 11. AP25 Rear Panel

Table 4 gives a description of each connector shown in the figure. For specific information on the pin-outs of each connector, please see Appendix A of this manual.

Table 4. AP25 Rear Panel Connections

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Power Entry Module/Power Switch	13	Digital Audio In (CH 9 – 16) – DB25F
2	Option Card Slots (3) example: Optical Film option card (see Appendix F)	14	Digital Audio Out (CH 1 – 8) – DB25M (for use in environments with amplifiers, routers, or crossovers that can handle digital in – see note below this table)
3	Automation GPIO – DB25F (sends/receives pulses to/from automation system)	15	Digital Audio Out (CH 9 – 16) – DB25M (for use in environments with amplifiers, routers, or crossovers that can handle digital in – see note below this table)
4	HDMI In (4)	16	Analog Audio Out (CH 1 – 8) – DB25M (connect to amplifiers)
5	Control (RS232) – DB9F (serial automation control)	17	Analog Audio Out (CH 9 – 16) – DB25M (connect to amplifiers)
6	Service Port (RS232)– DB9F (used for production tests)	18	Stereo Input 1 – (2) RCA L/R Single ended analog input (could be used for pre-show, intermission music, etc.)
7	Ethernet – RJ45F (Network connection for VNC and software updates when connected to the internet)	19	Monitor Out – RCA (connect to externally-powered amplified speaker in projection booth)
8	HDMI Out (1)	20	Hearing Impaired Audio Out – RCA
9	S/PDIF In - RCA Female 75 Ohm digital interface (connect a DVD player, game player, or other devices typically found in a home theater environment)	21	Stereo Input 2 – RCA same as 18
10	Audio In (A) – Optical TOS Link (connect a DVD player , game player, or other devices typically found in a home theater environment)	22	Analog Audio In – DB25F
11	Audio In (B) – Optical TOS Link(connect a DVD player, game player, etc. in a home theater environment)	23	Microphone In – XLR F (connect microphone for auditorium audio output tuning during setup or for public address announcements)
12	Digital Audio In (CH 1 – 8) – DB25F		

☑ When using the Digital Out, make sure the input device is set to the same sample frequency as the AP25 and that it's clock source is set to input. Sample rate choices are 48kHz, 96kHz, and 192kHz. Select the highest rate supported.

2.5 Chassis Rack Mounting and Connection

The AP25 chassis requires 3U of standard rack space for proper mounting.

⚠️ **Caution:** Because power line surges can damage the AP25, we require the use of a properly functioning computer-grade surge /spike suppressor. We also recommend using an uninterruptible power supply (UPS).

1. Install the AP25 into the audio rack, securing it properly with rack screws.
2. Connect the AP25 to other equipment (see appendices: A Connector Pin-outs, B Interface Wiring Diagrams, and C AP25 Wiring and Block Diagrams).
3. Connect the supplied power cable between the AP25 unit and the AC mains source.

2.5.1

Rack Mount Recommendations

Follow these recommendations if the AP25 unit will be installed in a closed or multi-unit rack assembly.

- Determine the maximum and ambient temperatures within the rack, since they may be greater than the maximum and ambient temperatures in the room. The maximum temperature for the equipment in a closed or multi-rack assembly is 40°C (104F°)
- Ensure adequate airflow for cooling purposes on all sides of rack-mounted equipment. Make sure that the ventilation fan is not blocked.
- Check nameplate ratings to ensure there is no overloading of supply circuits that could have an effect on over-current protection and supply wiring.
- Maintain reliable grounding of the equipment. Give particular attention to supply connections when connecting to power strips, rather than direct connections to the branch circuit.
- Using a properly functioning quality surge protector is required to protect the unit. Using an uninterruptible power supply is also recommended.

2.5.2 Power Supply

The AP25 power supply automatically switches itself to accommodate AC input between 110 VAC and 220 VAC.

2.6 Navigating the Menus

When the AP25 is first powered up, the home screen (main operator menu) will appear. Selecting the "Menu" button from the home screen will access the "System Setup" screen. Once you have navigated through sub-menus, selecting the "System" button always returns you to the "System Setup" screen.

Selecting "Home" from a sub-menu returns you directly to the home screen. If "Menu" is then selected, the AP25 returns to the last selected sub-menu.

The "Back" button works like the back button of an internet browser, and may be used to return through the history of previously selected sub-menus.

If the following symbol appears on the screen, it indicates that the front panel adjustment knob may be used as a navigation tool (usually to scroll through a list or to increase/decrease values):   ⟳

- ☑ Note: When using a laptop to VNC into the AP25, use the up and down arrows to mimic the scrolling action of the front panel adjustment knob.
- ☑ Note: When using a VNC device that doesn't have a keyboard, such as a tablet, arrow keys may be enabled/disabled by double tapping the fader level display box on the Home screen.
- ☑ Note: When logging into an AP25 using a VNC device, the default password is "-". If a password has been set for the AP25, this password will be needed to log in.

2.7

About Formats

The AP25 facilitates the process of creating customized audio formats, in addition to providing a set of pre-built formats that are ready to use.

The buttons along the bottom of the AP25 Home screen show the default formats or formats that have been created by the installation technician for a particular application. Each format consists of a set of discrete settings: an Input Source, Format Options, EQ settings, and Channel Profile, as illustrated below (Figure 12). If there are more than 8 formats available, then button 8 may be programmed as the "more" button which allows access to all available formats.

The EQ setup and Channel Profiles are named groups of settings. Each format is assigned an EQ setup and Channel Profile. If the setup does not require multiple EQ setups or Channel Profiles, then each format by default uses the current setup.

System setup, Network, Automation, Film Setup and Bass Enhancement are global settings.

GLOBAL SETTINGS

SYSTEM	NETWORK	AUTOMATION	FILM SETUP (Option)	BASS ENHANCEMENT

DISCRETE SETTINGS

Format (x40)

INPUT SOURCE	FORMAT OPTIONS	EQ SETUP – NAME (x40)	CHAN PROFILE – NAME (x40)

8 Channel Analog
Nonsync
  Input 1
  Input 2
  Mic Power on/off
Microphone (Mic Pre)
  Mic Power on/off
Optical (film card
        option)
Digital
  Ch 1-16
  Ch 1-8
  Ch 9-16
  Ch 1, 2
  Ch 9,10
TosLink A
TosLink B
S/PDIF (Coax)
HDMI
  Port 1
  Port 2
  Port 3
  Port 4
	Any Input Source:
	  Global Delay and Surround Offset
	    Global Audio Delay
	    Surround Delay
	    Hearing Impaired (HI) Delay
	    Surround Offset
	    Format Trim
	    Format Fader
	    Fade In
	    Fade Out
	Source: Analog 8ch Input
	  Extended Surround Options
	    None
	    Copy surround chs to rear surround chs
	    Matrix Decode Surround
	Sources: Nonsync 1(2) L/R
	  Nonsync Level & Routing
	    Screen channels
	    Surround channels
	    Screen & Surround channels
	    Matrix Decoder
	    Enable Bass Enhancement
	    Nonsync 1(2) gain
	    Enable Mic
	    Mic Level & Routing (for Nonsync)
	      Screen Center
	      Surround Channels
	      Gain
	  Extended Surround Options
	    None
	    Copy surround chs to rear surround chs
	Source: MIC Pre or Nonsync with Enabled Mic
	  Mic Level & Routing
	    Screen Center
	    Screen Channels
	    Surround Channels
	    Screen & Surround
	    Gain
	Sources: Digital Ch (1>16, 1>8, 9>16)
	  Digital Cinema Format Options
	    Default
	    5.1 DCP
	    7.1 DCP
	    5.1 to 7.1 Speakers
	    ES Matrix
	    Matrix
	    DCP includes HI
	    DCP includes VI
	    Enable Bass Enhancement (for Matrix)
	    Copy Surrounds to Rears (for Matrix)
	Sources: Digital Ch (1>2, 9>10), TosLink A(B), S/PDIF, HDMI 1-4
	  Decoder Setup
	    Speaker Configuration
	      5.1
	      7.1
	    Phantom Center (On/Off)
	    Neo:6
	      Off
	      Music
	      Cinema
	    Direct Mode (processing disabled)
	    Disable Surround Remap
	    DTS LFE +10dB
	Source: Optical (Film Card option)
	  Film Options
	    Film optical audio type
	      None, Mono, A-Type, SR
	    Matrix Decoder
	    Surround Offset
	    Optical Bass Extension
		Third Octave EQ
		  Enable
		  31 Band EQ (Ch1-Ch16)
		  Bass (Ch1-Ch16)
		  Bass Corner Frequencies
		  Treble (Ch1-Ch16)
		  Treble Corner Frequencies
		Parametric EQ (Ch1-Ch16)
		  Enable (Filter 103)
		  Freq (Filter 1-3)
		  Q (Filter 1-3)
		  Gain (Filter 1-3)
		Audio Levels
		  Analog Level (Ch1-Ch16)
		Dirac Optimization (option)
		  Enable
		  Dirac Configuration (name)
			Channel Names
			  Channel Names
			    Vu
			Routing/Crossovers (Output Ch1-Ch16)
			  In Channel mapping
			  Low Pass Filter Frequency
			  Low Pass Filter Slope
			  High Pass Filter Frequency
			  High Pass Filter Slope
			  Crossover ID
			  Output Trim
			Channel Delays
			  Input Channel Delays (Ch1-Ch16)
			  Output Channel Delays
			(From Audio Levels Menu)
			  Invert
			(From Decoder Menu)
			  Speaker Configuration
			  Phantom Center
			(From System Setup)
			  Digital Out Clock Rate
			  Output Mapping

Figure 12. Global Settings and Format Discrete Settings

In the Audio Format Setup screen, five options appear along the bottom: Input Source, Format Options, Audio EQ Setup, Channel Profile, and Audio Levels.

Menu (System) > Formats
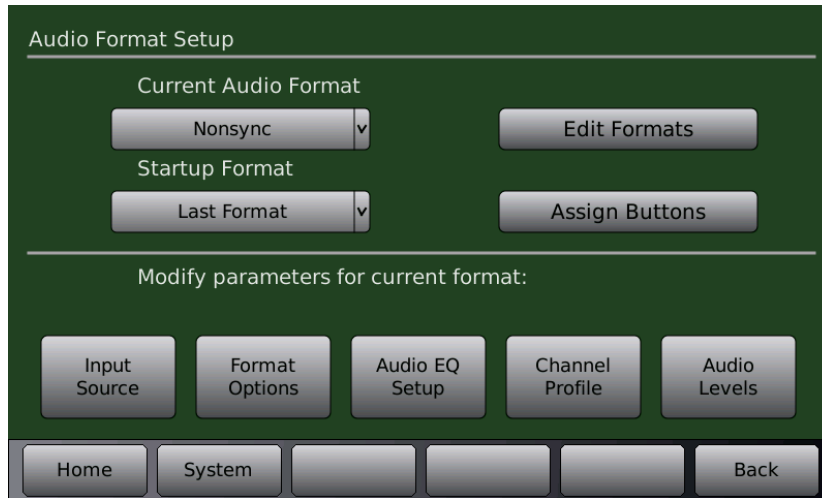
Figure 13. Audio Format Setup Screen

2.7.1 Creating an Audio Format

This is an overall summary of the procedure for creating an audio format. Each is described in more detail later in the manual.

- Under **Audio Format Setup**: Assign the selected format to a button.
- **Input Source** screen: Select the audio input.
- **Format Options** screen: Set global delay and other options, depending on format.
- **Channel Profile** screen: Set channel names, audio levels, and crossover settings.
- **Audio EQ Setup** screen: set up Third Octave EQ, Dirac, or Parametric EQ.

The following is a list of the format configuration options.

Audio Format:

- Home screen button assignment.
- Audio format name.
- Input source.
- Options: Global Delay, Surround Offset, and Extended Surrounds for routing and Matrix decoding.
- Audio Levels: Individual offsets for each channel.

Audio Profile:

- Channel Names.
- Crossover: Channel Routing and crossover points are assignable in the Routing/Crossovers menu.

Audio EQ:

- Dirac: Enabled or disabled depending on setup and calibration
- Third Octave EQ: Calibrated adjustment made by qualified technician
- Parametric Equalization: Calibrated adjustment made by qualified technician

2.8   Factory Presets

The AP25 factory settings include formats for Digital Cinema and Nonsync as described in the table below.

Table 5. AP25 Factory Presets

Format Name	Assigned Button	Signal Source	EQ Set	Channel Profile
Digital Cinema	1	Digital In (1-16)	EQ1	Profile1
Nonsync	2	Nonsync 1	EQ1	Profile1

The default EQ set is named EQ1 and includes all EQ settings flat and all filters off. This EQ set may be used and altered during the theater setup process. The default channel profile is Profile1, which includes the default 6 channel assignments and trim values flat.

See appendix F for Optical Film Card option factory presets.

2.8.1 Preset Formats

The default formats appear in the Audio Format Setup screen under the dropdown menu for Current Audio Format.

To create a format with the same name and source not shown in the table, go to the <Edit Formats> button on the upper right of this same menu. Any existing format may be copied to a new format.   Any of the format settings may be changed after the format is copied from another. You can also rename or delete existing formats.

Preset formats may also be selected when copying formats. Select Edit Formats > Copy Preset to Format and select from the Copy From Preset dropdown menu. Table 6 below lists the available presets.

Table 6. AP25 Preset Formats

Name	Source
Digital Cinema	Digital In (1-16)
HDMI 1	HDMI Port 1
HDMI 2	HDMI Port 2
HDMI 3	HDMI Port 3
HDMI 4	HDMI Port 4
Nonsync1	Nonsync1
Nonsync2	Nonsync2
SPDIF	S/PDIF 3 Dig
TOS A	S/PDIF 1 Optical
TOS B	S/PDIF 2 Optical
XD20 A	Analog 8Chan
XD20 D	Digital In (1-16)

2.8.2 Default EQ

The Default EQ appear in the Audio EQ Edit screen for Copy Preset to EQ. See a sample screen on page 79.

There is only one option for Default EQ (Flat), which has EQ filters <u>flat</u>, parametric filters <u>disabled</u>, and Dirac optimization <u>off</u>. Use this format as a starting point to create a new EQ set.

2.8.3 Default Channel Profiles

The Default Channel profile appears in the Audio Profile Edit screen for the **Copy Default to Profile** option. Select Channel Profile > Edit Profiles > Copy Default to Profile and then select from the dropdown menu Copy from Default. See a sample screen at 4.3.8.2 Edit Profiles, page 85.

There are two default channel profiles: 6-channel and 8-channel.

The 6-channel profile assigns 6 channels as named in the table below and enables the VU meters for 6 channels.

Table 7. Default 6-Channel Profile

Channel	Name
1	L
2	R
3	C
4	LFE
5	Ls
6	Rs

The 8-channel profile assigns 8 channels as named in the table below and enables the VU meters for 8 channels.

Table 8. Default 8-Channel Profile

Channel	Name
1	L
2	R
3	C
4	LFE
5	Lss
6	Rss
7	Lrs
8	Rrs

2.9   AP25 Configuration and Setup

This section describes procedures for AP25 audio level adjustment and sound performance verification.

B-Chain alignment will be performed differently depending on whether the (optional) Dirac Live®Theater Setup application or the AP25 1/3 Octave EQ room tuning function is used. In fact, Dirac Live® can be used in conjunction with 1/3 Octave EQ, in a case where Dirac Live® is used to tune the room and then the 1/3 Octave EQ is used afterwards to make some changes to specific frequencies.

2.9.1 Equipment Requirements

Complete checkout and adjustment of the AP25 unit requires the following equipment (not provided by Datasat Digital Entertainment unless otherwise noted):

- a single microphone or multiplexed microphones, connected to an RTA
- SPL meter
- Real Time Analyzer (RTA)
- Laptop computer running VNC for ethernet communication with AP25
- (Optional) Datasat AP25 Dirac Live® configuration software
- (Optional) Wireless router such as the Linksys WRT54GL or similar installed on AP25 Ethernet port (if connecting to laptop in auditorium). NOTE: Wired connection to the network will work as well, if the physical connection can be made.

2.9.2 Setting and Adjusting Audio Output Levels

The AP25 Audio Processor is designed to accommodate remote operation. For this reason, we highly recommend the use of a laptop computer for adjusting room EQ. The laptop computer must be connected to the Ethernet port of the AP25 in order to take advantage of the remote operation feature. You can use a wireless router (not supplied by Datasat) such as the Linksys WRT54GL or a router with a network cable for this connection.

The laptop computer uses a Virtual Network Connection (VNC) to communicate with the AP25. The front panel touch-screen display of the AP25 will appear on the laptop screen, but will not function as a touch-screen. Use the laptop's cursor and arrow keys to make selections.

> ☑ Note: When logging into an AP25 using a VNC device, the default password is "-". If a password has been set for the AP25, this password will be needed to log in.

2.9.3 Theater Equipment Check

Prior to adjusting the EQ, please check all of the components in the audio system for proper installation and operation.

2.9.3.1 Speakers

- Check that all speakers are properly mounted and secured. Ensure there are no loose parts or mounting hardware left around the speakers that could be a source of noise or rattles.
- Check the aiming of all speakers. Verify there are no obstructions in front of the speakers. For stage channels, ensure that the masking, screen frame, and sound wall do not block the speakers.
- Speaker cables are correctly secured to the speakers and are of a suitable gauge.
- Verify each speaker has no missing or open drivers.
- Check that all speakers are connected to the correct channel.
- Verify the high and low frequency drivers for each channel are in phase. Also, check each channel is in phase with the others.

2.9.3.2 Amplifiers

- The gain settings of all of the screen channel amplifiers and surround amplifiers should be roughly the same. If a particular amplifier requires a vastly different gain setting or operates differently than the others, then it should be checked and repaired.
- Check all of the amplifiers for distortion or noise.
- Verify that the cooling fans are operating correctly and that the air vents are clean and free from obstructions.

2.9.3.3 Auditorium

The auditorium should have all of the acoustic treatments installed prior to setting the EQ. Any excessive noise from air conditioners, hallways or other sources should be minimized. All theater seats must be installed. Remove any plastic coverings from chairs or speakers prior to any EQ (B-chain) alignment.

2.9.4 Assign Channels on AP25

After installing the AP25 into the rack and connecting the cabling for inputs and outputs, the next step is to assign channels.

The AP25 allows for custom defined channel names for the input channels. The input channels are named through the Channel Names screen.

Menu (System) > Formats > Channel Profile > Channel Names

In general, the default assignments must be preserved for the first 6 channels in order to maintain compatibility with the HDMI input channel assignments, and with the Hearing Impaired output channel. Default channel names are indicated in Table 9 below.

Figure 14. Channel Names Screen

When channel assignments are complete, you can eliminate the unassigned channels so they do not appear on the main screen. Turn off the Vu indicator for unused channels.

Do this by simply clicking the cursor on the VU button. When the button is green that channel will be displayed in the Home screen; when it is grey the channel is off and will not be displayed on the Home screen.

Changing Channel Names

To change or assign a name, touch a channel name button to open the names keyboard

Figure 15. Channel Names Keyboard

In addition to standard letter, number, period and dash keys, the keyboard has the following buttons:

- **Shift** (upper case / lower case shift)
- **Clear** (clears the name field)
- **Space**
- **Backspace**
- **Copy** (Copies the entire text field into memory)
- **Paste** (Clears text field and replaces with text from memory)
- **<-** (Move text cursor one character to the left)

- **->** (Move text cursor one character to the right)
- **Cancel** (exit the keyboard without saving)
- **OK** (save entry and exit)

Table 9: Default Channel Configuration

Channel	Default 6-channel names	Default 8-channel names
1	L	L
2	R	R
3	C	C
4	LFE	LFE
5	Ls	Lss
6	Rs	Rss
7	-	Lrs
8	-	Rrs
9	-	
10	-	
11	-	
12	-	
13	-	
14	-	
15	-	
16	-	

2.9.5 Hearing Impaired Output

The first 3 input channels (L,R, and C) are mixed to create the Hearing Impaired output channel. The hearing impaired mix is 50% Center channel, 25% Left and 25% Right channels.

2.9.6 Verify Channel Assignments in Auditorium

On the AP25, select a channel and turn on Pink Noise. In the auditorium, verify that the Pink Noise output is coming from the correct loudspeaker(s). Do this for all channels. For details, see Audio Levels, page 93.

Menu > Formats > Channel Profile > Audio Levels

- Select a channel.
- Turn on Pink Noise.
- In auditorium, listen to confirm audio is coming from correct speaker(s).
- Repeat for all channels.

2.10 B Chain Alignment using 1/3 Octave EQ

Adjust the alignment of each individual channel. There are various approaches to B-chain alignment, and the procedure presented below is offered as an example, not a requirement. The intent is to show the AP25 functions that are relevant to B-chain alignment.

Caution: Before proceeding with the room equalization, it is imperative that the loudspeaker and crossover systems be properly aligned. Issues like speaker phasing and horn tilt need to be checked. When using crossovers the low, mid and high frequency drivers must be balanced to produce a relatively even response from 100 Hz to 5 Hz. See *Theater Equipment Check*, page 34.

SUGGESTED MICROPHONE PLACEMENT
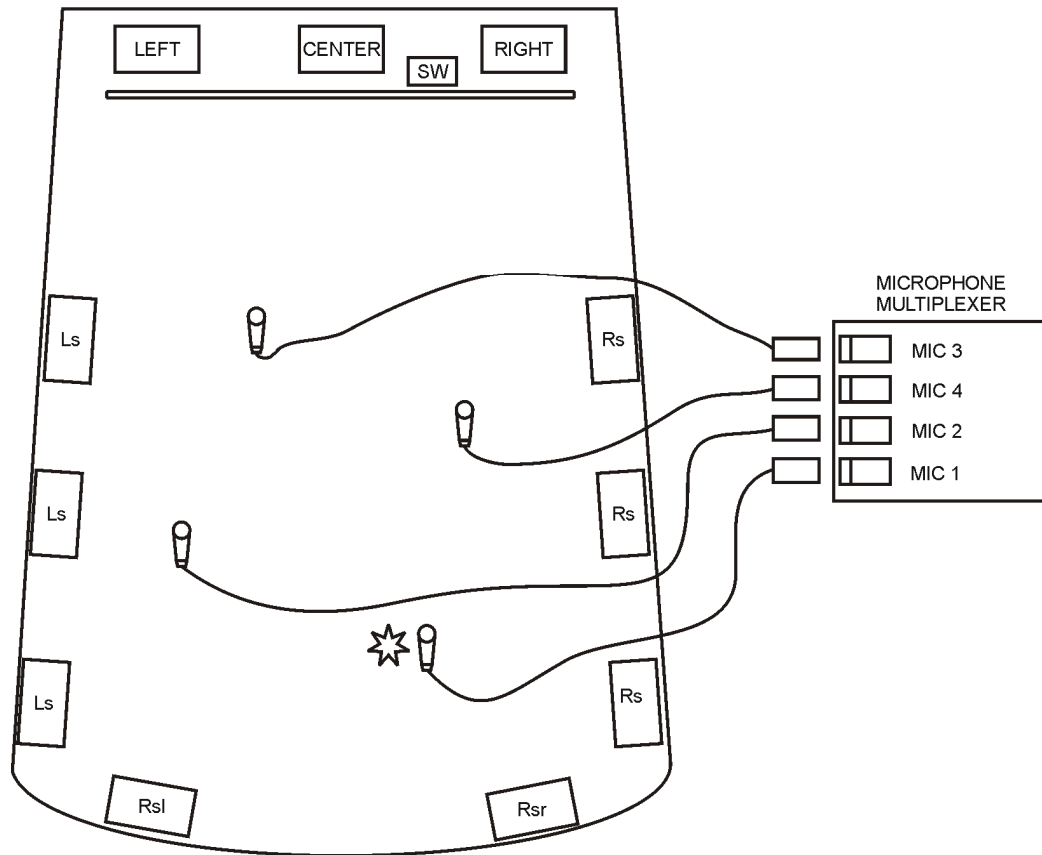
MAKE ALL SPL READINGS AT THIS LOCATION.

IF USING A SINGLE CALIBRATED MICROPHONE FOR ADJUSTING EQ, LOCATE THE MIC AT THIS LOCATION.

Figure 16. Suggested Microphone Placement in Theater

- Using a single microphone is not recommended, but if necessary, the best location would be two-thirds (2/3) of the way back and one-third (1/3) of the way in from the side of the auditorium (that is, slightly off-center). This position is also best for final SPL readings.

- If using a multiplexed microphone system, set up the microphones according to the instructions provided with that system.

Note: Be sure to open the curtains (if any) at the front of the auditorium.

2.10.1 Set levels to establish a baseline

- In the auditorium, confirm that all amplifiers are ON, mute is OFF, and masking and curtains are opened.
- Use a high-quality, calibrated SPL meter in the auditorium.

Menu (System) > Formats > Audio Levels

- Set the Fader to 7.0. This is the standard reference level.
- Run Pink Noise on each channel, one by one.
- First, by adjusting the amplifiers, try to achieve the baseline levels. Set the SPL levels according to the chart below.
  Note that SPL readings should be measured un-weighted, or C-weighted, with the meter set to slow.
  Use an RTA to calibrate the proper level setting of the subwoofer.

Table 10: SPL levels

Channel	Description	SPL
1	Left	85 dB
2	Right	85 dB
3	Center	85 dB
4	Sub bass	91 dB*
5	Left Surround	82 dB
6	Right Surround	82 dB
7	Back Surround	82 dB
8	Left Center	85 dB
9	Right Center	85 dB

  * Subwoofer should be set to 10 dB of in-band gain
   (see SMPTE RP-200), which equates to approximately 91 dBC (slow).

- If not possible to achieve the baseline, use the AP25 (Analog Output Levels) to make minor adjustments.

2.10.2 Perform the EQ

If using Dirac Live, please refer to the Dirac Live Theater Setup manual. For an overview, see *Using Dirac Live® to Tune the Auditorium*, page 43.

The AP25 contains a full suite of 1/3 Octave EQ filters that are "traditional" cinema processor filters. If using AP25 1/3 Octave EQ, complete the following steps.

Menu > Formats > Audio EQ Setup > Third Octave EQ
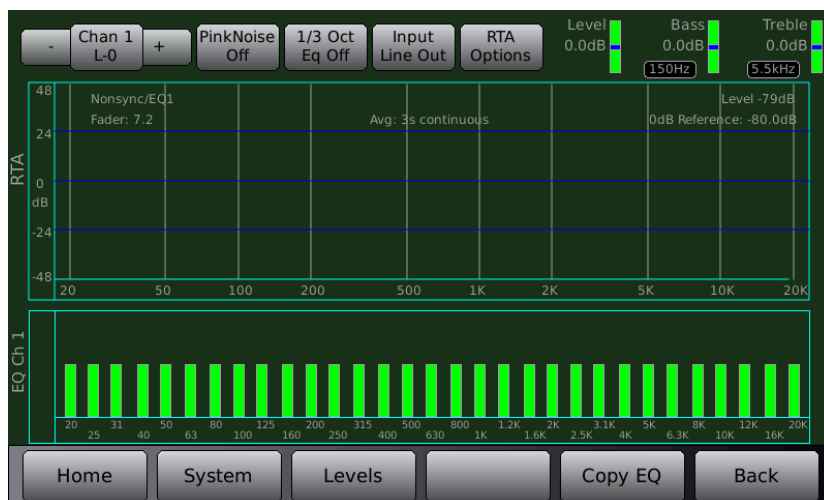
Figure 17. Third Octave EQ Screen

> **NOTE:** Touching a green bar in the EQ section (lower panel) will select that frequency and allow you to adjust the dB level of that frequency by rotating the fader knob. (On the laptop running AP25 Proxy, use the up/down arrow keys.)

- Use a single or multiplex microphone arrangement in the auditorium. A typical scenario is four mics feeding into a multiplexer.
- Use the RTA on the AP25 (Third Octave EQ screen) with the mic or multiplexer plugged into the AP25 rear panel, or use a separate RTA (in the auditorium) with the mic or multiplexer plugged into the RTA, which plugs into your laptop.

☑ Using a separate RTA in the auditorium avoids the necessity of running cables through the projection booth port and down into the theater. Use a third-party VNC software application on your laptop to establish a wireless connection with the AP25, and perform the EQ as described in the steps below.

- If the microphone is connected to the AP25, select **Input Mic** in the Third Octave EQ screen. If the microphone is connected to the RTA in the auditorium, select **Input LineIn.**

1. Select a channel to start with (for example: the L channel).

2. Turn ON **Pink Noise**.

3. Turn ON 1/3 Octave EQ.

4. Examine the response on the RTA (whichever RTA the microphone is attached to).

5. Turn on **XCurve Display**. Try to tune the frequency pattern to the XCurve. If the pattern does not conform – there is a hole or a peak or other variance – then select the frequency that needs adjusting, and push it down or pull it up.

6. Select a frequency in the lower panel by touching the green bar for the specific frequency. Once selected, the bar will turn yellow and allow adjustment.

7. Use the adjustment knob to adjust the frequency up or down.

8. Repeat the above for each channel except the subwoofer (LFE).

2.10.2.1 A note about XCurve

XCurve is the industry standard roll-off applied to all cinemas. The XCurve is flat to 2k, and then rolls off 3dB per octave. The **Third Octave EQ** screen offers three ways to look at the XCurve. XCurve is appropriate for both film playback and digital cinema.

- **XCurve Off** is just the natural display that gives you a flat response.
- **XCurve Offset** adds the 3dB per octave roll off starting at 2k. When in this mode you should adjust the response flat.
- **XCurve Display** (shown below) shows the guidelines. The two narrow lines are the plus and minus range of 3dB that is allowable. The heavier center line is the optimal level.

The scale (y-axis) on the left edge of the RTA is adjustable. Touch the scale and it will cycle through several different scales. You can also adjust the scale by touching the **RTA Options** button, which displays a control dialog.

Menu (System) > Formats > EQ Setup > Third Octave EQ > RTA Options > XCurve Display
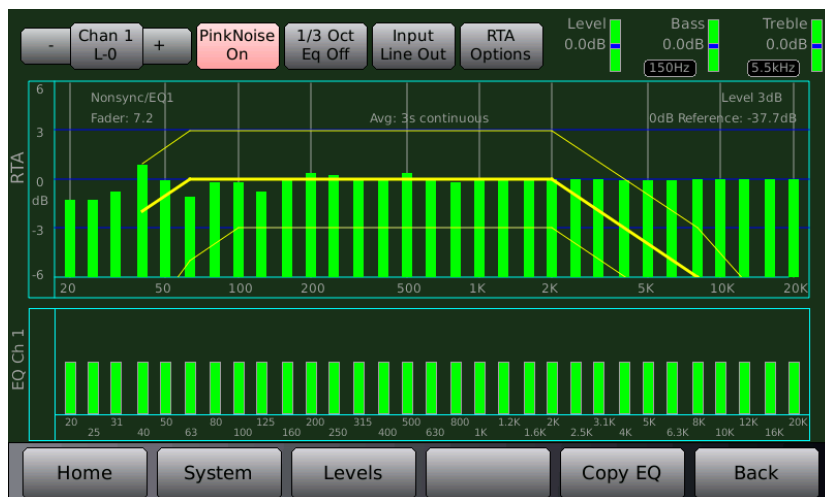
Figure 18. XCurve Display at +/- 6dB Scale

2.10.2.2 A note about Third Octave EQ

The RTA input source is also a useful tool to examine the effects of the settings applied. The changes from the Dirac, 1/3 Octave EQ, level, bass, and treble settings can all be seen by switching from Line In to Line Out. The Line In will be flat, when pink noise is on, while the Line Out will show the results of all adjustments.

Menu > Formats > EQ Setup > Third Octave EQ > Input LineOut
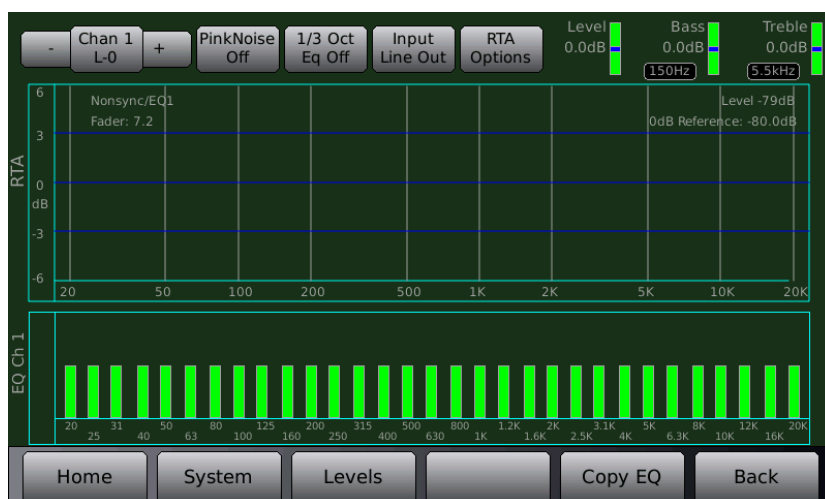
Figure 19. Input LineOut Selected

2.11 Subwoofer EQ – Parametric EQ

The AP25 features Parametric EQ on every channel. Parametric EQ is an optional adjustment and is in addition to 1/3 Octave EQ. It is only available with low frequencies and offers more control than 1/3 Octave EQ. The Parametric EQ screen looks similar to the 1/3 Octave EQ screen but displays a frequency range from 20 to 200Hz only. The screen has the same selections (Channel select, etc.) but also has controls for three filters.

Menu (System) > Formats > Audio EQ Setup > Parametric Equalization

The three filters can be configured regarding Q and Frequency, and are either enabled or disabled.

- To select a filter, highlight the **Filter** button and rotate the adjustment knob to select from the three filters.
- To adjust **Q**, **Freq**, or to **enable/disable**, select the control and rotate the adjustment knob.

Filter disabled in effect turns off Parametric EQ.
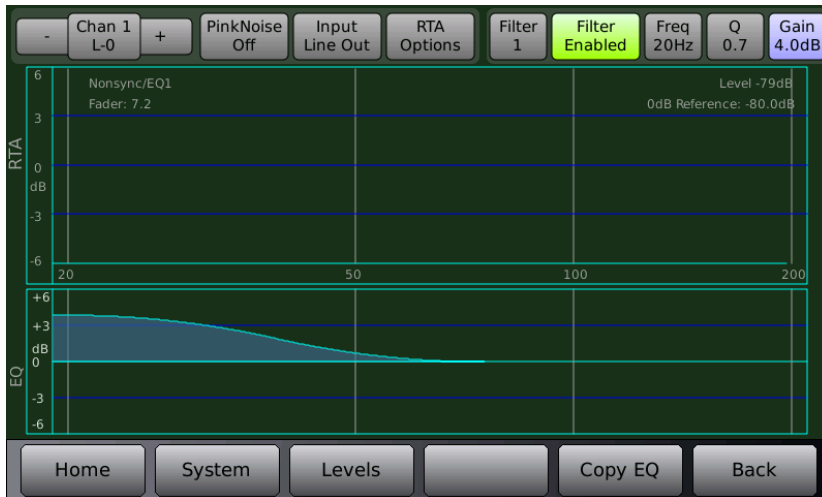
Figure 20. Parametric EQ Screen, Filter Enabled

2.12 Copy EQ Set to Another EQ Set

This screen is used to copy the EQ settings for all channels to a new EQ set under a new name. After equalizing all the channels, copy these settings to create another EQ (with a new name).

Menu (System) > Formats > Audio EQ Setup > Edit EQs
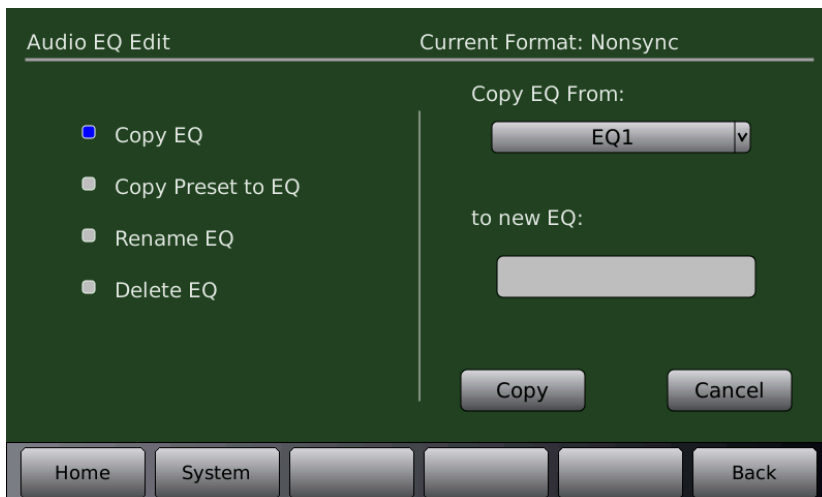
Figure 21. Copy EQ Settings

Use the **Copy EQ** function, accessible from the **Edit EQs** menu to copy the EQ set. Select the **Copy EQ From** set (select from the dropdown menu), then in the **to new EQ** field**,** enter a new name for the EQ set, then click the **Copy** button.

2.13 Final Adjustments

After performing the EQ, take another SPL level reading. If the SPL reading has changed, use the Level control (Third Octave EQ screen) to raise or lower to the proper SPL level for each channel (see Table 10 on page 38).

2.14 Copy Format

When a format has been configured, you may want to copy it to a new format, as a starting point, to save time in configuring the next format. For details, see *Edit Formats,* page 63.

Menu (System) > Formats > Edit Formats > Copy Format
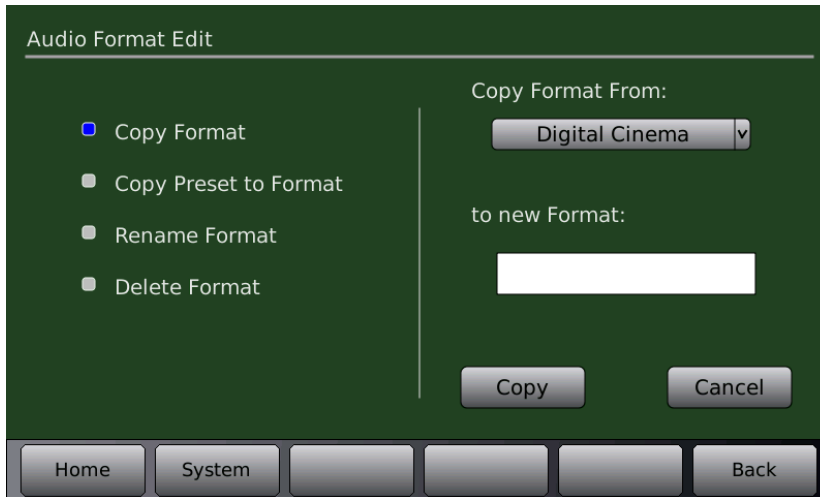
Figure 22. Audio Format Edit, Copy Format

For details about Copy Preset to Format, see 2.8.1 *Preset Formats*, page 31.

2.15 Setting up Multiple Screens

After setting up one screen (auditorium), you can copy the setup parameters including format names, channel assignments and EQ settings to other screens. This minimizes the time required for installing similar theaters since many of the values may be the same.

To do this, save the setup configuration on a memory stick (USB Flash drive), then use the saved setup to copy to the AP25 for the next screen, since many or all the values will be the same.

Menu (System) > USB Save/Restore > Save on USB > Master Configuration

See Saving and Restoring Configuration Files, page 56 for more details.

2.16 Using Dirac Live® to Tune the Auditorium

See the *Dirac Live*® *Theater Setup Guide* for detailed instructions. The Dirac Live® application is a separate tool, available from Datasat Digital Entertainment but not supplied with the AP25 processor.

2.17 AP25 Playback Sound Check

After installing and setting up the unit—or doing a maintenance check—it is a good idea to play content and stand in the theater while listening to the first few minutes of the movie. Check for the following

- The overall sound level is comfortable and balanced.
- The soundtrack quality is excellent and does not include extraneous noise.
- The dialog is in sync with the picture being projected.
- The surround speakers are heard at the correct level. (Please note that not all scenes will have surround material.)

To adjust the overall sound level in the theater, adjust the main fader on the audio processor.

3.0   How-To Procedures for Setup

This table provides a list of setup activities and provides instructions or a link to instructions elsewhere in this manual.

Table 11. Setup Procedures

ACTIVITY	INSTRUCTIONS
Assign a Format button	See 4.3.4 Assign Format Buttons, page 65.
Unassign / delete a Format button	See 4.3.4 Assign Format Buttons, page 65 – select the button and assign a "blank" format to it.
Configure power-on Format (Startup Format)	See 4.3.2 Startup Format, page 63.
Assign fader level to a Format or set global fader for all Formats	See 4.2 System Setup Screen, page 51 "Fader Control", and see 0 Assign Fader Level to a Format, page 52.
Create a Format	See 3.1 Example: Creating a Format, below. For detailed information about Formats, see About Formats, page 27.
Assign Channel Names and Vu meters	See 4.3.8.3 Channel Names, page 86.
Set Non-sync Level and Non-sync Routing	See 4.3.6.3 NonSync Level and Routing, page 72. See also 0 Assign Fader Level to a Format, page 53.
USB Save / Restore / Load	See 4.2.3 Saving and Restoring Configuration Files, page 56.
Load a personalized screen saver	See 4.2.3 Saving and Restoring Configuration Files, page 56. To set screensaver time and mode, see 4.2 System Setup Screen, page 51.
Set up Global Audio Delay for a format	See 4.3.6.1 Global Delay, page 69.
Set up Multiple Surround Channels	For digital cinema format, see 4.3.6.2 Extended Surround Options, page 71.
Set up HDMI option	For digital cinema format, see HDMI Options, page 76
View AP25 System information	See 4.2.5 System Info, page 59.
Update AP25 software	See 4.2.2 Updating AP25 Software, page 54.

3.1   Example: Creating a Format

Prior to creating a format, it is necessary to identify the following:

- Input source
- Format option
- EQ set up
- Output channel profile name

The following example describes how to create "non-sync 2" format, with stereo input, global delay of 0 ms, assignment of EQ and audio profile.

1. Open the Audio Format Setup screen.

    Menu (System) > Formats

2. Next, select **Edit Formats**. The Audio Format Edit screen displays.

3. On the left side choose the Copy Format radio button.

4. Under **Copy Format From** select **Nonsync**.

5. Touch the blank box under **to Format**. A keyboard will appear.
    Type in *Nonsync 2*, then select **OK**. The Audio Format Edit screen will return.

6. Touch the **Copy** button.

The screen will now change to Audio Format Setup.

7. Select **Assign Buttons** and the Format Button Assignments screen will display. Select an unused button number from the **Buttons** dropdown menu. In this example select button 3.

8. Next from the **Assign** dropdown list, select **Nonsync 2**. Then touch the **Assign** button on the right side of the screen. In the Current Assignments listing on the screen, Button 3 will now be assigned to **Nonsync 2**.

9. At the bottom of the screen, touch the **Back** button to return to the Audio Format Setup screen.

10. Select the **Input Source** button. This will open the Input Select screen.
    The right side of the screen should display "**Current Format: Nonsync2**".
    If it is not displayed, return to the Audio Format Setup screen by selecting the **Format** button and selecting **Nonsync 2** in the **Current Audio Format** dropdown menu. Return to the Input Select screen by touching the **Input Source** button.

11. In the Analog input section, touch the **NonSync1 L/R** option to change it to **NonSync2 L/R**. Then touch the **Back** button to return to the Audio Format Setup screen.

12. In the Audio Format Setup screen, select the **Format Options** button to go to the Format Options screen.

13. In the Format Options screen, you can (if necessary) set the **Global Delay** for the selected format.
    Select the **Nonsync Level and Routing** button to change input gain and routing of the Nonsync signal.
    Touch the **Back** button to return to the Audio Format Setup screen.

4.0   Setup Menus

On the next five pages, you will find a menu diagram for the AP25. This chapter contains a detailed description of all the screens under the "Menu" selection of the home page. Refer to section 1.4 for all operations under the "Home" screen.

    For information on AP25 System Setup configurations, see section 4.2.
    For information on Audio Format setup and changes, see section 4.3.
    For information on Network connections and changes, see section 4.4.
    For information on Automation events, cues, macros and assigning buttons, see section 4.5.

    The full menu structure of the AP25 is shown on the next five pages.

AP25 Menu Structure
Software V1.05.03 and above
(Page 1)

Home (Main)

Fader (readout)

Mute (Fader)

Monitor
Volume Control, Mute, Mix

Automation
Manual Control

Select Format
(8 buttons on bottom of screen. Light blue button = current selection)

Menu (System)

System Setup

Formats
See pages 2 & 3

Network
See page 5

Automation
See page 5

Screensaver Time
10 seconds, 1 Minute or 5 minutes

Screensaver Mode
Disabled
Dim Screen
Graphic
Black screen

Digital Out ClockRate
Off, 48kHz, 96kHz or 192kHz

Output Mapping
Ch 9-16 Out Normal
Copy Ch1-8 to Ch9-16

Output Mapping (H539 chs 17-24 out option only)
Ch 17-24 Out Normal
Copy Ch1-8 to Ch17-24
Copy Ch9-16 to Ch17-24

Fader Control
Global
Format

LCD Brightness

Update System Software

Select Update Source:
Main Server
Secondary Server
USB

USB Save/ Restore

Save on USB
AP25 Configuration
Master Configuration
Diagnostic Information
Load from USB
AP25 Configuration
Master Configuration
ScreenSaver

"Expert" System ⚠2

Setup:

System	EQs
System	EQs
Update	Dirac (option)
USB	1/3 oct
Log File	Paramtc
Info	CopyEQ
Network	Levels
Access	**Profile**
Format	Profiles
Formats	ChNames
Source	Routing
AssignBt	ChDelays
GlobDel	**Automation**
ExtSurr	Macros
Mic Level	Events
NS Level	Buttons
Decoder	Serial
Optical (option)	Test
Film Setup (option)	
Bass Enh	
DC Opts	

Access Control

NetCmd Password
Setup Password
ReLock Setup

System Info

Software version, Serial number, MAC Address, circuit board temps, board ID info, board voltage levels

More

Monitor-out tracks fader
"Expert" Nav Mode
VNC: Disable Hextile Encoding
View Log file
Feature Key
Identity

Notes:

1. Navigating the menus: When AP25 is first powered the home screen will appear. The "Menu" button will access the "System Setup" screen. After navigating through sub-menus, selecting the "System" button will return you to the "System Setup" screen.
   Selecting "Home" from a sub-menu will return to the Home screen. If "Menu" is then selected, the AP25 will return to the last selected sub-menu.
   The "Back" button works like an internet browser, and may be used to return through the history of previously selected sub-menus.

⚠2 When "Expert" navigation mode is enabled, the normal menu structure is replaced with a setup screen providing quick access to main menu buttons. Disable to return to normal menu structure.

AP25 Menu Structure
Software V1.05.03 and above
(Page 2)

Home (Main)

Menu (System)

Formats

- **Current Audio Format** (select)
- **Edit Formats**
  - Copy Format
  - Copy Preset to Format
  - Rename Format
  - Delete Format
- **Assign Buttons**
  - **Format Button Assignments** (Up to 8 may be assigned) Enable "More" Button
- **Startup Format** (select)

Mic Power on/off (select)
when Nonsync 1 or 2, Mic Pre are input source

Modify parameters for current format

- **Input Source** (Select from digital or analog audio sources)
- **Audio Levels**
- **Format Options** — See page 3
- **Channel Profile** — See page 3
- **Audio EQ Setup**
  - **Current Audio** EQ/Setup
  - **Edit EQs**
    - Copy EQ
    - Copy Preset to EQ
    - Rename EQ
    - Delete EQ

Audio Levels:
- **Pink Noise** On/Off (1-16)
- **Analog Level** (dB) (1-16)
- **Invert** On/Off (1-16)
- **Ch Mute** On/Off (1-16)
- **Master Fader**
- **Master Mute** On/Off
- **Pink Noise Multi Ch** On/Off
- **Digital Volume** Enable/Disable Offset

Audio EQ Setup:
- **Copy/Clear EQ**
  - Copy EQ Settings
  - Clear EQ on selected Ch.
  - Clear EQ on all Chs.
- **Parametric Equalization**
- **Third Octave EQ**
- **Dirac Optimization** (if installed)

Parametric Equalization:
- **Channel Select** (1-16)
- **Pink Noise** On/Off
- **Input** LineIn / LineOut / Mic
- **Filter** 1, 2, or 3
  - Filter Enabled/Disabled
  - Freq (Hz)
  - Q
  - Gain (dB)

RTA Options:
- **Range** (+/- 3dB, 6dB, 12dB, 24dB, 48dB, 64dB)
- **XCurve** (Off, Display, Offset)
- **Averaging** (None, Continuous, Manual)
- **Mic Level**
- **Mic Power** On/Off

Third Octave EQ:
- **Channel Select** Chan (select from 1-16) - (previous Ch) + (next Ch)
- **Pink Noise** On/Off
- **1/3 Oct EQ** On/Off
- **Input** LineIn / LineOut / Mic
- **Graphical 3rd** Octave EQ
- **Level Slider**
- **Bass Slider**
- **Treble Slider**

AP25 Menu Structure
Software V1.05.03 and above
(Page 3)

Home (Main)

Menu (System)

Formats

Format Options △1

Channel Profile

Global Delay and Surround Offset (set)
Global audio delay for current format (ms)
Surround Delay (ms)
H. I. Delay (ms)
Format Trim (dB)
Surround Offset (dB)
Fade In (ms)
Fade Out (ms)

Mic Level and Routing
Gain (set) (dB)
Select:
Screen Center
Screen chs
Surround chs
Screen & surround

Channel Profile Setup

Current Channel Profile (Select)

Edit Profiles

Copy Profile
Copy Default to Profile
Rename Profile
Delete Profile

Extended Surround Options
None
Copy surround chs to rear surround chs
Matrix Decode Surround Channels

Nonsync Level and Routing
Nonsync Gain (set)
L (dB)
R (dB)
Select:
Screen chs (L/R)
Surround chs (Ls/Rs)
Screen & surround chs
Matrix Decoder
Enable Bass Enh (see Bass Enh)
Enable Mic (see mic level & routing)

Channel Names (1-16)
Channel Names (Assign)
Vu Meter (On/Off)

Digital Cinema Format Options
DC Audio Configuration (select)
Default
5.1 DCP
DCP includes HI (on/off)
DCP includes VI (on/off)
7.1 DCP
DCP includes HI (on/off)
DCP includes VI (on/off)
5.1 DCP to 7.1 speakers (on/off)
DCP includes HI (on/off)
DCP includes VI (on/off)
ES Matrix
Matrix
Enable Bass enhancement (on/off)
Copy Surrounds to Rears (on/off)

Routing / Crossovers

Output Channel Routing
High / Low Pass Filters
Crossover ID
Output Channel Trim
Channel mapping chart

Channel Delays (mS)
Input ch select (1-8, 9-16)
Output ch select (1-8, 9-16)
Output ch select (17-24 optional)

Bass Enh   See page 4

Decoder Setup
Speaker Configuration (select 5.1 or 7.1)
Phantom Center (on/off)
DTS Neo:6 Option (select)
Off
Music
Cinema
Misc Options (select)
Direct Mode (decoder disabled)
Disable Surround Remap
DTS LFE +10dB

Film Options

Film Optical Audio Type:
None
Mono
A-Type
SR

Matrix Decoder
(On/Off)

Optical Bass Extension (On/Off)

Film Setup   See page 4

Notes:

△1 The Format Options available are determined by which Input Source has been selected:

Format Option	Input Source(s)
Global Delay & Surround Offset	All
Nonsync Level & Routing	Nonsync 1 or 2
Extended Surround Options	Analog 8ch, Nonsync 1 or 2, Mic Pre, Digital ch 9-16, Optical
Mic Level & Routing	Mic Pre
Film Options	Optical (Also requires that H338 Optical Film Card is installed)
Digital Cinema Format Options	Digital ch 1-8, Digital ch 1-16
Decoder Setup	Digital ch 1/2, Digital ch 9/10, TosLink A or B, S/PDIF Coax, HDMI 1-4

2. Input channels 7/8 are routed to 9/10 if a) copy surrounds to rear surrounds is set, and b) input source is 8 channel analog or 8 channel digital 1-8.

AP25 Menu Structure
Software V1.05.03 and above
(Page 4)

```
                              ┌─────────────────┐
                              │   Film Setup    │
                              └─────────────────┘
                                      │
              ┌─────────────────┐     │    ┌─────────────────────────┐
              │ Digital Soundtrack │──────│ Azimuth                 │
              │ Input           │          │   Mute                  │
              └─────────────────┘          │   Proj 1/2 (select)     │
      ┌──────────────┐   │                 │ Graph image             │
      │    Mute      │───┤                 └─────────────────────────┘
      └──────────────┘   │
┌─────────────────────┐  │         ┌──────────────┐    ┌──────────────┐
│ Select Input for    │──┘         │ Optical Gain │────│    Mute      │
│ Digital             │            └──────────────┘    └──────────────┘
│ Soundtrack:         │                                ┌──────────────┐
│   None              │                                │ Auto Adjust  │
│   Digital Chs. 1-8  │                                └──────────────┘
│   Analog Chs. 1-8   │                                ┌──────────────┐
└─────────────────────┘                                │ Proj 1/2 (select) │
                                                       └──────────────┘
                         ┌──────────────┐              ┌──────────────┐
                         │ Slit Loss EQ │              │ Left/Right   │
                         │ Graph image  │              │ (manual adjust) │
                         └──────────────┘              └──────────────┘
```

Film Setup

Digital Soundtrack Input
- Mute
- **Select Input for Digital Soundtrack:**
  - None
  - Digital Chs. 1-8
  - Analog Chs. 1-8

Azimuth
- Mute
- Proj 1/2 (select)
- Graph image

Optical Gain
- Mute
- Auto Adjust
- Proj 1/2 (select)
- Left/Right (manual adjust)

Slit Loss EQ
Graph image
- **Left/Right** (select)
- **Proj 1 / 2** (select)
- **Parametric Filter Setting**
  - (manually adjust)
  - Freq (Hz)
  - Q
  - Gain (dB)
- Mute

Bass Enh

Matrix Bass Extension
- Pink Noise Enable (select)
  - Center
  - LFE
- Set Parameters for Bass Extension
  - Gain (dB)
  - Low pass Filter (Hz)

AP25 Menu Structure
Software V1.05.03 and above
(Page 5)

Home

Setup (System)

Automation

Network

Events

Automation Events
Delete Event

Automation Events
Add New Event
Edit Event

Network Configuration:
DHCP/Static (select)
IP Address
Mask
Broadcast Addr
Gateway
DNS Server 1
DNS Server 2
NTP Server
Log Server
Speed (Auto, 10Mb/s, 100Mb/s)
Connection Status

Net Diag:
Ping Test (Select Destination)
Log Net Stats
Phy Interface info
Rx info
Tx info
DCHP info

SNMP:
Agent Mode (Select):
Disabled
v1
v2
Manager IP Address
roCommunity
rwCommunity

Automation Edit Event
Event Name (set/edit)
Event Type:
No Event
GPI
Format Change
Serial

When (choose: GP1-
GP18, projector)
Goes (choose: low, high)

**When Format changes
to:** (choose format)

Run:
Action
Macro (choose)

**When Serial Data
Matches** (enter data or
select "Capture" button)

Delay (mS)

Macros

Automation Macros
Add
Delete
Copy

Actions For
"(macro)"
Add Before
Add After
Delete
Edit
Copy
Move Up
Move Down

Automation Edit Action
Always
Conditional

GPO
Set (1-20, Projector)
To (Pulse, Low, High)
Width (ms)

Format (select)

Network
IP Address (set/edit)
TCP Port (set/edit)
Data (set/edit)

Serial
Baud Rate (select)
1200, 2400, 9600, 19200,
38900, 57600, 115200
Data Bits (select)
7, 8
Parity (select)
None, Even, Odd
Serial Command Mode (select)
AP20
Linked AP20
Panastereo
6AD

Mute (On/Off)

Fader
Set
Adjust

Serial (enter serial data
to send)

Buttons (1-20)
Name (assign/edit)

Automation Edit Event
(for button 1-20 when pressed)
Run
Action (assign/select)
Macro (assign/select)

Set Variable
Variable Name (Enter)
Set to (False/True)

Test
GPIO 1-18
GPO 19, 20
Proj 1/2
(select button to send an
automation signal low)

Run Macro
Marco name (select)

4.1   The Menu Button

The Menu Button is intended to be used by theater technicians only. Password protection is highly recommended.

Selecting the [Menu] button, after first powering up the AP25, will display the System Setup screen. This will provide access to the Setup menus.

In the next section, we will discuss in detail the options available through the menu bar. Pressing the Home button will take you back to the Home or Main screen.

4.2   System Setup Screen

Menu (System) > System Setup
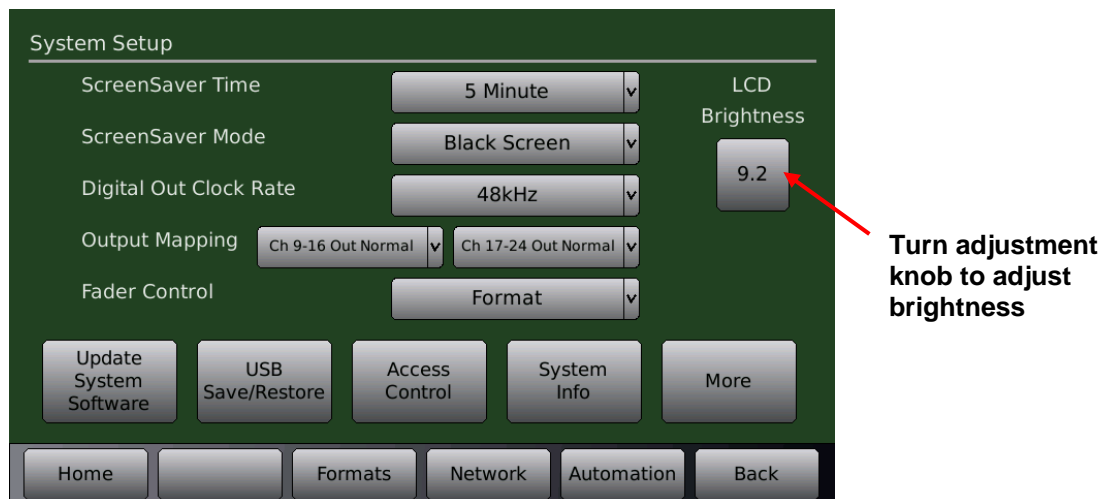
Figure 23. System Setup Screen

The following options are available directly from this screen.

ScreenSaver Time - Options include a 10 second delay, 1 minute delay, or 5 minute delay before screen saver initiates.

ScreenSaver Mode - Disabled, Dim Screen, Graphic, or Black screen.

- Disabled will turn off the screen saver.
- Dim Screen will reduce the LCD brightness after the time specified in the ScreenSaver Time drop-down menu. Touching the screen or turning the adjustment knob will restore the brightness.
- Graphic mode uses the stored screen saver graphic. Touching the screen or turning the adjustment knob will restore the Home screen.
- Black Screen will black out the screen after the specified time selected under Screensaver Time.

LCD Brightness -Use the on-screen slider or the adjustment knob to adjust the brightness of your LCD screen.

Digital Out ClockRate – When interfacing with external digital equipment select appropriate clock rate to match that equipment. Select from the following options:

- Off
- 48 kHz
- 96 kHz
- 192 kHz

Output Mapping – Channels 9-16:

- **Ch 9-16 Out Normal** – Standard output channel assignments.
- **Copy Ch 1-8 to Ch 9-16** – The output of channels 1 through 8 will be *copied* to output channels 9 through 16 for both the Analog output connector and Digital output connector. Output channels 9-16 are not assignable if this option is used.

Output Mapping – Channels 17-24 (Only available when optional H539 board is installed):

- **Ch 17-24 Out Normal** – Standard output channel assignments.
- **Copy Ch 1-8 to Ch 17-24** – The output of channels 1 through 8 will be *copied* to output channels 17 through 24 for both the Analog output connector and Digital output connector. Output channels 17-24 are not assignable if this option is used.
- **Copy Ch 9-16 to Ch 17-24** – The output of channels 9 through 16 will be *copied* to output channels 17 through 24 for both the Analog output connector and Digital output connector. Output channels 17-24 are not assignable if this option is used.

Fader Control – The Fader knob controls the playback level in the auditorium/theater. It can be set in either of two modes:

- **Global**: The fader level setting will affect all audio formats and will not be displayed in the Home screen. Example: While in a format and the fader is adjusted from 5.0 to 6.0, the fader will remain at 6.0 when another format is selected.
- **Format**: Fader level settings can be assigned to each audio format button on an individual basis. To differentiate it from the Global setting and allow an easy reference for the projectionist, the fader level setting for the format will display at the top of the Home screen below the text "Fmt Fader". In this mode, if a fader level is adjusted for a specific format, it will not affect other formats. See next topic.

☑ **Note:** This setting will not affect the main fader display on the Home screen.

☑ **Note**: If the operator needs to preset the level for each audio format, then set up Fader Control to be in Format mode.

4.2.1 Assign Fader Level to a Format

To assign a specific fader level to a format button, do the following:

1. Select **Menu (System)**, then in the **Fader Control** pulldown menu select **format**. Return to the main screen by selecting **Home** button. **Fmt Fdr** (format fader) will now appear on the home screen.
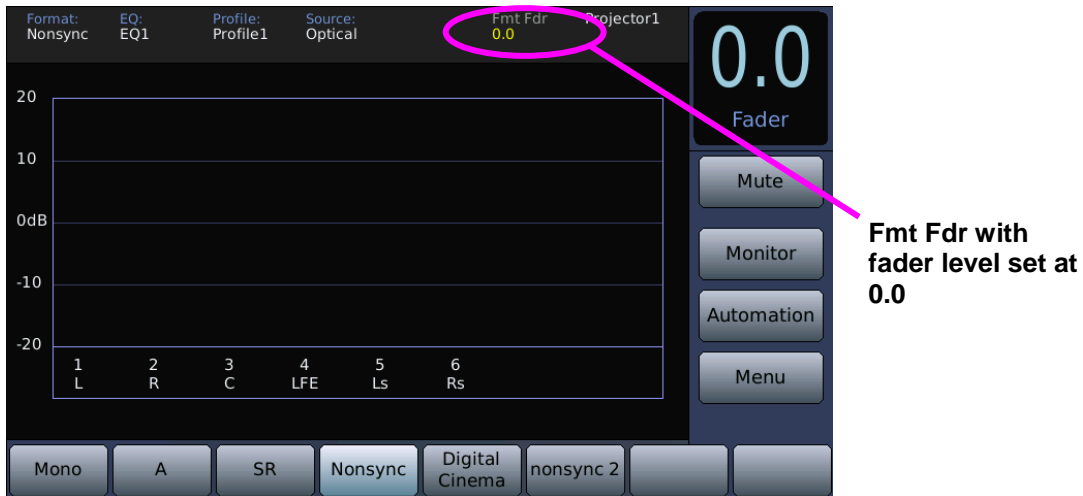

Figure 24. Setting Fader Level for a Format (1 of 3)

2. Next, select the desired format button, in this example we will use Non Sync.

3. Next, adjust the fader volume to the desired level using the fader knob. The screen should appear as shown below.
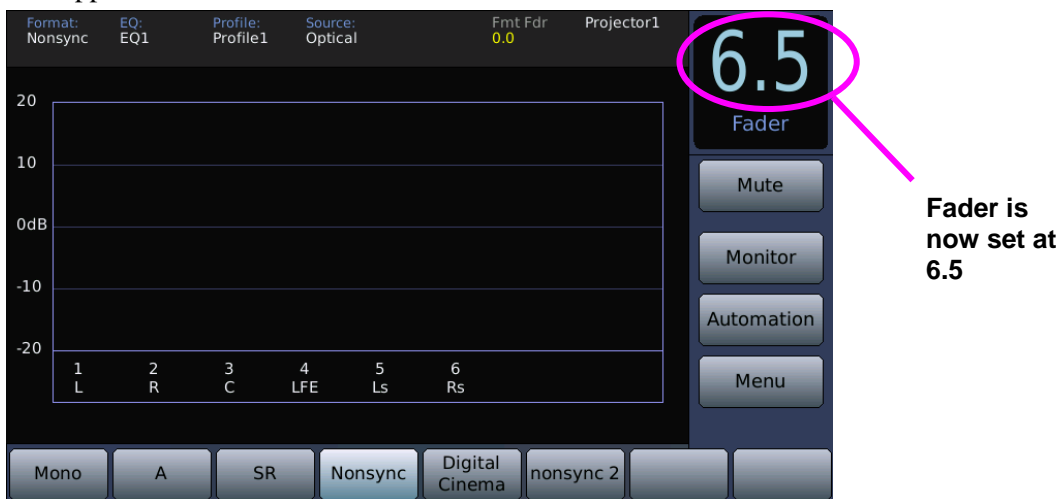
Figure 25. Setting Fader Level for a Format (2 of 3)

4. Finally, hold down the current format button (shown in green, Non Sync in this example) for about 5 seconds, until **Fmt Fdr** (in yellow) matches the fader setting (6.5 in our example).

Figure 26. Setting Fader Level for a Format (3 of 3)

The **Non Sync** audio format button is now set at 6.5 and will remain so until changed.

☑ **Note**: If you adjust the fader up/down for a selected format but do not do step 4 above (to change the Fmt Fdr assignment), then when you leave and return to this format, it will assume the previously set Fmt Fdr setting.

4.2.2 Updating AP25 Software

There are two ways you can update your software.

- Use an internet connection to connect to the servers at Datasat Digital Entertainment to select and install the update.
- Update from a USB Device.

Both methods are described in more detail below.

Menu (System) > Update System Software
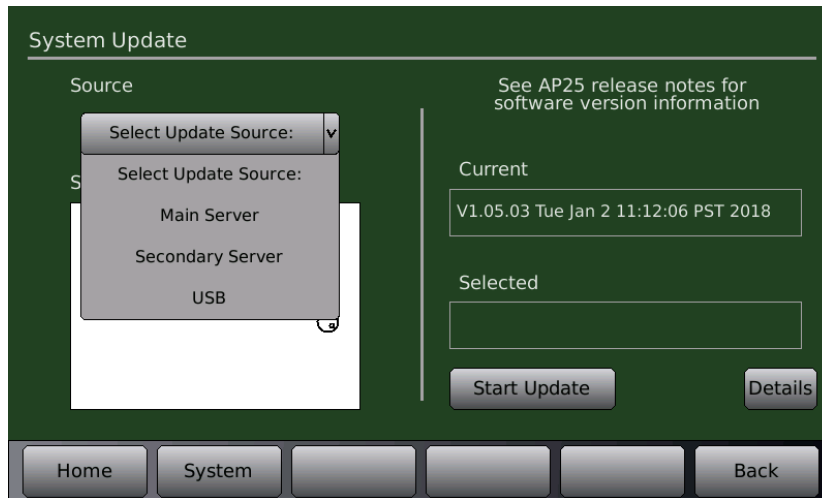
Figure 27. System Software Update Screen

## 4.2.2.1 Update System Software from Network

The following steps describe how to update your AP25 software through the internet.

Using the **Select Update Source** dropdown menu, choose **Main Server**, or **Secondary Server**. Both will provide the same information. If you successfully connect to the server a list will appear of all available software versions. The most current will always be at the top of the list. Use the adjustment knob to highlight the desired software version.

The current version of software loaded on the AP25 is displayed under **Current** on the right side of the screen. The highlighted software version, will display under **Selected** on the right side of the screen. Once the desired version is confirmed, press the Start Update button

☑ Note: If you select an older version of software than is currently loaded on the AP25, you will receive a warning message and be asked to verify that you wish to continue.

☑ Note: Your AP25 must already have an active internet connection in order to update software through the internet. If you receive a message "failed to get file list" your internet connection is not working and the AP25 is unable to connect with the server.

Connection will take place automatically, and the following screen will appear.
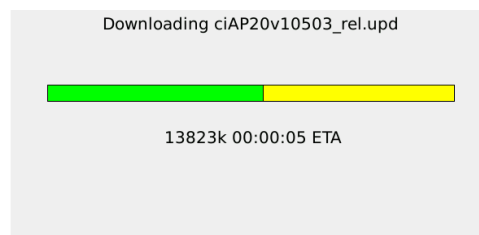
Figure 28. Downloading Software Update via Internet

Depending upon your connection speed, downloading, decompressing, and installing files could take anywhere from 10 minutes to less than a few minutes to complete. When the installation process is finished, the AP25 will automatically reboot.

4.2.2.2 Update System Software from USB Device

You may update the software through a USB drive.

1. First, obtain the software update file from Datasat Digital Entertainment technical support.

2. Copy the update file to the root directory of the USB drive. Be sure not to change the filename, or the AP25 will not recognize it.

3. Insert the USB drive into the USB slot on the front panel of the AP25, choose **Select Update Source > USB (see** Figure 27), select the update file and press the **Start Update** button.

☑ Note: If you select an older version of software than is currently loaded on the AP25, you will receive a warning message and be asked to verify to continue.

4.2.3 Saving and Restoring Configuration Files

You can save and restore standard configurations and master configurations to a USB drive (memory stick). You can also save Diagnostic information (the system log file) for use in troubleshooting the system.

A *master configuration* is intended to be a template used to configure similar AP25s in a system. It is used as the first step in creating the configuration of each installed unit. Copy the master configuration file from one AP25 and load it via USB into all AP25s.

☑ **Note**: Always be careful, as any existing Master Configuration file on the USB will be overwritten when you save another one.

The *standard configuration* is specific to one AP25. This contains the unique third octave EQ, DiracEQ, formats, profile, automation, and global configurations needed for that AP25. The standard configuration file can only be loaded back onto the same AP25.

You can also load a screensaver of your choice via the USB port.

To perform any of these options, insert the USB drive into the front panel and then press the **USB Save/Restore** button on the System Setup screen. (If no Flash drive is present, a message will appear prompting you to insert a USB device.)

Menu (System) > USB Save/Restore
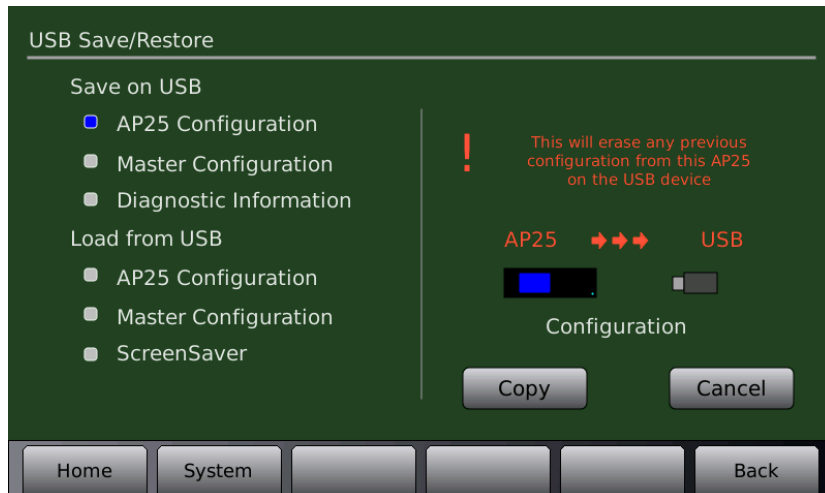
Figure 29. USB Save/Restore Screen

▪ Select an activity on the left, then touch **Copy** on the right.

The following options are available when using a USB Flash drive:

Table 12. USB Flash Drive Options

OPTION	RESULT
Save AP25 Configuration	Save AP25 configuration to USB device. This will erase from the USB device any previous configuration stored for this unit.
Save Master Configuration	Save AP25 configuration to USB device as a MASTER configuration which may be loaded onto other AP25 units. This will erase from the USB device any existing MASTER configuration.
Save Diagnostic Information	Save AP25 Diagnostic information to the USB device to facilitate troubleshooting.
Load AP25 Configuration	Copy AP25 configuration from a USB device to system. This will ERASE the existing configuration on the AP25 and cause a system restart after loading the new configuration.
Load Master Configuration	Copy AP25 MASTER configuration from a USB device to system. This will ERASE the existing configuration and cause a system restart after loading the new configuration.
Load ScreenSaver	Load a graphic image (AP25.jpg) from the USB device and use it as the ScreenSaver. The screensaver image is an 800 wide x 480 high jpeg image. The file must be named "AP20.jpg" and placed in the root directory of the USB device.

4.2.4 Access Control

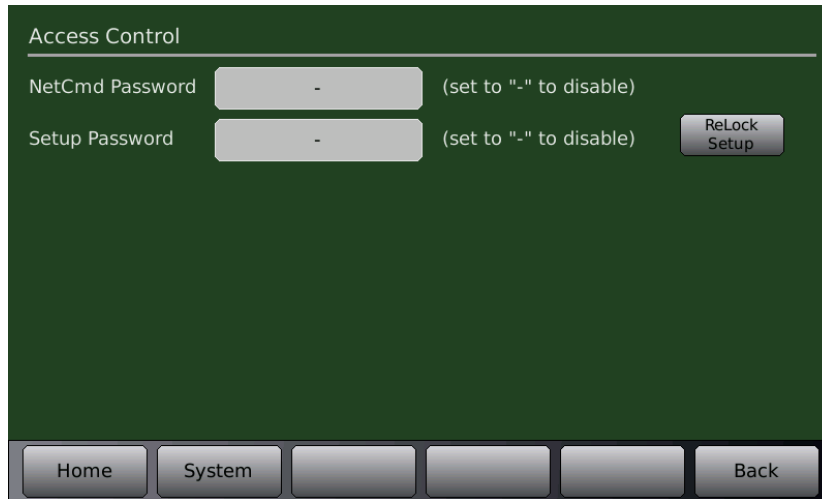**Menu (System) > Access Control**

Figure 30. Access Control Screen

By creating passwords, you can control user access to certain functions of the AP25.

The **Netcmd password** is the password used to control access to operator-level commands from a remote network device (i.e. automation device, server) or theater management system.

A **Setup password** will restrict users from access to the **System Setup** menu. A user without the correct password will not be able to make any changes to the system, formats, network, or automation. This password will not block access to the Home Screen items, but will block access to the "menu" button

The setup password needs to be entered only once when entering the setup menus and remains in effect until:

- The AP25 is powered cycled
- One hour passes with no activity
- The ReLock Setup button is pushed.

If the password is lost and you cannot access the AP25, contact Datasat Digital Entertainment technical support.

Password restrictions take place as soon as the password is configured in the Access Control screen.

Passwords are case sensitive. You can enter upper case characters by using the shift button on the virtual keyboard displayed on the LCD. To remove password protection, clear the password by pressing the Clear button, then enter a hyphen "-" and press "OK".

☑ Note: When removing password protection, if no hyphen is entered (blank selection), the AP25 will continue to ask for a password to enter the setup menus. In that case select the OK button to enter the setup menus without entering a password.

☑ Note: When logging into an AP25 using a VNC device, the default password is "-". If a password has been set for the AP25, this password will be needed for VNC log in.
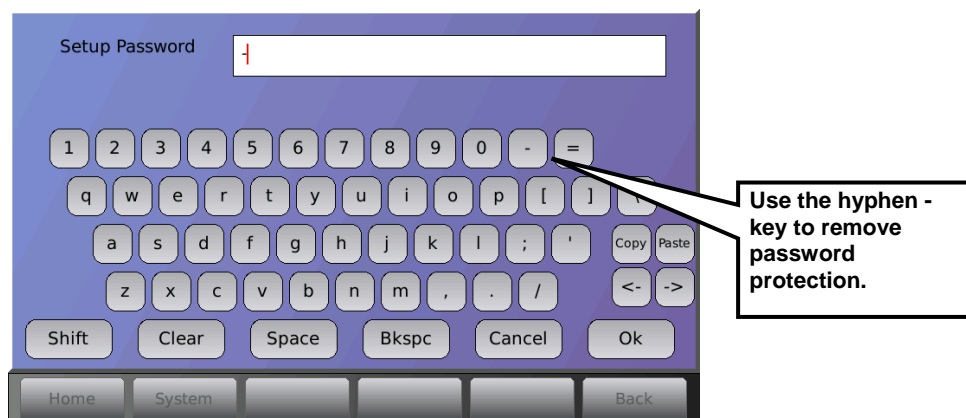
Figure 31. Net Command Virtual Keyboard

4.2.5 System Info

From the system Setup screen, touch the System Info button. The **System Info** screens are shown below.

Menu (System) > System Info

Figure 32. System Info Screens

4.2.6 Version, Serial Number, and MAC address

- ▪ The upper left corner of the screen displays software version, build date, AP25 serial number & configuration, and its unique MAC address.

4.2.7 System Monitor

- ▪ The upper right corner of the screen displays the internal board temperatures, the current fan speed, and the model code.
- ▪ The lower portion on the first screen displays board information such as board ID, Address, hardware revision level, loader version, loader check-sum, firmware version, and firmware check-sum.
- ▪ The lower portion on the second screen displays the expected and actual bus voltages for each board. It is normal for the actual level to vary slightly from the expected. The background color for the expected and actual values will turn red should the actual voltage be out of the acceptable range.

4.2.8 More

Selecting the More button will access the second System Setup screen

Menu (System) > More

Figure 33. System Setup (2) Screen

4.2.8.1   Monitor-out tracks fader

4.2.8.2   "Expert" Nav Mode

When "Expert" Navigation Mode is enabled, the normal AP25 menu structure is replaced with a setup screen that provides quick access to the main menu buttons. After enabling, the new screen appears when the "System" button is pressed. It must be disabled to return to the normal menu structure. Note: The "Home" screen function is not changed and the unavailable buttons will be faded out (button availability is related to the input for the currently selected format).
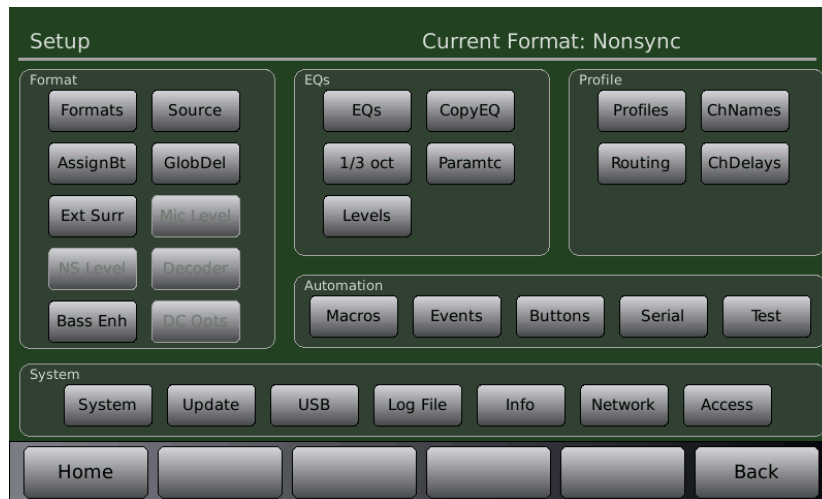
Figure 34. "Expert" Nav Mode (note that several buttons are faded out

4.2.8.3 VNC: Disable Hextile Encoding

Selecting this option will improve VNC performance for some clients.

4.2.8.4 View Log File

The log file (shown in Figure 35, below) is a complete listing of all software events that have taken place since the AP25 was last powered on. The listing includes changes made internally by the AP25 software, as well as user initiated system changes through the touch screen interface. You may scroll through the log file using the front panel adjustment knob.

The log file is helpful for debugging by Datasat Digital Entertainment staff. You may be asked by the Datasat staff to save the log files on the USB Flash drive, to send for troubleshooting purposes.

☑ Note: The log files persist during a front panel off/on cycle. However, log files are cleared after restarting the AP25 from a full power-on (rear panel power switch).

Select **Save Diagnostic Info** in the section *Update System Software From USB Device* on page 56.
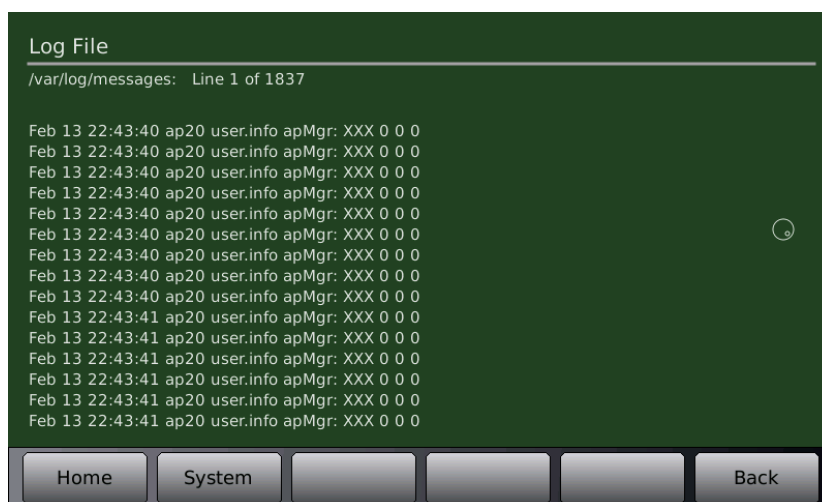
Figure 35. Log File Screen

4.2.8.5 **Feature Key**

This is used to enter an unlock code when upgrading to optional features such as DiracLive®. Selecting the feature key will bring up a keyboard screen to enter the code.

4.2.8.6 **Identity**

Three text fields can be entered into the AP25 to be used for identification. These are labeled "Screen", "Theater", and "Circuit".

The text entered in the "Screen" field will be displayed in the bottom left corner of the home screen above the navigation menu. This information can be useful for verification of the correct AP25 when connecting through VNC.

The Screen, Theater, and Circuit information may be used by a remote theater management system or other custom application software.

4.3   Formats

Menu (System) > Formats
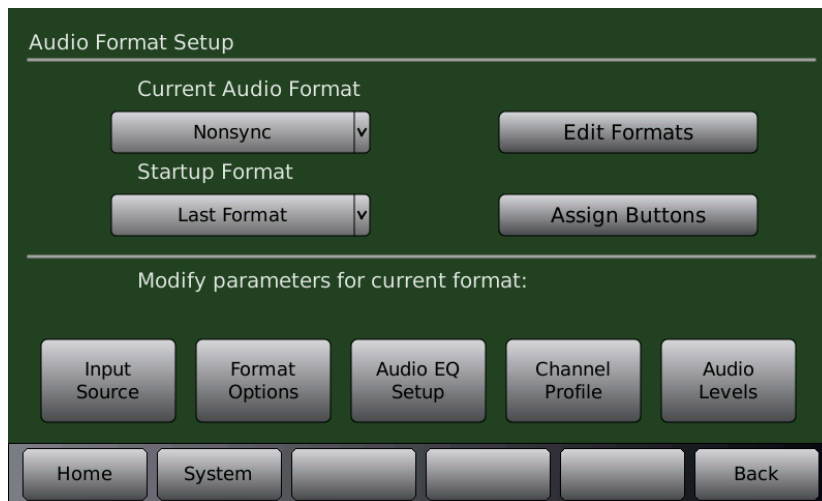
Figure 36. Audio Format Setup Screen

4.3.1 Current Audio Format

Select the format you wish to modify from the dropdown list of installed formats. Touch the dropdown list to open it. Use the adjustment knob to scroll the list in cases where there are several formats. Touch the format name to select it. This will become the current format.
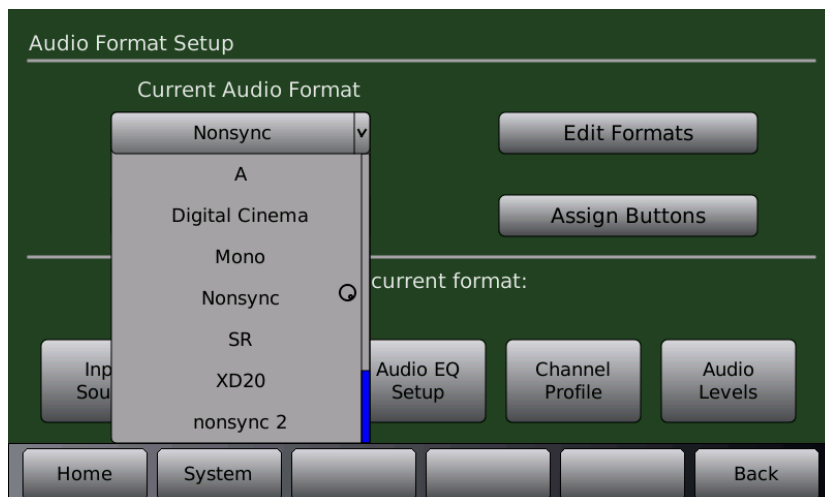
Figure 37. Select Current Audio Format

4.3.2 Startup Format

The Startup format is the default format selection when the AP25 is powered up. Select any defined format or **Last Format**. Touch the dropdown list to open it, then select the format.
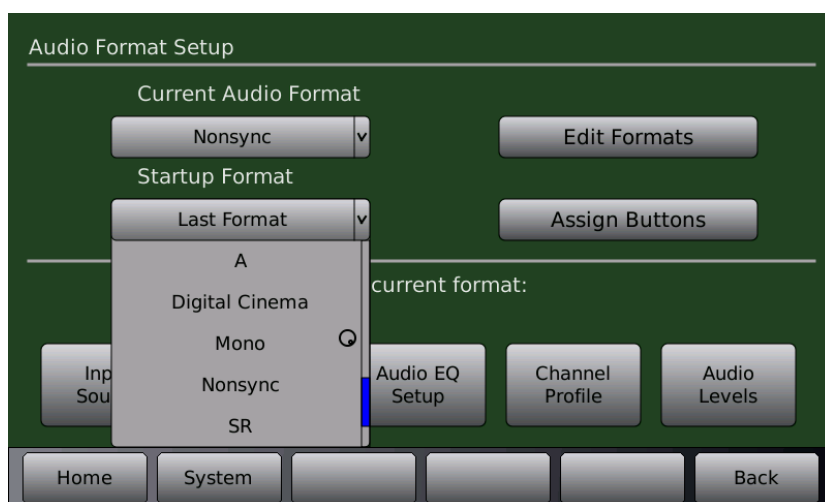
Figure 38. Select Startup Audio Format

4.3.3 Edit Formats

Menu (System) > Formats > Edit Formats
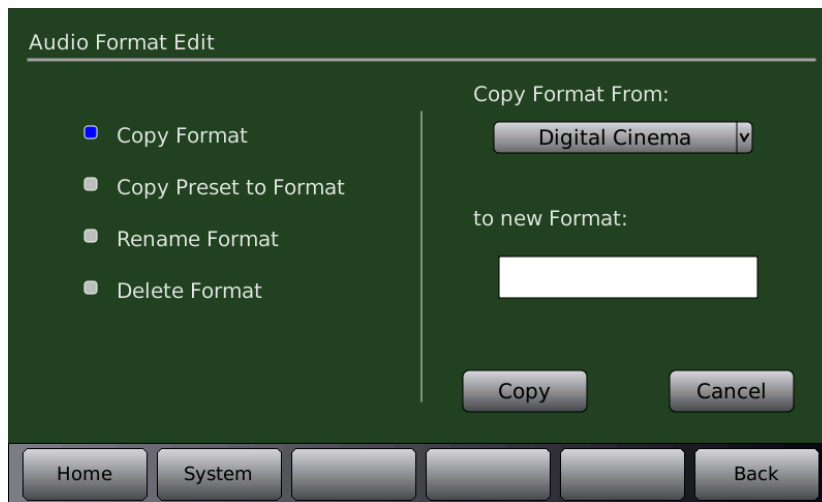
Figure 39. Audio Format Edit Screen

- **Copy Format** – Use an existing audio format as a template for a new one.
  Select the audio format you wish to copy from by selecting it from the **Copy Format From** dropdown list. Then, touch the **to new Format** box to bring up the virtual keyboard and enter a name for the new format.
  Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Copy Preset to Format** – Select one of the pre-installed audio formats in your AP25 and use it as a template for a new one. Select the format you wish to copy from by selecting it from the dropdown box. Then, touch the **to new Format** box to bring up the virtual keyboard and enter a name for the new format. Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Rename Format** – Give an existing audio format a new name. Select an existing format from the drop-down list on the right side of the screen. Touch the "To" box to bring up the virtual keyboard and enter a new name for the format. Press the **Rename** button to complete the process, or press **Cancel** to quit.
  Note: Renaming the format will change any references, such as the button name or the format on **Macros** and **Events**.

- **Delete Format** – Select an existing audio format from the drop-down list on the right side of the screen. Press the **Delete** button to complete the process, or press **Cancel** to quit.

4.3.4 Assign Format Buttons

Menu (System) > Formats > Assign Buttons

Figure 40. Format Button Assignments Screen

- Touch the **Assign** dropdown list to open it, then select a format.

- Touch the **to** (button) dropdown list to open it, then select a button number.

- Touch the **Assign** button.

The button assignment will now be listed in the **Current Assignments** listing in the screen above. Additionally, the audio format will now be assigned to the corresponding button location along the bottom of the Home screen as shown in Figure 41.

☑ **Note**: If the format name you wish to assign to a button does not appear in the Assign dropdown list, you can add it using the **Edit Formats > Copy Format** function. See 2.14 *Copy Format*, page 43.

☑ **Note**: To unassign or delete a button assignment, select the button from the dropdown list, then select the *blank* option from the **Assign** dropdown list, then touch **Assign**. The Current Assignments listing will no longer show the button assignment.
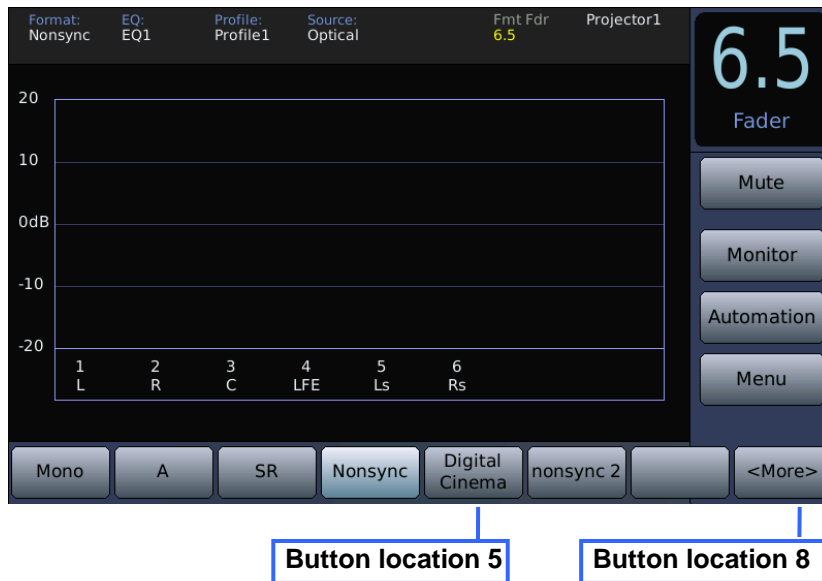
Figure 41. Home Screen Format Button Locations

4.3.4.1 Enable "More" Button

Selecting the **Enable "More" Button** from the Format Button Assignment screen allows access to more than the eight format buttons normally available on the Home screen. When the **Enable "More" Button** is not selected, the **Home** screen will display up to eight assignable format buttons on the bottom of the screen. When the **Enable "More" Button** is selected, format buttons 1-7 will be displayed and button 8 will display **<More>** (see Figure 41). Selecting the **<More>** button on the Home screen brings up a pop-up window which allows you to select from all formats.
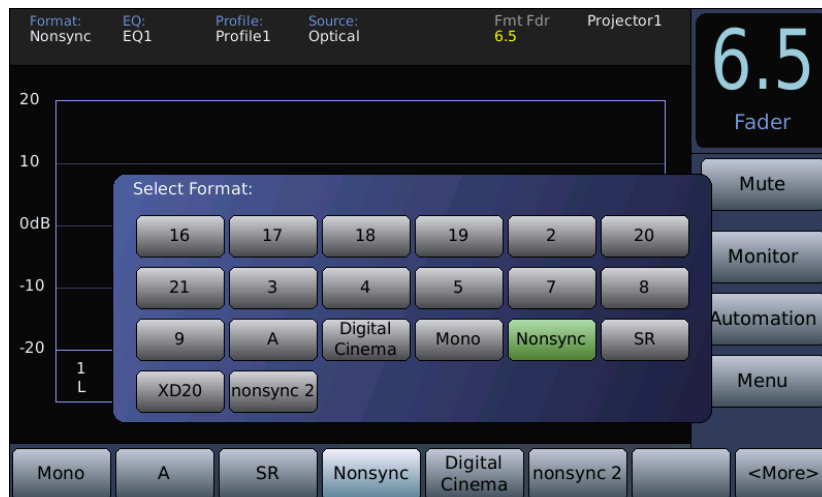
Figure 42. Home Screen <More> Format Select

4.3.5 Input Source

Menu (System) > Formats > Input Source

Touch any of the button options below to change the Input source of the current audio format.

- ▪ If Nonsync is selected, touching the button again toggles the selection between Nonsync1 and Nonsync2.
- ▪ If Digital is selected, touching the button again toggles the selection between

  Digital Ch: 1 > 16; Digital 1 > 8; Digital Ch 9 > 16; Digital Ch: 1,2; and Digital 9,10.
- ▪ If HDMI is selected, touching the HDMI Input button cycles the selection from HDMI-1 through HDMI-4 or Off.
- ▪ A Mic Power button appears for input selections Nonsync 1, 2 and MicPre (as seen in figure below). Touch the button to select Mic Power on or off.
- ▪ Decoder appears for input selections Digital 1,2; Digital 9,10; TosLink A & B; S/PDIF; and HDMI 1-4.

See Table 13 (below) for a description of where input channels will be routed within the AP25.
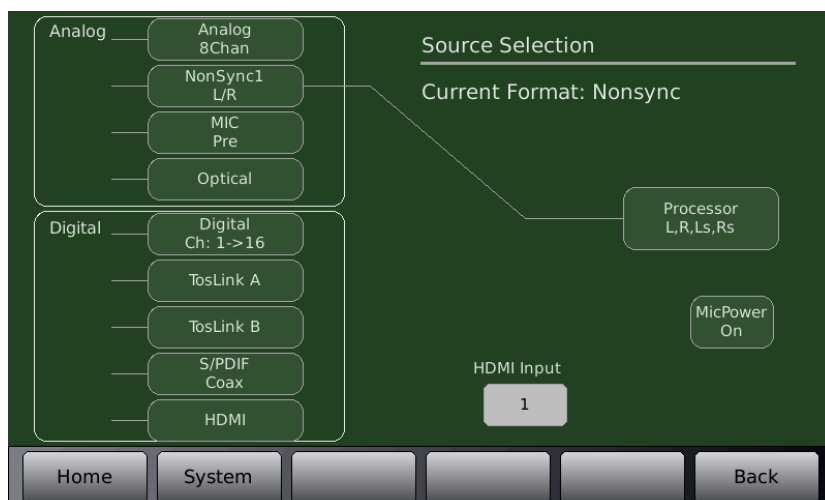
Figure 43. Input Source Screen

Table 13. Input Source Mapping

INPUT		OUTPUT
Analog 8 Channel		Processor Channel 1 → 8
NonSync1 L/R (set to Screen Channels)		Processor Channel 1, 2 (L, R)
NonSync1 L/R (set to Surround Channels)		Processor Channel 5, 6 (Ls, Rs)
NonSync1 L/R (set to Screen & Surround Channels)		Processor Channel 1, 2, 5, 6 (L, R, Ls, Rs)
NonSync1 L/R (set to Matrix Decoder)		Processor Channel 1, 2, 3, 5, 6 (L, R, C, Ls, Rs)
MIC Pre (set to Screen Center)		Processor Channel 3 (Center)
MIC Pre (set to Screen Channels)		Processor Channel 1, 2 (L, R)
MIC Pre (set to Surround Channels)		Processor Channel 5, 6 (Ls, Rs)
MIC Pre (set to Screen & Surround Channels)	**Maps to…**	Processor Channel 1, 2, 5, 6 (L, R, Ls, Rs)
Optical (option, see appendix F)		Processor Channel 1 → 8
Digital Channel 1 → 16		Processor Channel 1 → 16
Digital Channel 1 → 8		Processor Channel 1 → 8
Digital Channel 9 → 16		Processor Channel 1 → 8
TosLink A		Processor Channel 1 → 2 [1]
TosLink B		Processor Channel 1 → 2 [1]
S/PDIF Coax		Processor Channel 1 → 2 [1]
HDMI Port 1-4		Processor Channel 1 → 8

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[1] If a Dolby® Digital bitstream is detected and decoded, the decoded stream will be routed to the first eight channels internally on the AP25. See section 4.3.6.6 Decoder Setup for more information.

4.3.6 Format Options

The Format Options screen allows changes to Global Delay, Extended Surround Options, Nonsync Level and Routing, Mic Level and Routing, Matrix and Routing, Digital Cinema Format Options, Decoder Setup and Film Options (if the optional Optical Film card (H338) is installed – see appendix F). It also provides feedback on the current Audio format.

The options on this screen will change according to the currently selected input source. Figure 44 below shows the options available when the input source is Nonsync.

Menu (System) > Formats > Format Options

Figure 44. Format Options Screen

4.3.6.1 Global Delay and Surround Offset

This screen is available for all input sources.

Menu (System) > Formats > Format Options > Global Delay and Surround Offset
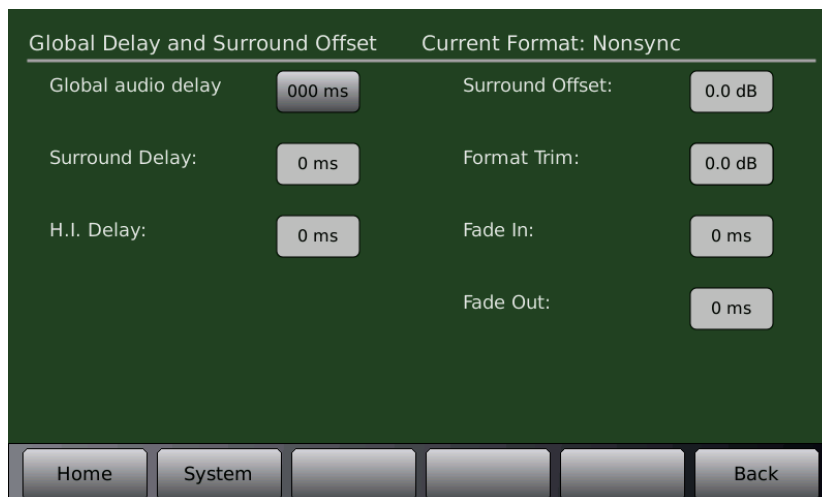
Figure 45. Global Delay and Surround Offset

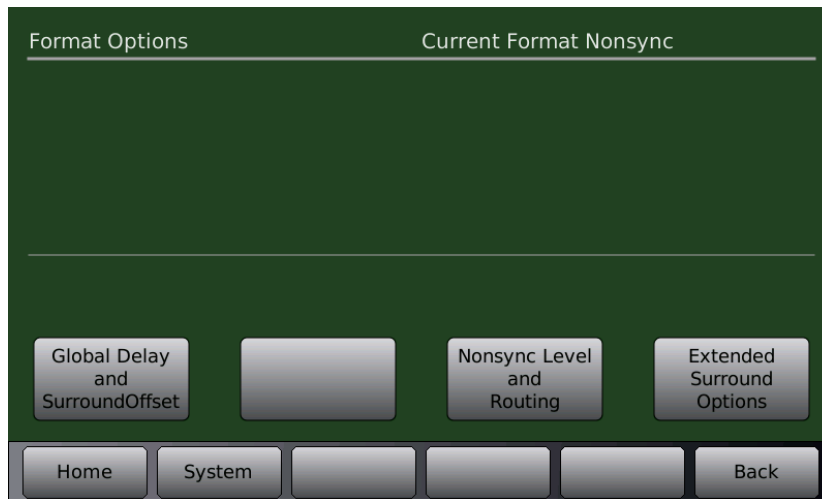**Global audio delay for current format:** Audio can be delayed for a selected format, if necessary, to synchronize with a digital video projector. Use the adjustment knob to adjust the audio delay. Delay values increase by 1 ms increments up to a maximum of 1 second.

Surround Delay: Enter the desired delay, in milliseconds, up to a maximum of 100 ms. Select the Surround Delay box and then dial in the correct value using the front panel adjustment knob. The surround delay is applied to the internal channels 5,6,7 and 8.

H.I. (Hearing Impaired) Delay: Audio can be delayed on the Hearing Impaired output channel.   Enter the desired delay, in milliseconds, up to a maximum of 220 ms.

Surround Offset: Use the adjustment knob to adjust between -10 dB to +10 dB offset in increments of 0.5 dB.

Format Trim: This may be used to apply volume level trim to the current format. This may be used in a case where you want to balance the volume level of two different sources. The difference between using the Format Trim and the Format Fader feature is that the Format Trim allows you to change the master fader level and keep the relative levels balanced. Format Trim may be entered in 0.5 dB increments from 0 dB to -10 dB.

Fade In/Fade Out: During a format change, the Fade In and Fade Out period can be up to 5 seconds in increments of 20 ms. Use the adjustment knob to set.

Changes happen real-time. To discard a changed setting, you must set it back to where it was prior to the change.

4.3.6.1.1.   Calculating the Surround Delay

Sound from the back of the theater should arrive at the listener's ears approximately 20 ms after the arrival of the front speaker sound. The following procedure describes how to arrive at the correct surround delay setting.

- Measure the distance between a **rear seat** and the nearest **surround speaker** in feet. If calculating in metric, convert meters to feet by multiplying by 3.
- Measure the distance from the **same rear seat** to the nearest **screen speaker**. If calculating in metric, convert meters to feet by multiplying by 3.
- Subtract surround distance from the screen distance, and add 20 (screen - surround + 20). The result is the surround delay in milliseconds.
- After setting the surround delay in the AP25, verify the setting by listening to a familiar soundtrack. The action on-screen should match sound in the auditorium.

4.3.6.2 Extended Surround Options

This screen is available for input source Analog 8ch.

Menu (System) > Formats > Format Options > Extended Surround Options
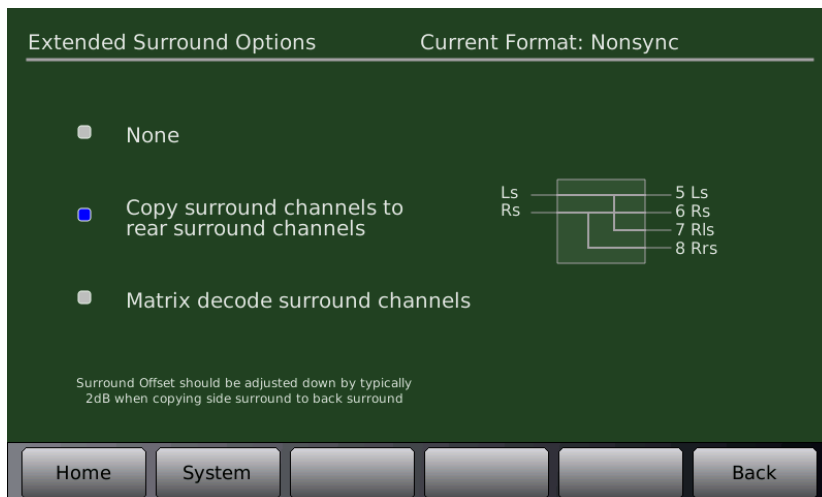
Figure 46. Extended Surround Options

- **None** – No surround option, signals are not re-routed.
- **Copy surround channels to rear surround channels** – Allows the surround channels (Ch 5 & 6) to be copied for output on Rear Surround channels (Ch 7 & 8). This option can be used to fill in the rear when playing a 5.1 DCP.
- **Matrix decode surround channels** – allows for matrix decoding of right and left surround channels for extended surround channel output to Rear Surround channels (Ch7 and Ch8).

This screen below is available for input sources Nonsync 1 or 2, Mic Pre, Digital ch 9-16 or Optical.

Menu (System) > Formats > Format Options > Extended Surround Options
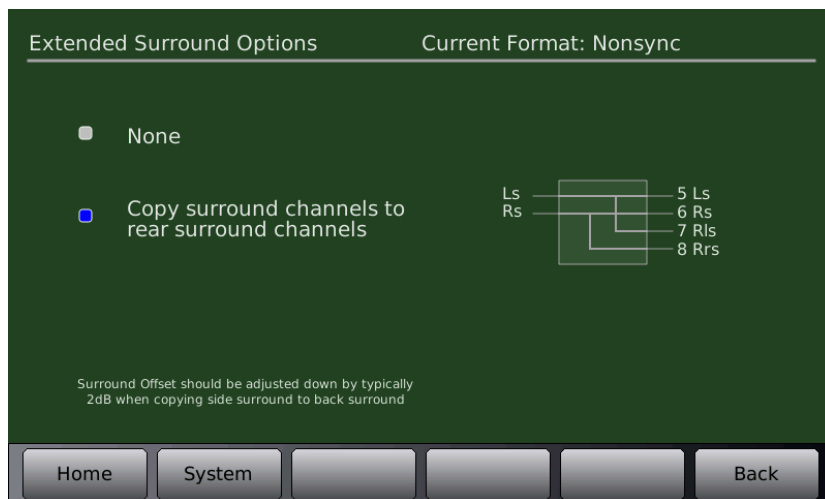
Figure 47. Extended Surround Options

- **None** – No surround option, signals are not re-routed.

▪ **Copy surround channels to rear surround channels** – Allows the surround channels to be copied to the Rear Surround channels (Ch7 and Ch8)

4.3.6.3 NonSync Level and Routing

This screen is available for Nonsync 1 or 2 input sources only.

Menu (System) > Formats > Format Options > NonSync Level and Routing
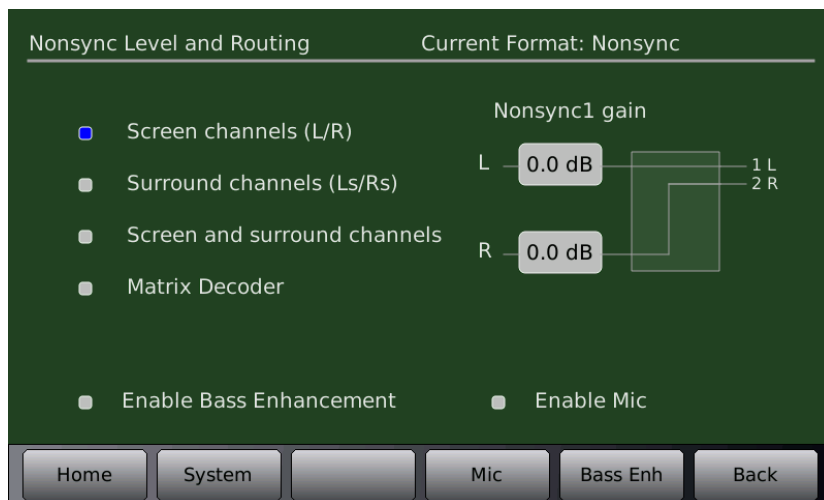
Figure 48. Nonsync Level & Routing

Adjust the input levels of Nonsync1 and Nonsync2 by selecting the box next to L or R and turning the fader knob. Gain may be adjusted from 6 dB to -6 dB in increments of 0.5 dB.

Inputs can be sent to:

▪ Screen channels (Left and Right outputs)

▪ Surround channels (Left Surround and Right Surround outputs)

▪ Screen and surround channels (Left and Left Surround, Right and Right Surround outputs)

▪ Matrix Decoder (Left, Center, Right, Left Surround and Right Surround outputs)

☑ Note when Enable Mic is selected both Microphone and non-sync will be on at the same time. Microphone audio is not mixed with the nonsync audio but must be routed to different speakers.

☑ The microphone audio is added to the hearing impaired audio when using the nonsync input with the microphone playing on the surround channels.

4.3.6.3.1.   Bass Enhancement

Items needed: RTA with Microphone.

Select the **Enable Bass Enhancement** button to turn on Bass Enhancement.

To setup the Bass Enhancement, select the **Bass Enh** button. The following screen will appear.
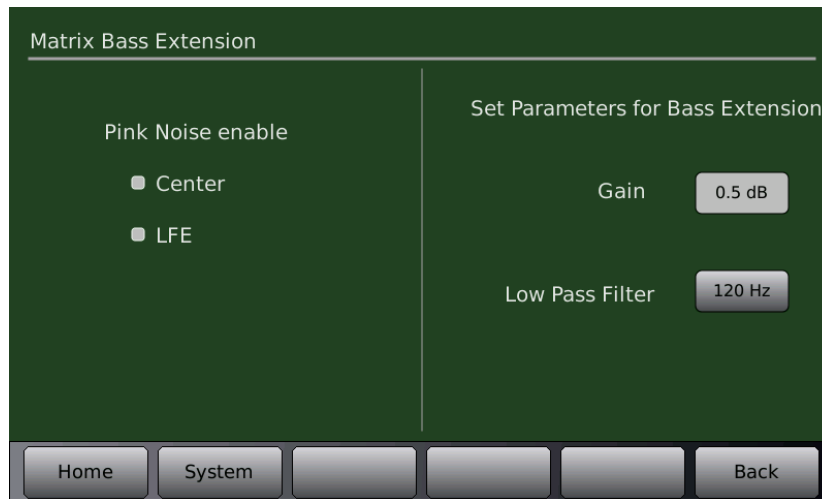
Figure 49. Matrix Bass Extension

The left half of the screen allows you to enable pink noise on Center and/or LFE channels. The right half of the screen provides settings for the parameters of optical bass gain and low pass filter frequency

Gain allows you to set the gain for the matrix bass. Select the button and rotate the main fader to adjust for the desired level. Gain may be adjusted from 10 dB to -20 dB in 0.5 dB increments.

Low Pass Filter allows you to choose the frequency of the filter. Select the button and rotate the main fader to adjust the desired frequency. The filter may be adjusted from 50 to 120 Hz in 10 Hz increments.

When adjusting the Matrix Bass Extension, set up a microphone in the auditorium. It is best to use a single microphone, or if using a multiplexer select single microphone only, and connect it to the RTA.

Select an optical format on the AP25, enable pink noise on the center channel, and note the level and low frequency roll off displayed on the RTA. Select the appropriate Low Pass Filter setting by pressing that button and using the fader knob to make any changes required to match the low pass filter to the roll off measured.

Next turn on the subwoofer channel, enable pink noise on the LFE channel, then select the Matrix Bass Gain by pressing the <Gain> button. Use the AP25 fader knob, or up and down keys when using a laptop, to adjust the Matrix Bass Gain to match the Center channel level previously noted on the RTA display.

☑ Note: Matrix Bass Extension parameters are global, and if enabled, will affect both nonsync and optical formats (in cases where the optional H338 optical card is installed).

4.3.6.3.2.   Nonsync Mic Level and Routing

System > Formats > Format Options > Nonsync Level and Routing > Mic
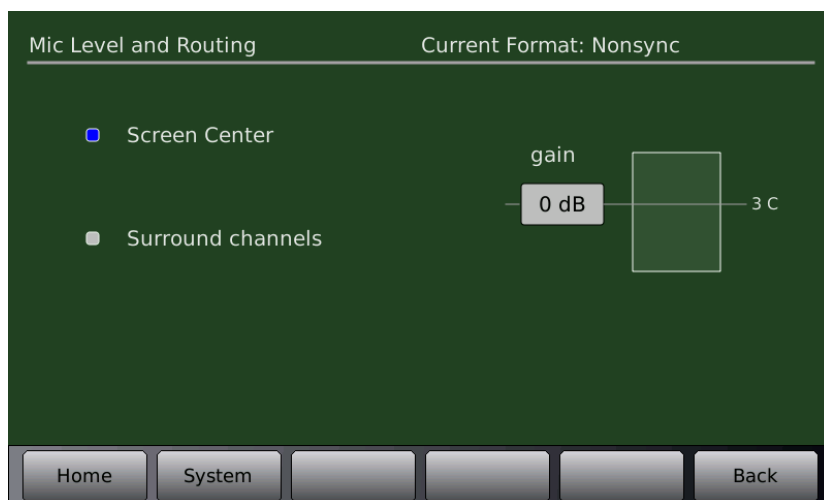
Figure 50. Mic Level with Nonsync

If Enable Mic is selected in the Nonsync level and routing screen, you can adjust mic level and routing by going to Mic Level and Routing screen. The Mic may be routed either to the Center channel, or Left and Right Surrounds. Gain may be increased up to 66 dB in 3 dB increments after an initial 9 dB increase from 0 dB.

☑   Note this is used with the Nonsync format and Microphone option, if using just the Microphone format see section 4.3.6.4

4.3.6.4 Mic Level and Routing

This screen is available for Mic Pre input source only.

Menu (System) > Formats > Format Options > Mic Level and Routing
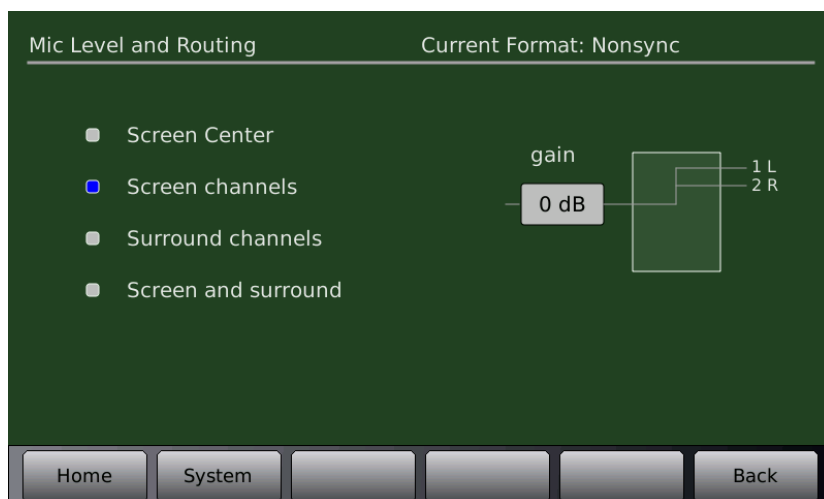
Figure 51. Mic Level & Routing

Adjust the Mic gain by selecting the box under gain and turning the fader knob.

Mic Input can be sent to:
- ■ Screen Center
- ■ Screen channels (Left and Right)
- ■ Surround channels (Left and Right Surrounds)
- ■ Screen and surround (Left and Right, Left and Right Surrounds)

4.3.6.5 Digital Cinema Format Options

This screen is available for Digital ch 1-8, Digital ch 1-16 and Digital 9-16 input sources only.

Menu (System) > Formats > Format Options > Digital Cinema Format Options
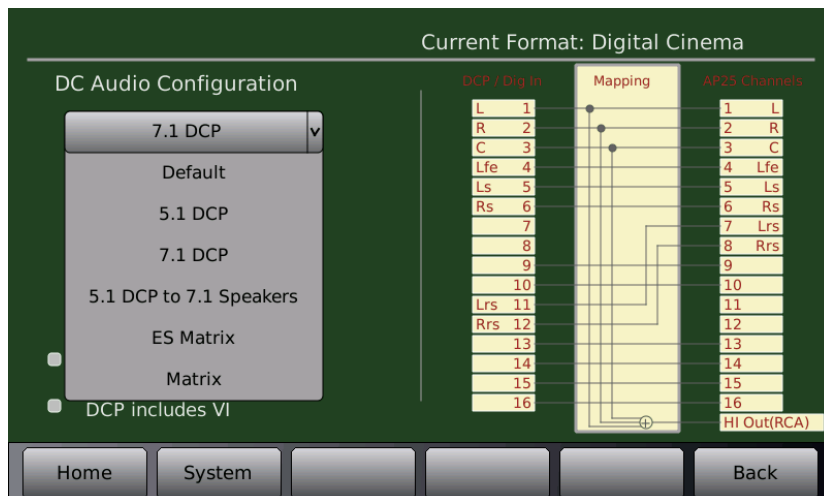
Figure 52. Digital Cinema Format Options

Default - Digital In mapping is straight through to the AP25 channels. The HI Out on the AP25 RCA jack is mixed from L, R, C inputs.

5.1 DCP – Digital In mapping is straight through to the AP25 channels Out.

- ■ DCP includes HI – Select to route DCP HI In on pin 7 to the AP25 RCA jack. If disabled, HI Out is mixed from DCP In L, R, C.
- ■ DCP includes VI - Select the DCP VI-N on pin 8 to AP25 channel 16. This channel becomes a fixed level, not affected by fader value. Channel 15 becomes unavailable.

7.1 DCP – Select when playing a 7.1 DS DCP in which the left/right back surround channels come in on channels 11 and 12. When selected the back surround channels are routed to the AP25 channels 7 and 8. The AP25 channels 11 and 12 are not available with this option. Input channels 7 and 8 are not routed unless one of the following options is selected:

- ■ DCP includes HI – Select to route DCP HI In on pin 7 to the AP25 RCA jack. If disabled, HI Out is mixed from DCP In L, R, C.
- ■ DCP includes VI – Select to route DCP VI-N on pin 8 to AP25 channel 16. This channel becomes a fixed level, not affected by the fader value. Channel 15 becomes unavailable.

5.1 DCP to 7.1 Speakers – Select to play 5.1 DCP in a theater set for 7.1 playback. The side surround channels (5 and 6) are copied to the back surround channels (7 and 8). The undefined channels 9-16 are mapped directly to the AP25 channels 9-16.

☑ **Note**: In this mode the surround Offset should be adjusted down by typically 2dB to achieve proper surround level.

- DCP includes HI – Select to route DCP HI In on pin 7 to the AP25 RCA jack. If disabled, HI Out is mixed from DCP In L, R, C.
- DCP includes VI – Select to route DCP VI-N on pin 8 to AP25 channel 16. This channel becomes a fixed level, not affected by the fader value. Channel 15 becomes unavailable.

ES Matrix – Select to play in an Extended Surround (ES) 5.1 configuration. Matrixed surround format is a digital soundtrack format used in film and not a standard DCP format. The surround channels from inputs 5 and 6 are matrix decoded to create a center back surround channel that is routed to the back surround channels, or AP25 channels 7 and 8. The undefined channels 9-16 are mapped directly to the AP25 channels 9-16.

Matrix – Select to expand 2-channel mix to 5 channels or 5.1. Digital In channels 1 (L) and 2 (R) are sent through a matrix and output to AP25 channels Out 1-6 (L, R, C, Lfe, LS, RS) and HI Out is mixed from DCP In L, R, C. The undefined channels 9-16 are mapped directly to the AP25 channels 9-16.

- Enable Bass Enhancement – Select to add bass enhancement to the matrix, in which the low frequencies are routed to AP25 channel 4.
- Copy Surrounds to Rears – Select to copy left and right surrounds to left and right rear surrounds.

4.3.6.6 Decoder Setup

This screen is available for the following input sources:

- Digital ch 1,2
- Digital ch 9,10
- TosLink A or B
- S/PDIF Coax
- HDMI 1-4

The AP25 accepts a DTS, DTS-HD, DTS-HDMA or Dolby® Digital audio stream from a DVD, Game Console, Satellite link or other source device. The Encoded bit stream is automatically detected and decoded internally by the AP25 software. The decoded stream is routed to the first eight channels internally on the AP25.

The following digital inputs accept DTS or Dolby® Digital audio streams:

- HDMI (ports 1 – 4)
- S/PDIF1 (TosLink A)
- S/PDIF2 (TosLink B)
- S/PDIF3 (Coax)

Operation

The AP25 monitors the selected input signal from one of the S/PDIF or HDMI ports to determine the type of audio signal received. If a DTS, DTS-HD or Dolby Digital bitstream is detected, the AP25 decodes the audio and places it on the first 8 channels (see Table 1).

If an un-encoded digital signal is received (i.e. 2-channel PCM), the signal is routed to the first two channels in the AP25 (Left and Right) and the others remain muted. The HDMI also supports 6 or 8 channel un-encoded PCM signal. The AP25 will switch between stream types as the signal type changes. This occurs automatically within the AP25.

Table 14: Decoder Channel Assignments

CHANNEL NUMBER	CHANNEL NAME
1	Left
2	Right
3	Center
4	LFE
5	Left Surround
6	Right Surround
7	Back Surround (only with 6.1 playback)
8	

Decoder Setup Options

Additional Decoder options are available to set the speaker configuration and phantom center option. These options are accessed through the **Decoder Setup** screen. (Note: You must first select a format with HDMI, TosLink or S/PDIF as the source).

Menu (System) > Formats > Format Options > Decoder Setup
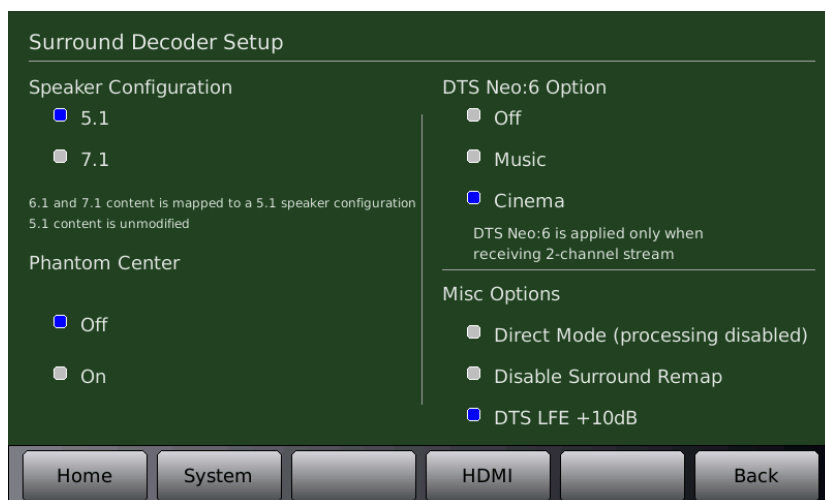
Figure 53. Decoder Setup Screen

Speaker Config

- **5.1** – 6.1 and 7.1 content is mapped to a 5.1 speaker configuration and 5.1 content is unmodified.
- **7.1** –5.1 and 6.1 content is mapped to a 7.1 speaker configuration and 7.1 content is unmodified.

Phantom Center

- **Off** – Normal operation with a center channel speaker.
- **On** – Use when center channel speaker is not available. The information from the center channel plays on the left and right channels. Note: This is only in effect while playing audio through the decoder.

DTS Neo:6 Option

- **Off**
- **Music** – Neo:6 Music keeps the front left and right channels intact while synthesizing the center and surround channels from the 2-channel source.
- **Cinema** – Neo:6 Cinema creates 6.1-channels, from 2-channel movie sources. It removes in-phase information from the Left/Right signals and uses it to create the center channel. Out-of-phase information is extracted and sent to the surround channels.

Note: DTS Neo:6 is applied only when receiving 2-channel stream.

Misc Options

- **Direct Mode** – Processing is disabled.
- **Disable Surround Remap** – When enabled, this option will not remap the playback of 5.1 content to 7.1 speaker configuration.
- **DTS LFE +10dB** – Removes the +10dB LFE boost applied to the LFE channels when playing DTS decoded audio. This option may be required for older DTS audio discs.

4.3.7 EQ Setup

Menu (System) > Formats > Audio EQ Setup
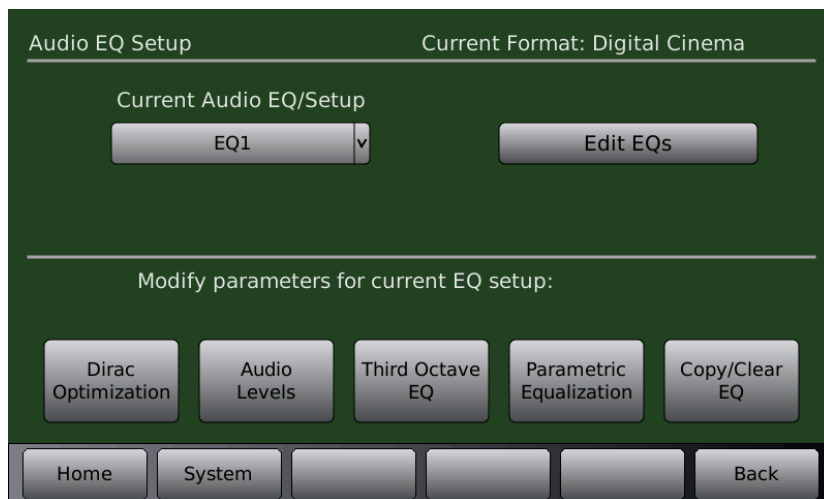
Figure 54. Audio EQ Setup Screen

4.3.7.1 Current Audio EQ

This drop-down list allows you to select from the list of available EQ setups. The selection will become the current audio equalization setup.

4.3.7.2 Edit EQs

Selecting the Edit EQs button from the Audio EQ Setup screen will open the screen below.

Menu (System) > Formats > Audio EQ > Edit EQs
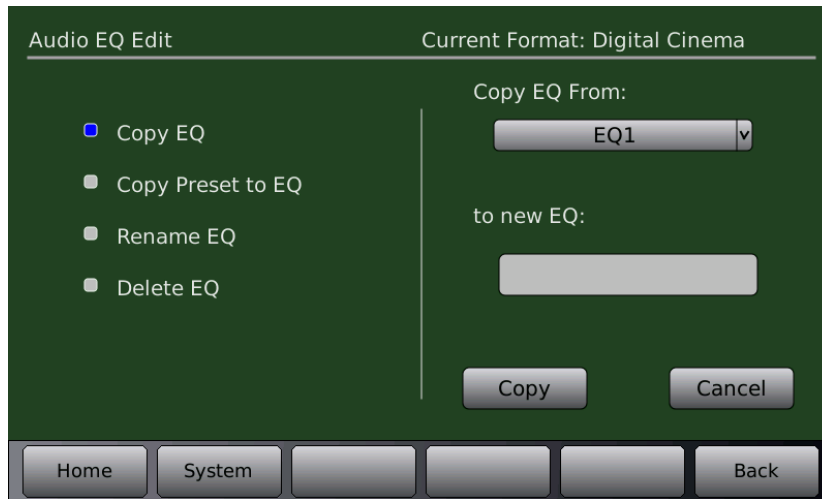
Figure 55. Audio EQ Edit Screen

Available options are:

- **Copy EQ** – Use an existing EQ setup as a template for a new one. Select the EQ you wish to copy from by selecting it from the dropdown box. Then, touch the "to EQ" box to bring up the virtual keyboard and enter a name for the new EQ. Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Copy Preset to EQ** – Select a preset EQ setup and use it as a template for a new one. Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Rename EQ** – Give an existing EQ setup a new name. Select an existing EQ setup from the drop-down list on the right side of the screen. Touch the "To" box to bring up the virtual keyboard and enter a new name for the EQ setup. Press the **Rename** button to complete the process, or press **Cancel** to quit.
  Note: The EQ name is changed for all formats that use the EQ.

- **Delete EQ** – Select an existing EQ setup from the drop-down list on the right side of the screen. Press the **Delete** button to complete the process, or press **Cancel** to quit.

4.3.7.3

Dirac Optimization (option)

The Dirac Optimization button only appears if the DiracLive® option is installed. The Dirac Live setup procedure must be used to copy Dirac configuration filter set files to the AP25 before this screen becomes functional.

Menu (System) > Formats > Audio EQ Setup > Dirac Optimization
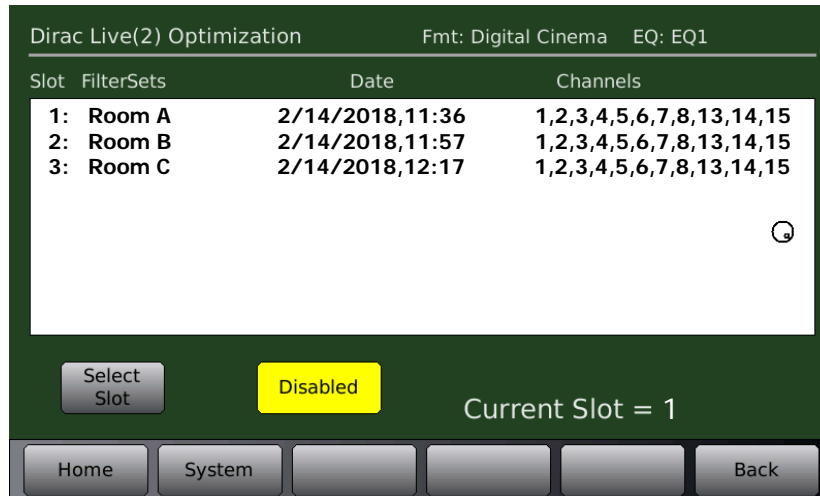
Figure 56. Dirac Optimization Screen

- Dirac Live Optimization Enabled/Disabled – Touching the button will toggle between enabling and disabling the Dirac Optimization.
- Current Slot – Displays the name of the current Dirac filter set.
- Select Slot – Select a saved configuration from the list in the box above, then touch the **Select Slot** button. This configuration will now become the current Dirac configuration.

4.3.7.4

Third Octave EQ

Selecting the **Third Octave EQ** button from the **EQ Setup** screen will bring up a screen similar to that shown below. See the topic *A note about Third Octave EQ* in section 2.10 for a usage example.

Menu (System) > Formats > Audio EQ Setup > Third Octave EQ
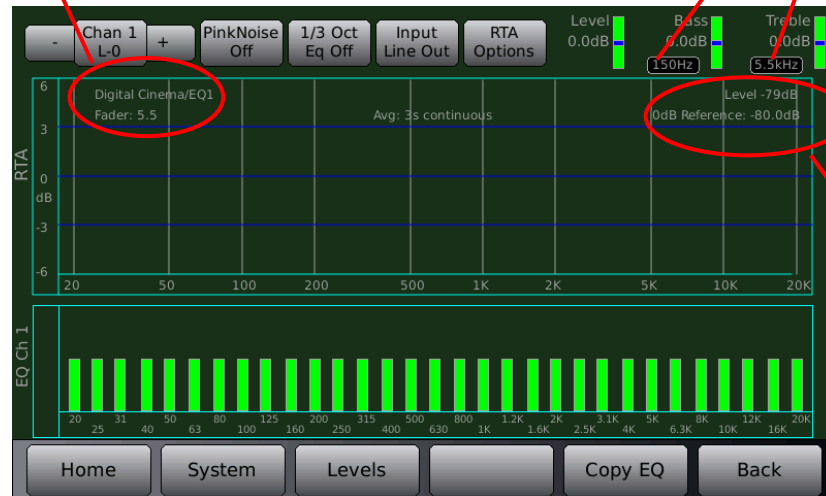
Figure 57. 1/3 Octave EQ Screen

In the upper left-hand portion of the RTA section, the current Format and current master fader value are shown. In the upper right-hand portion, the current audio level and the 0 dB reference are displayed.

▪ Channel Number Selection – Touch the **Chan** button to bring up a display of all available channels. Select the channel you would like to equalize. You may also select the next channel by touching the "+" sign button to the right of the Chan button, or select the previous channel by touching the "-" sign button left of the Chan button.

Figure 58. Channel Number Selection Screen

- **Pink Noise** On/Off – Turns Pink Noise on or off.
- **1/3 Octave Eq**. On/Off – Turns 1/3 octave equalization on or off. This affects all channels.
- **Input** LineIn/LineOut/Mic – LineIn means that the signal source for the RTA is from the current input channel and does not have any processing (Dirac, EQ, etc). LineOut means that the signal source for the RTA is from the current output channel, so you would see the effects of the Dirac, EQ, etc. If you are using the internal RTA to check the room tune, then you would select Mic.

☑ **Note**: When the Input field is **LineIn**, the RTA selects the input channel. The controls for EQ, bass, treble, and trim represent what is applied to input channel and their effects will not show up on the RTA display.
When the Input field is **LineOut** the RTA displays the output channel. Channel tuning should not be modified while the RTA input is in Line Out, but LineOut can be used to monitor the effect of the EQ settings currently applied.

☑ When the input field is set to Mic, the RTA selects the Mic input which will show the effects of the EQ settings as well as the room. Channel tuning should be done in this input or with an external RTA.

- **RTA Options:**

Menu (System) > Formats > Audio EQ Setup > Third Octave EQ > RTA Options
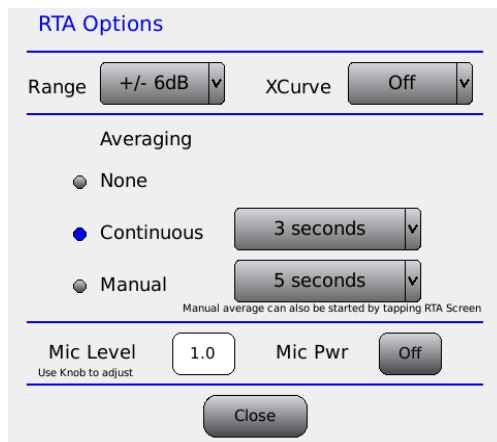
Figure 59. RTA Options Screen

- o **Range** – select a range for the RTA. Touch to open the dropdown list, then use the adjustment knob to select. Choices begin at ±3dB, doubling each time to a maximum of ±64dB

- o **XCurve** Off/Display/Offset – See *A note about XCurve* in section 2.10.2.1 for details on the XCurve function.

- o **Averaging** – select None, Continuous (1 to 30 seconds), or Manual (5 to 30 seconds). Select times from dropdown lists.

☑ The averaging settings (for continuous or manual times) are persistent – the values are retained when the AP25 is cycled off/on.

☑ Manual averaging can also be started by touching the RTA screen.

- o **Mic Level** – use the adjustment knob to change the microphone level

- o **Mic Pwr** On/Off

☑ If Mic Power is ON, it remains ON when you leave this screen and go to other screens. However, Mic Power is automatically disabled when the AP25 resets. This Mic Power setting is independent of the Mic power that is part of Format.

▪ **Trim/Bass/Treble** adjustments – Touch the Trim, Bass, or Treble bar and adjust it using the adjustment knob.

▪ **Corner Frequency** adjustments – Touch the corner frequency box for treble or bass and adjust using the adjustment knob. The corner frequency for bass can be set from 50Hz to 300Hz. The corner frequency for the treble can be set from 1.5kHz to 12kHz. The corner frequency cannot be set for individual channels—the setting affects all channels in the current EQ set.

▪ **Levels –** a button linking to the Audio Levels screen is provided on the menu bar. See 4.3.9 Audio Levels below.

▪ **Copy EQ -** a button linking to the Copy/Clear EQ screen is provided on the menu bar. See 4.3.7.6 Copy/Clear EQ below.

4.3.7.5 Parametric Equalization

Parametric filters allow you to adjust not only the gain or cut, but also the center frequency, and how wide or narrow the filter is. This allows you to tune in on room modes that show up in a spectrum analysis. Parametric filters allow you to add subjective bumps or dips to the filter.

Parametric EQ allows you to adjust the three (per channel) 20Hz to 200Hz parametric filters. Please see the topic *Subwoofer EQ – Parametric EQ* in section 2.11 for a detailed explanation of this function.

4.3.7.6 Copy/Clear EQ

Depending on the selection, the screen content will change.

   Menu (System) > Formats > Audio EQ Setup > Copy/Clear EQ

▪ **Copy EQ Settings** (1/3 octave EQ bass, treble, and parametric filters) from one channel to another channel. Select the channel you wish to copy from by selecting it from the dropdown list. Then, select the destination channel from the "To Channel" dropdown list. Press the Copy button to complete the process, or press Cancel to quit.
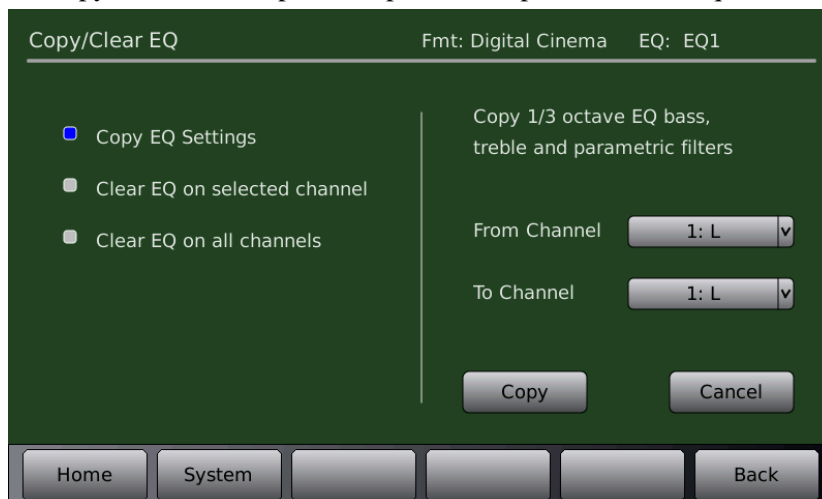
Figure 60. Copy EQ Settings

▪ **Clear EQ on selected channel** includes two check boxes to enable which settings are included in the clear function (1) third octave EQ including bass and treble and/or (2) parametric filters. The text on the right will reflect the selection on the left. Select the channel using the dropdown list, then touch **Clear** to complete the process.
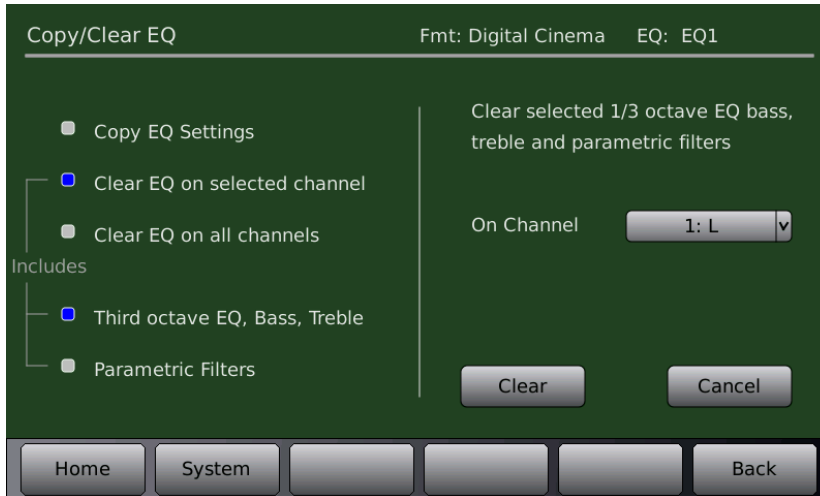
Figure 61. Clear EQ on selected channel

▪ **Clear EQ on all channels** clears third octave, bass, treble and parametric filters on all channels.
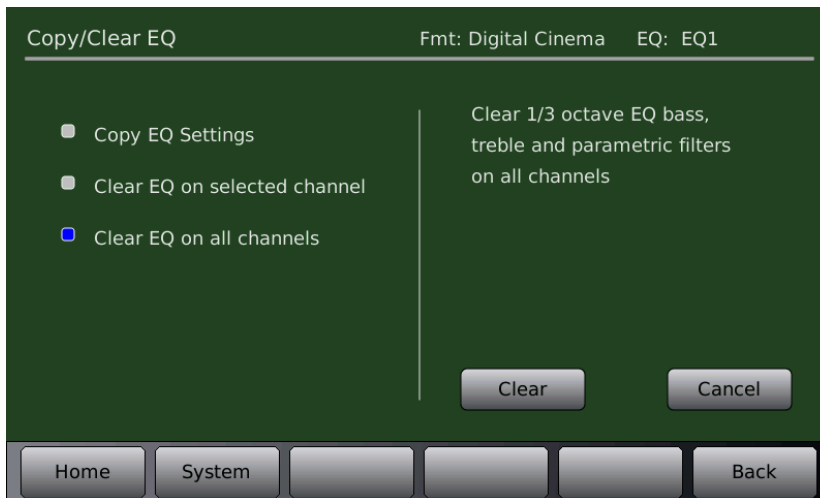
Figure 62. Clear EQ on all channels

4.3.8 Channel Profile

Menu (System) > Formats > Channel Profile
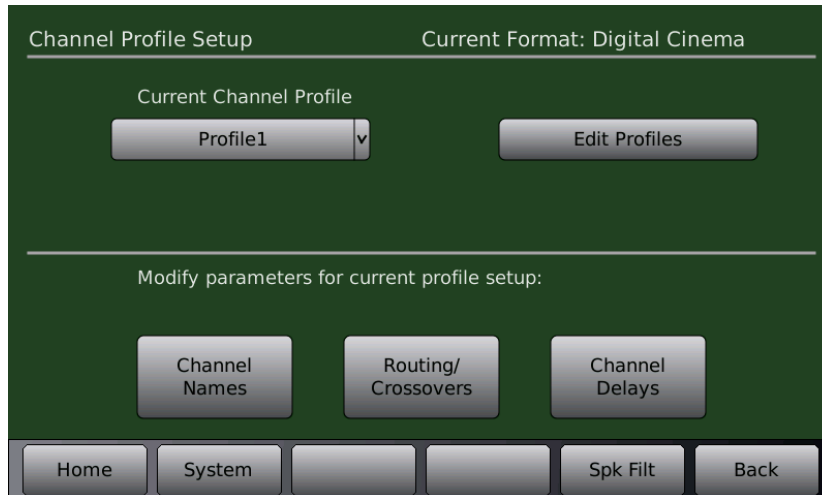
Figure 63. Channel Profile Setup Screen

4.3.8.1 Current Channel Profile

The current channel profile is displayed in the drop-down box under the label "Current Channel Profile". Before making changes to the profile, always verify that you are in the desired format (check the upper right corner of the Channel Profiles screen).

To select a different profile, touch the down arrow and select a profile from the list. Any changes made to the Channel Names, Routing/Crossovers and Channel Delays will be for this profile only, but will affect other formats with this same profile assigned.

4.3.8.2 Edit Profiles

Menu (System) > Formats > Channel Profile > Edit Profiles
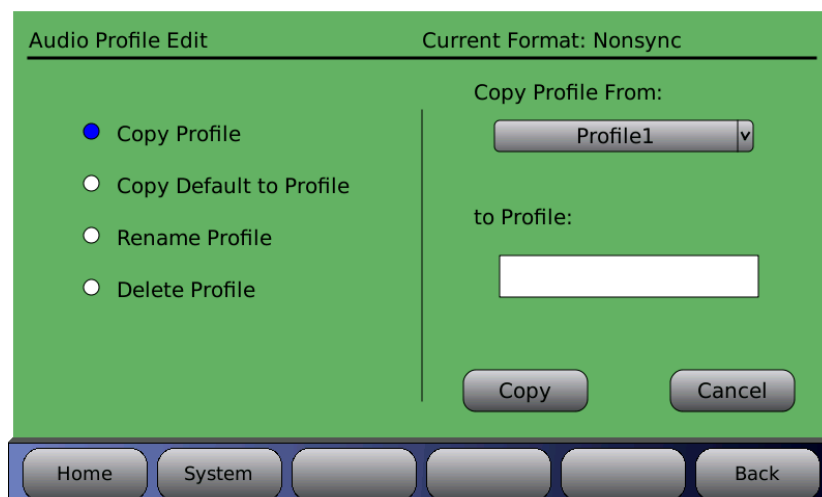
Figure 64. Audio Profile Edit

- **Copy Profile** – Use an existing audio profile as a template for a new one. Select the audio profile you wish to copy from by selecting it from the dropdown box. Then, touch the "to Profile" box to bring up the virtual keyboard and enter a name for the new profile. Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Copy Default to Profile** – Select the default audio profile and use it as a template for a new one. Select the profile you wish to copy from by selecting it from the dropdown box. Then, touch the "to Profile" box to bring up the virtual keyboard and enter a name for the new profile. Press the **Copy** button to complete the process, or press **Cancel** to quit.

- **Rename Profile** – Give an existing audio profile a new name. Select an existing profile from the drop-down list on the right side of the screen. Touch the "To" box to bring up the virtual keyboard and enter a new name for the profile. Press the **Rename** button to complete the process, or press **Cancel** to quit.
  Note: The Channel Profile name is changed for all Formats that use the Channel Profile.

- **Delete Profile** – Select an existing audio profile from the drop-down list on the right side of the screen. Press the **Delete** button to complete the process, or press **Cancel** to quit.

4.3.8.3 Channel Names

Depending how the AP25 is connected, sixteen channels are available. Channel assignments can be different in other profiles. The top title bar displays the current format and profile.

☑ **Note**: In general, the **default assignments** must be preserved for the first 6 channels in order to maintain compatibility with the HDMI input channel assignments, and with the Hearing Impaired output channel. Default channel names are indicated in Table 9 page 36.

The profile channel name refers to the input channel only. The channel name for the output channel (if used) will be a combination of the corresponding input and the crossover letter (for example, Left-H).

Menu (System) > Formats > Channel Profile > Channel Names

Figure 65. Assign Channel Names Screen (with Presets)

To change or enter a new channel name select the white field next to the desired channel. A keyboard will appear allowing you to enter text. Type in the channel name then select **OK**. The

channel name will now appear in the field and in the Home Screen (in yellow text just below the channel numbers).

When a Vu button is highlighted green, that channel will display Vu bars on the Home screen.

To turn off the VU meter in the Home Screen simply touch the green VU symbol next to the channel name. It will change to grey color and will no longer be displayed on the Home Screen.

4.3.8.4 Routing Crossovers

Crossover use can be attributed to the inability of most drivers to reproduce the entire audio spectrum smoothly and efficiently. Because of this, most speaker systems are comprised of several drivers, each of which is dedicated to the reproduction of a specific range of frequencies.

These frequencies are routed to the appropriate driver by a crossover network. This device divides the audio spectrum into two or more frequency bands. By doing this, each driver will receive only the frequencies that it can reproduce properly. The crossover network also prevents potentially damaging low-frequency energy from reaching the midrange or tweeter drivers.

This frequency division process is accomplished by using high-pass and low-pass filters. A high-pass filter passes frequencies above a pre-determined frequency and attenuates those below. This pre-determined frequency is called the crossover point. Conversely, a low-pass filter passes frequencies below the crossover point and attenuates those above. By cascading high-pass and low-pass filters, a band-pass filter can be realized. Filters of this type attenuate all frequencies outside of the pass-band created by the high and low-pass filters.

The rate at which the attenuating process takes place is dependent upon the slope of the crossover. A typical slope for cinema sound systems is 24dB/octave. Higher numbers indicate a much steeper cutoff rate while the lower numbers indicate a more gradual roll-off.

4.3.8.4.1. Signal flow

When implementing crossovers or implementing different internal routing on the AP25, the input channel numbers do not match the output channel numbers. The following explanation clarifies how the menus operate regarding the channel numbers.

1. From a user perspective, the channel mapping occurs near the last stage of the signal processing. Only high pass and low pass filters are applied after the signal routing occurs. This is illustrated in the diagram below.
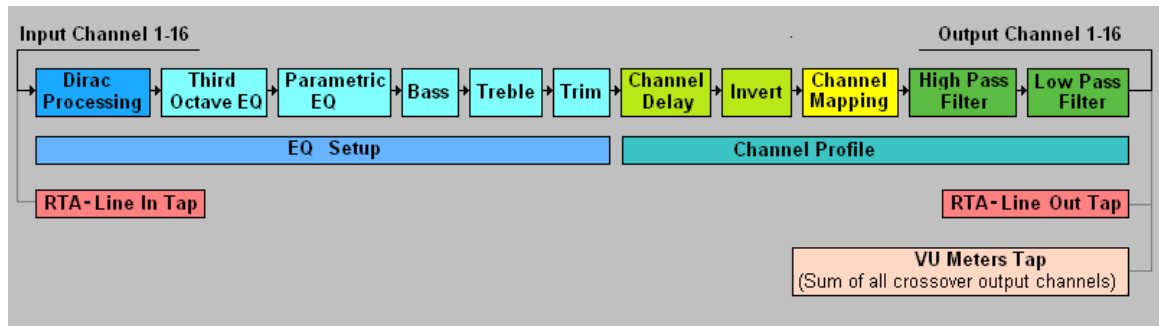
Figure 66. Signal Processing Flow Diagram

2. VU meters on the Home page show the input channel name while showing the VU level of the sum of the outputs for that crossover channel.

4.3.8.4.2. High Pass and Low Pass Shelf

The High Pass and Low Pass Shelves are for active crossover systems. The High Pass is the portion of the sound spectrum that is going to find its way to the top-end compression driver. The Low Pass is the portion of the sound spectrum that is going to find its way to the mid-woofer.

Since there are 16 output channels available, you have the option to use them any way you like. Suppose you actually have six channels of incoming sound, then you have 10 other D/A converted outputs that can be used as crossovers. All you need to do is identify which channels will be used as crossovers. Setting up your system in this way, lets you do away with passive crossovers. Although you would need more amplifiers, it does give you much tighter control of your system.

You can also decide how steep the High Pass or Low Pass cut-off is. The conventional values are 6, 12, 18, and 24 dB. As the numbers go up, the cut-off is steeper.

☑ **Note:** Set up the crossovers before you run the Dirac software. The Dirac software will fine-tune the characteristics of the crossover point. If a driver has issues with time alignment, or encounters an aberration of some sort that can be measured, it will do its best to correct for it. It will also adjust all the amplitudes to their appropriate values to get a smooth response within that range.

4.3.8.4.3. Routing/Crossover setup screen

Menu (System) > Formats > Channel Profile > Routing/Crossovers
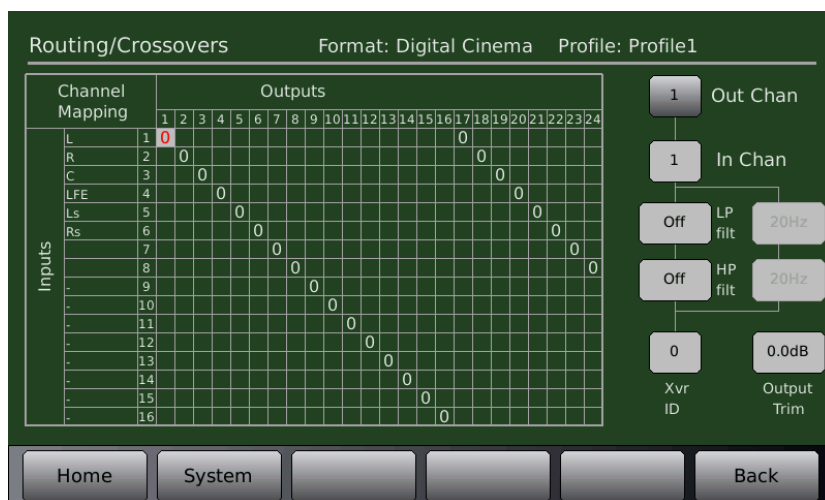
Figure 67. Crossover Setup Screen

The matrix on the left displays the input channel – to – output channel mapping.

To make assignments, first dial in the output channel, then edit the input channel and other options.

1. Dial in the output channel number. Touch the field and use the adjustment knob to change the setting.

2. Then edit the input channel. Input channel may be assigned 1-16. Output channels may share the same input.

3. Set Low pass filter. Options are Off, Lnk-Rly (Linkwitz-Riley) 6, 12, 18, and 24 dB/octave; Butwth (Butterworth) 6, 12, 18, and 24 dB/octave; and Bessel 6, 12, 18, and 24

dB/octave. Filters can be set from 20Hz to 20kHz. Low pass filters can be used even if crossover is not selected.

4. Set High pass filter. Options are Off, Lnk-Rly (Linkwitz-Riley) 6, 12, 18, and 24 dB/octave; Butwth (Butterworth) 6, 12, 18, and 24 dB/octave; and Bessel 6, 12, 18, and 24 dB/octave. Filters can be set from 20Hz to 20kHz. High pass filters can be used even if crossover is not selected.

5. Set Output Channel Trim. The Output channel trim may be set from 0dB to -10dB in 0.5dB increments. The output trim may be used to balance the levels of crossover channels.

☑ **Note**: The output channels are assigned one of the following letter IDs (**Crossover ID**): W, L, M, H, and 0-9. This is used for reference for the output channel and has no functional purpose at this time.

4.3.8.4.4. Example Crossover Setup

When setting up the AP25 crossovers, you will need to identify the speaker model used and obtain its technical specifications. Speaker technical specifications can usually be found on the manufacturer's web site.

In this example, we are setting up the AP25 **Left channel**, input 1, for 3-way crossover using the model JBL 2632-T speaker. There are three main steps to this process, as shown below. The specification sheet for the JBL 2632-T lists its frequency range as 30Hz to 20kHz and crossover frequencies as 350Hz and 1.2kHz.

Low Frequency
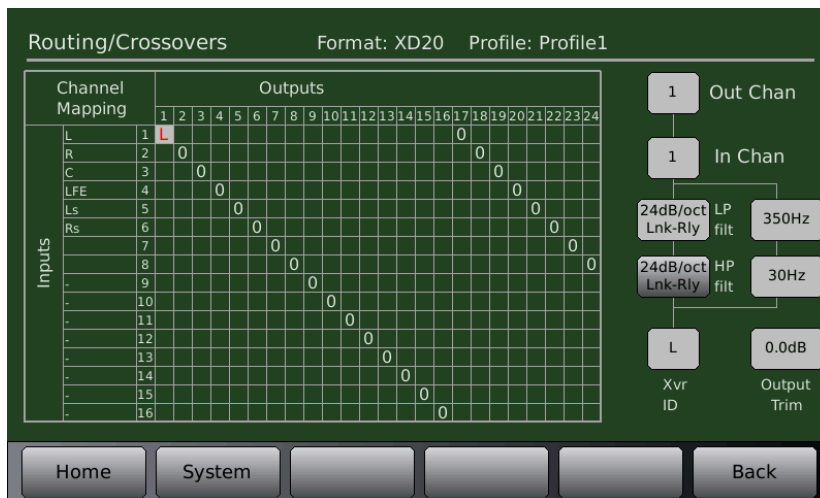
Figure 68. Example – Low Frequency Crossover Setup

As shown in Figure 68, set <u>output</u> channel **1** for the low frequency driver. To make changes select a box by touching it and then use the fader to change it's value.

The low pass filter should be set to the upper crossover point of the low frequency driver which in this case (for JBL 2632-T) is **350Hz**.

If the manufacturer indicates a particular slope then use it. In this case, JBL didn't list a slope so we chose **24dB/octave Lnk-Rly**.

Depending on the speaker, you may choose to add a high pass filter to block low frequencies. In this case, we chose to put a high pass filter to **30Hz**, to block frequencies below the lower capabilities of this driver although this is not deemed necessary by the manufacturer.

Set the crossover ID for easy identification. Here we set the crossover ID for channel 1 output **L** which identifies it as the low frequency output for channel one (1). This is only a label for easy identification and does not affect the crossover itself.

Mid Frequency
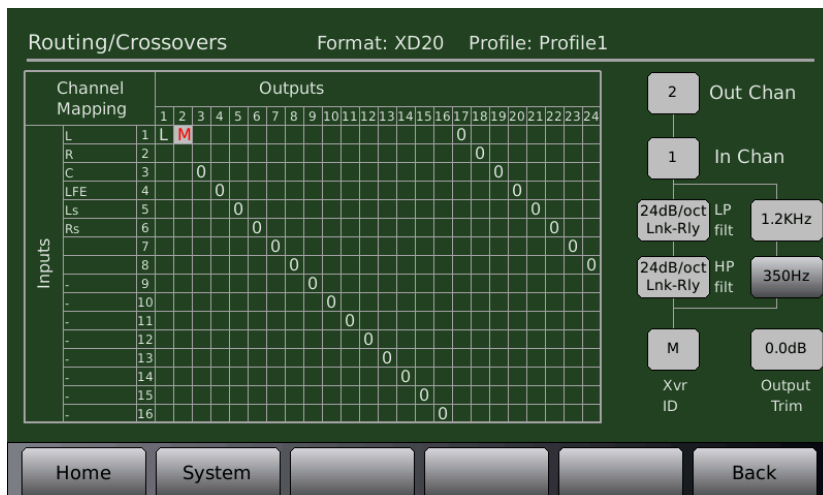
Figure 69. Example – Mid Frequency Crossover Setup

As shown in Figure 69, set <u>output</u> channel **2** for the mid range driver. Make sure the input channel is still set to **1** (or left channel, remember, left = channel 1 in the example).

Set the low pass filter to the mid range driver's upper crossover point, which in this case is **1200Hz**.

Set the high pass filter to the mid range driver's lower crossover frequency, which in this case is **350Hz**.

Set the slope to **24dB/octave**.

Set the crossover ID to **M** to identify it as the midrange frequency output for channel two (2).

High Frequency
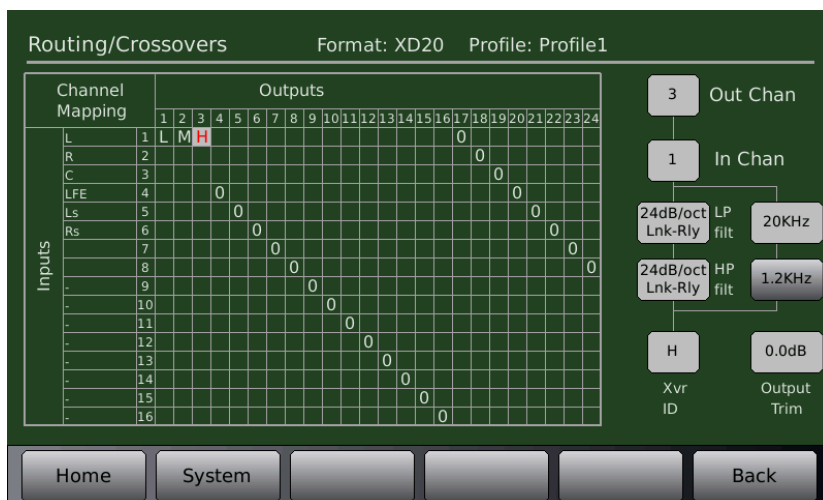
Figure 70. Example – High Frequency Crossover Setup

As shown in Figure 70, set <u>output</u> channel **3** for the high range driver. Make sure the input channel is still set to **1** (or left channel, remember, left = channel 1 in the example).

Set the high pass filter to the high range driver lower crossover frequency, **1200Hz**.

Set the slope to **24dB/octave**.

Set the Crossover ID to **H** to identify it as the high frequency output for channel three (3). Note: We also set the low pass filter to **1.2kHz**, the upper range of the speaker, for added protection although it was not specified as necessary by the manufacturer.

☑ The **main fader level adjust** will change the level on the input channel, in this example = left channel. When adjusting the fader, all output channels assigned to an input channel will change by the same amount.

☑ The **output channel** trim can be used to lower an individual output channel.

Figure 71 below shows a typical example of a completed routing/crossover setup in which the screen channels (left, right, center) have been tri-amped. The LFE, LS and RS channels have been routed to output channels 10, 11, and 12 (no low or high pass filters have been applied to these channels).
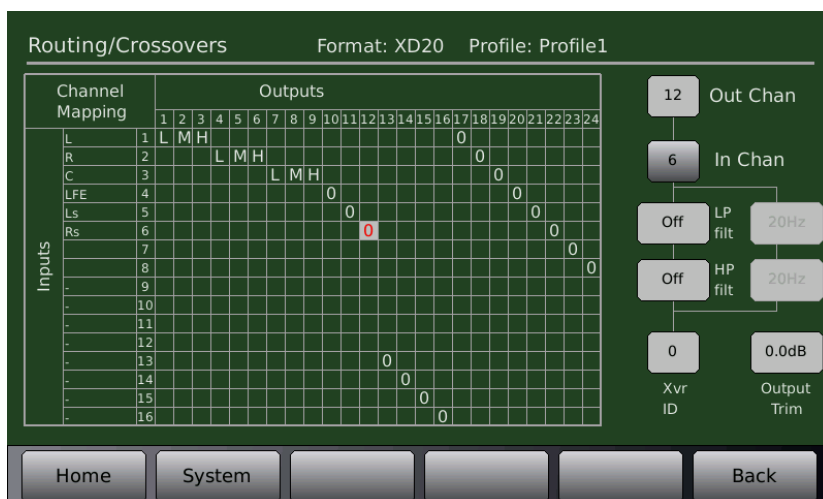
Figure 71. Example – Crossover Setup

4.3.8.5 Channel Delays

Menu (System) > Formats > Channel Profile > Channel Delays

Figure 72. Channel Delays

Delays can be set for each of the 16 channels. Touch the Delays box under the desired channel. Enter the delay by dialing in the correct value using the front panel adjustment knob.   Touch the right selection tabs to switch between input/output channels 1-8 or 9-16, and notice that the individual channel numbers will change per your selection in the channel boxes.

- Input Delays may be set in 1 millisecond increments (000-999ms). The input delay is applied to the channel before the crossover/routing point.

- Output Delays may be set in 0.1 millisecond increments (000-120ms). The output delay is applied to the channel after the crossover/routing point.

The Total delay (Input + Output) for each channel is shown at the bottom of the screen.

☑ Surround delays (channels 5, 6, 7 & 8) should normally be set as a format option for each individual format.

4.3.9 Audio Levels

Menu (System) > Formats > Audio Levels

Figure 73. Audio Levels

The Audio Levels screen is used for these functions:

- **Set the levels**. You can turn on the pink noise on any single channel to check and adjust the level. This assumes that you have a SPL meter. The adjustment is usually made when the Master Fader is set to 7.0.

- **Set surround delays**. This is usually a known quantity based on the room size or speaker locations. Surround delays set in this screen become part of the profile, and will affect all formats associated with that profile. To set a delay that is specific to a format only, not Profile, use the Global Delay and Surround Offset screen. See section 4.3.6.1 for more information.

- **Check channel phase**. This is done by enabling the pink noise on more than one channel and checking the difference in sound level with an SPL meter or RTA.

- **General testing or troubleshooting**. The technician may diagnose a problem by muting selected channels while playing content, or playing pink noise on selected channels.

- **Setting digital volume level**.

☑ Note: The lighter blue areas contain settings that are saved in the configuration file. The darker areas contain settings that are not saved.

At the top right of the screen, the current Format and current Profile are displayed.

- **Pink Noise** – Select to turn pink noise on for a selected channel (1-16). Pink noise is cleared when exiting the screen.
  When operating with Pink Noise Multi Chan selected you can enable pink noise on multiple channels.
  When operating with Pink Noise Multi Chan unselected, only one channel may be selected for pink noise, and any previous selection is cleared. In addition, the analog level button for the pink noise channel is automatically selected to simplify adjusting the gain after selecting the pink noise.

- **Analog Level** for channels 1-16 – This affects only the analog output signal, not the digital output. The value is the same as that shown in the EQ screen. Range is from -20dB to +10dB in .5 dB increments. To change, first select the control, then use the front panel adjustment knob to adjust up or down.

- **Invert** – Select control to enable/disable channel invert. Box turns blue when invert is enabled. (Invert is used primarily for test purposes.)

- **Chan Mute** for channels 1-16 – Select the control to mute or unmute the selected channel. Multiple channels may be muted. Channels remain mute when exiting the screen. The mute will reset after a power cycle.

- **Master Fader** – Select control and use the knob to change the master fader setting. Normally SPL meter readings are taken with the fader set to 7.0. This fader is the same as the one in the home page.

- **Master Mute** on/off control will mute/unmute all channels. This mute enable is the same as that on the home page. Use it in case of accidental loud noise.

- **Pink Noise Multi Chan –** Enabling allows multiple channels of pink noise to be chosen. When multi-channel pink noise is disabled, selecting pink noise on one channel automatically disables pink noise from the other channels.

- **Digital Volume Enable** and **Offset** controls are present. When the digital volume is not enabled, the master fader will have no effect on the Digital Volume. Once Digital Volume is Enabled, the Digital Volume Offset, which may be set between 0.0 and 10.0, should be set to the fader level that is considered maximum. For example, if the Digital Volume Offset is set to 7.0, then the digital signal attenuates as expected when the master fader is set below 7.0. The digital signal volume will not increase if the fader goes above the Digital Volume Offset.

- **Offset** can be adjusted by touching it and using the adjustment knob. The volume level is in effect only if the enable/disable box is enabled (blue). Digital volume should be enabled only if the system is using the digital output on the AP25.

- ☑ **Note**: Channels 1 through 16 on this screen refer to the input channels. In cases where the input is routed to a different output channel, the control represents only the input channel path. The same is true if the channel is routed to more than one output in a crossover configuration. For example, if L (Ch1) is routed to output channels 1 (Left-H) and 2 (Left-L), then if Ch1 is inverted the signal will be inverted on both output channels 1 and 2.

- **EQ –** a button linking to the Third Octave EQ screen is provided on the menu bar.

- **Param EQ –** a button linking to the Parametric EQ screen is provided on the menu bar.

4.4   Network
Menu (System) > Network

Figure 74. Network Screen

The Network screen displays the current network mode and IP address. It also displays whether or not the network connection is currently up or down. Use it to change between dynamic and static IP addressing.

- In static IP mode, you can enter values for the IP address, Netmask, and Gateway.
- To change or enter a value, touch the white box under the appropriate label.
- The DNS Server, NTP server and log file server can be entered whether using DHCP or Static modes.
- Speed may be set to Auto, 10Mb/s only or 100Mb/s only

4.4.1 SNMP
Menu (System) > Network > SNMP

Figure 75. SNMP Setup Screen

Agent Mode: If set to disabled, the SNMP is turned off. When enabled the SNMP the agent mode may be set to v1 (SNMPv1) or v2 (SNMPv2) to match the SNMP server requirement.

Manager IP Address: Set this to the IP address to send SNMP trap messages.

roCommunity: This is the access code for SNMP read messages.

rwCommunity: This is the access code for SNMP write messages.

4.4.2 Network Diagnostics

Menu (System) > Network > Net Diag

Figure 76. Network Diagnostics Screen

The Network Diagnostics screen shows current network statistics, and may be used for testing and troubleshooting network connectivity.

Log Net Stats: Saves the current network statistics in a log file. This file can be saved to a USB stick and then emailed to Datasat Tech Support for help with troubleshooting.

Ping Test: Use for testing connectivity of the AP25 with a server. Select a network device address from the dropdown menu. If available, the device address should appear in the box to the right. An address may also be entered here by tapping in the box and bringing up the keyboard. Press the **Ping Test** button. If the connection is working this will return a result of **OK**, if not the result will be **FAIL**.

4.5   Automation

Menu (System) > Automation

Figure 77. Automation Screen

The Automation menus provide the ability to add, edit and delete automation events.
Automation events may be single actions, or may be linked to a macro. Events may then be

associated with an automation button. Menus to allow the creation of macros are provided. A Macro is a script used to perform multiple actions (see 4.5.2 Macros, page 104).

4.5.1 Events

Menu (System) > Automation > Events
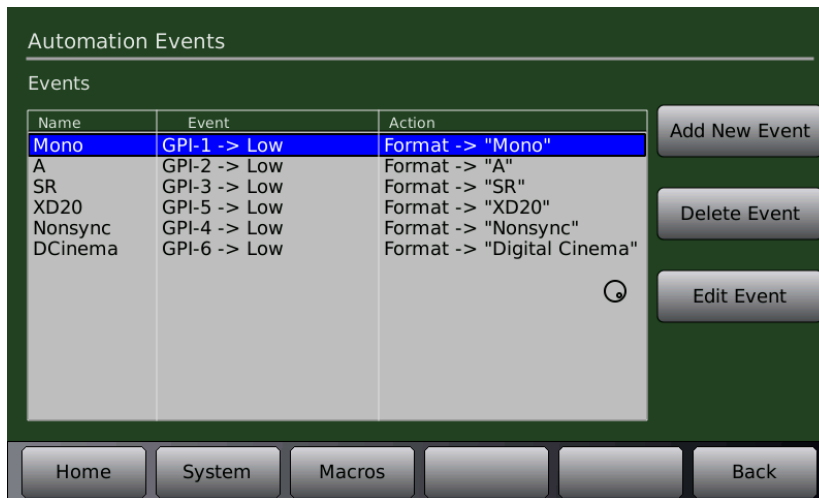
Figure 78. Automation Events Screen

Existing events will be displayed in the Automation Events screen. The front panel adjustment knob must be used to move the selection bar to an existing event for editing. The list will scroll when needed going past the end when there are more events in the list. The menu bar contains a "Macros" button to allow easy navigation between the Events screen and the Macros screen when building Macros.

4.5.1.1 Add New Event

Selecting the Add New Event button takes you into the "Automation Edit Event" screen and automatically assigns a temporary event name, which is added to the event list.

Menu (System) > Automation > Events > Add New Event
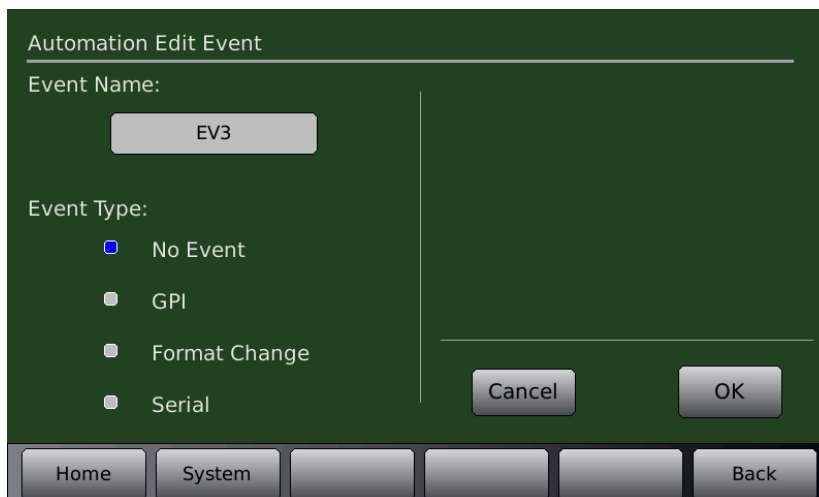
Figure 79. Automation Edit Event Screen

Event Name - Touching the Event Name box will bring up the keyboard screen and allow editing of the event name. Choose a name that is meaningful.

Event Type – When an event is first added the event type defaults to "No Event", this means the event type is not configured and should be replaced with one of the other event types.

▪ **GPI** – Configure an input event

When GPI is selected, an input may be configured to run either a single action or a macro when it receives a signal.

Figure 80. Automation Edit Event Screen - GPI

Select an input (GPI-1 thru 18 or Projector) from the dropdown list (under "When" on the right of the screen). Select the signal ("goes" Low or High). Select an Action or a Macro to run. If Macro is selected, choose a macro from the dropdown list. If Action is selected, tap/touch the name that appears in the white box. This will bring up the Automation Edit Action screen.
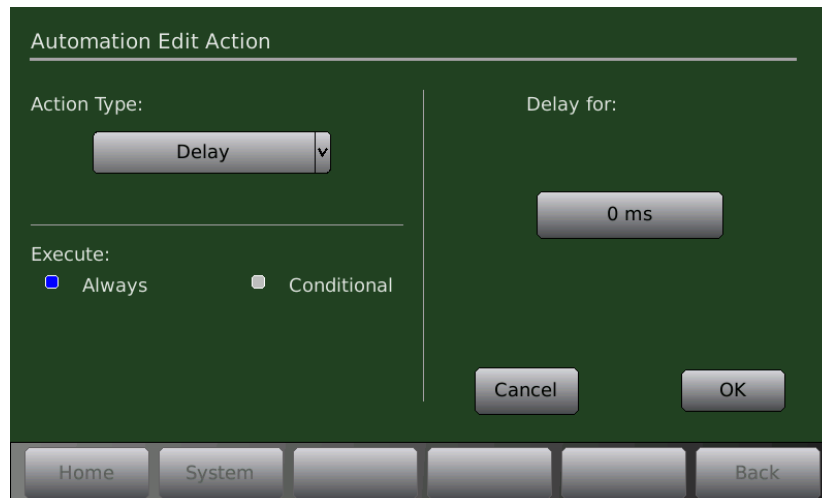
Figure 81. Automation Edit Action screen

Execute:

    o **Always** – The action is always executed.

    o **Conditional** – The action is executed conditionally based on a previous event.

Select the **Action Type:** from the dropdown menu. The following choices are available:

- o **No Action**
- o **Delay** – Delay is set in milliseconds with a range of 0-10000ms (10 seconds) in increments of 10 ms.
- o **GPO** – Select a GPO to set (GPO 1-20 or Projector) by touching the dropdown menu next to "Set". Then select an action for that GPO from the dropdown menu next to "To". Selections are Pulse, Low, and High. When Pulse is selected, the pulse width can be set between 100ms and 1000ms in 5ms increments, using the front panel adjustment knob.
- o **Format** –Select "Change Format To:" from the dropdown menu.
- o **Network** – Type in the IP Address, TCP Port and Data information by touching the associated box to bring up the keyboard screen.
- o **Mute** – Select between on and off.
- o **Fader** – The master volume control can be either **Set** to a specified value, or it can be incremented or decremented (**Adjust**) through automation. Range is 10.0 to -10.0 in 0.1 increments.
- o **Serial** – A specified string of characters can be transmitted on the serial port as an automation action.
- o **Set Variable** – Enter the Variable Name and set the variable to either True or False
- o **Run Macro** – This event can be used to nest macros, i.e. run a separate macro from within a macro. Up to 5 levels of macros can be nested.
  Tap/touch the Macro Name white box that appears on the right and a keyboard will appear. Type Macro Name and select OK when finished.

Touch OK when finished, or touch Cancel to cancel this task.

Setting up a Conditional Action Execute:

The following describes the steps to implement a conditional action.

A variable with an arbitrary name can be set to the value TRUE or FALSE based on an action. In Figure 82 below the variable Test_A is set to TRUE.
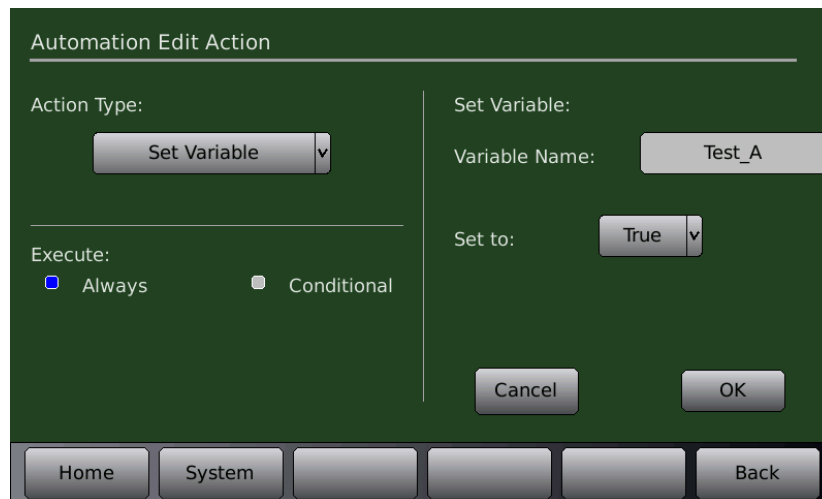
Figure 82. Automation Edit Action screen – Set Variable

A subsequent action is defined in a separate Automation Edit Action screen and the option Conditional is selected. Then enter the previously defined variable name and whether it should be TRUE or FALSE before the action is executed.

This is shown in Figure 83. The Action to pulse GPO-1 will occur only if the variable Test_A has been set as FALSE.

Figure 83. Automation Edit Action screen – Conditional GPO

   ☑ Use descriptive variable names.

   ☑ Try to keep variable names short and simple. The conditional action will not work as expected if the name does not match exactly.

   ☑ If the conditional action occurs and the variable has not been set as TRUE or FALSE, the variable is presumed to be FALSE.

▪ **Format Change –** Configure an event when a format is changed.

When Format Change is selected, an action or macro is run when the format changes to one selected from the dropdown list. Select an Action or Macro to run. If Macro is selected, choose a macro from the dropdown list. If Action is selected, touch the white box that appears below it. This will bring up the Automation Edit Action screen (for a description of options available, see Figure 81, and text following it, above). In Figure 84 below, when the format changes to "Digital Cinema" the Digital Cinema macro is run.

Touch OK when finished, or touch Cancel to cancel this task.
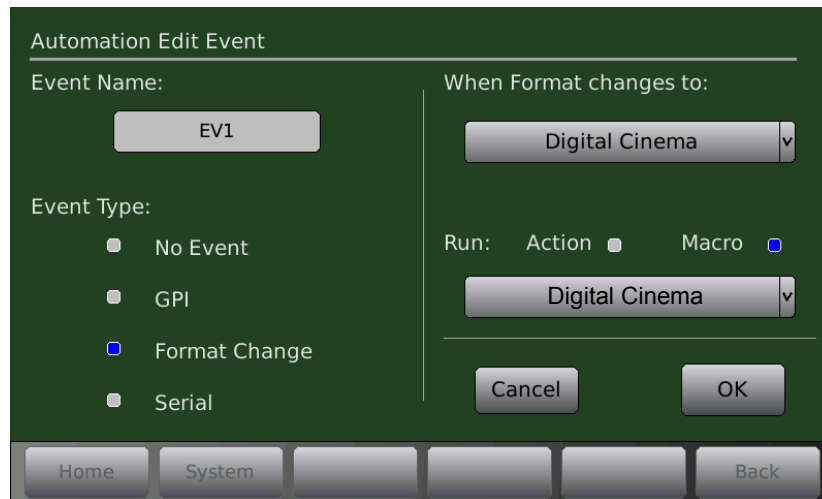
Figure 84. Automation Edit Event screen – Format Change

▪ **Serial**

The AP25 can be configured to allow an external device to send an RS232 command to the AP25, which, when receiving the specified serial command, will then execute any predefined action or macro.

o   The baud rate and number of stop bits must be set in the Automation Serial page to match the settings used by the external RS232 device. See 4.5.5 Automation Serial Port Setup below.

o   The RS232 device must be connected to the Control port on the back of the AP25.

In the example below a serial command named "Test<cr>" is created to switch the AP25 to the Digital Cinema format. In this example the macro named Digital_Cinema already exists to switch the AP25 to the Digital Cinema format.
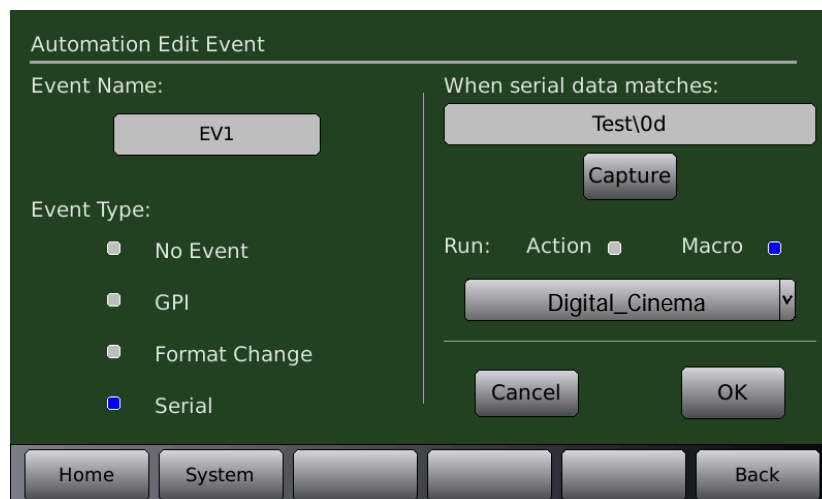
Figure 85. Automation Edit Event screen – Serial

Enter the serial command that will trigger the macro. The maximum size of the serial command is 36 characters.

- **Option 1**: Select the text box and the keyboard screen will appear. Type in the serial command.

- **Option 2**: Select the **Capture** button to automatically capture a command received from the serial port. This assumes that there is an external serial control device connected that can be manually triggered to send a single command.

Press the green **StopCap** button to complete the capture of the serial command. All serial data that has been received between **Capture** and **Stop Cap** will be displayed in the text bar. If more than the maximum characters have been received, then the data is truncated.

☑ **Note**: Non-ASCII characters may be entered by a back slash (\) followed by their hex value. For example, a CR character is 0D hex and can be included in the string as "\0d".

Touch OK when finished, or touch Cancel to cancel this task.

- **Fire Alert Event**

A Fire Alert event will shut down the AP25 audio and display a popup on the home screen that says "Fire Alert Mode Activated" (as shown below). The AP25 audio and menus are disabled until the unit is reset from the back power button.
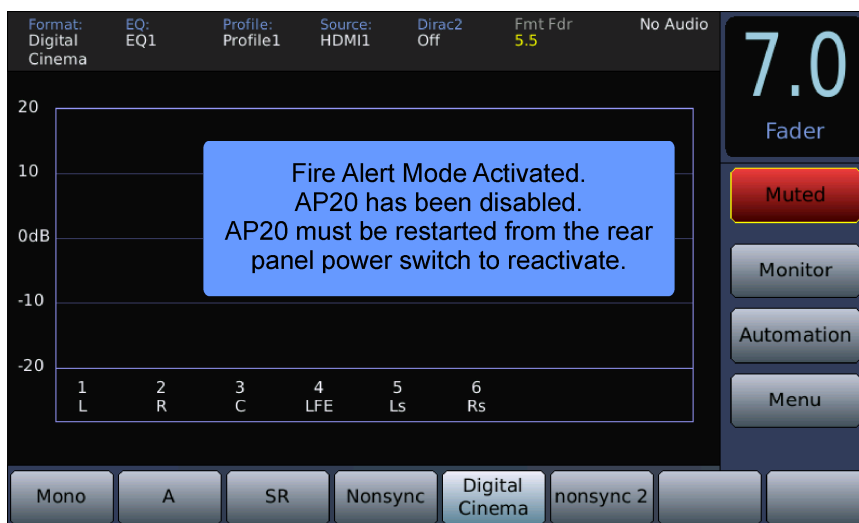
Fire Alert event is activated by an event that sets the variable FIRE to TRUE (In the Automation Edit Action screen set Action Type = Set Variable, Variable Name = FIRE, and Set to = TRUE).

Example: The Fire Alert event programmed to occur when GPI-6 goes low.

Once a Fire Alert event is programmed it will be seen in the Events screen. From here you can edit or delete the event.

Once the Fire Alert Mode is activated, the AP25 must be restarted from the rear panel power switch to reactivate normal operation. If the Fire Alert Mode pop up reappears after the restart, then GPI-6 must still be low. When GPI-6 goes high and the AP25 is restarted from the rear power switch, the AP25 should reactivate to normal operation.

4.5.1.2 Delete Event

To delete an existing event, highlight the event on the list and select Delete Event.

4.5.1.3 Edit Event

To edit an existing event, highlight the event on the list and select Edit Event. This will bring up the Automation Edit Event screen. Editing choices are the same as those described above in 4.5.1.1 Add New Event.

4.5.2 Macros

The Macros menus allow you to create a script of multiple actions. A Macro may then be assigned to an Event. The menu bar contains an "Events" button to allow easy navigation between the Events screen and the Macros screen when building Macros and assigning them to Events.

When the Macros menu is selected, a list of existing Macros are displayed. Scroll through the list of Macros using the front panel adjustment knob. When an existing Macro is highlighted the actions making up that Macro are displayed. The example in Figure 86 shows the "Digital_Cinema" Macro.

Menu (System) > Automation > Macros
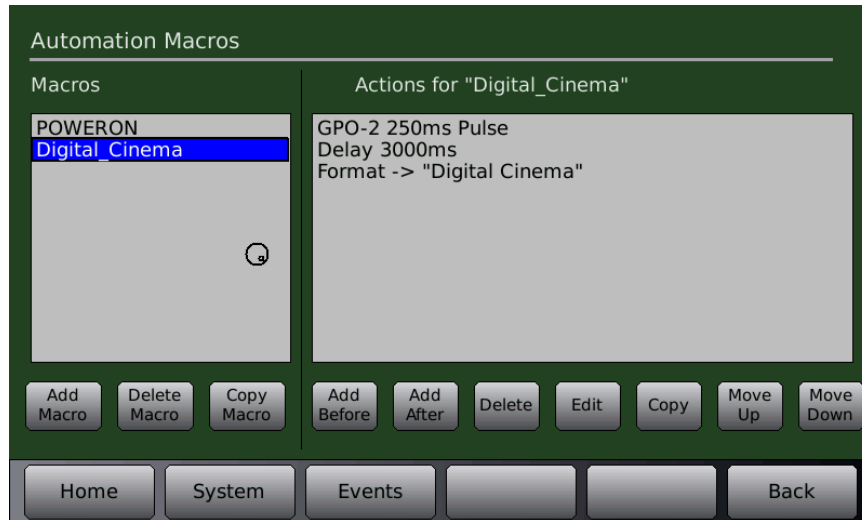
Figure 86. Automation Macros screen

4.5.2.1 Add Macro

To add a Macro, select the "Add Macro" button. The keyboard screen will appear allowing a Macro name to be typed in. Choose a name that is meaningful. A name of up to 15 characters will be displayed. The new Macro name will appear on the list and its "Actions" list will be blank.

Touch the box under "Actions for <macro name>. Actions may now be added. Select "Add After" to enter the first action. This will bring up the Automation Edit Action screen (for a description of options available, see Figure 81, and text following it, above).

Continue to define the Macro script by adding Actions before or after existing Actions (highlight existing actions using the front panel adjustment knob). Existing Actions may also be highlighted and edited (select the "Edit" button) or removed (select the "Remove" button).

4.5.2.2 Delete Macro

To delete a macro, highlight it on the list and select the "Delete Macro" button.

- ☑ Any actions contained in the Macro script must be removed before it can be deleted. Highlight the actions on the list and select the "Remove" button.
- ☑ Caution. A macro may be deleted even if it is associated with an Event and assigned to an Automation button.

4.5.2.3 Copy Macro

This feature is useful to create a macro similar to an existing macro without reentering all the events. After the macro is copied, just change or edit events that should be different.

To copy a Macro, first highlight the source macro, then press the Copy Macro button. A keyboard will appear to enter the name of the new macro. After entering the new macro name, press OK to return to the Macro list with the new macro added.

4.5.2.4 Actions For "Macro name"

Allows you to edit action items in the specified macro. Tap in the box below the *Actions For " "* label and, by turning the front panel fader, select the desired Macro item. The Marco name appears between the quotes (" "). Now, tap the desired command button below the event box.

Available commands for macro events are:

- **Add Before:** Add a new event before the highlighted selection.
- **Add After:** Add a new event after the highlighted selection.
- **Delete:** Delete the highlighted event. Select OK after popup message appears to confirm.
- **Edit:** Edit the currently selected event
- **Copy:** Copy the currently selected event. A copy of the selected event will appear below the current event on the list.
- **Move Up:** Move the placement of the selected event one position up the list.
- **Move Down:** Move the placement of the selected event one position down the list.

4.5.2.5 Example: Creating a Power On macro

In the Figure 87 below, when the AP25 is powered on, it will automatically run actions in a POWERON macro. The AP25 will pulse GPO-1 (start CD player), switch to NONSYNC format and adjust fader level to 5.0.

Go to **Menu > Automation > Macros**
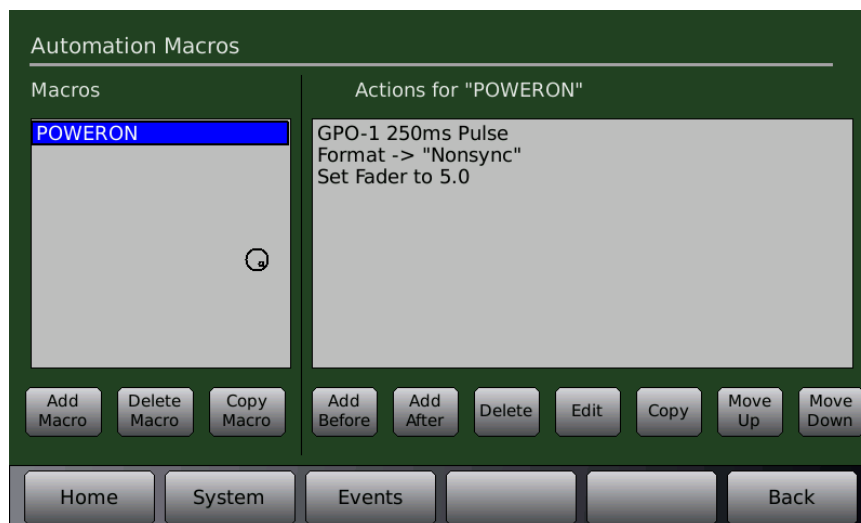
Figure 87. POWERON Macro

To start, choose "Add Macro" and name it POWERON (as shown above). Be sure to match case and spelling.

Next, add the actions required in the right "Actions for POWERON" column. Note: to add the first action, choose "Add After" and then the action desired. Continue adding actions until all are listed. Test by powering off the AP25 from the back, wait 10 seconds and power it back on. The events you programmed in the POWERON macro should have occurred.

☑   Note: you will not see POWERON in the EVENTS screen. It can only be seen in the Macros
    screen.

4.5.3 Automation Buttons

The Automation Buttons screen shows existing buttons assigned to an Event. Information on the
associated event appears below each configured button.

Menu (System) > Automation > Buttons

Figure 88. Automation Buttons

To configure a button, touch the button to select it.

A screen will open that allows both the button title and the event assignment to be configured.
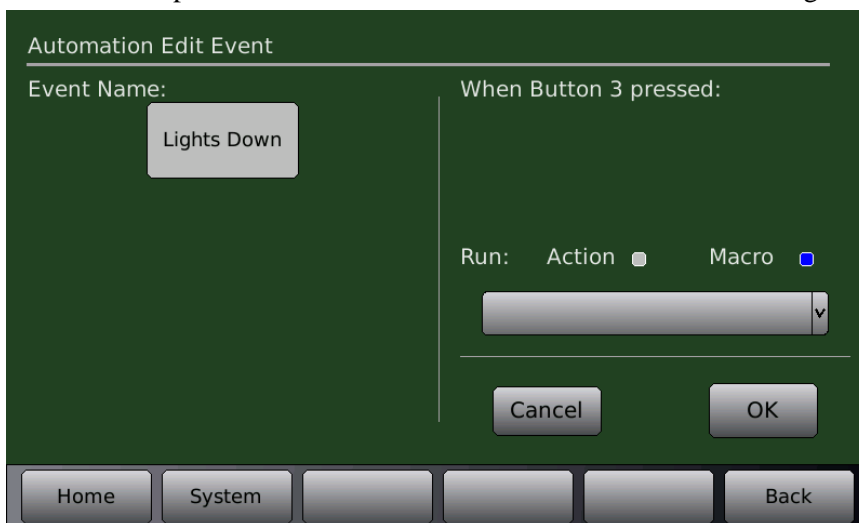
Figure 89. Button Assignment

▪ To enter or change the button title, touch the Event Name box to select. A keyboard
   screen will open allowing you to type in a new title for this button.

▪ To assign a macro to the button, select the Macro button, touch the Macro dropdown list
   and select from the listing. Touch OK when finished, or touch Cancel to cancel this
   task.

- To assign an Action to the button, select the Action button and touch the white box that appears below it. This will bring up the Automation Edit Action screen. See page 98 above.

- Touch OK when finished, or touch Cancel to cancel this task.

4.5.4 Automation Test Screen

The Automation Test Screen provides an easy way to test that the automation signals to and from the AP25 are correctly wired and operational.

Menu (System) > Automation > Test
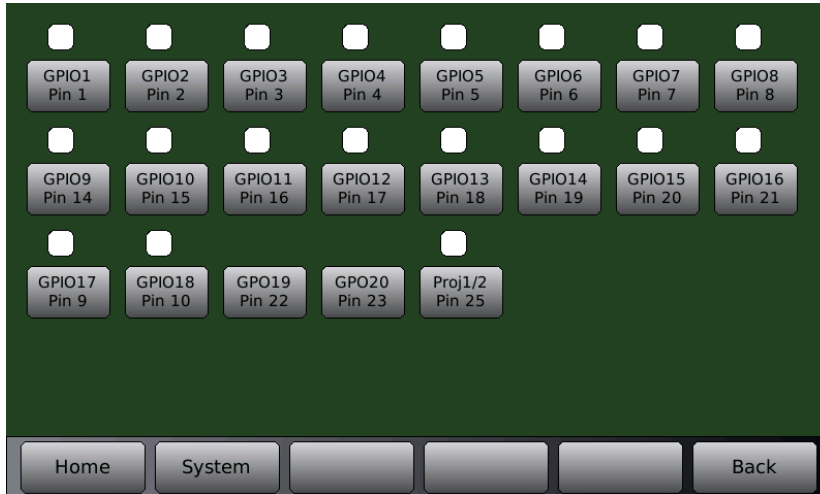
Figure 90. Automation Test

The screen displays a series of automation buttons, one for each automation output signal (GPO), and a circle above it that represents the signal input (GPI) state (GPO19 and 20 are outputs only and do not have an input indicator circle). The input indicator is white when the signal is high or just unconnected. The input indicator turns green when there is a low signal applied to the pin.

- To verify that the AP25 is properly receiving an input from an external source you would need to make the external device send a low signal on that pin. Then confirm that the signal is received by the AP25 by checking if the corresponding circle turns green.

  Example: The button at right illustrates when receiving an input signal on GPIO1.
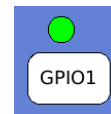
- To test an output signal, press the automation button. It creates a low pulse on the corresponding output pin. The button turns green in conjunction with the output signal being low.

  Example: The button at right when GPIO1 has been selected. Note that the circle will also turn green after pressing the button, indicating that it is reading the low signal on the same pin.
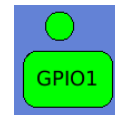
4.5.5 Automation Serial

Menu (System) > Automation > Serial

Figure 91. Automation Serial Port Setup

To setup the serial port, select the Baud rate and data bits settings for the automation interface. Touch the dropdown list to open it, then use the adjustment knob to select.

Available baud rate selections are: 1200, 2400, 9600, 19200, 38900, 57500, or 115200.

Available data bits selections are 7 or 8.

Available Parity selections are: None, even or odd.

There are four pre-programmed **Serial Command Modes** that may be selected from the dropdown list: AP25, Panastereo, 6AD, and linked AP25.

- **AP20 (AP25) -** Serial automation port can be used for any AP25 serial commands as defined by the AP25 document TM-H392. Additionally, any command defined by a serial event will be processed (see section 4.5.1.1 *Automation Edit Event: Serial*).

- **Panastereo -** The serial automation port will process fader commands using Panastereo compatible command set. This is intended to work with preexisting automation systems that support the Panastereo command set. Additionally, any command defined by a serial event will be processed (see section 4.5.1.1 *Automation Edit Event: Serial*). The format changes from the automation system must be programmed into the AP25 as automation events.

- **6AD** - The serial automation port will process fader commands using 6AD compatible command set. This is intended to work with preexisting automation systems that support the DTS-6AD cinema processor command set. Additionally, any command defined by a serial event will be processed (see section 4.5.1.1 *Automation Edit Event: Serial*). The format changes from the automation system must be programmed into the AP25 as automation events.

    The following commands are accepted in the 6AD serial mode:

    Vxx<cr> Set volume to xx, where xx is replaced by characters representing a value from 00 to 99.
    V+<cr>   Increment the master fader volume by 0.1.
    V-<Cr>   Decrement the master fader volume by 0.1.
    V<cr>   Return the current volume value (00-99).
    M+<cr>   Mute the master fader.

M-<cr>   Unmute the master fader.

M<cr>   Return the current mute status (+ or -).

The current fader and mute status is returned by the AP25 after each fader or mute command.

- **Linked AP20 (AP25)** - When two AP25s are being used together to control one auditorium the serial automation port will match:

    o *fader* command - volume level on both AP25s will be the same

    o *format* selection – the selected format will match on both AP25 as long as the format names are the same (note that only the format names must match).

5.0   Maintenance and Troubleshooting

Check the Datasat Digital Entertainment Online Support site, at <u>www.datasatdigital.com,</u> for the latest information on maintenance, troubleshooting, and AP25 software versions.

5.1   Routine Maintenance

We recommend that every six months you vacuum the outside of the unit to remove dust, especially around ventilation holes.

Clean the touch screen as needed with a soft cloth and non-abrasive cleaning solution suitable for cleaning LCD screens.

5.2   Troubleshooting

The following table provides troubleshooting data for the AP25.

PROBLEM	SOLUTION
The touch screen display is off-centered	See Touch Screen Positioning, below
The Home screen displays NoLock	See NoLock below
Fader not functioning	See Fader Not Functioning below

Touch Screen Positioning

The AP25 LCD display position has been configured at the factory. If, for some reason, you should need to recalibrate the location of the screen, follow the steps outlined below (these steps are much like opening a combination padlock):

1. Cycle the power on the AP25 from the rear panel switch. You will only be able to enter touch screen calibration mode for 2 minutes after recycling the power.
2. From the Home screen, rotate the control knob counter-clockwise at least one full revolution.
3. Rotate the knob clockwise one click. (You will feel and hear the click and see the fader level increase by one decimal value.)
4. Rotate the knob counter-clockwise eight clicks, listening for the clicks as you turn.
5. Rotate the knob clockwise one click.
6. Rotate the knob counter-clockwise two clicks. (You are now in calibration mode.)

7. The display will go black, and a small crosshair in a box will appear in the upper corner. Using a fine-tipped stylus, touch as close as you can to the center of the crosshair. The cross hair will move to a new corner. Do not use a pencil or pen tip as this may cause damage to the touch screen surface. Use a non metallic stylus or similar tool for calibration.
8. Touch the center of the crosshair again. Repeat this process as each new crosshair appears.
9. The last crosshair will appear in the center of the screen. Once you have touched this one, the process of repositioning your display is complete. The system will immediately perform a "soft boot" to save the new position values.

NoLock

If the source is a digital input and there is no clock signal, then the display will show "Dig NoLock" as shown below.
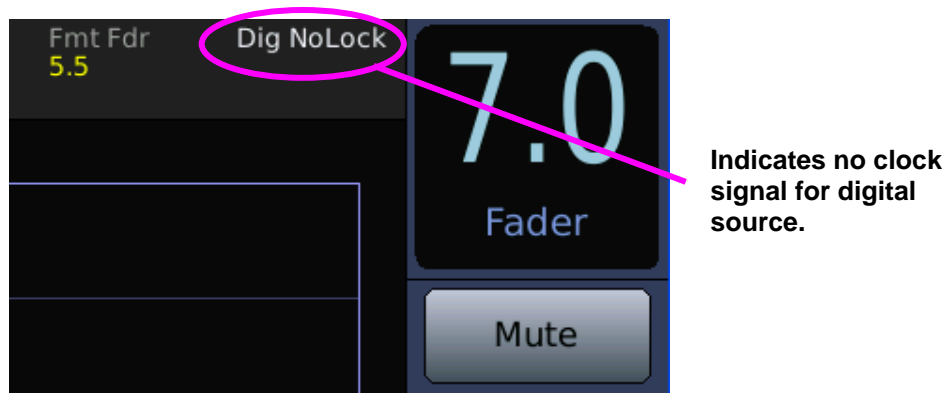
Figure 92. NoLock

Fader Not Functioning

If the front panel fader becomes damaged, use the following work around until it can be replaced.

Using your finger, double-tap the fader level number displayed in the box at the top right corner on AP25's touch screen. Once you double-tap, a set of arrows will appear that can be used to adjust the main volume up or down. To increase volume, touch the up pointing arrow. To decrease volume, touch the down pointing arrow. To make the green arrows disappear, simply double-tap the fader level number again.
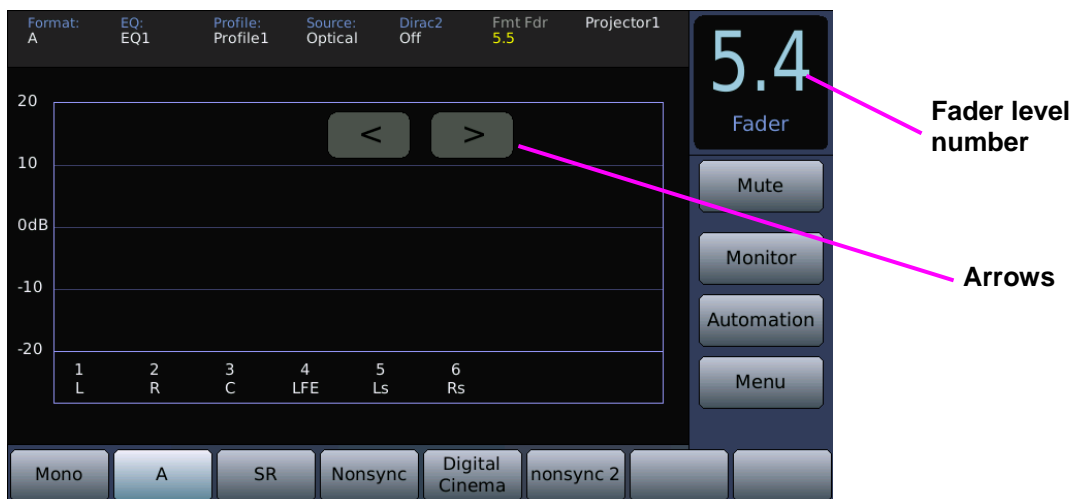
Figure 93. Fader Adjustment Work Around

5.3   Error Messages

5.3.1 Software Installation

Reading Image File From USB

ERROR: FAILED: USB device not found

mounting USB device

[Ok]

Figure 94. USB Device Not Found

If you encounter this error message, be sure you have inserted a USB device into the AP25. If a device is present, it may be malfunctioning. Replace the USB device with another to see if the problem is resolved. Also, if using an USB stick, be sure it has been formatted with FAT before copying a file.

Figure 95. Downloading Error

You may encounter this message when attempting to upgrade the AP25 operating system software through an internet connection or USB.

- If the message appears when using the internet connection, the message usually indicates there is a problem with the physical connection between your processor and the outside world. Check your cables, router, modem, or IP addressing scheme, as applicable, to make sure all is in order.

- If the message appears when using an USB stick, it usually indicates that either your USB stick was not formatted before the file was loaded or you are attempting to load a file not useable by the AP25. Be sure the file is correctly named and if you continue to have problems, contact Datasat techsupport.

5.3.2 Error Booting the AP25

If, during boot up, an object (such as your finger) is in contact with the touch screen, the software will fail to load. The message below will appear, and continues to scroll past until power is recycled at the power entry module (hard boot).

```
************************************************************

mount: mounting /dev/sda1 on /tmp/usb failed: No such device or address

mount: mounting /dev/sda on /tmp/usb failed: No such device or address

************************************************************

insert USB memory stick with AP25 image

************************************************************
```

To solve this problem, reboot the AP25, making sure nothing is in contact with the touch screen during the boot-up process.

Appendix A. Connector Pin-outs

This appendix lists the pin-out of all of the connectors on the back panel of the AP25 Audio Processor.
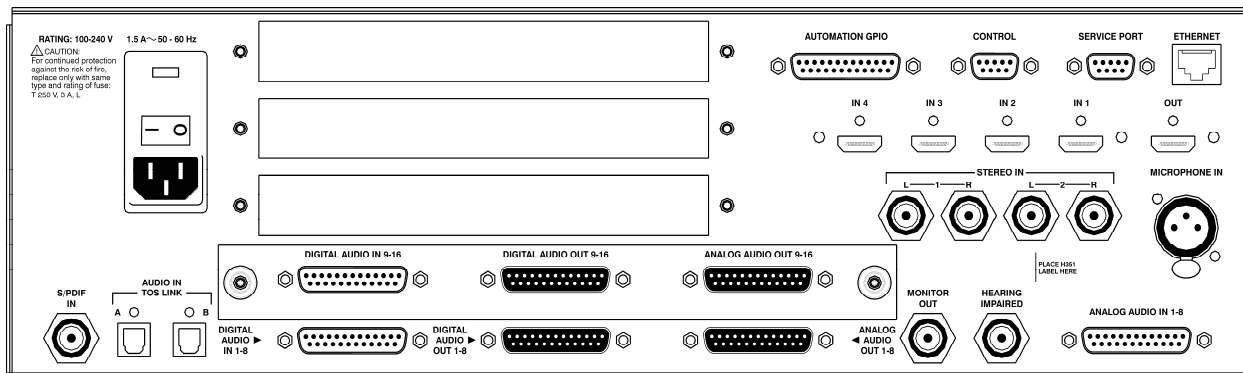
Figure 1. AP25 Rear Panel

AUTOMATION GPIO – DB25F	
Pin	**Description**
1	GPIO 1 (Format 0)
2	GPIO 2 (Format 1)
3	GPIO 3 (Format 2)
4	GPIO 4 (Format 3)
5	GPIO 5 (Format 4)
6	GPIO 6 (Format 5)
7	GPIO 7 (Format 6)
8	GPIO 8 (Format 7)
9	GPIO 17 (Format Remote Fader Enable)
10	GPIO 18 (Format MUTE Enable)
11	N/C
12	AP25 GND
13	AP25 Ext. 5 volts (140mA. max)
14	GPIO 9 (Format ID 0)
15	GPIO 10 (Format ID 1)
16	GPIO 11 (Format ID 2)
17	GPIO 12 (Format ID 3)
18	GPIO 13 (Format ID 4)
19	GPIO 14 (Format ID 5)
20	GPIO 15 (Format ID 6)
21	GPIO 16 (Format ID 7)
22	GPO 19 (Remote Fader Talley)
23	GPO 20 (MUTE Talley)
24	N/C
25	PROJECTOR C/O (1 / 2)
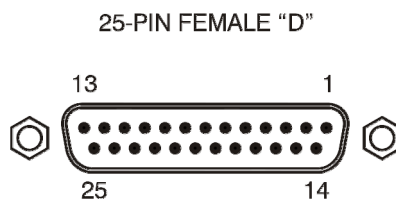
N/C = No connection

25-PIN FEMALE "D"

CONTROL (RS232)– DB9F	
Pin	**Description**
1	N/C
2	Data out - TXD
3	Data in - RXD
4	Connected to pin 6
5	Chassis GND
6	Connected to pin 4
7	Connected to pin 8
8	Connected to pin 7
9	N/C

N/C = No connection

9-PIN FEMALE "D"

SERVICE PORT (RS232)– DB9F	
Pin	**Description**
1	N/C
2	Data out - TXD
3	Data in - RXD
4	Connected to pin 6
5	Chassis GND
6	Connected to pin 4
7	Connected to pin 8
8	Connected to pin 7
9	N/C

N/C = No connection
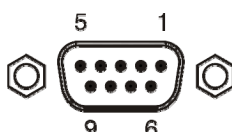
9-PIN FEMALE "D"

ETHERNET – RJ45F	
Pin	**Description**
1	TX D1 (+)
2	TX_D1 (-)
3	RX_D2 (+)
4	Not used
5	Not used
6	RX_D2 (-)
7	Not used
8	Not used

8-PIN FEMALE RJ45

HDMI IN 1-4, OUT – HDMI	
Pin	**Description**
1	TMDS Data 2 (+)
2	TMDS Data 2 (Shield)
3	TMDS Data 2 (-)
4	TMDS Data 1 (+)
5	TMDS Data 1 (Shield)
6	TMDS Data 1 (-)
7	TMDS Data 0 (+)
8	TMDS Data 0 (Shield)
9	TMDS Data 0 (-)
10	TMDS Clock (+)
11	TMDS Clock (Shield)
12	TMDS Clock (-)
13	CEC
14	N/C
15	DDC Clock
16	DDC Data
17	Ground
18	+5 V
19	Hot Plug Direct

N/C = No connection

HDMI

Hearing Impaired, Monitor Out, Stereo Inputs 1&2, S/PDIF In – RCA

RCA FEMALE	
Pin	**Description**
Center	Signal
Outer	Ground

RCA FEMALE

MICROPHONE IN – XLR F	
Pin	**Description**
1	Microphone Ground
2	Microphone In (+)
3	Microphone In (-)

3-PIN XLR FEMALE

DIGITAL AUDIO IN (CH 1 – 8) – DB25F		
Pin	**Description**	**Standard Ch Assignment**
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No connection

25-PIN FEMALE "D"

13   1

25   14

DIGITAL AUDIO IN (CH 9 – 16) – DB25F		
Pin	**Description**	**Standard Ch Assignment**
1	Chassis Ground	
2	AES 9/10 -	
3	AES 11/12 +	
4	Chassis Ground	
5	AES 13/14 -	
6	AES 15/16 +	
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 9/10 +	
15	Chassis Ground	
16	AES 11/12 -	
17	AES 13/14 +	
18	Chassis Ground	
19	AES 15/16 -	
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No connection

25-PIN FEMALE "D"

13   1

25   14

DIGITAL AUDIO OUT (CH 1 – 8) – DB25M		
Pin	**Description**	**Standard Ch Assignment**
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	Word Clock Out	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No connection

25-PIN MALE "D"

1   13

14   25

DIGITAL AUDIO OUT (CH 9 – 16) – DB25M		
Pin	**Description**	**Standard Ch Assignment**
1	Chassis Ground	
2	AES 9/10 -	
3	AES 11/12 +	
4	Chassis Ground	
5	AES 13/14 -	
6	AES 15/16 +	
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	Word Clock Out	
14	AES 9/10 +	
15	Chassis Ground	
16	AES 11/12 -	
17	AES 13/14 +	
18	Chassis Ground	
19	AES 15/16 -	
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No connection

25-PIN MALE "D"

1   13

14   25

The digital audio output pin-out is compatible with the XD10P Cinema Audio Processor as well as with the Ultra Stereo JSD-80 cinema processor. The pin-out also matches the Dolby DMA8.

Datasat Digital Entertainment offers a DB25 male to female cable, 3-feet long, for hook-up (P/N 2503004100). If wiring your own cable, the following criteria must be met:

1. Cable must be double shielded to conform to FCC\CE RF radiation emission limits. Ground shield on the AP25 end.

2. Conductors must be 28-AWG or larger.

3. Choose a paired AES/EBU Digital Audio Cable (such as Belden 7890A). To prevent signal degradation, cable length should be kept as short as possible. If the cable is being run through conduit, it is recommended that it be tested before installing, especially if approaching the maximum length stated in the chosen cable's spec.

ANALOG AUDIO OUT (CH 1 – 8) DB25M	
Pin	**Description**
1	ANALOG GND
2	CHANNEL 1 (+)
3	CHANNEL 7 (-)
4	ANALOG GND
5	CHANNEL 3 (+)
6	CHANNEL 8 (-)
7	ANALOG GND
8	CHANNEL 2 (+)
9	ANALOG GND
10	CHANNEL 5 (-)
11	CHANNEL 6 (-)
12	CHANNEL 4 (-)
13	ANALOG GND
14	CHANNEL 1 (-)
15	ANALOG GND
16	CHANNEL 7 (+)
17	CHANNEL 3 (-)
18	ANALOG GND
19	CHANNEL 8 (+)
20	CHANNEL 2 (-)
21	N/C
22	ANALOG GND
23	CHANNEL 5 (+)
24	CHANNEL 6 (+)
25	CHANNEL 4 (+)

N/C = No connection

25-PIN MALE "D"

ANALOG AUDIO OUT (CH 9 – 16) DB25M	
Pin	Description
1	ANALOG GND
2	CHANNEL 9 (+)
3	CHANNEL 15 (-)
4	ANALOG GND
5	CHANNEL 11 (+)
6	CHANNEL 16 (-)
7	ANALOG GND
8	CHANNEL 10 (+)
9	ANALOG GND
10	CHANNEL 13 (-)
11	CHANNEL 14 (-)
12	CHANNEL 12 (-)
13	ANALOG GND
14	CHANNEL 9 (-)
15	ANALOG GND
16	CHANNEL 15 (+)
17	CHANNEL 11 (-)
18	ANALOG GND
19	CHANNEL 16 (+)
20	CHANNEL 10 (-)
21	N/C
22	ANALOG GND
23	CHANNEL 13 (+)
24	CHANNEL 14 (+)
25	CHANNEL 12 (+)

N/C = No connection

25-PIN MALE "D"

1   13
14   25

ANALOG AUDIO IN – DB25F	
Pin	Description
1	Left (-)
2	R/S (+)
3	R/S (-)
4	L/S (-)
5	R/E (-)
6	Right (-)
7	L/E (-)
8	Center (-)
9	GND
10	GND
11	GND
12	Sub (-)
13	GND
14	Left (+)
15	L/S (+)
16	R/E (+)
17	Right (+)
18	L/E (+)
19	GND
20	Center (+)
21	N/C
22	GND
23	GND
24	Sub (+)
25	N/C

N/C = No connection

25-PIN FEMALE "D"

13   1
25   14

H338 Optical Film Card Option (Rear panel plug in board).

PROJECTOR 1 INPUT (Optional)– DB9F	
Pin	**Description**
1	LT (+)
2	LT / RT (-)
3	LT/ RT (-)
4	RT (+)
5	LT / RT (-)
6	LT / RT Analog GND
7	N/C
8	N/C
9	LT / RT Analog GND

9-PIN FEMALE "D"

N/C = No connection

PROJECTOR 2 INPUT (Optional)– DB9F	
Pin	**Description**
1	LT (+)
2	LT / RT (-)
3	LT / RT (-)
4	RT (+)
5	LT / RT (-)
6	LT / RT Analog GND
7	N/C
8	N/C
9	LT / RT Analog GND

9-PIN FEMALE "D"

N/C = No connection

Appendix B: Interface Wiring Diagrams

From digital audio output of D-cinema server, XD10, XD20, DMA8

DIGITAL AUDIO IN (CH 1 - 8) - DB25F

Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No Connection

DIGITAL AUDIO IN (CH 9 - 16) - DB25F

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

N/C = No Connection

DIGITAL AUDIO OUT (CH 1 - 8) - DB25M

Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	Word Clock Out	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No Connection

DIGITAL AUDIO OUT (CH 9 - 16) - DB25M

Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 9/10 -	
3	AES 11/12 +	
4	Chassis Ground	
5	AES 13/14 -	
6	AES 15/16 +	
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	Word Clock Out	
14	AES 9/10 +	
15	Chassis Ground	
16	AES 11/12 -	
17	AES 13/14 +	
18	Chassis Ground	
19	AES 15/16 -	
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No Connection

To digital amplifiers and speakers

AMP

SPEAKER

SPEAKER

BALANCED INPUT — RED / BLK / SHIELD — GND

UNBALANCED INPUT — RED / BLK / SHIELD — GND

Notes:
- Identical to the XD10P Audio Processor digital input
- Identical to the Ultra Stereo JSD-80 cinema processor digital input
- Directly compatible with XD10/XD20 digital output.
- Matches the Dolby DMA8.
- Datasat offers a DB25 male to female cable, 3-feet long (P/N 2503004100) for connection of XD10/XD20/DMA8 digital out to AP20 ch 1-8 digital in. If wiring your own cable, the following criteria must be met:
  1. Cable must be double shielded to conform to FCC/CE radiation emission limits. Ground shield on the AP20 end.
  2. Conductors must be 28-AWG or larger.
  3. Choose a paired AES/EBU Digital Audio Cable (such as Belden 7890A). To prevent signal degradation, cable length should be kept as short as possible. If the cable is being run through conduit, it is recommended that it be tested before installing, especially if approaching the maximum length stated in the chosen cable's spec.

TITLE	AP25 Digital Audio In/Out	DRAWING NO. H416	REV. B2	DATE 15FEB18

RATING: 100-240 V   1.5 A ∼ 50 - 60 Hz

AUTOMATION GPIO   CONTROL   SERVICE PORT   ETHERNET

IN 4   IN 3   IN 2   IN 1   OUT

STEREO IN
L — 1 — R   L — 2 — R

MICROPHONE IN

DIGITAL AUDIO IN 9-16   DIGITAL AUDIO OUT 9-16   ANALOG AUDIO OUT 9-16

PLACE H351
LABEL HERE

S/PDIF IN   AUDIO IN TOS LINK   A   B

DIGITAL AUDIO ▶ IN 1-8   DIGITAL AUDIO OUT 1-8   ANALOG AUDIO ◀ OUT 1-8

MONITOR OUT   HEARING IMPAIRED

ANALOG AUDIO IN 1-8

AMP

L

SPEAKER

UNBALANCED

+
COM

When using Internal Crossovers

The Analog Audio channels are assigned output pins during the AP25 Setup. Example shown is if channel 1 was defined as "Left".

ANALOG AUDIO OUT (CH 1 - 8) DB25M

Pin	Description
1	ANALOG GND
2	CHANNEL 1 (+)
3	CHANNEL 7 (-)
4	ANALOG GND
5	CHANNEL 3 (+)
6	CHANNEL 8 (-)
7	ANALOG GND
8	CHANNEL 2 (+)
9	ANALOG GND
10	CHANNEL 5 (-)
11	CHANNEL 6 (-)
12	CHANNEL 4 (-)
13	ANALOG GND
14	CHANNEL 1 (-)
15	ANALOG GND
16	CHANNEL 7 (+)
17	CHANNEL 3 (-)
18	ANALOG GND
19	CHANNEL 8 (+)
20	CHANNEL 2 (-)
21	N/C
22	ANALOG GND
23	CHANNEL 5 (+)
24	CHANNEL 6 (+)
25	CHANNEL 4 (+)

N/C = No Connection

ANALOG AUDIO OUT (CH 9 - 16) DB25M

Pin	Description
1	ANALOG GND
2	CHANNEL 9 (+)
3	CHANNEL 15 (-)
4	ANALOG GND
5	CHANNEL 11 (+)
6	CHANNEL 16 (-)
7	ANALOG GND
8	CHANNEL 10 (+)
9	ANALOG GND
10	CHANNEL 13 (-)
11	CHANNEL 14 (-)
12	CHANNEL 12 (-)
13	ANALOG GND
14	CHANNEL 9 (-)
15	ANALOG GND
16	CHANNEL 15 (+)
17	CHANNEL 11 (-)
18	ANALOG GND
19	CHANNEL 16 (+)
20	CHANNEL 10 (-)
21	N/C
22	ANALOG GND
23	CHANNEL 13 (+)
24	CHANNEL 14 (+)
25	CHANNEL 12 (+)

N/C = No Connection

ANALOG AUDIO IN   DB25F

Pin	Description
1	Left (-)
2	R/S (+)
3	R/S (-)
4	L/S (-)
5	R/E (-)
6	Right (-)
7	L/E (-)
8	Center (-)
9	GND
10	GND
11	GND
12	Sub (-)
13	GND
14	Left (+)
15	L/S (+)
16	R/E (+)
17	Right (+)
18	L/E (+)
19	GND
20	Center (+)
21	N/C
22	GND
23	GND
24	Sub (+)
25	N/C

N/C = No Connection

| TITLE | AP25 Analog Audio In/Out | DRAWING NO. H417 | REV. B1 | DATE 15FEB18 |

GPIO automation pins are assigned formats and defined as in/out during setup. Example shown in diagram is if GPIO 1 (format 1) was defined as "Digital Cinema". More details in Section 4.5 of the manual.

AP25 Automation, serial control, Internet/Dirac, Mic In, Hearing Impaired, S/PDIF In Audio In A&B, and Monitor Out

25 PIN "D" FEMALE

DIGITAL CINEMA — 1K ¼W — DIGITAL CINEMA FORMAT TALLY

REMOTE FADER ON — 1K ¼W — REMOTE FADER LED RESERVED
MUTE PULSE — 1K ¼W — MUTE LED
N/C — N/C
AUTOMATION RETURN — CHANGE OVER (C/O)
+6V DC

TO THEATER AUTOMATION SWITCH CONTACTS

TO THEATER AUTOMATION LED STATUS INDICATORS

PROJECTOR CHANGEOVER RELAY

CONTROL (RS232) DB9F

Pin	Description
1	N/C
2	Data out - TXD
3	Data in - RXD
4	Connected to pin 6
5	Chassis GND
6	Connected to pin 4
7	Connected to pin 8
8	Connected to pin 7
9	N/C

To Serial Control Automation

AUTOMATION GPIO   -   DB25F

Description	Pin		
GPIO 1	1	14	GPIO 9
GPIO 2	2	15	GPIO 10
GPIO 3	3	16	GPIO 11
GPIO 4	4	17	GPIO 12
GPIO 5	5	18	GPIO 13
GPIO 6	6	19	GPIO 14
GPIO 7	7	20	GPIO 15
GPIO 8	8	21	GPIO 16
GPIO 17	9	22	GPI 19
GPIO 18	10	23	GPI 20
N/C	11	24	N/C
AP25 GND	12	25	Projector c/o
AP25 Ext. 5 volts (140mA max)	13		N/C = No Connection

AC In 100-240 VAC

Surge Protector

In-line fuse 3 Amp SB

ETHERNET   RJ45F

Pin	Description
1	TX_D1 (+)
2	TX_D1 (-)
3	RX_D2 (+)
4	Not used
5	Not used
6	RX_D2 (-)
7	Not used
8	Not used

To Network

RATING: 100-240 V   1.5 A ~ 50 - 60 Hz

AUTOMATION GPIO   CONTROL   SERVICE PORT   ETHERNET

IN 4   IN 3   IN 2   IN 1   OUT

STEREO IN   MICROPHONE IN
L—1—R   L—2—R

DIGITAL AUDIO IN 9-16   DIGITAL AUDIO OUT 9-16   ANALOG AUDIO OUT 9-16

S/PDIF IN   AUDIO IN TOS LINK   A   B   DIGITAL AUDIO IN 1-8   DIGITAL AUDIO OUT 1-8   ANALOG AUDIO OUT 1-8   MONITOR OUT   HEARING IMPAIRED   ANALOG AUDIO IN 1-8

MICROPHONE IN   XLR F

Pin	Description
1	Microphone Ground
2	Microphone In (+)
3	Microphone In (-)

EXTERNAL DYNAMIC MICROPHONE

S/PDIF In DVD player, PlayStation®, etc. in a home theater environment

Audio In A & B Optical TOS link for DVD player, PlayStation®, etc. in a home theater environment

MONITOR OUT

HEARING IMPAIRED OUT 300 mVRMS

AMPLIFIED SPEAKER

HEARING IMPAIRED SYSTEM

TITLE	DRAWING NO.	REV.	DATE
AP25 Automation, Serial Control, Internet, Mic In, Hearing Impaired, S/PDIF In, Audio In A & B, and Monitor Out	H418	B3	15FEB18

HDMI IN 1-4, OUT	
HDMI	
Pin	**Description**
1	TMDS Data 2 (+)
2	TMDS Data 2 (Shield)
3	TMDS Data 2 (-)
4	TMDS Data 1 (+)
5	TMDS Data 1 (Shield)
6	TMDS Data 1 (-)
7	TMDS Data 0 (+)
8	TMDS Data 0 (Shield)
9	TMDS Data 0 (-)
10	TMDS Clock (+)
11	TMDS Clock (Shield)
12	TMDS Clock (-)
13	CEC
14	N/C
15	DDC Clock
16	DDC Data
17	Ground
18	+5 V
19	Hot Plug Direct

N/C = No Connection

RCA FEMALE	
Pin	**Description**
Center	Signal
Outer	Ground

TITLE	DRAWING NO.	REV.	DATE
AP25 Stereo 1 & 2 In, HDMI In/Out	H419	A1	15FEB18

XD20

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE XD10P DIGITAL AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

MAIN MENU → SETUP	(ENTER)
SYSTEM SETUP MENU → AUTOMATION	(ENTER)
AUTOMATION\CONTROL → FORMAT	(ENTER)
FORMAT AUTOMATION → PIN DEFINITIONS	(ENTER)
FORMAT PIN DEFS → PREDEFINED FORMATS	(ENTER)
AUTOMATION PRESET → (*) XD10P ANALOG	(ENTER)

TO TIMECODE READER HEAD

P/N 9022D435xx

AP25

P/N 2503001400 DB25 M/F (ONE-TO-ONE)

P/N 2503001700 DB25 M/M (ONE-TO-ONE)

XD20 DIGITAL OUT CONNECTOR (CH1-10)

PIN	FUNCTION
1	AES GND
2	AES 1/2 -
3	AES 3/4 +
4	AES GND
5	AES 5/6 -
6	AES 7/8 +
7	AES GND
8	
9	AES GND
10	
11	
12	AES GND
13	
14	AES 1/2 +
15	AES GND
16	AES 3/4 -
17	AES 5/6 +
18	AES GND
19	AES 7/8 -
20	AES GND
21	
22	
23	AES GND
24	
25	

AP25 DIGITAL AUDIO IN (CH 1 - 8)

Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

AUTOMATION GPIO - DB25F

PIN	DESCRIPTION
1	GPIO (Format 0)
2	GPIO (Format 1)
3	GPIO (Format 2)
4	GPIO (Format 3)
5	GPIO (Format 4)
6	GPIO (Format 5)
7	GPIO (Format 6)
8	GPIO (Format 7)
12	AP25 GND

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	N/C
5	FORMAT 4	DTS
6	FORMAT 5	N/C
7	FORMAT 6	NON-SYNC
8	FORMAT 7	N/C
9-11	N/C	N/C
12	USER GND	DTS COMMON
13	USER SUPPLY	N/C
14-25	N/C	N/C

NOTES:

1 Refer to TM-H795 section 4.5 for information on programming the AP25 automation.

| TITLE | XD20 "DIGITAL" AUDIO OUT TO AP25 "DIGITAL" AUDIO IN | DRAWING NO. H420 | REV. C1 | DATE 15FEB18 |

DATASAT
DIGITAL ENTERTAINMENT

XD20

P/N 9022D435xx

**TO TIMECODE
READER HEAD**

TO PROGRAM THE XD20 AUTOMATION
CONNECTOR, CHOOSE THE XD10P ANALOG
AUTOMATION PRESET VIA THE FOLLOWING MENU
SEQUENCE:

| MAIN MENU | |
| ➞ SETUP | (ENTER) |

| SYSTEM SETUP MENU | |
| ➞ AUTOMATION | (ENTER) |

| AUTOMATION\CONTROL | |
| ➞ FORMAT | (ENTER) |

| FORMAT AUTOMATION | |
| ➞ PIN DEFINITIONS | (ENTER) |

| FORMAT PIN DEFS | |
| ➞ PREDEFINED FORMATS | (ENTER) |

| AUTOMATION PRESET | |
| ➞ (*) XD10P ANALOG | (ENTER) |

12VDC OUT TO
DR-1 DRIVE UNIT

COM 1　　CSP VIDEO

EMA　　　AUX I/O

DIGITAL AUDIO IN　DIGITAL AUDIO OUT　EXT. DIGITAL IN　ANALOG OUT　NARRATION OUT　TIMECODE　AUTOMATION

**P/N 2503001700
DB25 M/M (ONE-TO-ONE)**

AP25

RATING: 100-240 V　1.5 A～50 - 60 Hz

AUTOMATION GPIO　CONTROL　SERVICE PORT　ETHERNET

IN 4　IN 3　IN 2　IN 1　OUT

STEREO IN
L —1— R　L —2— R　　MICROPHONE IN

**P/N 2503001400
DB25 M/F
(ONE-TO-ONE)**

DIGITAL AUDIO IN 9-16　DIGITAL AUDIO OUT 9-16　ANALOG AUDIO OUT 9-16

S/PDIF
IN　AUDIO IN
TOS LINK
A　　B
DIGITAL AUDIO IN 1-8　DIGITAL AUDIO OUT 1-8　ANALOG AUDIO OUT 1-8　MONITOR OUT　HEARING IMPAIRED　ANALOG AUDIO IN 1-8

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	N/C
5	FORMAT 4	DTS
6	FORMAT 5	N/C
7	FORMAT 6	NON-SYNC
8	FORMAT 7	N/C
9-11	N/C	N/C
12	USER GND	DTS COMMON
13	USER SUPPLY	N/C
14-25	N/C	N/C

△5

AP25 AUTOMATION GPIO
DB25F

PIN	DESCRIPTION
1	GPIO (Format 0)
2	GPIO (Format 1)
3	GPIO (Format 2)
4	GPIO (Format 3)
5	GPIO (Format 4)
6	GPIO (Format 5)
7	GPIO (Format 6)
8	GPIO (Format 7)
12	AP25 GND

For optimum playback sound, the XD20 digital
output should be used to the AP25 digital in.

Notes:
1. NC = No Connecton
2. GND = Ground
3. Cable must be shielded and the shield should be connected to the connector's
   shell (chassis/earth ground)
4. Connectors shown are type used on the unit.

△5 Refer to TM-H795 section 4.5 for information on programming the AP25
automation.

TITLE	DRAWING NO.	REV.	DATE
XD20 ANALOG AUDIO OUT TO AP25 ANALOG AUDIO IN, CH 1-8	**H421**	**C1**	**15FEB18**

TO PROGRAM THE XD10 AUTOMATION CONNECTOR,
CHOOSE THE XD10P DIGITAL AUTOMATION PRESET VIA
THE FOLLOWING MENU SEQUENCE:

MAIN MENU → SETUP	(ENTER)
SYSTEM SETUP MENU → AUTOMATION SETUP	(ENTER)
AUTOMATION\CONTROL → FORMAT	(ENTER)
FORMAT AUTOMATION → PIN DEFINITIONS	(ENTER)
FORMAT PIN DEFS → PREDEFINED FORMATS	(ENTER)
AUTOMATION PRESET → (*) XD10P ANALOG	(ENTER)

P/N 9022D435xx
TO TIMECODE
READER HEAD

DTS-XD10

AUTOMATION   EMA CONTROL
I/O CONTROL
ANALOG OUT (CH 1-10)   DIGITAL AUDIO OUT
TIMECODE   NARR   AUX
ANALOG OUT (EXPANDED)
FULL RANGE
COM 1   PROJECTOR VIDEO

P/N 2503001700
DB25 M/M (ONE-TO-ONE)

P/N 2503001400
DB25 M/F (ONE-TO-ONE)

AP25

RATING: 100-240 V   1.5 A～50 - 60 Hz
AUTOMATION GPIO   CONTROL   SERVICE PORT   ETHERNET
IN 4   IN 3   IN 2   IN 1   OUT
STEREO IN   MICROPHONE IN
L — 1 — R   L — 2 — R
S/PDIF IN   AUDIO IN TOS LINK   A   B
DIGITAL AUDIO IN 9-16   DIGITAL AUDIO OUT 9-16   ANALOG AUDIO OUT 9-16
MONITOR OUT   HEARING IMPAIRED
DIGITAL AUDIO IN 1-8   DIGITAL AUDIO OUT 1-8   ANALOG AUDIO OUT 1-8   ANALOG AUDIO IN 1-8
PLACE H391 LABEL HERE

NOTES:
1. THE XD10 MUST HAVE THE DIGITAL OPTION INSTALLED WHEN CONNECTING TO THE AP25 DIGITAL CONNECTOR.
2. REFER TO TM-H795 SECTION 4.5 FOR INFORMATION ON PROGRAMMING THE AP25 AUTOMATION.

AP25 DIGITAL AUDIO IN (CH 1 - 8) DB25F

Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

XD10 DIGITAL OUT CONNECTOR (CH1-10)

PIN	FUNCTION
1	AES GND
2	AES 1/2 -
3	AES 3/4 +
4	AES GND
5	AES 5/6 -
6	AES 7/8 +
7	AES GND
8	
9	AES GND
10	
11	
12	AES GND
13	
14	AES 1/2 +
15	AES GND
16	AES 3/4 -
17	AES 5/6 +
18	AES GND
19	AES 7/8 -
20	AES GND
21	
22	
23	AES GND
24	
25	

AP25 AUTOMATION GPIO - DB25F

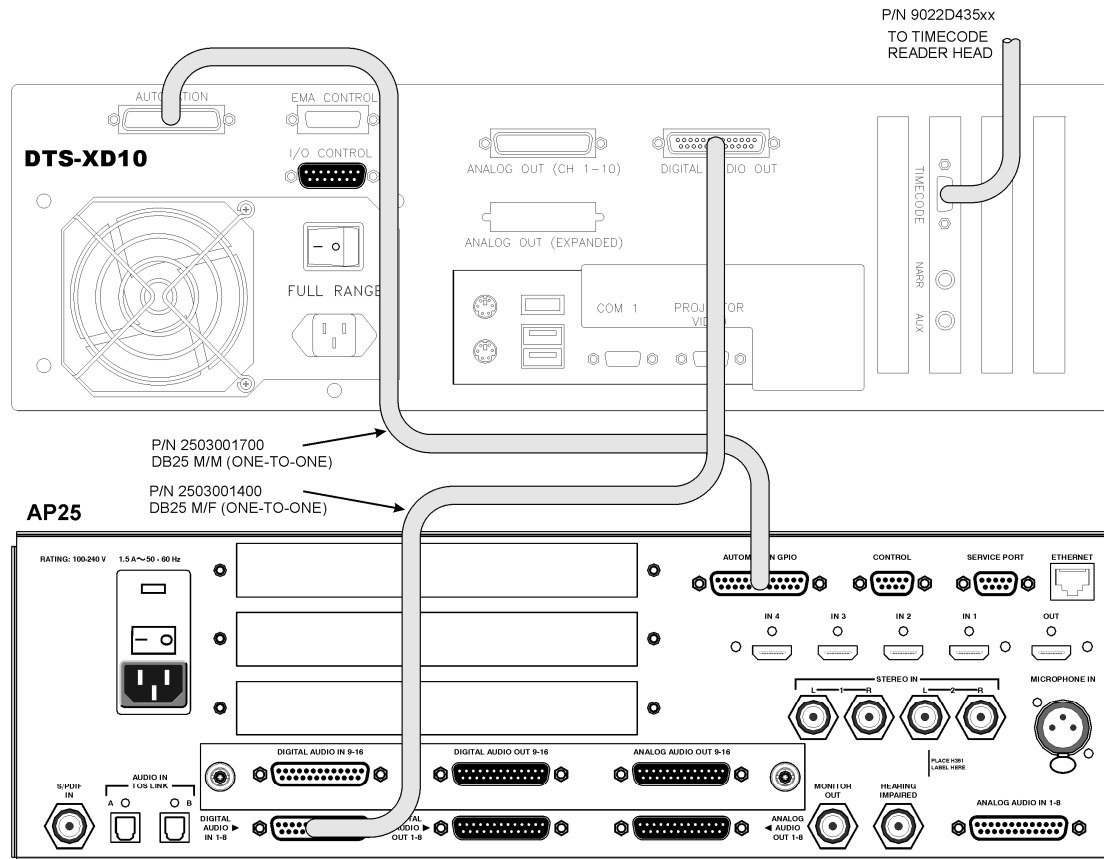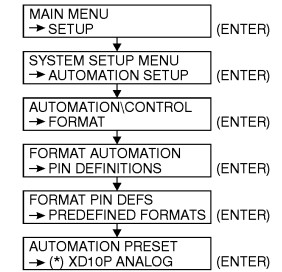| Pin	Description
1	GPIO 1 (Format 0)
2	GPIO 2 (Format 1)
3	GPIO 3 (Format 2)
4	GPIO 4 (Format 3)
5	GPIO 5 (Format 4)
6	GPIO 6 (Format 5)
7	GPIO 7 (Format 6)
8	GPIO 8 (Format 7)
12	AP25 GND

N/C = No Connection

XD10 AUTOMATION CONNECTOR - DB25F

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	NC
5	FORMAT 4	DIGITAL
6	FORMAT 5	NC
7	FORMAT 6	NON-SYNC
8	FORMAT 7	NC
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	

TITLE	DRAWING NO.	REV.	DATE
XD10 "DIGITAL" AUDIO OUT TO AP25 "DIGITAL" AUDIO IN, CH 1-8	H422	C1	15FEB18

TO PROGRAM THE XD10 AUTOMATION CONNECTOR, CHOOSE THE XD10P ANALOG AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

MAIN MENU → SETUP	(ENTER)
SYSTEM SETUP MENU → AUTOMATION SETUP	(ENTER)
AUTOMATION\CONTROL → FORMAT	(ENTER)
FORMAT AUTOMATION → PIN DEFINITIONS	(ENTER)
FORMAT PIN DEFS → PREDEFINED FORMATS	(ENTER)
AUTOMATION PRESET → (*) XD10P ANALOG	(ENTER)

P/N 9022D435xx
TO TIMECODE READER HEAD

DTS-XD10

AP25

P/N 2503001700
DB25 M/M (ONE-TO-ONE)

P/N 2503001400
DB25 M/F
(ONE-TO-ONE)

AP25 AUTOMATION GPIO - DB25F

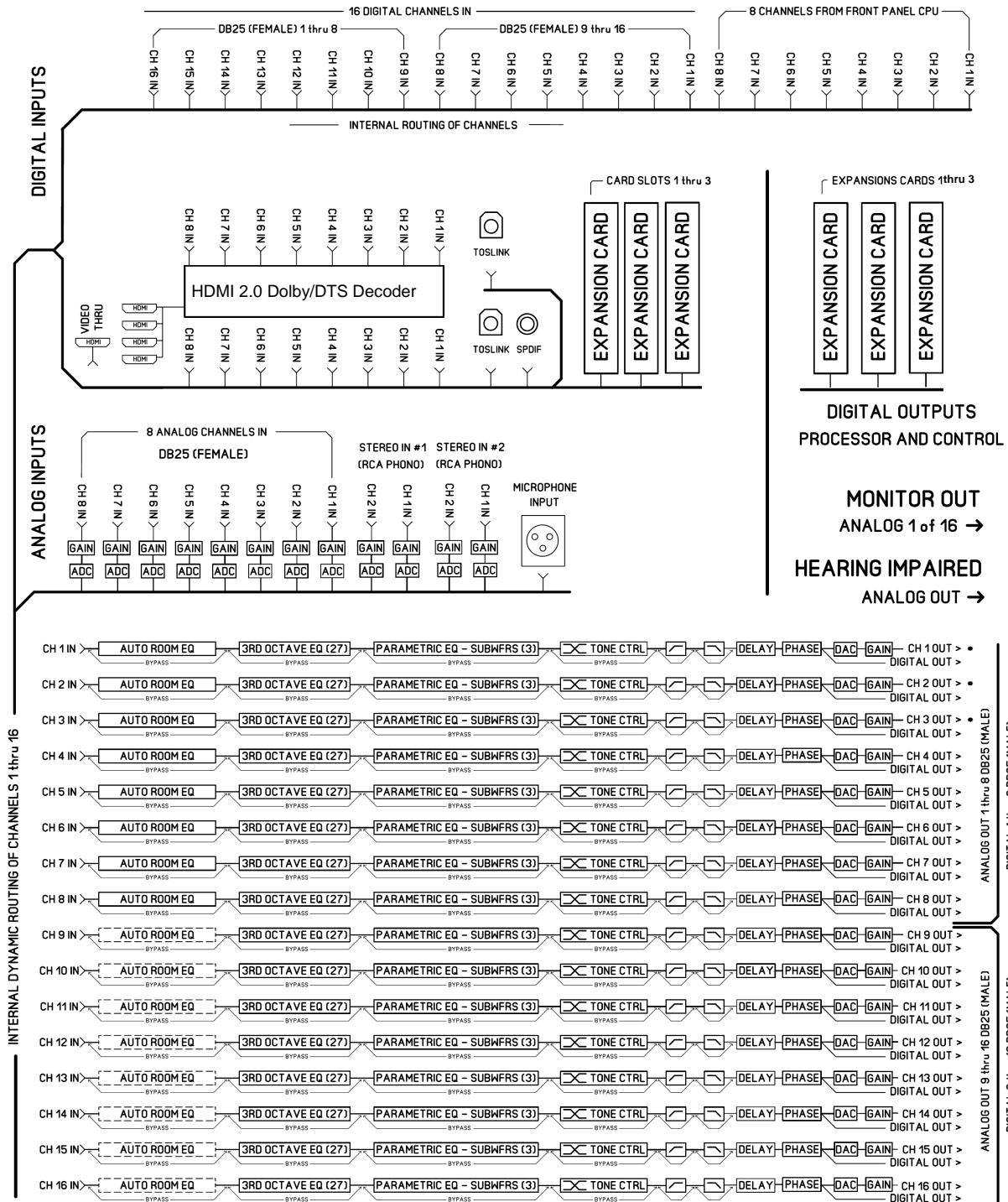| Pin	Description
1	GPIO 1
2	GPIO 2
3	GPIO 3
4	GPIO 4
5	GPIO 5
6	GPIO 6
7	GPIO 7
8	GPIO 8
9	GPIO 17
10	GPIO 18
11	N/C
12	AP25 GND
13	AP25 Ext. 5 volts (140mA max)
14	GPIO 9
15	GPIO 10
16	GPIO 11
17	GPIO 12
18	GPIO 13
19	GPIO 14
20	GPIO 15
21	GPIO 16
22	GPO 19
23	GPO 20
24	N/C
25	PROJECTOR C/O (1 / 2)

N/C = No Connection

XD10 AUTOMATION CONNECTOR - DB25F

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	NC
5	FORMAT 4	DIGITAL
6	FORMAT 5	NC
7	FORMAT 6	NON-SYNC
8	FORMAT 7	NC
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	

Notes:
1. NC = No Connecton
2. GND = Ground
3. Cable must be shielded and the shield should be connected to the connector's shell (chassis/earth ground)
4. Connectors shown are type used on the unit.

5. Refer to TM-H795 section 4.5 for information on programming the AP25 automation.

For optimum playback sound, the XD10 digital output should be used to the AP25 digital in.

TITLE	DRAWING NO.	REV.	DATE
XD10 "ANALOG" 6 & 8 TRACK OUT TO AP25 ANALOG IN CH 1-8	H423	C2	15FEB18

Appendix C: AP25 Wiring and Block Diagrams
AUDIO PROCESSOR BLOCK DIAGRAM

NOTES:

Appendix D: AP25 Product Specifications

Digital Audio Decoders
Dolby

- Dolby AC3

DTS

- DTS-HD Master Audio / DTS ES / DTS 5.1 / Neo:6

Signal Inputs

Digital Audio Inputs

- Channels: 16
- Connectors: Two DB25 Female (Ch1-8 and 9-16)
- Digital Format: AES/EBU
- Sample Rates: 44.1kHz, 48kHz, 96 kHz and 192kHz

Other Digital Audio Inputs

- Connectors: Two TOSLINK (optical S/PDIF) and 1 coaxial (S/PDIF)

Analog Audio Inputs

- Channels: 8 balanced, can be connected unbalanced
- Connector: DB25 (Female)
- Impedance: 10k ohms
- Sensitivity: 300mv RMS

Other Analog Audio Inputs

- Channels: 2 stereo single ended input pairs
- Connector: 4 RCA jacks
- Impedance: 10k ohms
- Sensitivity Adjustable: -16dBv to -4dBv

Microphone Input

- Single channel -68dBv to -8dBv input with switchable +48V phantom power
- Connector: XLR female

HDMI Audio & Video Inputs

- Audio Channels: Up to 8 channels (LPCM, DTS-HD Master Audio & Dolby AC3)
- Connectors: 5 HDMI connectors (4 switched as inputs and 1 as output)
- HDMI 2.0 compliant digital audio with video pass-thru. HDCP 2.2 supported on the output and input #4.

Signal Outputs

Digital Audio Outputs

- Channels: 16, fully routable as to input
- Connectors: Two DB25 Male (Ch1-8 and 9-16)
- Digital Format: AES/EBU
- Sample Rates: 48kHz, 96 kHz and 192kHz

Analog Audio Outputs

- Channels: 16 (fully routable as to input), common mapping with Digital Outputs
- Balanced (can be connected unbalanced or single ended)
- Connectors: Two DB25 Male (Ch1-8 and Ch9-16)
- Level: 300mV with Fader at 7, +26dBu max (balanced)
- Connector: 1 single ended RCA output, channel-selectable to drive an external monitor. Adjustable Levels, to 300mV RMS
- Connector: 1 single ended RCA output, summed output for the hearing impaired. - Fixed Level Out, 300mV RMS

Audio EQ

Dirac Live® Room Optimization (option)

- 16-Channel Dirac Live® room optimization
- Installer kit required to install Dirac Live®

3rd Octave EQ

- 16 channels - 31 user-adjustable bandpass filters
- Gain +/-6dB adjustable in 0.5dB steps
- Frequencies range from 20Hz to 20kHz.

Parametric

- 16 channels with 3 user-adjustable parametric filters for shaping Subwoofer response.
- Adjustable from 20 to 200Hz, gain +/-6dB in 0.1dB steps
- Q range from 0.7 to 5.

Hi/Low Active Crossovers

- Adjustable from 20Hz to 20kHz; adjustable slope of 6, 12, 18 or 24dB per octave (Linkwitz-Riley, Butterworth or Bessel)

Bass/Treble tone control

- Adjustable +/-6dB at 150Hz and 5.5kHz
- Corner frequency for bass adjustable from 50Hz to 300Hz
- Corner frequency for treble adjustable from 1.5kHz to 12.0kHz

Audio Delays

Individual Channel Delays

- Input delay 0 - 999ms
- Output delay 0-120ms

Global Delay

- 0 –1000ms

Note: Total delay per channel not to exceed 1000ms

35mm Film Optical Soundtrack Audio Processing (with optional H338 PCB)

- Built-in processing for mono, A-Type and SR noise reduction.
- Matrix decoding LT/RT to left, center, right and surround
- Optical bass extension with adjustable low-pass filter and gain.
- 2 projector inputs for change-over operation.
- Automation control for change-over.
- BNC connectors for external RTA and oscilloscope.
- Graphical user interface for A-chain alignment including optical gain, slit-loss EQ, and azimuth.

Automation Inputs/Outputs

- Connector: DB25 Female
- 18 bi-directional GPIO's plus additional 2 GPO only, optically isolated, mute and fader inputs
- External +5v@140mA

Management

Remote Control

- RS232 DB9 Female
- 10/100Mbps Ethernet
- Can be controlled by smart phone, iPad, Android based devices via iRule or VNC
- Crestron Integrated Device

Setup/Operation Profiles

- Named profiles identifying inputs, output, filter and channel gain settings
- Touchscreen or automation format switching
- Export/Load of user profile to additional cinema processors with identical room setups (via USB)

Setup/Operation Profiles

- Configurable for up to 40 user defined named format selections. Format selections include processing options along with a selected named set for EQ and output channel profile.
- Configurable for up 40 user defined named EQ sets which include definitions for Dirac optimization, third octave EQ, parametric EQ, bass and treble controls.
- Configurable for up to 40 user defined output channel profiles which include output channel names, output routing, crossover high/low pass filters.
- User defined input selections controllable by Touchscreen, GPIO, or ethernet
- Export/Load of user configurations via USB

Power Requirements

100-240 VAC, 50-60Hz, auto-switching

60w power consumption

Hardware Dimensions

3U 19" rackmount standard

Imperial - 5.25" (H) x 19.0" (W) x 15.0" (D) Shipping Weight: 30lbs

Metric - 13.33 cm (H) x 48.25 cm (W) x 38.1 cm (D) Shipping Weight: 13.6kg

Regulatory Compliance

UL CB Scheme

FCC Part 15, subpart B Class A

CE

RoHS compliant

E&OE

All product specifications subject to change without notice. All trademarks are properties of their respective owners.

Appendix E: 8-Channel AP25 Version and H332 Upgrade

Introduction

The 8-channel version of the AP25 (P/N MD10H78501) contains all features of the standard 16 channel version (P/N MD10H78500) with the exception of Digital Audio channels 9-16 in and out, and Analog Audio channels 9-16 out.

The 8 channel AP25 may be upgraded to 16 channels by adding the H332 circuit card (P/N 9030H33200). See page E5.

AP25 8-Channel Screens

The following screens differ from the standard 16-channel version. All other screens are the same as those in the standard 16-channel version, and are described in the other sections of this manual.

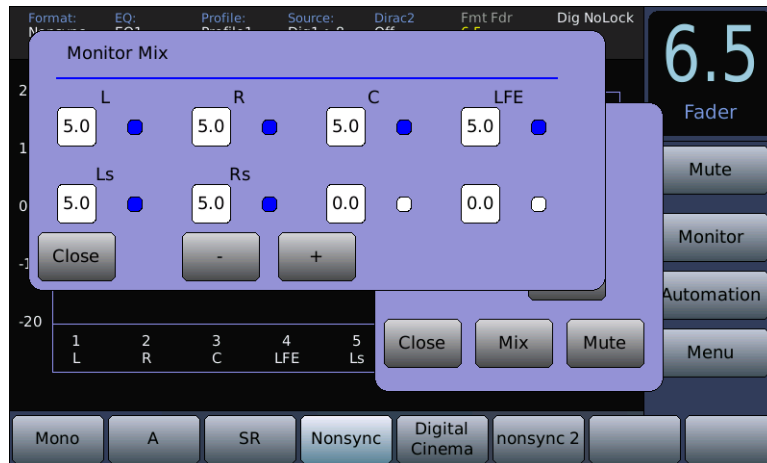**Home Screen – Monitor Mix, Home → Monitor → Mix**

Figure 1 – Monitor Mix

Channel selection is limited to 8 channels.

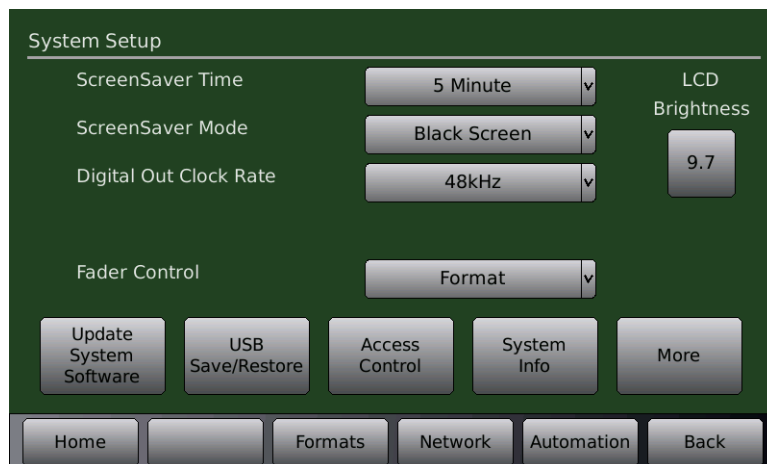**System Screen - Output Mapping not available**

Figure 2 – System Screen

The Output Mapping feature found on the System setup screen of the 16-channel AP25 (**Menu (System) → Output Mapping)** is not available on the 8 channel version.
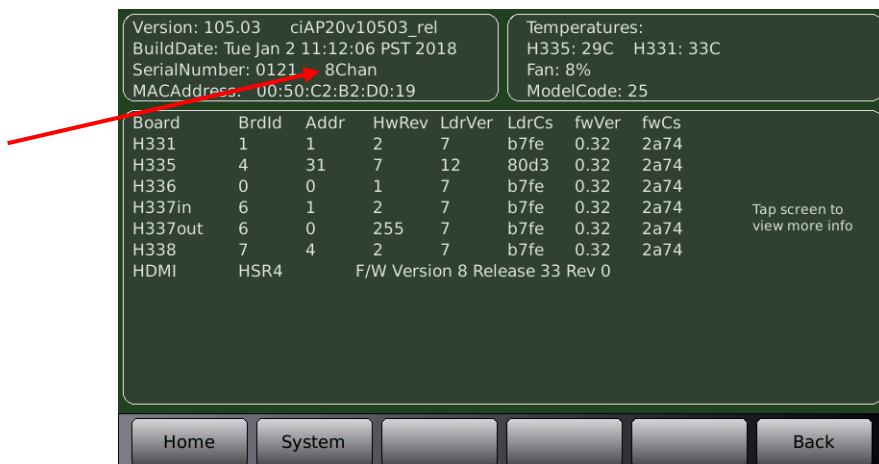
System Information Screen

Figure 3 – System Info Screen

Menu (System) → System Info

The System Info screen will display **8Chan.**
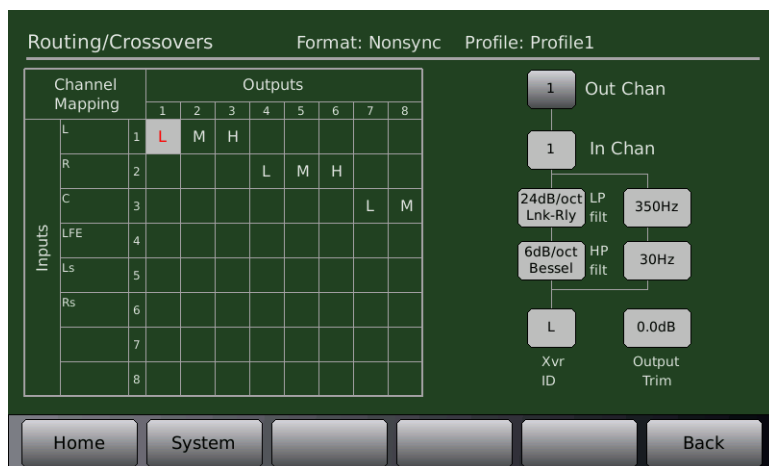
Routing/Crossovers

Figure 4 – Routing/Crossovers Screen

Menu (System) → Formats → Channel Profile → Routing/Crossovers
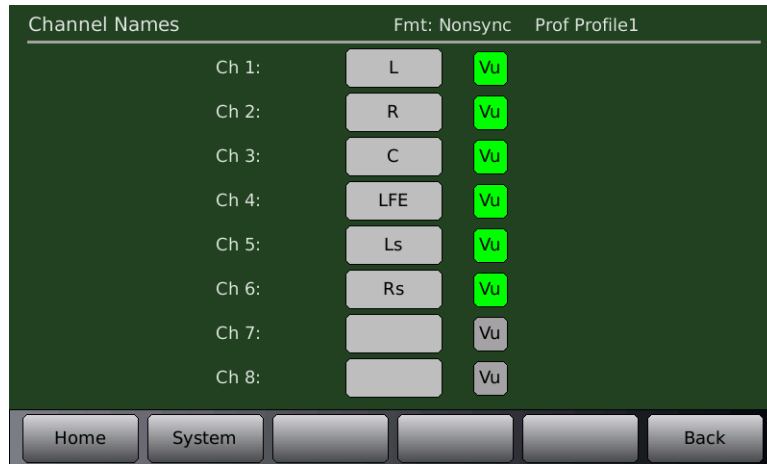
Channel selection is limited to 8 channels.

Figure 5 – Channel Names Screen

Menu (System) → Formats → Channel Profile → Channel Names

Channel selection is limited to 8 channels.
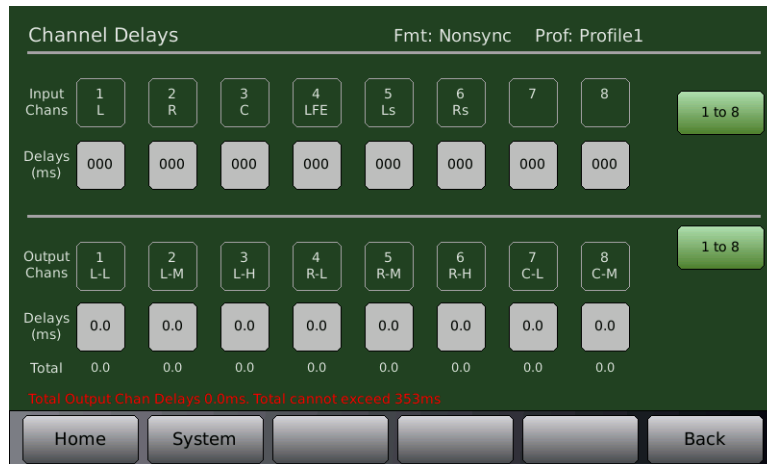
Channel Delay Screen

Figure 6 – Channel Delays Screen

Menu (System) → Formats → Channel Profile → Channel Delays

Channel selection is limited to 8 channels.

Format Source Selection Screen
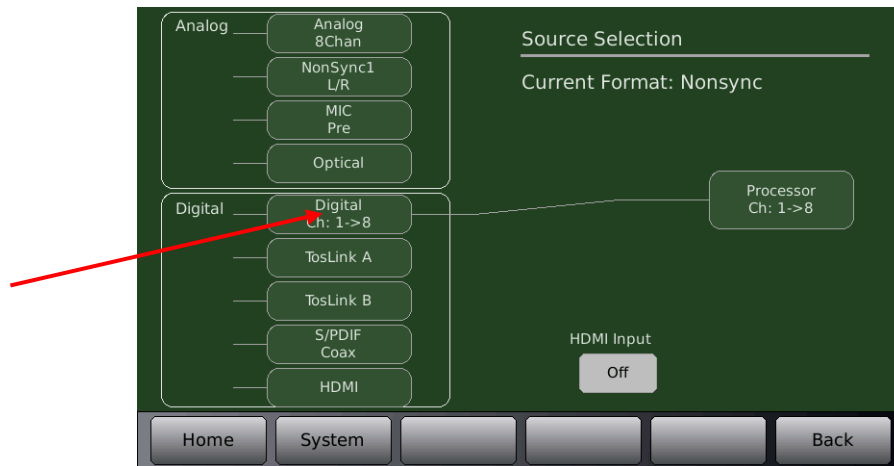
Figure 7 – Input Select Screen

Menu (System) → Formats → Input Source

Only the Digital Ch 1-8 and Digital Ch: 1, 2 selections are available. Pressing the **Digital** button will not toggle to other choices. The factory default **Digital Cinema** format is 8 channel.

Audio Levels Screen
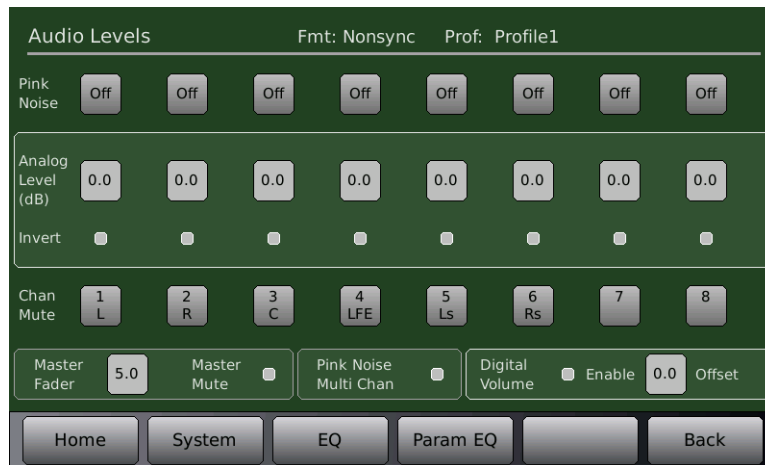
Figure 8 – Audio Levels Screen

Menu (System) → Formats → Audio EQ Setup → Audio Levels

All selections in the Audio Levels Screen are limited to 8 channels.

3rd Octave EQ Screen

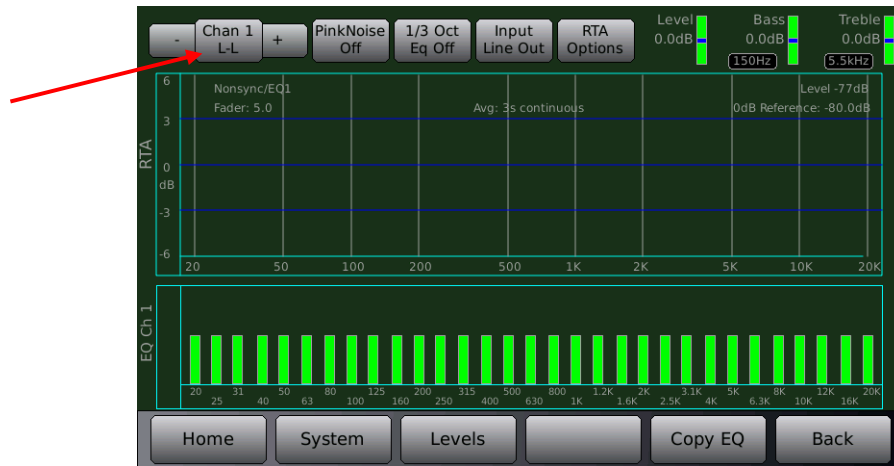**Figure 9 – Third Octave EQ**

Menu (System) → Formats → Audio EQ Setup → Third Octave EQ

Channel selection is limited to 8 channels.
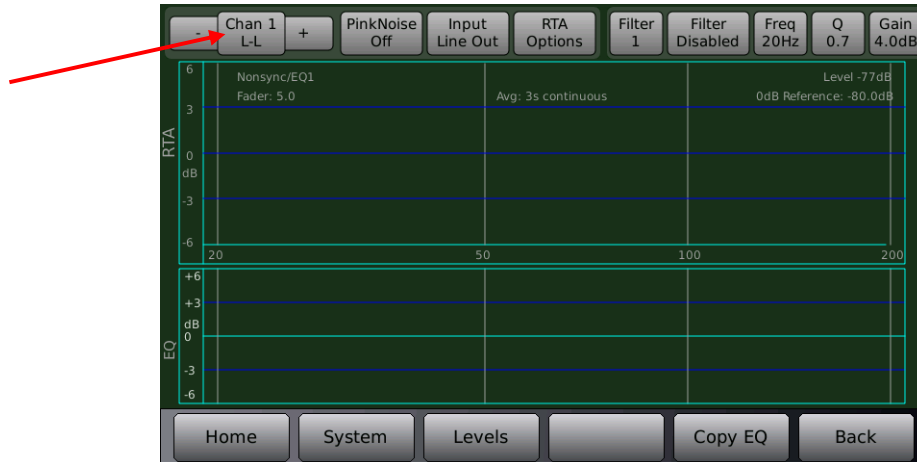
Parametric EQ Screen

Figure 10 – Parametric EQ

Menu (System) → Formats → Audio EQ Setup → Parametric Equalization

Channel selection is limited to 8 channels.

16-Channel Upgrade (H332 Card)

The 8 channel AP25 may be upgraded to 16 channels by adding the H332 circuit card. Order P/N 9030H33200 latest version.

H332 Card Installation
Tools required: Phillips head #2 screw driver

⚠ Caution: The H332 card contains parts that are static sensitive. Use caution when handling to avoid damage. Keep the card in the anti-static bag until needed. Just before removing the card from the bag, hold the bag and touch the chassis of the player. This will make your body the same electrical potential as the player (and will prevent static discharge). It is a good idea to stand on a linoleum or cement floor (not carpet) when handling the card.

Figure 11 – AP25 Rear Panel – H332 Card Installed

- Turn off the AP25's rear panel power switch and unplug the power cord.
- Remove the large (bottom) cover plate from the AP25 rear panel.
- Slide the H332 card into the card guides of the option slot and gently push the card into its mating connector. Tighten the attached thumbscrews.
- Turn on the AP25's rear panel power switch. It should boot up and display the following message indicating that it has detected the H332 card.

- Press "Dismiss". Channels 9-16 are now available for configuration and use.

Appendix F: Optical Film Card Option

F1. Introduction

The Optional Optical Film card (H338) will enable the playback of standard optical film soundtracks including Mono, A, and SR type. After the H338 card is installed, optical formats must be programmed before playing optical sound.

This card offers two inputs (Projector 1 & 2), see **Figure 1** below. Both inputs have an LED to indicate which input is active. The automation in the AP25 must be programmed to switch the inputs at the proper time. In addition to these inputs, there are two Lt/Rt test points. These are BNC type connectors that are used for alignment of the projectors optics.

Proj 1 LED   Proj 2 LED
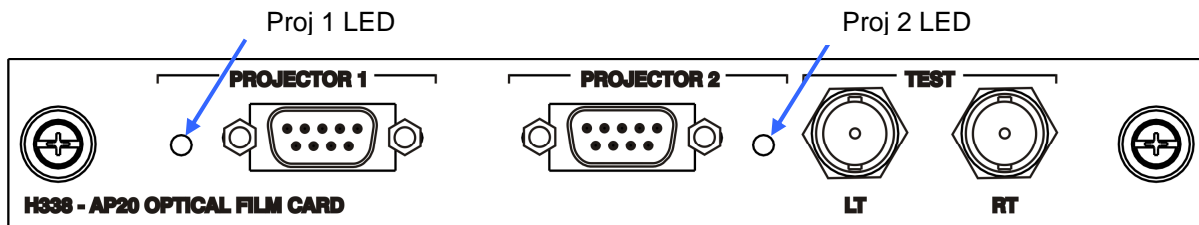
Figure 1 – H338 Optical Film Card

The remainder of this document is organized in 3 sections:

- Section F2: H338 card installation and verification of AP25 software version (this section may be skipped if the AP25 was purchased with the Optical Film Card option from the factory).
- Section F3: Setting up the AP25 menus for Optical formats. If the AP25 was purchased with the Optical Film Card option from the factory, then optical formats have already been added to the configuration and button assignments made. You may skip to Section F4 - Alignment. Note: Factory settings for A-type and SR default to Matrix Bass Extension set "On". See Section F3.4 for more information on Matrix Bass Extension.
- Section F4: Alignment.

F2. H338 Card Installation

Note: Skip to section F3 if the AP25 was purchased with the Optical Film Card option installed in the factory

Tools required: Phillips head #2 screw driver

⚠ **Caution:** The H338 card contains parts that are static sensitive. Use caution when handling to avoid damage. Keep the card in the anti-static bag until needed. Just before removing the card from the bag, hold the bag and touch the chassis of the player. This will make your body the same electrical potential as the player (and will prevent static discharge). It is a good idea to stand on a linoleum or cement floor (not carpet) when handling the card.
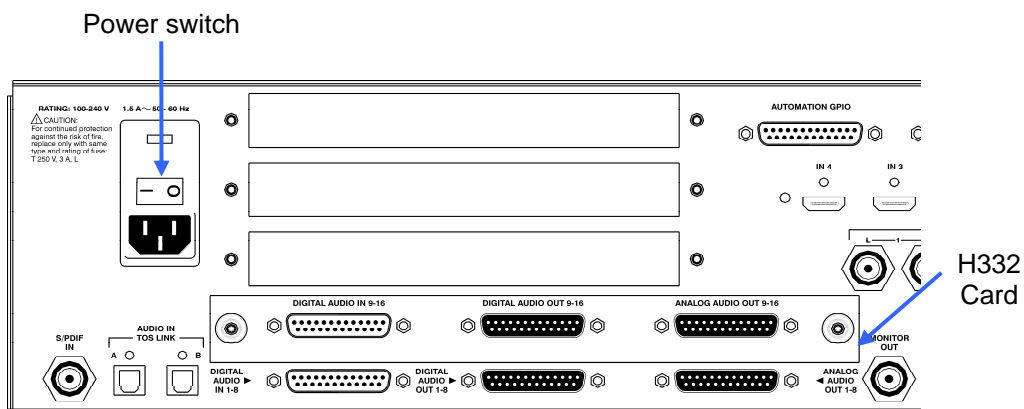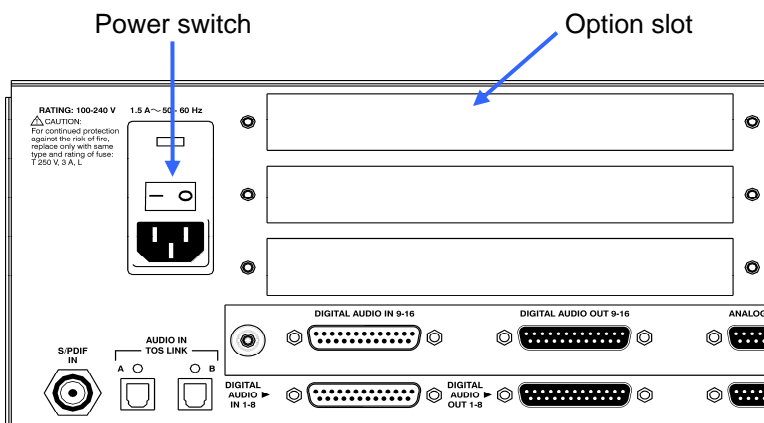
Figure 2 – AP25 Rear Panel

- Turn off the AP25's rear panel power switch and unplug the power cord.
- Remove one of the three cover plates from the AP25 option slots. All slots are identical.
- Slide the H338 card into the card guides of the option slot and gently push the card into its mating connector. Tighten the attached thumbscrews.

F3.   AP25 Optical Format and Analog Input Setup

When the H338 Optical Film Card is installed in the factory, the following factory presets are already included.

Table 1. AP25 Optical Film Card Factory Presets

Format Name	Assigned Button	Input Source	Signal Source	EQ Set	Channel Profile	Comments
Mono	1	Optical	Projector 1	EQ1	Profile1	
A	2	Optical	Projector 1	EQ1	Profile1	Default is Matrix Decoder and Optical Bass Extension "on"
SR	3	Optical	Projector 1	EQ1	Profile 1	Default is Matrix Decoder and Optical Bass Extension "on"

The factory default film audio format selected is A-Type.

The default EQ set is named **EQ1** and includes all EQ settings flat and all filters off. This EQ set may be used and altered during the theater setup process. The default channel profile is **Profile1** which includes the default 6 channel assignments and trim values flat.

If the H338 card is not factory installed, Optical formats must be created in the AP25 before the H338 can be used. The optical format must have the analog input source selected as Optical. The H338 card supports standard optical film soundtrack formats: Mono, A-type and SR-type.

F3.1.

Create Optical Formats

To create an optical format, copy an existing format. Go to:

Menu (System) → Formats → Edit Formats
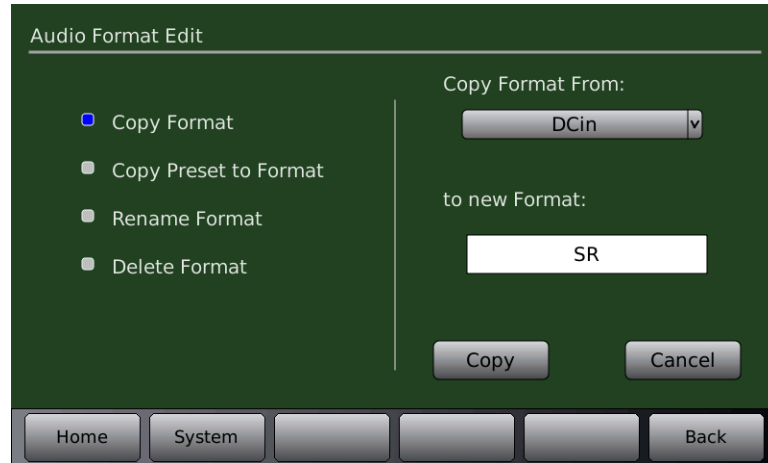
Figure 3– Copy Audio Format

Press the **Copy Format** button.

Select a format from the drop down menu of **Copy Format From** (in **Figure 3**, above, "DCin" is selected to copy)

Press the **to Format** box and type in a new format name: Mono, A-Type, or SR (in **Figure 3**, above, "SR" has been entered).

Press the **Copy** button. Repeat for other desired optical format(s).

F3.2.   Assign Optical Formats to Format Buttons

After creating the optical formats, they may be assigned to "Format Buttons". The format buttons will then appear on the Home screen and be available for selection. In **Figure 4** below, SR is selected.
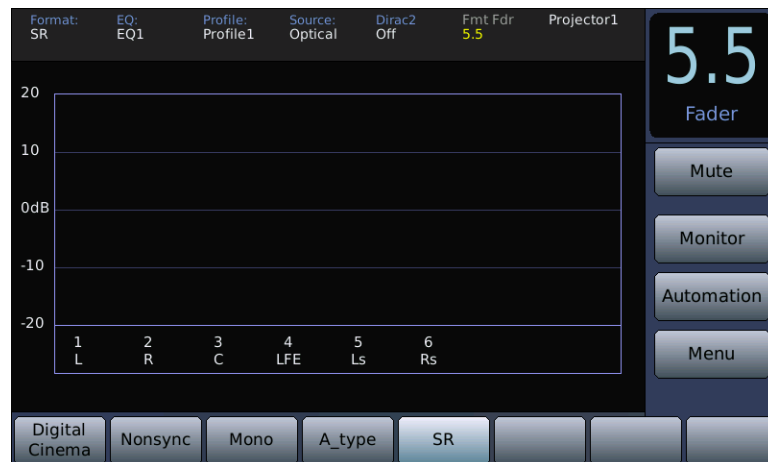
Figure 4 – Home Screen – SR format

To assign a format button, go to:

Menu (System) → Formats → Assign Buttons
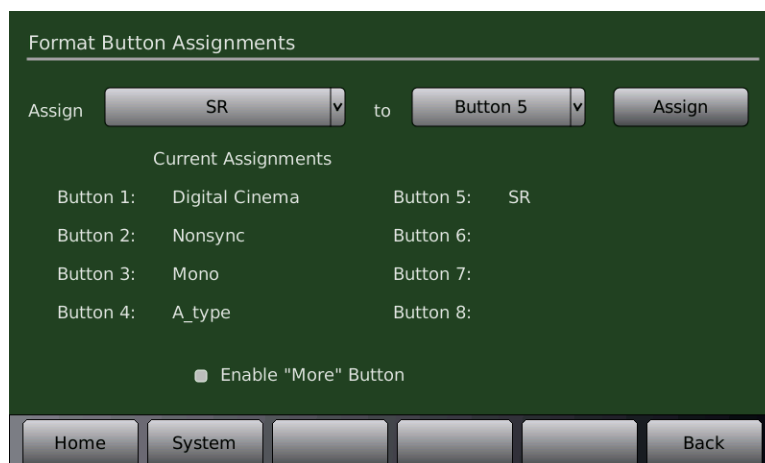
Figure 5 – Format Button Assignment

Select a Format to assign from the **Assign** drop down menu. Select a button to assign the format to from the drop down menu. Press the **Assign** button. In **Figure 5** above, SR has been assigned to Button 5. The current format assignments will be listed next to the button numbers. The newly selected format should now appear on the list.

F3.3.   Input Source Selection

Select the **Input Source** button. This will open the **Input Select** screen. Each of the optical formats must be set to have **Optical** selected as their input source. In the example in **Figure 6** below, SR will have its input source set to Optical. The right side of the screen should display "**Current Format: SR**". If it is not displayed, return to the Audio Format Setup screen and select **SR** in the **Current Audio Format** drop down menu. Return to the Input Select screen by pressing the **Input Source** button. Select **Optical** as the **Analog** Input Source. A line should appear from the selected source to the output

Menu (System) → Formats → Input Source

Figure 6 – Select Input Source

F3.4.   Film Options Setup

The Optical Film Card Options allows you to setup the optical sound formats. Each format will need to be setup. In **Figure 7** SR is selected for setup.

Go to: **Menu (System)** → **Formats** → **Format Options** → **Film Options**

Figure 7 – Film Options Screen

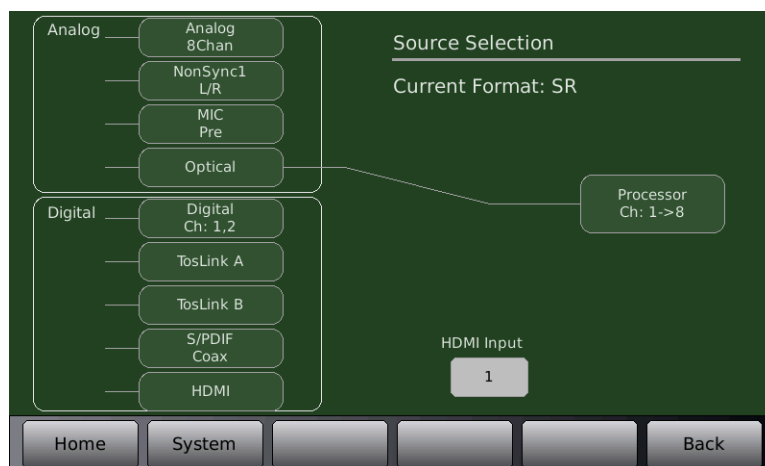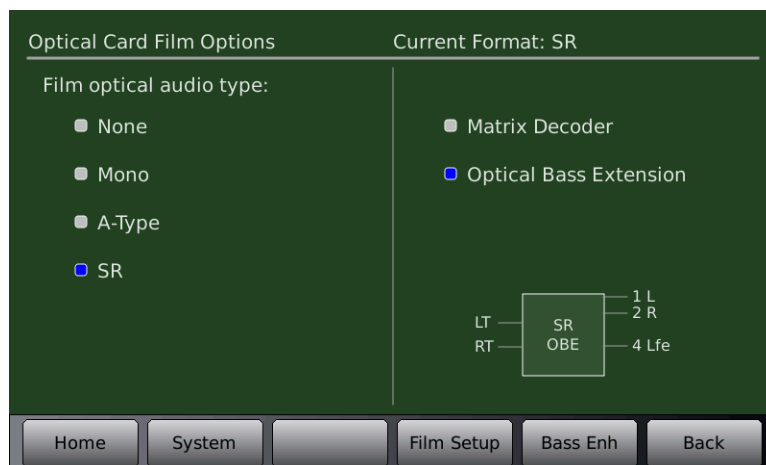☑ **Note***:* The **Film Options** button only appears for a format with **Optical** selected as the input source. If you do not see the **Film Options** button check that you are in the correct format and that the input source is selected for **Optical**.

On the left side of the screen under "Film optical audio type" select the audio processing type for the current format, which is displayed on top right of this screen.

• **None** No processing is done. This is not a normal film format.

• **Mono**. This is for processing a mono optical film track. The Academy filter is applied.

• **A-Type** Apply A-type noise reduction. Should be used with the matrix decoder option enabled.

• **SR** Apply SR-type noise reduction. Should be used with the matrix decoder option enabled.

Screen right allows you to enable the matrix decoder or bass extension. The right screen also provides a pictorial of the resulting processing done for that format: Inputs from the film are on the left. The resulting channels are on the right side, and are internal to the AP25. Note that these are not necessarily the output channels as they and may be routed on the AP25 output (see Section **2.9.4 Assign Channels on AP25** in this manual).

• **Matrix decoder** enables matrix decoding for the selected optical sound format. When Matrix is enabled, center + surround channel are added. Note that matrix surround channels are not discrete outputs; instead they are decoded from Lt and Rt.

• Matrix Bass Extension (**Optical Bass Extension** (OBE)) enables bass extension for the desired format. When selected, **Lfe** will appear as an output in the pictorial discussed above. Selecting the **Bass Enh** button will take you to the Matrix Bass Extension setup screen.

☑ Note: Matrix Bass Extension parameter settings are global and will be the same for both nonsync and optical formats when enabled. Each format may enable or disable the Bass Extension independently.

Typical Setups for optical formats are shown below. While other combinations are possible they are not representative of what should be used with standard film formats.

When **Mono** is selected:
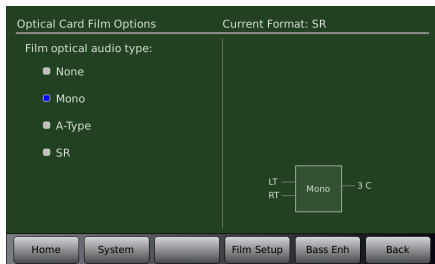
In this example, left total (LT) and right total (RT) are the inputs. Output is: **3C** = channel 3 is center (your only audio out which is the sum of left total and right total). Notice Matrix and OBE are not available for Mono. The Academy curve is applied.

When **A-Type** is selected:
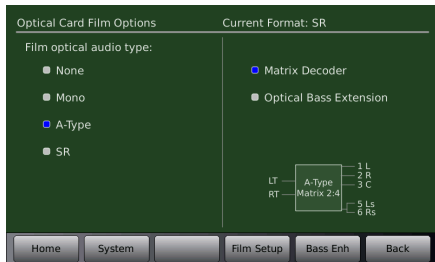
In this example, left total (LT) and right total (RT) are the inputs. Outputs are: **1L** = channel 1 is left, **2R** = channel 2 is right, **3C** = channel 3 is center, **5Ls** = channel 5 is left surround, and **6Rs** = channel 6 is right surround.
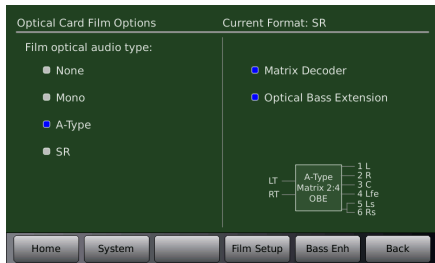
In this example, left total (LT) and right total (RT) are the inputs. Outputs are: **1L** = channel 1 is left, **2R** = channel 2 is right, **3C** = channel 3 is center, **4Lfe** = channel 4 is bass**, 5Ls** = channel 5 is left surround, and **6Rs** = channel 6 is right surround.

When **SR** is selected:
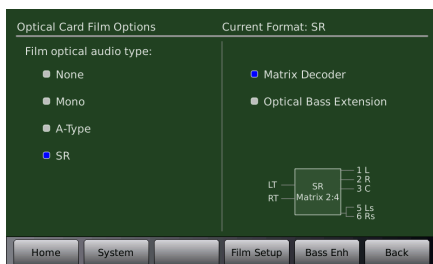
In this example, left total (LT) and right total (RT) are the inputs. Outputs are: **1L** = channel 1 is left, **2R** = channel 2 is right, **3C** = channel 3 is center, **5Ls** = channel 5 is left surround, and **6Rs** = channel 6 is right surround.

In this example, left total (LT) and right total (RT) are the inputs. Outputs are: **1L** = channel 1 is left, **2R** = channel 2 is right, **3C** = channel 3 is center, **4Lfe** = channel 4 is bass**, 5Ls** = channel 5 is left surround, and **6Rs** = channel 6 is right surround.

F4. <u>Alignment</u>

A-Chain alignment consists of calibrating the projector(s) optical film path, the solar cell, and the optical preamp. These adjustments consist of both mechanical alignments on the projector(s) and software settings in the AP25. Adjustments on the projector(s) optical heads differ depending on t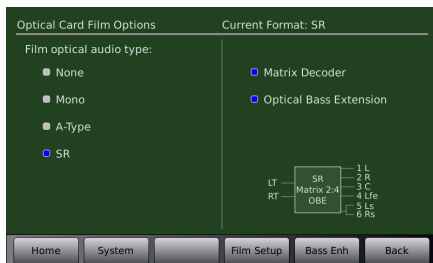he manufacturer; however the end results are the same. This section describes briefly the projectors optical head adjustment, for detail adjustments refer to that projector manufacturer's recommended procedure.

F4.1.   Materials and equipment required

For initial mechanical alignment of the projectors optical head, the following is recommended or required. These items are not supplied by Datasat Digital Entertainment.

- RTA – Real Time Analyzer with Microphone
- Oscilloscope
- Voltage meter
- Cotton swabs
- PC (lap top) and wireless router to connect into the AP25 using VNC (optional)
- Miscellaneous tools needed to make adjustments on projector optics mechanical alignment.

Test Films (not supplied by Datasat Digital Entertainment):

- 50% tone   (Cat 69T)
- Pink noise   (Cat 69P)
- Buzz Track (P35-BT)
- L/R   (Cat 97)
- Illumination uniformity (Cat 566) optional

F4.2.   Inspection and voltage check

Visually inspect the optical film path of the projector. Make sure all components are clean and in good working order. The items that need to be checked are rollers, lateral guides, bearings, dampener, etc. Use a cotton swab, lightly coated with lens cleaner, to wipe the optical lens. Check the LED voltage and adjust it if necessary, as per the manufacturer's recommended procedure.

F4.3.   Wiring and Connections

Projector 1 & 2 inputs on the AP25 are 9-pin female D-connectors. See **Figure 8** below for pin assignments. Input from the solar cell is a 9-pin Male D-connector.

PIN NO.	DESCRIPTION
1	LEFT +
2	LEFT -
3	N.C.
4	RIGHT +
5	RIGHT -
6	LEFT ANALOG GND.
7	N.C.
8	N.C.
9	RIGHT ANALOG GND.

9-PIN FEMALE "D"
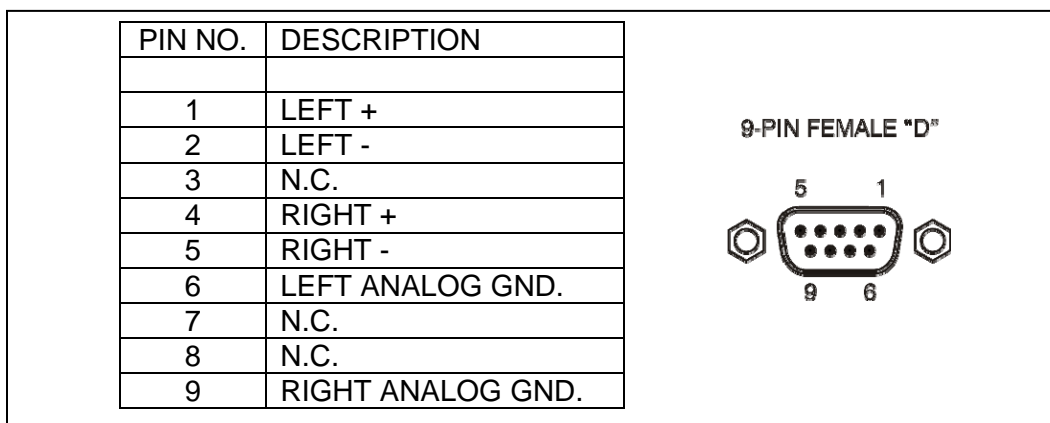
Figure 8 – Solar Cell input pin assignment

Prior to optical alignment, verify all wiring and connections are correct. Shielded cables such as Belden 8451 or similar should be used.

The right channel is nearest the edge of the film. To confirm proper wiring, while observing the projector output on a RTA or the AP25 setup screen, place a business card or similar object to block the side of the cell nearest the edge of the film. You should detect a large drop in the right channel level.

Although white light tungsten type exciter lamps have been replaced in projectors with Red LED readers the adjustment and calibrations remain similar. Making adjustments to the film optics will vary depending on the manufacturer; it is recommended that a review of the manufacturer's recommended alignment adjustments be reviewed prior to making any mechanical changes on the optical head on the projector.

F4.4.   Mechanical Optical Alignment

Connect the oscilloscope to the AP25 via the Left and Right BNC test connectors on the H338 optical card located on the back of the AP25. See **Figure 9**.
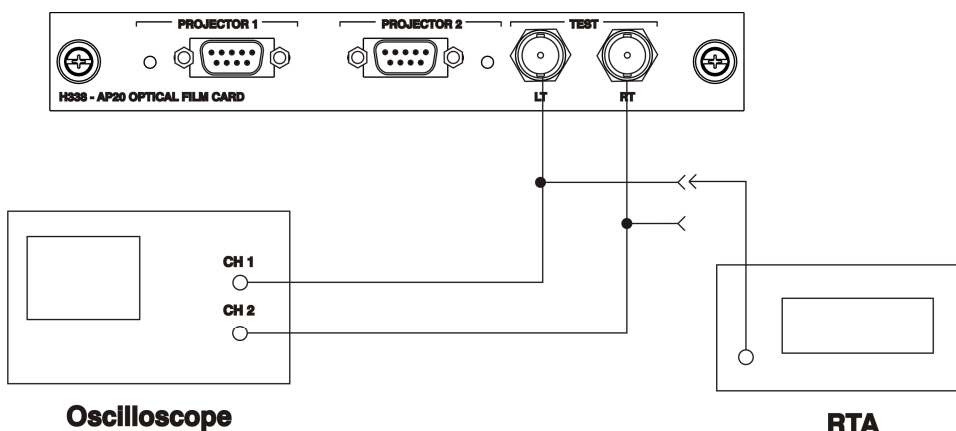
Figure 9 – Test connections

The **Film Setup** screen on the AP25 will be used during the alignment procedure. Go to **Menu (System) → Formats → Format Options → Film Options → Film Setup.**
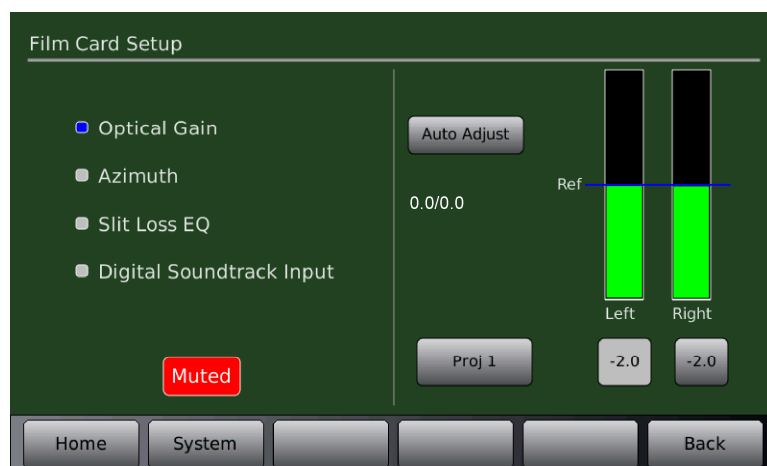
Figure 10 – Film Card Setup Screen

☑   Note: When in the Film Card Setup screen, noise reduction (SR) is not active and all audio outputs are muted. Changing to another screen will enable any noise reduction and un-mute

the audio. While in this screen you may also select the red **Muted** button to un-mute the audio. When un-muted, the button will turn gray and say **Mute**.

The Film Card Setup screen allows you to make needed adjustments in the selected optical format.

The left screen allows you to choose the adjustment you want to make.

- o • **Optical Gain** adjusts the optical gain.

- o • **Azimuth** allows the azimuth to be viewed.

- o • **Slit Loss EQ** adjusts the slit loss EQ.

- o • **Digital Soundtrack Input** sets the Digital Soundtrack Input source that will use Optical as its fallback. See section F4.4.6 for more information.

The right screen has a pictorial of adjustments that can be made and changes with the selections on the left.

F4.4.1.   Optical Gain Adjustment

Items needed: 50% tone test film (CAT 69T), oscilloscope, and specific tools required to make adjustments, such as Allen/Hex Wrenches, small screw driver etc.

On the AP25 select one of the optical formats in the home screen, next select **Menu (System)** → **Formats** → **Format Options** → **Film Options** → **Film Setup**. You should now be in the Film Card Setup screen as shown in **Figure 11**. Select **Optical Gain**.
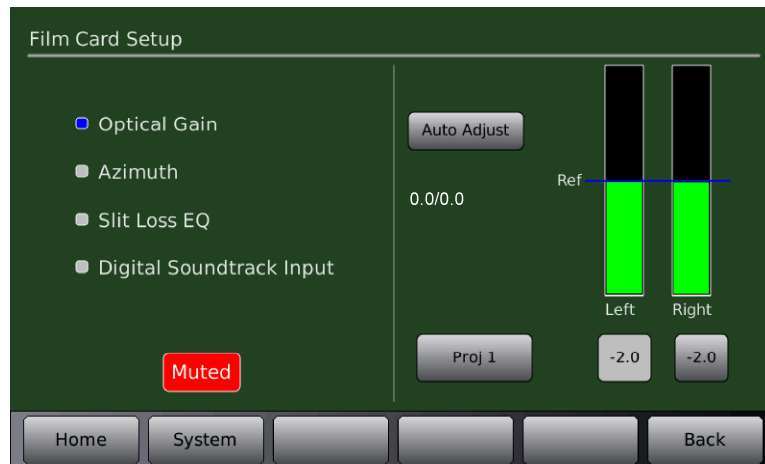
Figure 11 – Film card setup screen, Optical Gain

Thread the 50% tone test film (Cat69T) and run the projector. The signal should now be present on the scope and the AP25 Film Card Setup screen as shown in **Figure 11**.

Two vertical graphs indicate the optical level for the left and right channels. The goal is to adjust each signal to the reference level. The numbers in white (under Auto Adjust) follow the graph. The numbers are separated into two readings (0.0 / 0.0) where the number on the left is left channel and number on right is the right channel.

A projector select button is provided: Projector 1 = **Proj1** and projector 2 = **Proj2**. Pressing the button makes the selection.

Auto Adjust enables auto (self) adjustment when pressed. When pressed, a count down will appear as adjustments are made. If no signal is present or is out of range, a pop-up message will appear:
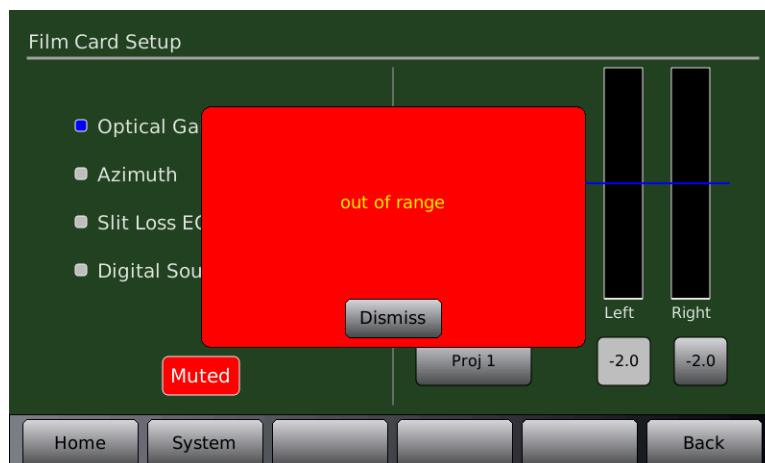
Figure 12 – Auto Adjust "Out of Range"

If this appears then either the signal is too great or (more likely) no signal or a very low signal is present. Be sure the test/alignment film is playing. Also check that projector's optical solar cell is connected and powered. Consult your projector's manual for more information.

To close this window, press **Dismiss**.

To manually adjust levels, select the button below the left input level bar and use the AP25 front panel adjustment knob to increase or decrease this level until it meets the reference line.

☑ Note: When using a laptop to VNC into the AP25, use the up and down arrows to mimic the action of the AP25 adjustment knob.

Repeat this step for the Right channel by selecting the button below that level indicator. The numbers in the buttons indicate the adjustment made to meet the reference level in dB.

F4.4.2.   Film path check

Items needed: Buzz Track test film, oscilloscope, and specific tools required to make adjustments, such as Allen/Hex Wrenches, small screw driver etc.

Thread up and play the Buzz Track test film. This test film has modulation beyond the scanned optical areas. If the alignment is off, the error can be seen on the oscilloscope and also heard on a monitor. The goal is to align the film path so that the slit image is centered on the soundtrack area of the film. This results in either a null response or equal level on both tracks. While observing the oscilloscope, make adjustments to the projector's optics to achieve the checked example shown below in **Figure 13**. Some adjustments are made by moving the projector's film guide laterally, while on others the lens and LED assembly is moved. Refer to the manufacturer's procedure regarding the proper adjustment for your model projector.
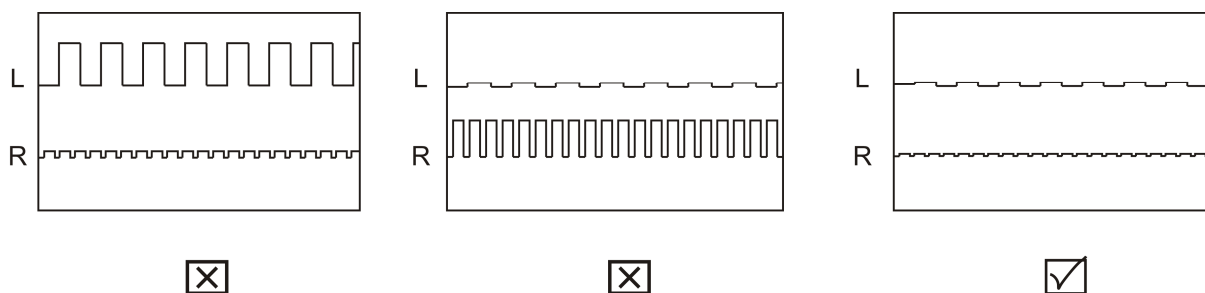
Figure 13 – Cell alignment viewed on Oscilloscope using Buzz Track test film

F4.4.3.   Cell Alignment

Items needed: Left/Right test film (CAT 97), oscilloscope and specific tools required to make adjustments, such as Allen/Hex Wrenches, small screw driver etc.

Thread up and play the Left/Right test film (CAT 97). This test checks for crosstalk between the Left and Right channels. The goal is to have both channels at equal level. If necessary, make adjustments to the solar cell by moving it left or right across the film path to achieve results as seen in **Figure 14**. Refer to the projector manufacturer's procedure for this adjustment.
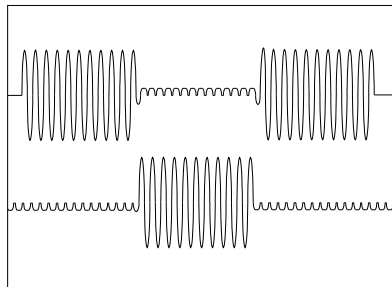
Figure 14 – Crosstalk using Cat 97 test film

☑   Note: while running the CAT 97 test film you can also select Azimuth in the AP25's optical set up screen. If alignment is correct you should be able to observe a cross on the screen as shown in **Figure 15**. The same applies to viewing on the oscilloscope in X/Y mode.
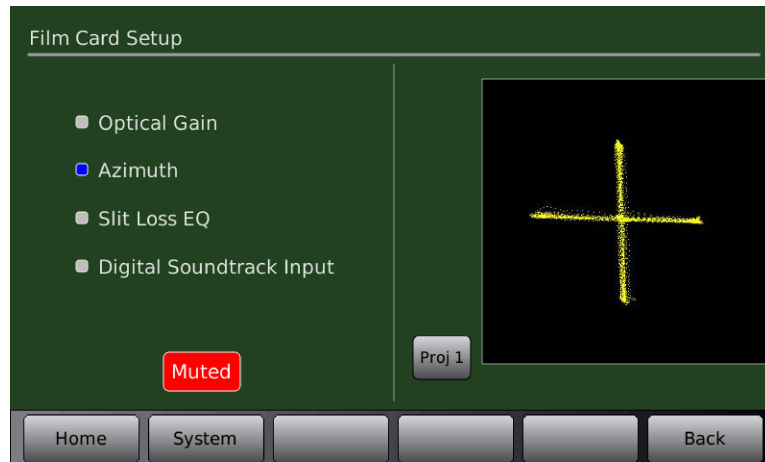
Figure 15 – Optimum LED to lens alignment

F4.4.4.   Azimuth and Focus

Items needed: Pink Noise test film (CAT 69P) oscilloscope, RTA, and specific tools required to make adjustments, such as Allen/Hex Wrenches, small screw driver etc.

Thread Pink noise test film (CAT 69P) and start the projector. Using the oscilloscope in the XY mode, adjust the projector's optics (azimuth and focus controls) for the best diagonal trace, see. **Figure 16**

| In Phase, Out of focus/azimuth | Out of Phase | Correct |
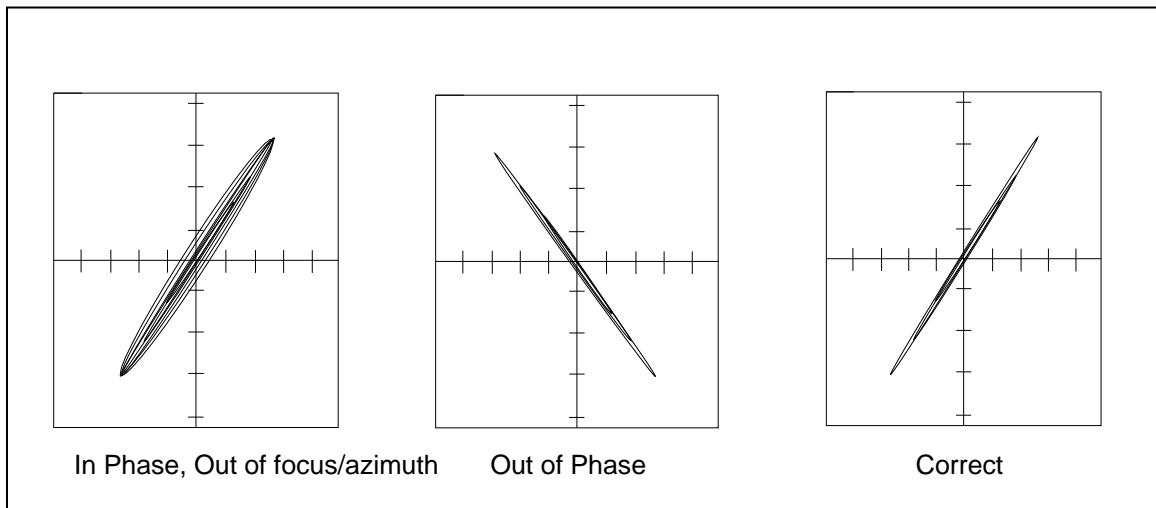
Figure 16 – Azimuth

This can also be viewed on the AP25 screen by going to **Menu (System)** → **Formats** → **Format Options** → **Film Options** → **Film Setup** and Selecting **Azimuth** (see **Figure 15**).

When Azimuth is selected, on the right a pictorial of the azimuth adjustment is shown.

A projector select button is provided: Projector 1 = **Proj1** and projector 2 = **Proj2**. Pressing the button makes the selection.

The pattern on the graph shows the azimuth adjustment.

Connect the RTA to one of the test BNC connectors on the H338 preamp card. While observing the response on the RTA, adjust the projector optics for the flattest response. This is achieved by moving the optical lens in or out for the sharpest focus and gently rotating it for straight azimuth. This is done while observing both the oscilloscope and RTA, see **Figure 16** and **Figure 17**.

Once set, move the RTA to the other test point and the results should be the same. Final slit loss correction will be done in the next step. Depending on the design of the projector's optics, both focus and azimuth can interact; refer to the projector's manufacturer for proper adjustment procedure of azimuth and focus.
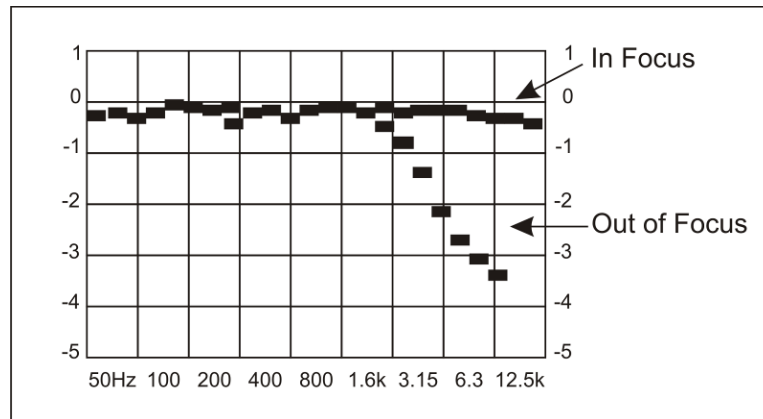
Figure 17 – Focus

After the flattest response is achieved by adjusting the projector optics, the final slit loss correction is made using the Parametric Filter Settings, see **Figure 18**.

F4.4.5.   Slit Loss EQ

When Slit Loss EQ is selected a graph of the slit loss adjustment is shown on the right of the screen (see **Figure 18** below). The goal is to achieve a flat response. Each frequency level should meet reference ("db" on the graph) as shown. Note the roll-off after 12.5 kHz.

Menu (System) → **Formats** → **Format Options** → **Film Options** → **Film Setup** → **Slit Loss EQ**
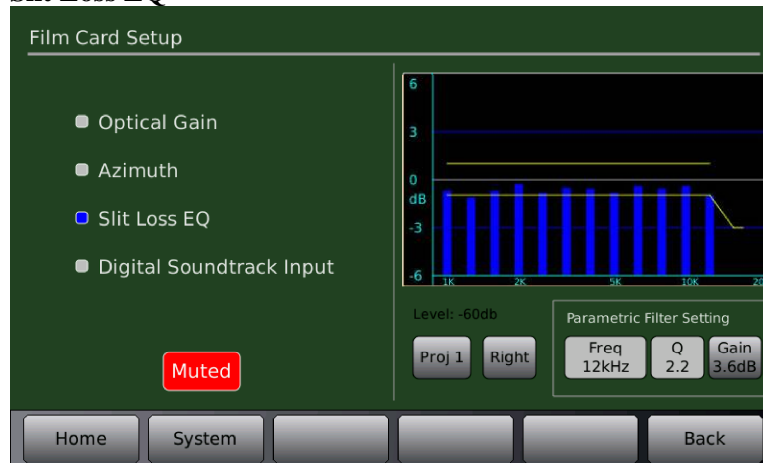
Figure 18 – Slit Loss EQ

A projector select button is located below the graph: Projector 1 = **Proj1** and projector 2 = **Proj2**. Press the button to select.

The **Level** number above the **Proj** button is a general indicator of the input signal level that can be used to confirm there is a valid signal. In **Figure 18** the Level is -7dB, which is typical when playing pink noise.

A button to allow switching between **Right** and **Left** channels is located to the right of the **Proj** button. Press this button to select the channel.

Parametric Filter Setting

The frequency (**Freq**) select button is used to scroll and select the desired frequency. Press the button and turn the fader to make the selection.

The **Q** button is used to select the bandwidth range when making an EQ adjustment. A smaller number adjusts frequencies closest to the Freq selected whereas a large number will expand the adjustment affect. Press the button and turn the main fader to make selection.

The **Gain** button is used to make level adjustments at the filter frequency. Press the gain button and turn the main fader as needed.

F4.4.6.   Digital Soundtrack Input

Digital Soundtrack Input is used to allow a smooth cross-fade from the optical playback to another analog or digital input source (that is connected to the AP25 rear panel). If digital soundtrack for film is not used then keep the selection at None (factory default).

Menu (System) → Formats → Format Options → Film Options → Film Setup → Digital Soundtrack Input

Film Card Setup

⬤ Optical Gain

⬤ Azimuth

⬤ Slit Loss EQ

◻ Digital Soundtrack Input

Muted

Select Input for Digital Soundtrack:

None   ◻

Digital Channels 1->8   ◻

Analog Channels 1->8   ◻

| Home | System | | | | Back |
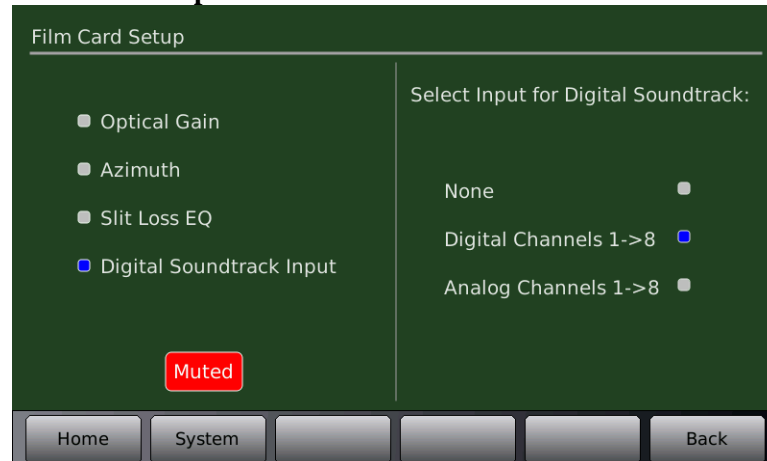
Figure 19 – Digital Soundtrack Input

None is use when the AP25 analog and digital input connectors are not used for the film digital soundtrack.

Digital Channels 1->8 select this if the film digital soundtrack player is connected to the AP25 Digital Input channels 1-8 connector.

Analog Channels 1->8 select this if the film digital soundtrack player is connected to the AP25 Analog Input channels 1-8 connector.

☑   When the Digital Channels input is used for the digital soundtrack you must make sure that the **Input Source** selection is **Digital Ch: 1->8** as shown in **Figure 20** below. The other options, Digital Ch: 1->16 or Digital Ch: 9->16, should not be used because it eliminates the cross-fade function between digital and optical. Pressing the **Digital Ch:** button repeatedly allows you to change the digital channel selection.

Menu (System) → Formats → Input Source
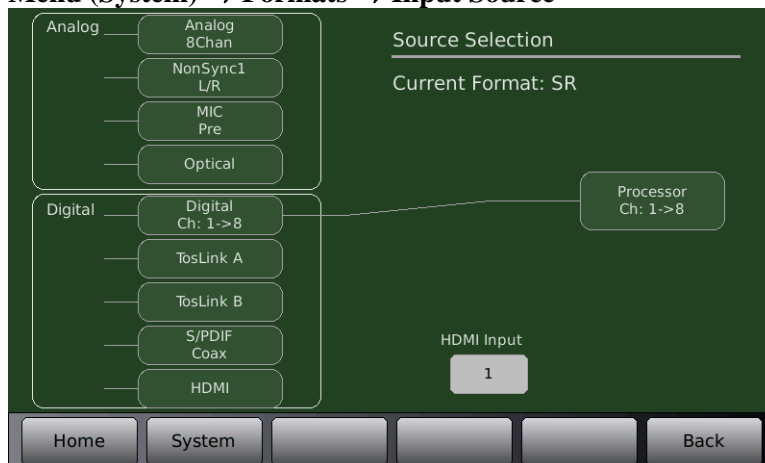
Figure 20 – Input Source Screen

F4.4.7.   Matrix Bass Extension

Items needed: RTA with Microphone

When Matrix/Optical Bass Extension (OBE) is selected, the left half of the screen allows you to enable pink noise on Center and/or LFE channels. The right half of the screen provides settings for the parameters of optical bass gain and low pass filter frequency.

☑ Note: Input source must be set to Optical for the Film Options menu to be available.

Menu (System) → Formats → Format Options → Film Options → Bass Enh
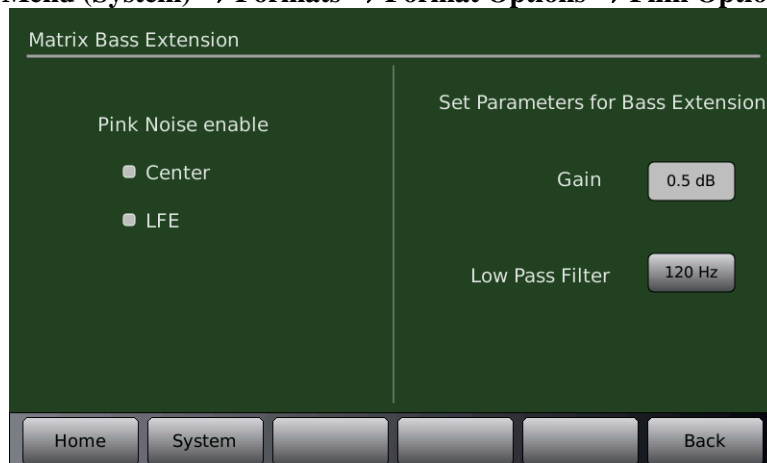
Figure 21 – Matrix Bass Extension

Gain allows you to set the gain for the optical bass. Press the button with the number displayed and rotate the main fader to adjust for the desired level.

Low Pass Filter allows you to choose the frequency of the filter. Press the button with the number displayed and rotate the main fader to adjust the desired frequency.

When adjusting the Bass Extension, set up a microphone in the auditorium. It is best to use a single microphone, or if using a multiplexer select single microphone only, and connect it to the RTA.

Select an optical format on the AP25, enable pink noise on the center channel, and note the level and low frequency roll off displayed on the RTA. Select the appropriate Low Pass Filter

setting by pressing that button and using the fader knob to make any changes required to match the low pass filter to the roll off measured.

Next turn on the subwoofer channel, enable pink noise on the LFE channel, and then select the Bass Gain by pressing the <Gain> button. Use the AP25 fader knob, or up and down keys when using a laptop, to adjust the Bass Gain to match the Center channel level previously noted on the RTA display. The Bass Gain range is -20dB to +10dB in 0.5dB increments.

F4.4.8.   Optical Surrounds Delay Settings

☑ Surround delays are in addition to any channel delays.

To set surround delays for the optical formats, go to **Menu (System) → Formats → Format Options → Global Delay and Surround Offset**

Global Delay and Surround Offset		Current Format: SR	
Global audio delay	000 ms	Surround Offset:	0.0 dB
Surround Delay:	0 ms	Format Trim:	0.0 dB
H.I. Delay:	0 ms	Fade In:	0 ms
		Fade Out:	0 ms

Fade In and Fade Out should be set to 0ms for Film Formats to prevent interference with the Optical Crossfade

| Home | System | | | | Back |

Figure 22 – Surround Delay

Select Surround Delay. Enter the desired delay (in milliseconds). The delay is entered by selecting the Surround Delay box and then dialing in the correct value using the front panel rotary encoder.

For more information on calculating the Surround Delay, see section 4.6.3.1 in this manual.

F4.4.9.   Recheck Optical Gain Levels

See F4.4.1 above: Optical Gain Adjustment. If any adjustments were made it may be necessary to reset these levels. This will complete the optical alignment.

F4.5.   Trouble shooting

No activity seen on AP25 Film Card Setup Screen.
Confirm projector optical LED is on, next check connections from Projector to H338 card, confirm which Projector input is being used, and check that LED light is on next to input, if not select an optical format on the home screen.

The AP25 mutes when switching from optical card to digital or analog input source
This may occur if the digital soundtrack input is not set correctly. Go to the Film Card Setup screen and select Digital Soundtrack Input, in this menu choose the input source in use, analog or digital.

Appendix G: Connecting Two AP25 units

Two AP25 units can be linked together serially. When this is done the two units work in unison locking their format, fader level, and mute selection.

Both AP25 units must have matching format names. The names must match exactly although their format profiles may be different.

A null modem cable is needed.
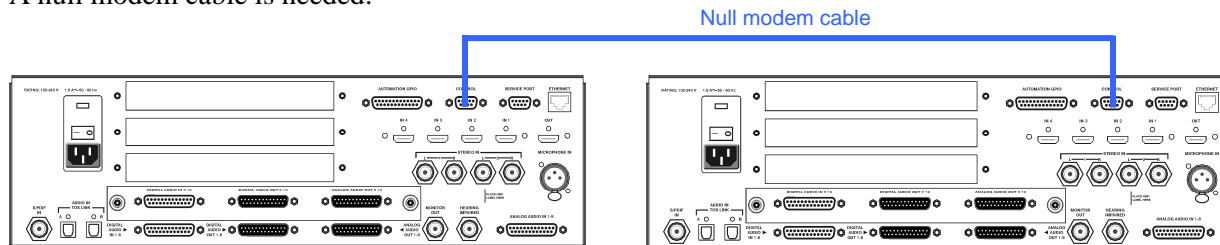
Null modem cable

Connect a null modem cable to the Control connector of each AP25 unit.
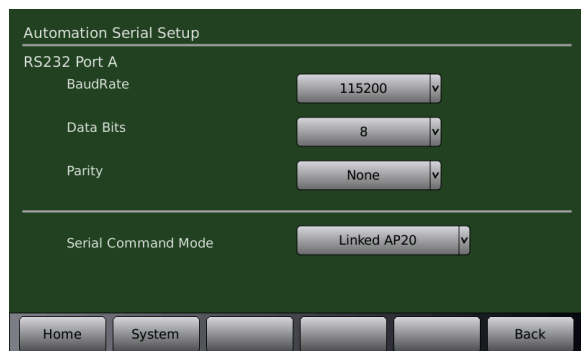
Program both AP25s to lock onto the other by selecting:

Automation > Serial > Serial Command Mode

Select "Linked AP20"

AP25 #1

AP25 #2
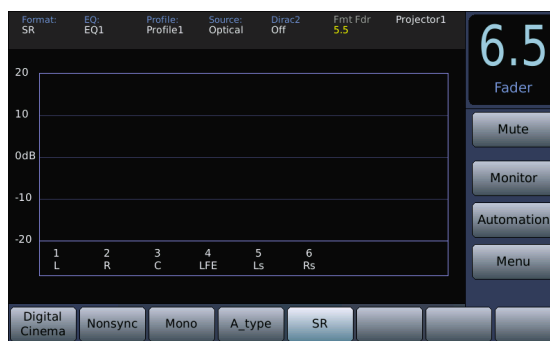
Formats

When programming format names on each AP25, the format names match exactly, as shown in the example above. When selecting any of the three available formats on either AP25, that format will be chosen on both AP25 units. The above shows SR as selected.

Note: If one of the AP25's Nonsync format was named "nonsync" or "Non sync" it would not work. Both must be named exactly as in the above example, AP25 #1 Nonsync, AP25 #2 Nonsync.

Appendix H: AP25 Remote Command API

Introduction

This document describes the serial and network control commands for the Datasat AP25 Audio Processors. The AP25 supports a command set for remote control and automation. These commands can be transmitted via either the Ethernet or the serial interface.

This document is intended to be used by any system integrator who needs to control the AP25 remotely. Example of an application where these commands could be used may be an automation unit, a remote control unit, or a remote software interface.

It assumes that the reader is familiar with standard serial and network TCP/IP concepts.

Serial Control

The remote serial control device must be connected to the RS232 "Control" connector on the back of the AP25. To configure the serial port, go to the menu System -> Automation ->Serial. Select the desired baud rate. Also set Serial Command Mode to AP20.

For test purposes you may connect to the AP25 using PuTTY or any similar serial communications program. Connection from a standard PC to the AP25 is a straight-through cable.

Once the serial connection is made and setup the user can execute any of the commands listed within this document.

Ethernet connection to AP25

The RJ45 connector labeled Ethernet on the back of the AP25 can be connected to a network switch or router. Once the network parameters are properly set the IP addresses for the AP25 can be found in the Network screen in the IP Address box.

The AP25 may also be connected directly to another network device using crossover cable, or a straight cable if the device supports auto-MDIX.

The client initiates the communication session with the AP25 IP address at port 14500. Once connected the client may send commands as described in this document to set or read the AP25 configuration. The configuration changes happen as soon as they are received. For example, you should see the Fader volume change immediately after receiving a command to set the fader.

For test purposes you may use PuTTY or any similar communications program to make a TCP/IP connection to the AP25.

Using PuTTY

Open PuTTY in the configuration Session and set the following: Host Name: (enter the AP25 IP address) Port: 14500   Configuration type: Raw. Select the Open button. Once the network connection is made the user may type in commands listed within this document and read the response.

Using HyperTerminal

In HyperTerminal, select "Connect Using: TCP/IP (WinSock). Then enter the AP25 IP address under "Host address:", and 14500 for "Port number: ".

Using Telnet

To use Telnet, enter the IP address and port number in the command line, for example:

```
# telnet 10.1.1.78 14500
```

Application Programming

Custom programs can be written to communicate with the AP25 using standard TCP/IP communications. An example C language interface is included at the end of this document for reference.

Password Protection

The AP25 may be protected from unauthorized access by setting a password under the **System > Access Control** screen. There are two levels of password protection in the AP25, labeled **NetCmd Password** and **Setup Password**.

NetCmd Password

The NetCmd Password is used to prevent unauthorized access to the AP25 through a network connection. The NetCmd Password does not prevent access through the serial command.

Setup Password

The Setup Password prevents unauthorized access to any AP25 setup commands through the AP25 local front panel or remotely through serial or Ethernet connections. This does not affect the operator level commands that are used in this document.

Authentication Command

The AUTH command must be sent to the AP25 before sending a password protected command. If this is not done, then the command results in no action and the AP25 returns the string "SECERR". Sending the correct password enables all network commands for the password level for as long as the network connection is maintained.

Not all network commands require a password. Inquiry commands such as SYSTEM and IDENTIFY will operate without a password.

Command Format

The general command format for all configuration commands is listed below:

@COMMAND [ARG1] [ARG2] <CR>

Each **COMMAND** and its arguments are defined in this document. Whether or not **[ARG1]** and/or [ARG2] are used depends on the command. Square brackets **[]** around the arguments in this document indicate that the argument is optional.

The command is terminated by a **<CR>**. The response returns ASCII text and is also terminated by **<CR>** character at the end. The **<CR>** represents an ASCII character with the value 0x0D. How to enter this character in the command is entirely dependant on the remote program or interface used. On a terminal interface, it is added by pressing ENTER on the keyboard. In some GUI interfaces it is represented by "**\r**", and for XML it may be **&#10**.

Important: If you are having problems with executing a simple command to the AP25, check that the command string starts with '@' and properly sends the carriage return at the end.

Some commands are characterized as "Read" and are used only to read status or information from the AP25. Commands that are "Read/Write" can be used to set the specific configuration item, or just read it.

For "Read/Write" commands the last argument is the value to write to the configuration. Omit the final argument in order to read the configuration item without changing it.

General Commands

1. System Information

Returns system versions and MAC address

Command:	@SYSTEM <cr>	Operation
Response:	VER<space>[Version]<LF> VERDATE<space>[Date]<LF> MAC<space>[Mac Address]<CR><\0>	Read

Parameters

Version	Software version number
Date	Software date/time
Mac Address	AP25 MAC address

2. Identify

Get system identify information. Mostly used in discovery protocol.

Command:	@IDENTIFY<cr>	Operation
Response:	AP20<space> [IP]<space> [Circuit]<space> [Theater]<space> [Screen]<cr>	Read

Parameters

AP20	Confirms AP25 is connected at this address
[IP]	IP address (useful after broadcast command)
[Circuit]	Circuit information
[Theater]	Theater information
[Screen]	Screen information

3. Health

Enquiry for system health data.

Command:	@HEALTH [*SUB CMD*]<cr>	Operation
Response:	(depends on SUB_CMD)	Read

SUB_CMD

TEMPERATURE

Returns t1, t2, t3 Celsius temperatures where:
t1: H331 board temperature
t2: H332 board temperature

t3: H335 board temperature

Example response:
HEALTH TEMPERATURE 34,29,25

H331VOLTS

Returns voltages sensed on H331 board,
<vok>,<ref>,<5v>,<+15v>,<-15v>,<-5V>

Example response:
HEALTH H331VOLTS 1,3.18,4.99,15.0,-15.0-,-5.0
<vok> is 1 if voltages are all within limits, else 0

H332VOLTS

Returns voltages sensed on H332 board,
<vok>,<ref>,<5v>,<+15v>,<-15v>,<-5V>

Example response:
HEALTH H332VOLTS 1,3.18,4.99,15.0,-15.0-,-5.0
<vok> is 1 if voltages are all within limits, else 0.
If H332 board is not present, response will be
HEALTH H332VOLTS NA

H335VOLTS

Returns voltages sensed on H335 board, <vok>,<ref>,<1.3v>

Example response:
HEALTH H335VOLTS 1,3.13,1.32
<vok> is 1 if voltages are all within limits, else 0

H336VOLTS

Returns voltages sensed on H336 board,
<vok>,<ref>,<+5V>,<+15V>,<-15V>,<48V>,<vcpu>

Example response:
HEALTH H336VOLTS 1,3.39,5.10,15.0,-14.4,0.0,1
<vok> is 1 if voltages are all within limits, else 0
<48V> is mic phantom power, will be 0 if phantom power off
<vcpu> will be 1 if CPU power in limits, else 0

H338VOLTS

Returns voltages sensed on H338 board,
<vok>,<ref>,<5v>,<+10V>,<-10V>

Example response:
HEALTH H338VOLTS 0,3.18,5.02,10.56,-10.48
<vok> is 1 if voltages are all within limits, else 0
If H338 board is not present, response will be:
HEALTH H338VOLTS NA

4. Board Information

Command:	@BOARDINFO<cr>	Operation
Response:		**Read**
	H331,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	H332,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	H335,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	H337In,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	H337Out,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	H338,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	HDMI,[*ID*],[*AD*],[*R*],[*V*],[*CS*],[*FW*],[*FCS*],	
	<cr>	

Returns a list of boards, present and their hardware and PIC f/w versions.

Arguments
  None

Board IDs:
  H331   H331 Board
  H332   H332 Board
  H335   DSP/Motherboard
  H337in   H337In
  H337in   H337Out
  HDMI   HDMI Interface board

Parameters:
  [ID]   Board ID
  [AD]   Board Slot Address
  [R]   Hardware revision
  [V]   Loader version
  [CS]   Loader Checksum
  [FW]   Firmware version
  [FCS]   Firmware Checksum

5. Authorization

Command:	@**AUTH**<space>**[Password]**<cr>	**Operation**
Response:	**AUTH**<space>**[SETUP|OP|SECERR]**<cr>	**Read**

Give a password to allow usage of restricted commands. The authorization is required for many commands if access the AP25 is configured with a Password. The **AUTH** must be issued before issuing any password protected commands, and is valid only for the duration of the TCP/IP connection.

There are two levels of password protection in the AP25. Both levels are set in the **System > Access Control** screen on the AP25. The top password labeled **NetCmd Password** will allow access to the AP25 for Operator level type commands. The bottom password labeled **Setup Password** allows access to setup and configuration level commands.

The **AUTH** may be used for either the Operator or Setup level password.

Parameters:

[Password] Operator level or Setup level password. The AP25 compares this first with setup level password and gives Setup Level authorization if it matches. Otherwise, it compares it to the Operator (NetCmd) password and authorizes operator commands if it matches.

SETUP **The AP25** returns this value when Setup Level authorization has been granted.

OP **The AP25** returns this value when Operator Level authorization has been granted.

SECERR **The AP25** returns this value if neither Setup nor Operator level authorization has been granted.

6. Serial Number

Command:	@**SERIALNO**<CR>	**Operation**
Response:	**SERIALNO** <space>**[SN]**<CR>	**Read**

Reads the AP25 serial number.

Parameters

[SN] This value is the serial number that has been programmed into the unit during the manufacturing process.

7. MAC Address

Command:	@MAC`<CR>`	Operation
Response:	MAC`<space>`*[Mac adr]*`<CR>`	Read

Reads the AP25 or AP25 network MAC address.

Parameters

   [Mac adr]   This is the 12 digit AP25 network interface MAC address.

Example
     Send*:*   MAC
     Receive*:*   MAC 080077124578

Format Commands

8. Format Selection

Command:	@FORMAT`<space>`*[New Format]*`<CR>`	Operation
Response:	FORMAT`<space>`*[Format]*`<CR>`	Read/Write

This is used to select a new format, or view the current format.

Parameters
  [New Format] This is the format name to select. The name must match exactly the format
          name on AP25.
          Note: Spaces may be used within the name.

  [Format]   This is the current format name.

Example
   Set the format to Digital Cinema
   Send: FORMAT Digital Cinema
   Receive*:*   FORMAT Digital Cinema

Automation

9. **Execute an AP25 Macro**

Command:	@RUNMACRO<space>*[Macro]*<CR>	Operation
Response:	[OK or ERR no macro]<CR>	Write

This is used to execute a macro defined in the AP25.

Parameters

[Macro]   This is the macro name to execute. The name must match exactly the macro name on AP25.
Note: Spaces may be used within the name.

OK   Response after macro is found and executed.

ERR no macro   Response if macro does not exist on the AP25.

Example

Run Macro named Auto1
Send: RUNMACRO Auto1
Receive*:*   OK

Level Commands

10. **Master Fader Level**

Command:	@FADER<space>*[New Level]*<CR>	Operation
Response:	FADER<space>*[Level]*<CR>	Read/Write

This is used to set or read the fader level.

Parameters

[New Level]   Value to set the fader in tenths.
Omit this argument to only read the fader value.
[Level]   Current master fader level in tenths.

Example

Set the master fader to 7.0
Send: FADER 70
Receive*:*   FADER 70

11. Master Fader Mute

Command:	@MUTED<space>*[New Value]*<CR>	Operation
Response:	MUTED<space>*[Value]*<CR>	Read/Write

Mute or Unmute the AP25 output.

Parameters

    [New Value]   1 to mute, 0 to unmute.

    [Value]   Current mute value.

Example

    Mute

        Send: MUTED 1
        Receive*:*   MUTED 1

12. Monitor Level

Command:	@MONITORLEVEL<space>*[New Value]*<CR>	Operation
Response:	MONITORLEVEL<space>*[Value]*<CR>	Read/Write

Set or read the AP25 monitor level.

Parameters

    [New Value]   0 (minimum) to 100 (maximum).

    [Value]   Current monitor level value.

Example

    MONITORLEVEL

        Send: MONITORLEVEL 70
        Receive*:*   MONITORLEVEL 70

13. Monitor Mute

Command:	@MONITORMUTE<space>*[New Value]*<CR>	Operation
Response:	MONITORMUTE<space>*[Value]*<CR>	Read/Write

Set or read the AP25 monitor level.

Parameters

[New Value]   0 (unmute) or 1 (mute).

[Value]   Current mutevalue.

Example

Mute the monitor.

Send: MONITORMUTE 1
Receive*:*   MONITORMUTE 1

Sample Network Control Program

```
/* ===================================================================== **
 *
 *   Module:     Ap20NetCmd.cpp
 *
 *   Project:    AP25 Ethernet Control Program
 *
 * ===================================================================== **
 *
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 * OR INABILITY TO USE THE SOFTWARE OR RELATED DOCUMENTATION.
 *
 * ===================================================================== */

/* ===================================================================== **
 *   Compile Options
 * ===================================================================== */

#define StrAp20Ip        "10.1.1.78"
#define StrAp20Password  "xyz"

/* ===================================================================== **
 *   Include Files
 * ===================================================================== */

#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#include <arpa/inet.h>

/* ===================================================================== **
 *   Definitions
 * ===================================================================== */

#define AP20_PORT_NUM    14500

/* ===================================================================== **
 *   Data
 * ===================================================================== */

#define RX_BUF_SIZE 2048
char rxBuf[ RX_BUF_SIZE + 1 ];
```

```
/* ========================================================================= **
 *  Prototypes
 * ========================================================================= */

int AP20Command( char *strAp20_IpAddress, char *StrCmd, char *StrPassword );
int Send( int fd , char *StrCmd );
int ReadResponse( int fd , char *StrCmd );

/* ========================================================================= **
 *  Functions
 * ========================================================================= */

/* ------------------------------------------------------------------------- **
 *  Function:  main
 *
 *  Picks up the Command from the command line arguments.
 *  In this example the AP20 IP address and AP20 Setup password is hardcoded.
 * ------------------------------------------------------------------------- */

int main (int argc, char **argv)
{
  char StrCmd[256];
  int cnt;

  if ( argc < 2)
    {
      printf ("Usage: Ap20NetCmd arg1 ... arg\n");
      exit(1);
    }

  // collect args
  int firstarg=1;
  snprintf( StrCmd, sizeof(StrCmd), "%s", argv[firstarg++] );
  for ( cnt = firstarg; cnt < argc; cnt++ )
    {
      strcat ( StrCmd , " ");
      strcat ( StrCmd , argv[cnt]);
    }

  AP20Command( StrAp20Ip, StrCmd, StrAp20Password );
}


/* ------------------------------------------------------------------------- **
 *  Function:  AP20Command
 *
 *  - A socket connection to the AP20 is established to the AP20 IP
 *    address using port 14500.
 *  - Send the AUTH command if the AP20 has a password defined.
 * ------------------------------------------------------------------------- */

int AP20Command( char *strAp20_IpAddress, char *StrCmd, char *StrPassword )
{

  int fd;
  struct sockaddr_in MySocket;        // sender main socket

  memset(&MySocket, 0, sizeof(MySocket));
  MySocket.sin_addr.s_addr = inet_addr( "127.0.0.1" );
  MySocket.sin_addr.s_addr = inet_addr( strAp20_IpAddress );    // Set the AP20 IP address here
  MySocket.sin_family      = AF_INET;
  MySocket.sin_port        = htons( AP20_PORT_NUM );            // Set the AP20 Port address

  // Get a file descriptor for the socket
  if ((fd = socket(AF_INET, SOCK_STREAM, 0)) < 0)
    {
      printf("socket() failed\n");
      return -1;
    }

  // Connect to the AP20
  if( ::connect( fd, (struct sockaddr *)&MySocket, sizeof( MySocket ) ) != 0 )
```

```
      {
        printf("connect() fail\n");
        close( fd );
        fd = -1;
        return -1;
      }

    printf( "Connection to %s:%d OK\n", strAp20_IpAddress, AP20_PORT_NUM );

    // Send passord only if AP20 has Setup Password defined

    char StrAuth[100];
    sprintf( StrAuth, "AUTH %s", StrPassword );
    if( strlen( StrPassword ) )
      {
        Send( fd, StrAuth );
        ReadResponse( fd, StrAuth );
        if( !strcmp( rxBuf, "SETUP" ) )
          {
            printf( "Wrong Password\n" );
            return( -1 );
          }
        else
          printf( "Password OK\n" );
      }

    Send( fd, StrCmd );
    ReadResponse( fd, StrCmd );

    close( fd );                                 // Close connection
    fd = -1;
    return( 0 );
}


/* ---------------------------------------------------------------------- **
 *  Function:  Send
 *
 *  Sends a command string the AP20.
 * ---------------------------------------------------------------------- */

int Send( int fd , char *StrCmd )
{
  char strAP20Cmd[1024];

  // Command starts with '@' and ends with CR

  strcpy( strAP20Cmd, "@"    );
  strcat( strAP20Cmd, StrCmd );
  strcat( strAP20Cmd, "\r"   );

  printf( "Sending NetCmd to AP20: %s\n", strAP20Cmd );

  int ret = write(fd,&strAP20Cmd,strlen(strAP20Cmd) );
  if ( ret < 0 )
    {
      fprintf(stderr,"write fail\n");
      close(fd);
      fd = -1;
    }
  return 0;
}

/* ---------------------------------------------------------------------- **
 *  Function:  ReadResponse
 *
 *  Reads data received from the AP20 until CR is received.
 * ---------------------------------------------------------------------- */

int ReadResponse( int fd , char *StrCmd )
{
  char c;
```

```
    int count=0;

    for( int i=0; i<RX_BUF_SIZE; i++ )
      {
        // read 1-by-1.
        int ret = read(fd, &c, 1);
        if ( ret < 0 )
          {
            printf( "Count=%d, Error\n", count );
            close(fd);
            fd = -1;
          }

        if (ret == 1)
          {
            // add to buffer
            rxBuf[count++] = c;
            if( c == '\r' )                      // End of response
              {
                rxBuf[count] = 0;
                printf( "%s\n", rxBuf );
                break;
              }
          }
      }
    return 0;
}

/* ======================================================================= **
 *              # # #   End of Ap20NetCmd.cpp      # # #
 * ======================================================================= */
```