# KRAMER

# USER MANUAL

## MODELS:

## AFM-20DSP, AFM-20DSP-LE, AFM-20DSP-AEC

## 20-Port Audio Matrix

# Contents

# Introduction

Welcome to Kramer Electronics! Kramer Electronics provides a world of creative and affordable audio and visual solutions for the AV industry. At Kramer, we go beyond the box with end-to-end solutions that blend cutting-edge cloud technologies, advanced software, and dependable hardware.

## Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment.

- Review the contents of this user manual.

ⓘ To check for up-to-date user manuals, application programs, and if firmware upgrades are available (where applicable) for your device, go to:
  - www.kramerav.com/downloads/AFM-20DSP
  - www.kramerav.com/downloads/AFM-20DSP-LE
  - www.kramerav.com/downloads/AFM-20DSP-AEC

## Achieving the Best Performance

- Use only quality connection cables. We recommend Kramer high-performance, high-resolution cables to avoid interference, deterioration in signal quality because of poor matching, and elevated noise levels (often associated with low quality cables).

- Do not secure the cables in tight bundles or roll cable slack into tight coils.

- Avoid interference from nearby electrical appliances that may adversely influence signal quality.

- Position your Kramer **AFM-20DSP**, **AFM-20DSP-LE**, **AFM-20DSP-AEC** device away from moisture, excessive sunlight, and dust.

## Safety Instructions

⚠️ **Caution:**
- This equipment is for inside building use only. It may only be connected to other equipment that is installed inside a building.

- For products with relay terminals and GPI\O ports, refer to the permitted rating for an external connection, located next to the terminal or in the user manual.

- There are no operator serviceable parts inside the device.

⚠️ **Warning:**
- Use only the power cord that is supplied with the device.

- Before installation, disconnect the power and unplug the device from the wall.

- Do not open the device. High voltages can cause electrical shock! Servicing by qualified personnel only.

- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label located on the bottom of the device.

## Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at https://www.kramerav.com/il/quality/environment.

# Overview

Congratulations on purchasing your Kramer device 20-port matrix device.

Each model listed in this User Manual is a high-performance, multi-channel DSP, professional audio matrix switcher with 20 analog ports that can be configured as inputs or outputs according to preset I/O configurations. In addition, each device includes a comprehensive and user-friendly graphic interface that makes configuring every detail of your audio system intuitive and easy.

**AFM-20DSP** includes multi-channel DSP, built-in 2x60W@8Ω and 1x120W@70V / 100V power amplifier, 4x4 Dante interface, HDMI™ embedding and de-embedding, and S/PDIF.

**AFM-20DSP-LE** (Lite Edition), is a "lite" version of **AFM-20DSP** without Dante, HDMI, AMP, and S/PDIF.

**AFM-20DSP-AEC** (Acoustic Echo Cancellation), the device expands the **AFM-20DSP** capabilities with the addition of Echo Cancellation, Noise Reduction, Comfort Noise Generation, and an USB type B port.

The following table shows the features of each device:

| Device Name | Maestro | Flex I/O | Dante | HDMI | Amp | S/PDIF | AEC | USB |
|---|---|---|---|---|---|---|---|---|
| AFM-20DSP | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| AFM-20DSP-LE | Yes | Yes | No | No | No | No | No | No |
| AFM-20DSP-AEC | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Most of the information included in this user manual is relevant to **AFM-20DSP**, **AFM-20DSP-LE**, and **AFM-20DSP-AEC**.

Sections referring to Dante, HDMI, S/PDIF, and amplifier ports (in the embedded webpages and Protocol 3000 sections) are not relevant to **AFM-20DSP-LE**.

Unless specified otherwise, **AFM-20DSP** or "device", when used by itself throughout this manual, refers to all three devices.

## Exceptional Quality

- High-Performance, Professional Audio Matrix Switcher – Professional, studio grade signal conversion technology, including the latest generation 32-bit advanced Digital Analog Converter architecture to achieve excellent dynamic performance and improved tolerance to clock jitter. Maintains the quality of the original audio signal with selectable sampling rates up to 96kHz. Flat frequency response, unmatched sonic performance, excellent signal to noise ratio, and extraordinarily low distortion levels.

- Multi-Channel Processing – Provides DSP (Digital Sound Processing) that enables simultaneous processing of all input and output signals.

- Programmable – Supports up to 10 global presets per I/O configuration plus 10 mixer snapshot presets.

- Audio de-embedding is for **AFM-20DSP** and **AFM-20DSP-AEC** only – It de-embeds the audio signal from the HDMI input for routing to any of the outputs or for routing to the loop output.

## Advanced and User-friendly Operation

- Intuitive and Comprehensive Configuration and Control – Through a powerful, user-friendly graphic interface, set volume (gain and attenuation) and DSP for each input, execute routing, select line in, mic in, phantom power or line out on each port, configure master level, and more.

- Convenient Control – Through the user-friendly embedded webpages and RS-232 serial controller, control signal routing, independent volume.

- Easy, Cost-Effective Maintenance – LED indicators for main power, line in/out, mic in, clipping (power amp, Dante sync, and HDMI for **AFM-20DSP** only), enable easy local maintenance and troubleshooting. Local firmware upgrade via the USB type-A port ensures lasting, field-proven deployment.

- Built-in Power Amplifier for **AFM-20DSP** and **AFM-20DSP-AEC** only – 2x60W @ 8Ω and 1x120W @ 70V / 100V power amplifier.

- Easy Installation – 19" enclosure for rack mounting a device in a 1U rack space with included rack ears and universal 100-240V AC power connection.

- Firmware Upgrade – Ethernet-based via software upgrade tool.

## Flexible Connectivity

- Wide Range of I/O Formats:

| Device | Analog Ports | 4x4 Dante Interface | HDMI Input | HDMI Output | S/PDIF Input | USB |
|---|---|---|---|---|---|---|
| **AFM-20DSP** | 20 | ✓ ** | ✓ | ✓ | ✓ | |
| **AFM-20DSP-LE** | 20 | | | | | |
| **AFM-20DSP-AEC** | 20 | ✓ ** | ✓ | ✓ | ✓ | ✓ |

**

ⓘ The Audinate Ultimo 4x4 chip can support up to **4 Dante audio channels. T**his chip has the following limitations:

- It can handle either 2 stereo streams or 4 mono streams, but only from two different devices.

- It can only accept streams from a maximum of two Dante sources.

As a result, when using mono microphones, you can connect only two sources, even if the total number of channels is under the 4-channel limit.

- Maximum Flexibility:

  - **AFM-20DSP**: use the default 12x8 I/O matrix configuration or select one of the preset analog I/O configurations.
  Route any input to any output, even between different formats (for example, route an analog input to an S/PDIF output); control volume and DSP per port; route any of the ports to the power amplifier.

  - **AFM-20DSP-LE**: use the default 12 x8 I/O matrix configuration or select one of the preset analog I/O configurations.

  - **AFM-20DSP-AEC**: use the USB audio as a stereo speaker or operate as an audio line-in or microphone for an audio recorder application or call conferencing.

# Typical Applications

**AFM-20DSP** is ideal for the following typical applications:

- Conference rooms and auditoriums.

- Government, live events, and healthcare.

- Large corporate connectivity systems.

## Controlling your AFM-20DSP

Control your **AFM-20DSP** by RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller, or via the Ethernet with the use of built-in user-friendly webpages.

# Defining AFM-20DSP

This section defines **AFM-20DSP/LE/AEC** front panels.

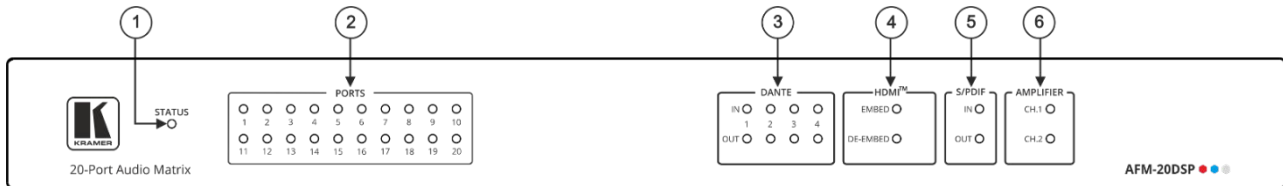## AFM-20DSP, AFM-20DSP-AEC Front Panels



Figure 1: AFM-20DSP and AFM-20DSP-AEC Front Panel

## AFM-20DSP-LE Front Panel



Figure 2: AFM-20DSP-AEC Front Panel

| # | Feature | Function | |
|---|---------|----------|---|
| 1 | STATUS LED | Indicates system status: | |
| | | Almost 3 cycles of red/blue/off/green LEDs flashing in sequence for about 30 seconds when system is starting up, and the application has not been launched yet. | Flashing green when application is initializing.<br>Green when system is ready for operation. |
| 2 | PORTS LEDs (1 to 20) | Indicate port status: | |
| | | Green when an input signal is present, and the port is defined as line in.<br>White when defined as line out.<br>Blue when defined as mic in. | Red when in clipping state.<br>Orange when in limiting state.<br>Off when there is no signal on the input. |
| 3 | IN OUT DANTE™ LEDs (1 to 4) | Indicate Dante signal status: | |
| | | Green when a signal is detected.<br>Red when clipping occurs. | Orange when in Limiting state.<br>Off when no signal is detected. |
| 4 | HDMI™ LEDs | EMBED | Turns green when an analog audio signal is associated with the HDMI OUT signal. Otherwise remains OFF. |
| | | DE-EMBED | Turns green when the HDMI IN audio signal is present. Otherwise remains OFF. |
| 5 | IN OUT S/PDIF LEDs | Indicate S/PDIF status: | |
| | | Green when a signal is detected.      Off when no signal is detected.<br>ⓘ   If a signal is detected only on one channel, either left only or right only, the status LED turns green. | |

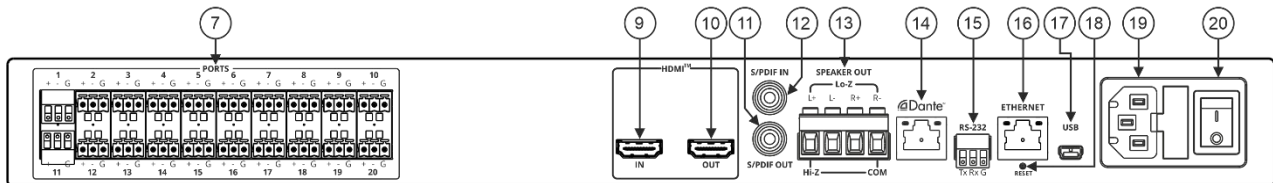| # | Feature | Function |
|---|---------|----------|
| ⑥ | CH 1(L)/CH 2(R) AMPLIFIER LEDs | Indicate amplifier signal status:<br>• Green when a signal is detected. • Off when no signal is detected.<br>In the webpage, Ch1 and CH2 are referred to as AMP 1 and AMP 2, respectively. |

# AFM-20DSP/LE/AEC Rear Panels



Figure 3: AFM-20DSP Rear Panel



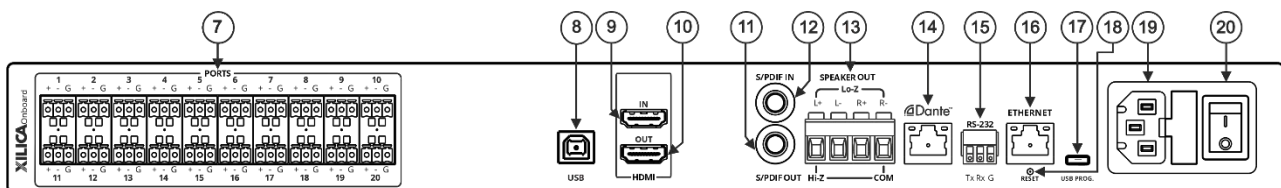Figure 4: AFM-20DSP-LE Rear Panel



Figure 5: AFM-20DSP-AEC Rear Panel

| # | Feature | Function |
|---|---------|----------|
| ⑦ | PORTS 3-pin Terminal Block Connectors (1 to 20) | Interchangeable balanced mono audio ports. Connect to an audio source or acceptor in one of 7 selectable I/O configurations: 16x4, 14x6, 12x8, 10x10, 8x12, 6x14, 4x16.<br>Each port can be defined as line in, mic in, mic + 48V in, or line out. |
| ⑧ | USB | **AFM-20DSP** can process the USB audio as a stereo speaker or operate as an audio line-in or microphone for an audio recorder application or call conferencing.<br><br>When the **AFM-20DSP** is connected to a computer via USB-C:<br>• In the computer's Settings > Manage sound devices > Output devices, the **AFM-20DSP** USB shows as "Speaker USB AUDIO CODEC".<br>• In a computer recoding application, the audio input settings for **AFM-20DSP** show as "Line USB AUDIO CODEC".<br>ⓘ Important:<br>• The computer's "Output" device (such as speakers) shows in the **AFM-20DSP** embedded webpages as a USB Digital "Input".<br>The computer's "Input" device (such as a microphone) shows in the **AFM-20DSP** embedded webpages as a USB Digital "Output". |
| ⑨ | HDMI™ IN Connector | Connect to an HDMI source for de-embedding the audio signal (the video signal is passed through to the output). |
| ⑩ | HDMI™ OUT Connector | Connect to an HDMI acceptor for embedding an audio signal from the matrix. |

| # | Feature | Function |
|---|---------|----------|
| (11) | S/PDIF OUT RCA Connector | Connect to a digital stereo audio acceptor. |
| (12) | S/PDIF IN RCA Connector | Connect to a digital stereo audio source. |
| (13) | SPEAKER OUT | Outputs two selected audio signals in two channels.<br>For Lo-Z: connect stereo output to Lo-Z speakers: L+ and L- to the left speaker; R+R- to the right speaker.<br>For Hi-Z (70V or 100V): connect Hi-Z and COM to mono Hi-Z speakers. |
| (14) | Dante PoE RJ-45 Port | Connect to Dante audio via the network. Provides 4 Tx channels and 4 Rx channels.<br>By default, DHCP is enabled. |
| (15) | RS-232 3-pin Terminal Block Connector | Connect to a PC/serial controller to control the device. |
| (16) | ETHERNET RJ-45 Connector | Connect to a PC via a LAN to control the device and for firmware upgrade. |
| (17) | Mini USB Connector | Connect to your PC to control the device. |
| (18) | RESET Recessed Button | Press and hold for about 5 seconds to reset the configuration to its default parameters. |
| (19) | Mains Power Connector and Fuse | Plug in the power cord. |
| (20) | POWER Power Switch | Turns the device on and off. |

# Installing AFM-20DSP

This section provides instructions for installing **AFM-20DSP**. Before you start the installation, make sure that the environment is within the recommended range:

- Operation temperature – 0° to 40°C (32 to 104°F).

- Storage temperature – -40° to +70°C (-40 to +158°F).

- Humidity – 10% to 90%, RHL non-condensing.

**Caution:**
- Install **AFM-20DSP** before connecting any cables or power.

**Warning:**
- Ensure that the environment (such as maximum ambient temperature and air flow) is compatible for the device.

- Avoid uneven mechanical loading.

- Appropriate consideration of equipment nameplate ratings must be used to avoid circuit overload.

- Reliable earthing of rack-mounted equipment must be maintained.

**To mount the AFM-20DSP in a rack**

Attach both rack ears by removing the screws from each side of the machine and replacing those screws through the rack ears, or place the machine on a table.
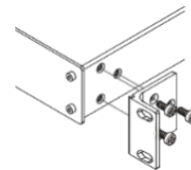
For more information, go to www.kramerav.com/downloads/AFM-20DSP.

# Connecting the 20-Port Audio Matrix

This section describes how to connect the **AFM-20DSP**, **AFM-20DSP-LE**, and**AFM-20DSP-AEC** devices.

## Connecting AFM-20DSP

(i) Always turn off the power to each device before you connect it to the **AFM-20DSP**. After connecting your **AFM-20DSP**, connect its power and then switch on the power to each device.



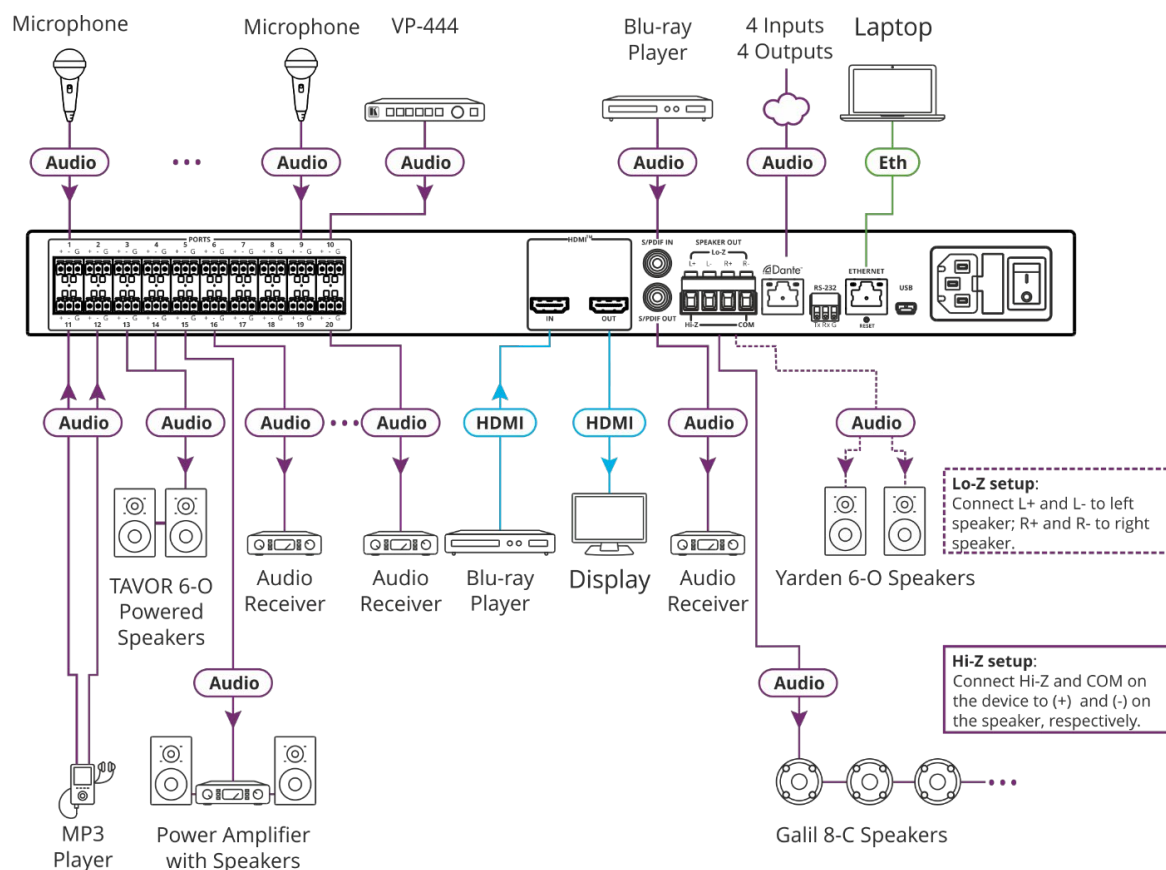Figure 6: Connecting to the **AFM-20DSP** Rear Panel

**To connect AFM-20DSP as illustrated in the example in [Figure 6](#):**

1. Connect these audio sources to the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example):

   ▪ Microphones to ports 1 to 9.

   ▪ The audio output of the Kramer **VP-444** scaler to port 10.

   ▪ An MP3 player to ports 11 and 12.

2. Connect the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example) to the following audio acceptors:

- Ports 13 and 14 to powered speakers (for example, Kramer **Tavor 6-O**).
- Port 15 to a power amplifier with speakers.
- Ports 16 to 20 to audio receivers

3. Connect the HDMI connectors as follows:

- A source (for example, a Blu-ray player) to HDMI IN ⑨.
- HDMI OUT ⑩ to an acceptor (for example, a display).

4. Connect the S/PDIF digital audio ports as follows:

- A source (for example, a Blu-ray player to S/PDIF IN ⑫.
- S/PDIF OUT ⑩ to an acceptor (for example, an audio receiver).

5. Connect the SPEAKER OUT Hi-Z OUT or Lo-Z OUT 4-pin terminal block connector ⑬ as follows:

- For Hi-Z connection: connect Hi-Z and COM terminal blocks to the + and – terminals of a mono speaker (for example, the **Galil 8-C** ceiling speakers, daisy chained). The speakers either output the left side (L+, L-) of the audio input or the stereo input reduced to a mono signal (see [Defining Audio Settings](#) on page [44](#)) .
- For Lo-Z connection: connect the L+ and L- connectors to the left-side speaker (for example, **Yarden 6-O**) and the R+ and R- connectors to the right-side.

6. Connect the Dante RJ-45 port ⑭ to up to 4Tx and for Rx audio channels via the network.

7. Connect the RS-232 3-pin terminal block connector ⑮ to the RS-232 port on a controller (for example, a laptop) to control the **AFM-20DSP**.

8. Connect the ETHERNET RJ-45 port ⑯ to the Ethernet to control the **AFM-20DSP** and use for firmware upgrade.

9. Connect the mini USB connector ⑰ to a control device (for example, a laptop) to control the **AFM-20DSP**.

10. Connect the power cord to the **AFM-20DSP** mains socket ⑲ and to the mains electricity (not shown in [Figure 6](#)).

# Connecting AFM-20DSP-LE

ⓘ Always switch off the power to each device before connecting it to your **AFM-20DSP-LE**. After connecting your **AFM-20DSP-LE**, connect its power and then switch on the power to each device.
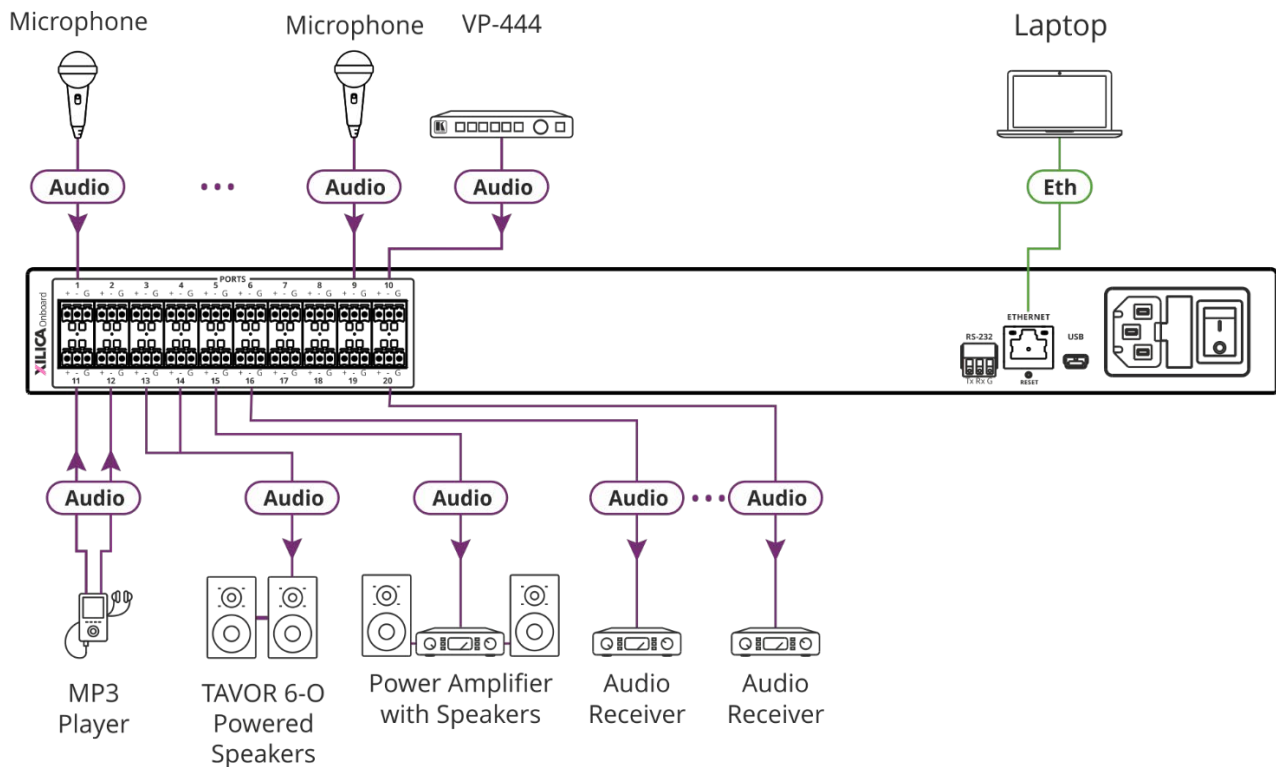


Figure 7: Connecting to the **AFM-20DSP-LE** Rear Panel

**To connect AFM-20DSP-LE as illustrated in the example in Figure 7:**

1. Connect the following audio sources to the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example):

   ▪ Microphones to ports 1 to 9.

   ▪ The audio output of the Kramer **VP-444** scaler to port 10.

   ▪ An MP3 player to ports 11 and 12.

2. Connect the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example) to the following audio acceptors:

   ▪ Ports 13 and 14 to powered speakers (for example, Kramer **Tavor 6-O**).

   ▪ Port 15 to a power amplifier with speakers.

   ▪ Ports 16 to 20 to audio receivers.

3. Connect the RS-232 3-pin terminal block connector ⑮ to the RS-232 port on a controller (for example, a laptop) to control the **AFM-20DSP-LE**.

4. Connect the ETHERNET RJ-45 port ⑯ to the Ethernet to control the **AFM-20DSP-LE** and use for firmware upgrade.

5. Connect the mini USB connector ⑰ to a control device (for example, a laptop) to control the **AFM-20DSP-LE**.

6. Connect the power cord to the **AFM-20DSP-LE** mains socket ⑲ and to the mains electricity (not shown in Figure 7).

# Connecting AFM-20DSP-AEC

After connecting your **AFM-20DSP-AEC**, connect its power and then switch on the power to each device.



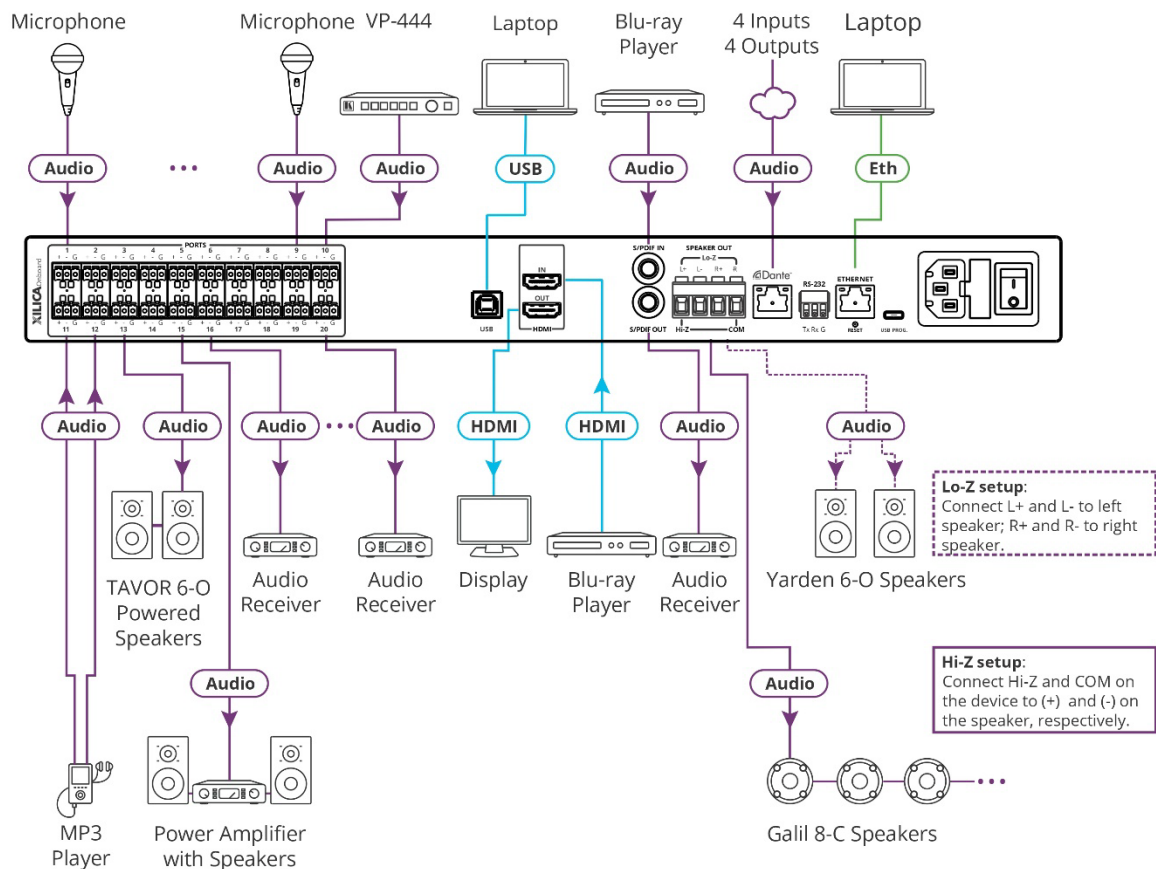Figure 8: Connecting to the **AFM-20DSP-AEC** Rear Panel

**To connect** AFM-20DSP-AEC **as illustrated in the example in [Figure 8](#):**

1.  Connect these audio sources to the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example):

    ▪ Microphones to ports 1 to 9.

    ▪ The audio output of the Kramer **VP-444** scaler to port 10.

    ▪ An MP3 player to ports 11 and 12.

2.  Connect the PORT balanced mono 3-pin terminal block connectors ⑦ (port I/O is set to 12x8 in this example) to the following audio acceptors:

    ▪ Ports 13 and 14 to powered speakers (for example, Kramer **Tavor 6-O**).

    ▪ Port 15 to a power amplifier with speakers.

    ▪ Ports 16 to 20 to audio receivers

3.  Connect the HDMI connectors as follows:

    ▪ A source (for example, a Blu-ray player) to HDMI IN ⑨.

- HDMI OUT ⑩ to an acceptor (for example, a display).

4. Connect the S/PDIF digital audio ports as follows:

   - A source (for example, a Blu-ray player to S/PDIF IN ⑫.

   - S/PDIF OUT ⑩ to an acceptor (for example, an audio receiver).

5. Connect the USB ⑧ to a computer such as a laptop

   - To process the USB audio as a stereo speaker.

   - To operate as an audio line-in or microphone for an audio recorder application or call conferencing.

6. Connect the SPEAKER OUT Hi-Z OUT or Lo-Z OUT 4-pin terminal block connector ⑬ as follows:

   - For Hi-Z connection: connect Hi-Z and COM terminal blocks to the + and – terminals of a mono speaker (for example, the **Galil 8-C** ceiling speakers, daisy chained). The speakers either output the left side (L+, L-) of the audio input or the stereo input reduced to a mono signal (see Defining Audio Settings on page 44) .

   - For Lo-Z connection: connect the L+ and L- connectors to the left-side speaker (for example, **Yarden 6-O**) and the R+ and R- connectors to the right-side.

7. Connect the Dante RJ-45 port ⑭ to up to 4Tx and for Rx audio channels via the network.

8. Connect the RS-232 3-pin terminal block connector ⑮ to the RS-232 port on a controller (for example, a laptop) to control the **AFM-20DSP**.

9. Connect the ETHERNET RJ-45 port ⑯ to the Ethernet to control the **AFM-20DSP** and use for firmware upgrade.

10. Connect the mini USB connector ⑰ to a control device (for example, a laptop) to control the **AFM-20DSP**.

11. Connect the power cord to the **AFM-20DSP** mains socket ⑲ and to the mains electricity (not shown in Figure 6).

# Connecting to AFM-20DSP via RS-232

You can connect to the **AFM-20DSP** via an RS-232 connection ⑮ using, for example, a PC.

The **AFM-20DSP** features an RS-232 3-pin terminal block connector allowing the RS-232 to control the **AFM-20DSP**.

Connect the RS-232 terminal block on the rear panel of the **AFM-20DSP** to a PC/controller, as follows:

From the RS-232 9-pin D-sub serial port connect:

- Pin 2 to the TX pin on the **AFM-20DSP** RS-232 terminal block

- Pin 3 to the RX pin on the **AFM-20DSP** RS-232 terminal block

- Pin 5 to the G pin on the **AFM-20DSP** RS-232 terminal block
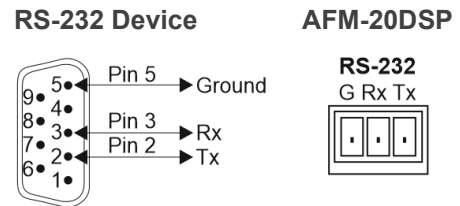
# Operating and Controlling AFM-20DSP

**AFM-20DSP**, **AFM-20DSP-LE**, **AFM-20DSP-AEC** can be monitored through the front panel LEDs (see AFM-20DSP, AFM-20DSP-AEC Front Panels on page 5) and controlled via the:

- Embedded webpages (see Using Embedded Webpages on page 18).

- Protocol commands (see Protocol 3000 Commands on page 68).

## Operating via Ethernet

You can connect to the **AFM-20DSP** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Connecting the Ethernet Port Directly to a PC on page 15).

- Via a network hub, switch, or router, using a straight-through cable (see Connecting the Ethernet Port via a Network Hub or Switch on page 17).

(i) To connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

## Connecting the Ethernet Port Directly to a PC

You can connect the **AFM-20DSP** Ethernet port directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

(i) This type of connection is recommended for identifying the **AFM-20DSP** with the factory configured default IP address.

After the **AFM-20DSP** is connected to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.

2. Click **Change Adapter Settings**.

3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter opens.
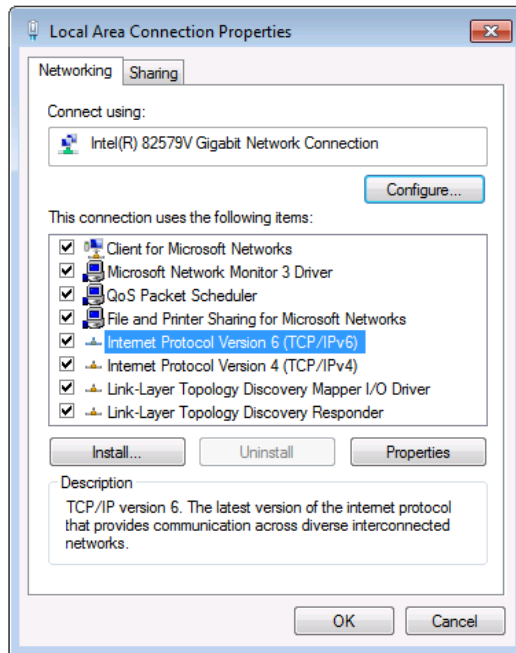
Figure 9: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.

5. Click **Properties**.
The Internet Protocol Properties window relevant to your IT system opens.

6. Select **Use the following IP Address** for static IP addressing and enter the details as shown in Figure 10.
For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.
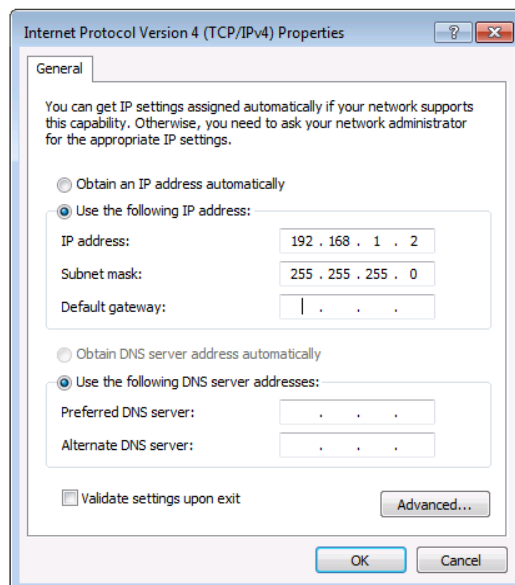


Figure 10: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

## Connecting the Ethernet Port via a Network Hub or Switch

You can connect the **AFM-20DSP** Ethernet port to the Ethernet port on a network hub, or using a straight-through cable with RJ-45 connectors.

## Configuring the Ethernet Port

You can set the Ethernet parameters via the embedded webpages.

# Using Embedded Webpages

The embedded webpages allow users to operate **AFM-20DSP** locally or remotely. To access the webpages open a browser or use an Ethernet connection (see Accessing the AFM-20DSP Webpages on page 19).

Before attempting to connect:

- Do the procedures in Operating via Ethernet on page 15.

- Make sure your browser is supported.

The following operating systems and browsers are supported:

| Operating System | Browser |
|---|---|
| Windows 7 | Chrome |
| Windows 10 | Chrome |
| Mac | Chrome |

(i) Some features might not be supported by some cellphone operating systems.

The **AFM-20DSP** webpage enables you to:

- Using the Top Status Bar on page 19.

- Processing Audio Signals on page 22.

- Routing Inputs to Outputs on page 37.

- Mixing Audio Signals on page 41.

- Defining Audio Settings on page 44.

- Defining Video Settings on page 45.

- Restarting and Resetting the Device on page 53.

- Defining Settings on page 54.

- Defining Communication Settings on page 55.

- Performing Firmware Upgrade on page 56.

- Setting Date and Time on page 57.

- Configuring Device Automation on page 57.

- Viewing Device Information on page 58.

(i) For your convenience, some of the same tasks can be done via DSP, Matrix, and Mixer pages. For example, you can link analog input and output pairs through any of these three pages.

# Accessing the AFM-20DSP Webpages

**To browse the AFM-20DSP webpages:**

1. Open a supported browser.

2. Enter the IP address of the device. The authentication page opens.

3. Enter the Username and Password (by default Admin/Admin).

4. Click **Sign in**. The Main webpage opens.

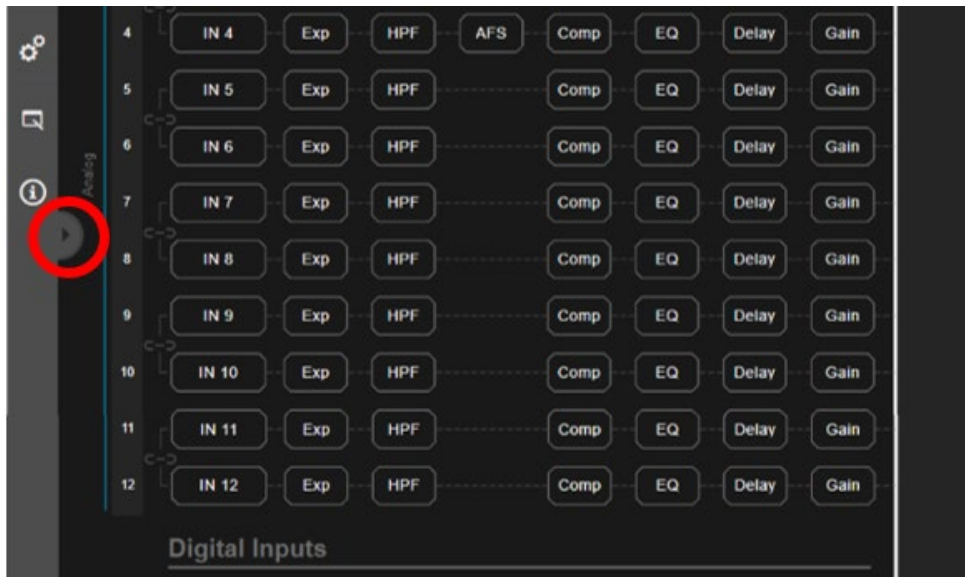   Note – To hide the Navigation List, click the arrow below the **About** icon.



Figure 11: Main Page – Navigation List Hidden

5. To set and control the device, click the applicable icon in the Navigation List.

# Using the Top Status Bar

Use the top status bar to do the following functions:
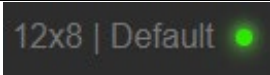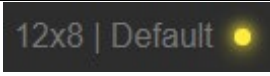
- [Viewing/Changing Current Analog I/O Configuration and Preset Name](#) on page .
- [Changing Security Settings](#) on page .

  Note – To enter/exit full-screen display view, click the display-view icon (⊞ / ⊠).

## Viewing/Changing Current Analog I/O Configuration and Preset Name

In the top pane of each menu bar, shows the analog I/O setup, the preset name, and the status of the setup.

The indication light displays:

| Color | Description | Example |
|-------|-------------|---------|
| Green | If the current preset unmodified. | 12x8 \| Default ● <br> Figure 12: Analog and/or Preset Status Unmodified |
| Yellow | If the current preset has been modified. | 12x8 \| Default ● <br> Figure 13: Analog and/or Preset Status modified |

**To save a modified preset (yellow indication light):**

1. Click the preset status area. The A/V settings page opens.

2. Do the instructions in Defining Audio Settings on page 44.

# Changing Security Settings

You can easily disable or enable the webpages security using the lock icon. When security is disabled, it is not necessary to enter a password to access the webpages.

- For information about the default login credentials, see Default Communication Parameters on page 64.

- For information about changing the default login credentials, see Setting Access Security on page 54.

**To disable security settings:**

1. Click the closed lock icon (🔒) that indicates security is enabled.
   The following message opens:

> **Would you like to disable security?**
>
> Enter password to disable authentication
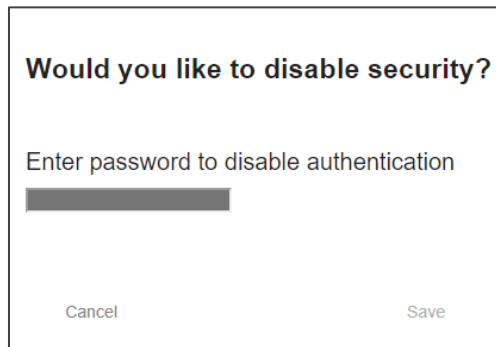>
> ▬▬▬▬▬▬▬▬▬
>
> Cancel                    Save

Figure 14: Disabling Security Message

2. Enter the current password (Admin, by default).

3. Click **Save**. Security is disabled.

**To enable security settings:**

Click the security disabled icon (🔓). Security is enabled.

# Viewing the Matrix Area

The matrix area in the DSP page shows the inputs that are currently routed to the outputs.

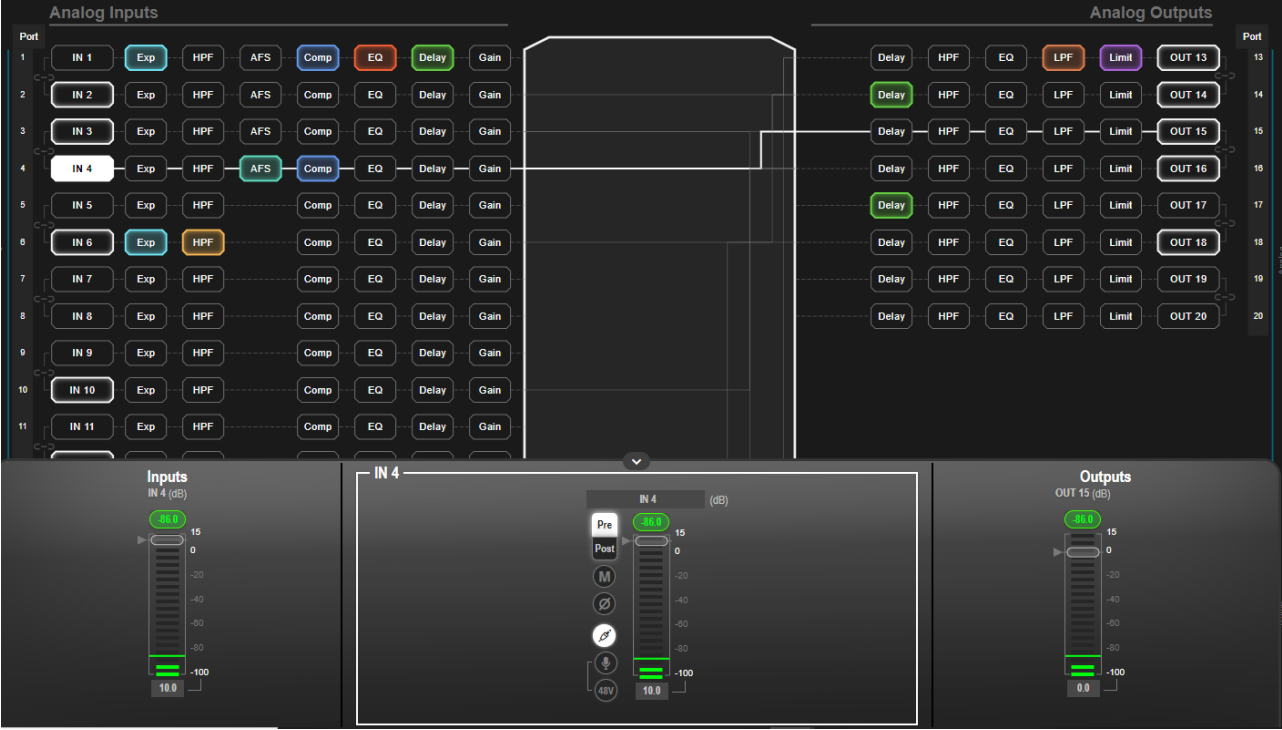Clicking an IN or OUT button or a module, highlights the routing path.



Figure 15: Matrix Area – Routing Path

When opening the processing view, the Input sliders routed to the outputs opens.



Figure 16: Processing View – Inputs Routed to Outputs

# Processing Audio Signals

Use the DSP page to process the input and output signals and present an overall view of your session, including analog and digital in-out connections (in the Matrix area), using pre-matrix and post-matrix modules.

In general:

- Click the Matrix area to enter the Matrix page (see Routing Inputs to Outputs on page 37).

- Click an input, output, or any module to open its process view and configure that item.

The DSP page enables users to do these actions:

- Selecting Output Signals to Route to Amplifier Outputs on page 22.

- Linking Analog Inputs and Outputs on page 23.

- Processing a Signal on page 24.

## Selecting Output Signals to Route to Amplifier Outputs

Select the audio outputs to duplicate and output to the amplified speakers ⑬.

**To duplicate the audio outputs to the amplifier:**

1. From the Navigation List, click **DSP**.

2. In **Duplicate to Amplifier Output 1** click the down arrow, and select an output. For example, OUT 19.
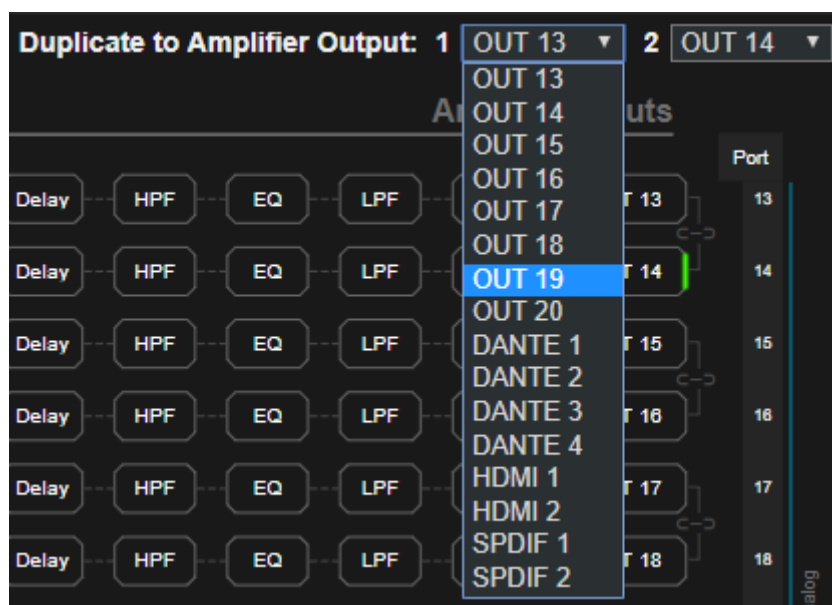


Figure 17: DSP Page – Selecting Left Amplifier Output Signal

3. In **Output 2**, click the down arrow and select an output (for example, OUT 20).
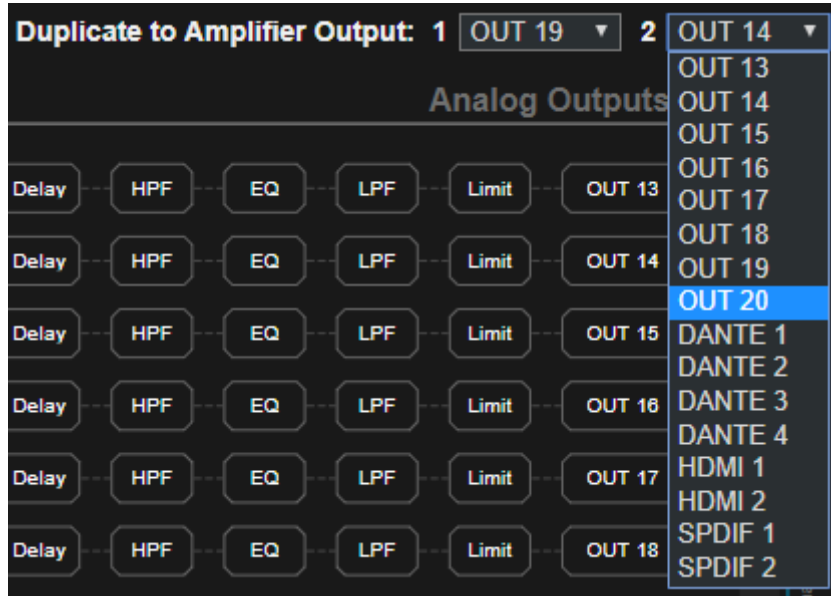


Figure 18: DSP Page – Selecting Right Output Amplifier Output Signal

OUT 19 outputs to the left side of the amplified speaker and OUT 20 outputs to the right side of the amplified speaker as indicated in green on the left and the right sides of output 19 and output 20.
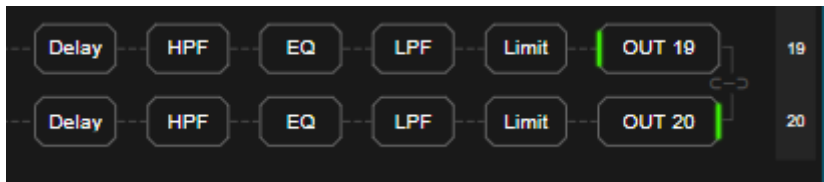


Figure 19: DSP Page – Selected Left and Right Amplifier Outputs

# Linking Analog Inputs and Outputs

Users can link analog inputs and outputs in predefined pairs to balance stereo analog sources and acceptors. When linked, signal chain modules are set for both channels simultaneously.

**To link an analog audio pair:**

1. In the Navigation List, click **DSP**.

   (i) In addition, you can link audio analog audio pairs via the Matrix or Mixer page.

2. Click the link on the side of the ports (IN 7 and IN 8 in this example).



Figure 20: DSP Page – Linking Analog Audio Ports

The selected inputs are linked.

# Processing a Signal

Use processing view to configure the selected audio signal. Access processing view by clicking an input / output button or a filtering tool in the DSP session view.
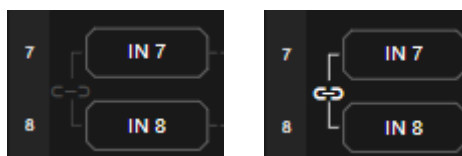Note - Different port types have different processing modules.

In general:

- To enable a module click ![on] (on). To disable a module, click ![off] (off).

- In the processing view, the module appears at the center and input/output volume sliders appear to the left/right (for further information, see Input / Output Channels Operation on page 25).

- Adjust configuration knob by clicking and holding the mouse then moving it up or down, or enter the parameter value below the knob and press **Enter** on your keyboard to apply.

- Reset a configuration knob to its default parameter value, by clicking the mouse within the knob area while pressing **Ctrl** on your keyboard.

- The parameter value always appears below the knob or slider.

- A selected input or output button appears with a white rim.

- A selected processing tool button appears with a distinctive color.

- An enabled processing tool button appears with a distinctively coloured rim.

Processing modules enable users to do these actions:

- Adjusting Analog Input Parameters on page 26.
- Adjusting Digital Input Parameters on page 27.
- Post-Matrix Signal Processing on page 33.
- Using Expander Module on page 27.
- Using HPF (High Pass Filter) Module on page 28.
- Using AFS (Auto Feedback Suppression) Module on page 30.
- Using Compression Module on page 31.
- Using Equalizer Module on page 32.
- Using Gain Module on page 33.
- Using Post Matrix Equalizer Module on page 35.
- Using LPF (Low Pass Filter) on page 35.
- Using Limit Module on page 36.

# Input / Output Channels Operation

This section describes the function of the input and output sliders (the examples in this section, showing the inputs, apply also to outputs).

**Note** - In figures 21 and 22 below, meters (left side) display on a scale of -100 dBFS to 0 dBFS maximum (above this is clipping or audio saturation). On the right side, the gain level points to amplification for positive values and attenuation for negative values.

**Level Measurement Indicators**:

The audio signal enters the digital system at a certain level and is measured in dBFS units (dB relative to full scale, the maximum value).

- **Maximum level indicator** – shows the highest registered level (in RMS) and can change only if a higher level is detected.
  Click the indicator to reset to the current maximum value.

- **0dBFS** – refers to the maximum signal level that can enter the system. signal levels higher than the system limit are clipped.

- **Current maximum level indicator** – displays the current maximum level and holds it until a higher value is detected.
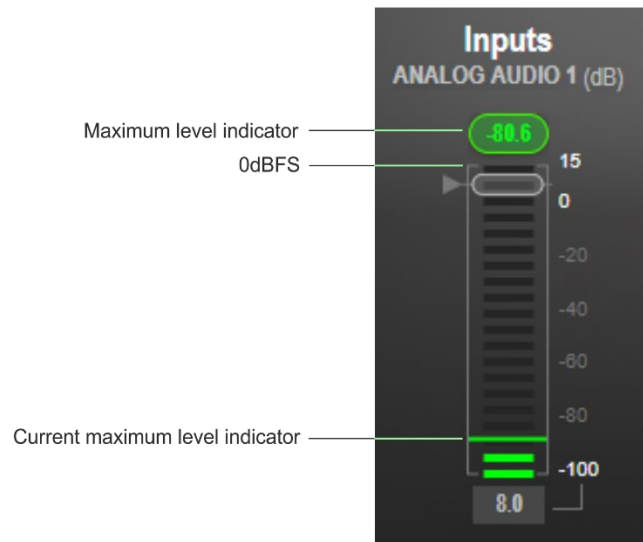


`Figure 21: Level Measurement Indicators

**Gain/Attenuation Fader**

- **Maximum level** – 15dB is the maximum gain.

- **Unity gain** – when volume fader is set to 0dB, the input level is not changed.

- **Volume fader** – slide to increase or decrease the audio level.

- **Minimum level** – -100dB is the maximum attenuation.

- **Current fader position** – shows the current position of the fader. You can also type a volume level into this box and press **Enter** on your PC.
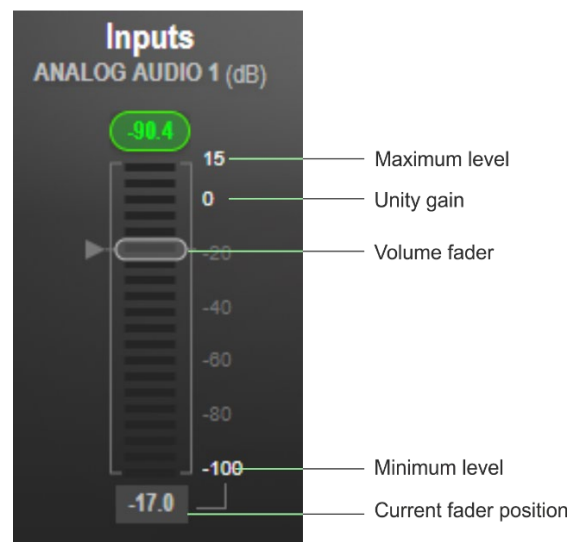


Figure 22: Channel Fader

# Pre-Matrix Signal Processing

This section describes the input pre-matrix signal processing of the input audio signal. The input fader always appears to the left.

**Adjusting Analog Input Parameters**

See Input / Output Channels Operation on page 25 to understand the function of the slider. IN 1 is used as an example in this section.

**To adjust analog input parameters:**

1. In the Navigation List, click **DSP**.

2. Click **IN 1**.
   The IN 1 processing window open.



Figure 23: Processing View – Processing Analog Audio Input

3. Do these actions:

| To | Do this: |
|---|---|
| To adjust the audio input level: | Move the fader. |
| To set the signal volume before and after using the pre-matrix modules: | Select **Pre** or **Post.** |
| To mute / unmute the input audio: | Click 🅜 / 🅜. |
| To inverse polarity (used for troubleshooting): | Click ⊘. |
| To select audio line in: | Click 🖉 |
| To select dynamic microphone: | Click 🎤. |
| To select condenser microphone (the title IN changes to MIC): | Click 48V. |

Analog input parameters are adjusted.

**Adjusting Digital Input Parameters**

Digital (Dante, HDMI and S/PDIF) input signal settings are the same. Dante is used as an example in this section.

See Input / Output Channels Operation on page 25 to understand the function of the slider.

**To adjust the Dante input parameters:**

1. In the Navigation List, click **DSP**. The DSP (Main) page appears.

2. Click **DANTE**. The Dante input processing window opens.

Figure 24: Processing View – Processing Digital Input

3. Do these actions:

| To | Do this |
|---|---|
| To set the Dante audio input level (both sliders are identical): | Move the volume fader. |
| To set the signal volume before and after using the pre-matrix modules: | Select **Pre** or **Post**. |
| To mute / unmute the input audio: | Click ⓜ / 🔴ⓜ. |
| To inverse polarity (used for troubleshooting): | Click Ø. |

Digital audio parameters are adjusted.

**Using Expander Module**

To increase the difference in loudness between the quieter and louder sounds, use the Expander module. When the Expand module is used, the quiet sounds (usually background noises) become quieter while the loud sounds become louder. The levels of audio signals that fall below the set threshold level are reduced.

**To adjust the expander module:**

1. In the Navigation List, click **DSP**.

2. Click **Exp**. The button turns light blue and the Expander module page opens.

3. Click the Off button ⏻ . The Exp module turns on 🟢 .



Figure 25: Processing View – Expander Module

4. Define the following:

   ▪ **Threshold** – Decreases the volume of audio signals that are below the threshold level.

   ▪ **Attack Time** – Sets the response speed of the expander to signal levels above the threshold.

   ▪ **Release** – Sets the response speed of the expander to signal levels below the threshold.

5. To set the amount to which the volume is decreased, click the **Ratio** down arrow.
   Note - The higher the ratio the more the audio level below the threshold is lowered.

ⓘ  The Expansion (dB) indicates the amount of expansion in a dB scale.

Expander settings are adjusted.

**Using HPF (High Pass Filter) Module**

A High Pass Filter passes signals that are higher than a certain cut-off frequency. Frequencies under the cut-off frequency are attenuated. Use the HPF module to cut off low frequencies and let higher frequencies pass.

**To adjust the HPF:**

1. In the Navigation List, click **DSP**.

2. Click **HPF**. The button turns light orange and the High Pass Filter module window opens. The left side shows the input volume slider.

3. Click the Off button [Off]. The HPF module turns on [On].



Figure 26: Processing View – HPF Module

4. Set the cut-off frequency.

5. Select the HPF low-cut algorithm type (or select **None**):

   ▪ **Bessel** – A linear filter with maximum linear phase response. It is frequently used in audio-crossover systems.

   ▪ **Link R** (Linkwitz-Riley) – An Infinite Impulse Response (IIR) filter used in audio crossovers. It has a parallel combination of low-pass and high-pass. The filters are usually designed by cascading two Butterworth filters, each of which has a -3dB gain at the cut-off frequency. The resulting Link-R filter has a -6dB gain at the cut-off frequency.

   ▪ **Butter** (Butterworth) – Designed to have a frequency response as flat as possible in the passband.

6. Select the HPF slope (**24**, **18**, **12** or **6dB/Oct**) – Set the filter drop-off per octave from the filter frequency.

HPF parameters are adjusted.

**Using AFS (Auto Feedback Suppression) Module**

Use the Auto Feedback Suppression module to eliminate microphone feedback (applies to analog inputs 1 to 4).

ⓘ     We recommend analog inputs 1 to 4 for microphones to eliminate audio feedback.

**To adjust the AFS module:**

1. In the Navigation List, click **DSP**.

2. Click **AFS**. The button turns turquoise and the AFS module page opens.



Figure 27: Processing View – AFS Module

3. Click the Off button ⏻ Off . The AFS module turns on ⏻ On .

4. Set each of the 8 bands to dynamic (Dyn) or fixed (Fix), depending on the application.



Figure 28: AFS Module – Selecting Input Fixed or Dynamic AFS Band Values

5. Define the following:

- **Threshold (dB)** – Sets the AFS activation threshold for feedback suppression.

- **Max Depth (dB)** – Sets how deep the cut per band.

- **Notch Step Size** – Sets the decrease in dB steps until reaching Max depth.

- **Default Bandwidth (Oct)** – Sets the width of the notch.

- **Recycle Delay** – Sets time period [Hours] until the filters are reused.

6. Select the sensitivity from **Very High** to **Very Low**.

7. Click **Recycle Enabled** / **Disabled** to enable / disable the filters.



Figure 29: AFS Module – Defining AFS Parameters

AFS parameters are adjusted.

**Using Compression Module**

To reduce the signal dynamic range which is the difference between the loudest and quieter sounds, use the Compressor module. For example, the difference between a scream and a whisper, which makes the sound seem more natural.

**To adjust the compressor settings:**

1. In the Navigation List, click **DSP**.

2. Click **Comp**. The button turns blue and the Compressor module pane opens.

3. Click the Off button ⏻ Off. The Comp module turns on ⏻ On.
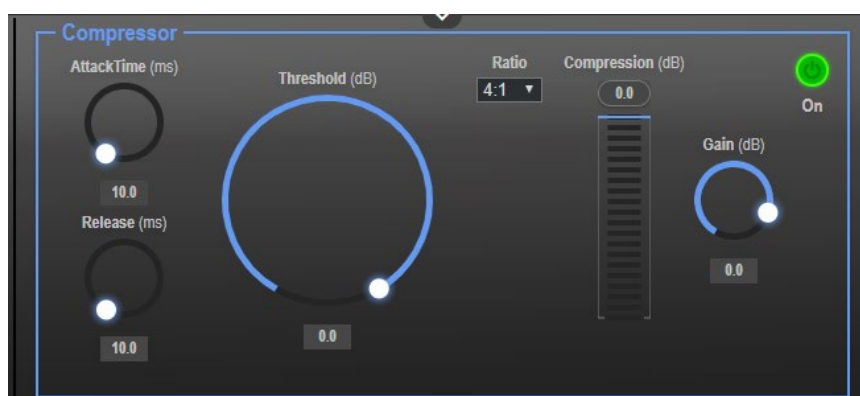


Figure 30: Processing View – Compressor Module

4. Set the following:

   ▪ **Threshold** – The level that the signal needs to rise above for the compressor to begin working. If a signal is too low or does not cross the threshold, the compressor allows the signal to pass through unchanged.

   ▪ **Attack Time** – The response speed of the compression to signal levels above the

threshold.

- **Release** – The response speed of the compressor to signal levels above the threshold.

5. To set the amount to which the volume is decreased, click the **Ratio** down arrow.

6. Set the gain to compensate for the attenuation caused by compression.

The Comp settings are adjusted.

### Using Equalizer Module

To change the balance of different frequency components in the audio signal, use the Equalizer module.

**To adjust the equalizer:**

1. In the Navigation List, click **DSP**.

2. Click **EQ**. The button turns orange and the Equalizer processing page opens.

3. Click the Off button . The Equalizer module turns on .



Figure 31: Processing View – Equalizer Module

4. Perform the following actions for each of the four bands:

- To ignore a band, click **BYPASS**.

- Adjust the band **Frequency (Hz)**.

- To set the range of frequencies around the selected frequency, set **Bandwidth (Oct)**.

- Set the bandwidth audio **Level (dB)**.

Equalizer settings are adjusted.

### Using Delay Module

Set the delay to accommodate the audio to the listeners distance from the speakers. Delay time tool converts the delay in ms to meters, feet, and samples.

**To adjust the delay:**

1. In the Navigation List, click **DSP**.

2. Click **Delay**. The button turns green and the Equalizer processing page opens.

3.  Click the Off button [Off] . The Delay module turns on [On] .
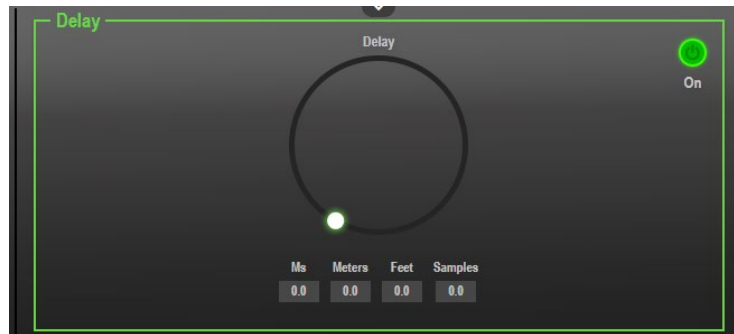


Figure 32: Processing View – Delay Module

4.  Set the delay.

Delay setting is adjusted.

**Using Gain Module**

1.  In the Navigation List, click **DSP**.

2.  Click **Gain**. The button turns violet and the Gain processing page opens.
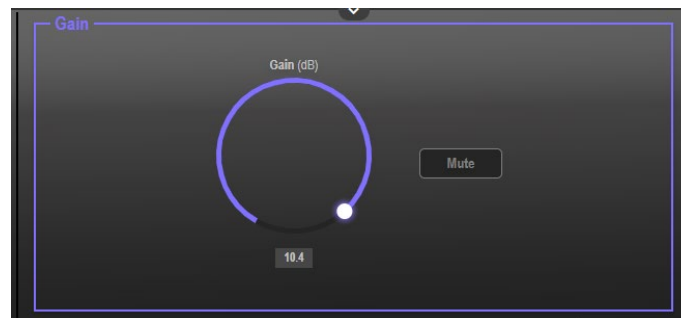


Figure 33: Processing View – Gain Module

3.  Do these actions:

    ▪  Set gain.

    ▪  In necessary, click **Mute**.

Gain is adjusted.

# Post-Matrix Signal Processing

**AFM-20DSP** enables performing post-matrix signal processing to outputs, including:

**Setting Audio Output Parameters**

Analog, Dante, HDMI and S/PDIF output signal settings are identical. Dante is used as an example in this section.

See to understand the function of the slider.

**To adjust the audio outputs:**

1. In the Navigation List, click **DSP**.

2. Click **Dante**. The Dante processing window opens.
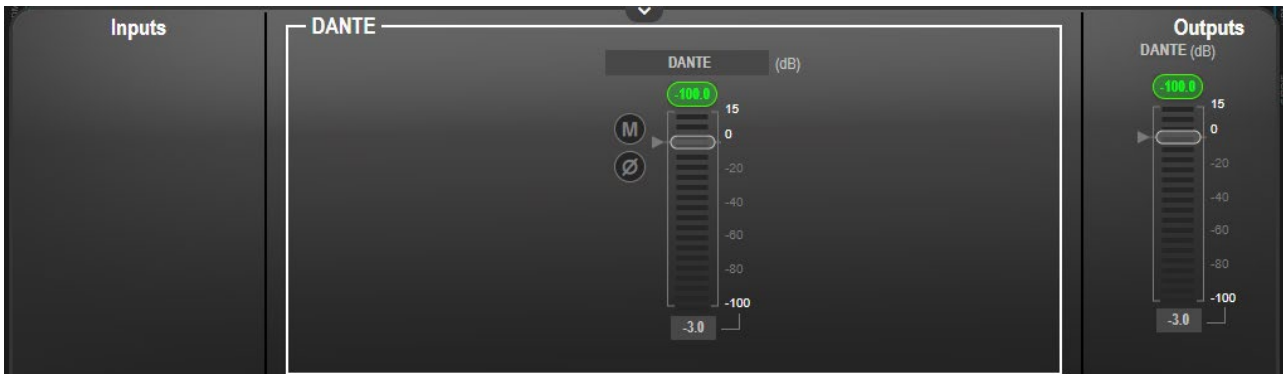


Figure 34: Processing View – Processing Digital Input

3. Do these actions:

   ▪ Move the volume fader to set the output audio level (both sliders are identical).

   ▪ To mute / unmute the output audio, click ⓜ / 🔴.

   ▪ To inverse polarity (used for troubleshooting), click Ø.

Audio outputs are adjusted.

**Using Post Matrix Equalizer Module**

To change the balance of different frequency components in the audio signal, use the Equalizer module.

**To adjust the equalizer:**

1. In the Navigation List, click **DSP**.

2. Click **EQ**. The button turns orange and the Equalizer processing window opens.

3. Click the Off button [⏻ Off]. The Equalizer module turns on [⏻ On].



Figure 35: Processing View – Processing Output Equalizer

4. Do these actions for each of the eight bands:

   ▪ To ignore that band, click **BYPASS**.

   ▪ Set the band frequency (Hz).

   ▪ Set the audio level (dB).

   ▪ Set the bandwidth (Oct).

   Equalizer settings are adjusted.

**Using LPF (Low Pass Filter)**

To cut off high frequencies and let lower frequencies pass, use the LPF tool.

**To adjust the LPF:**

1. From the Navigation List, click **DSP**.

2. Click **LPF**. The button turns a peach color and the Low Pass Filter processing page appears. The left side shows the input volume slider.

3. Click the Off button ⏻ . The LPF module turns on ⏻ .
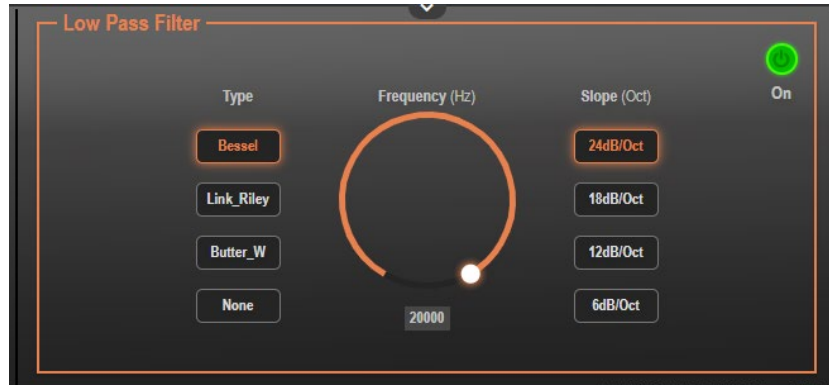


Figure 36: Processing View – Processing Output LPF

4. Set the frequency.

5. Select LPF type (**Bessel**, **Link R**, **Butter** or **None**).

6. Select LPF slope (**24**, **18**, **12** or **6dB/Oct**).

Frequency settings are adjusted.

**Using Limit Module**

To the specified threshold, reducing the gain above the threshold, use the Limiter tool to limit the signal level. A limiter can boost the volume of a certain sound.

**To adjust the limiter:**

1. From the Navigation List, click **DSP**.

2. Click **Limit**. The button turns purple and the Limiter processing window opens.
   The right side shows the output volume slider.

3. Click the Off button ⏻ . The Limiter module turns on ⏻ .



Figure 37: Processing View – Limiter Module

4. Set the **Threshold**.
   Note - The **Gain Reduction** meter as you change the threshold.

5. To set the response speed of the limiter to signal levels above the threshold, set the **Release** time.

Limiter settings are adjusted.

# Routing Inputs to Outputs

Click a cross-point to connect any inputs to any of the outputs via the Matrix page; set the connection volume, link analog input and output pairs and select the outputs to the amplifier.

ⓘ   **AFM-20DSP-LE** Matrix page includes only analog inputs and outputs.

**AFM-20DSP** enables performing the following functions:

- Connecting Inputs to Outputs on page 37.
- Setting Cross-Point Volume on page 38.
- Linking Analog Pairs on page 39.
- Setting Amplifier Outputs on page 39.

## Connecting Inputs to Outputs

**To route an input or several inputs to an output:**

1. In the Navigation List, click **Matrix**.

2. Click an in-out cross-point (for example, IN 2 input and OUT 14 output). The black cross-point turns green.
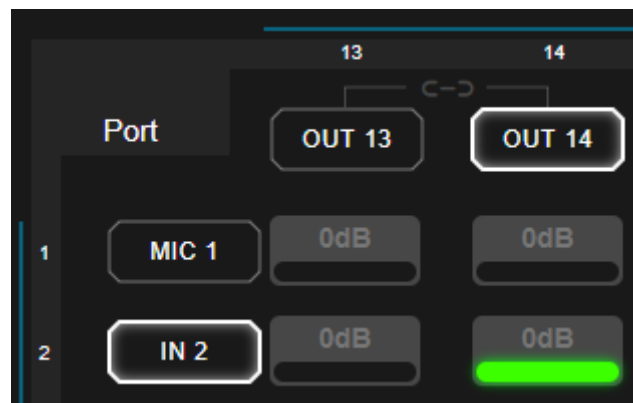


Figure 38: Matrix Page – In-Out Cross-Point

3.  Click any other cross-points (one input to output/s or several inputs to output/s).
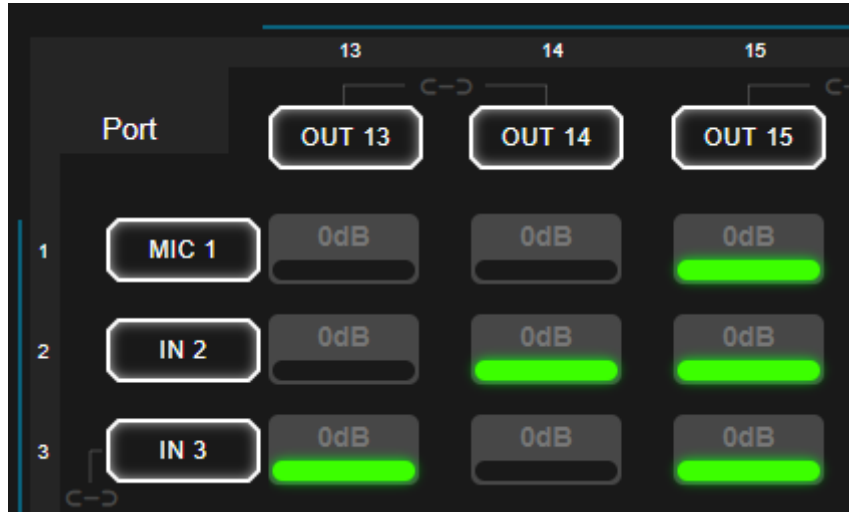


Figure 39: Matrix Page – Multiple Input-Output Cross-Point

Selected inputs are routed to selected outputs.

> You can also select an audio signal generator for testing.

## Setting Cross-Point Volume

Set the cross-point volume separately for each in-out connection.

**To set the cross-point volume:**

1.  In the Navigation List, click **Matrix**.

2.  Click the volume area (0dB, by default). The volume window opens.



Figure 40: Matrix Page – Setting Cross-Point Volume

3. To set the cross-point volume, use the knob, or enter the value and click **Enter**. The cross-point volume is set and shows at the cross-point.
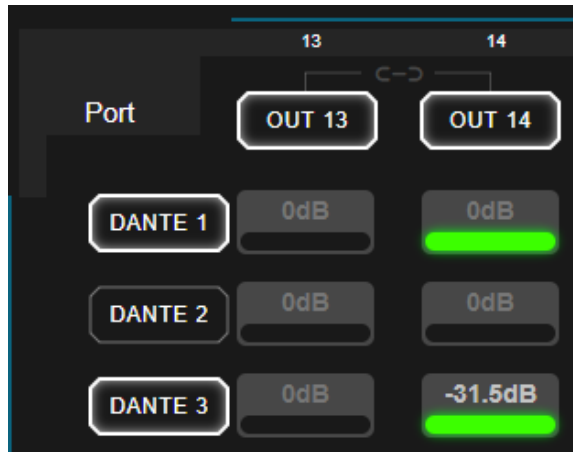


Figure 41: Cross-Point Volume Value

## Linking Analog Pairs

To link analog input or output pairs, see

## Setting Amplifier Outputs

To set the amplifier left and right outputs, use Matrix or DSP, see ).

**To set amplifier outputs:**

1. In the Navigation List, click **Matrix**.

2. Click **AMP** (on the lower right side of the page). The AMP page opens and displays all available outputs.



Figure 42: AMP View

3. Select an output to route to Amp 1 (amplifier left side) and to Amp 2 (amplifier right side). the button turns green and shows the status as ON.
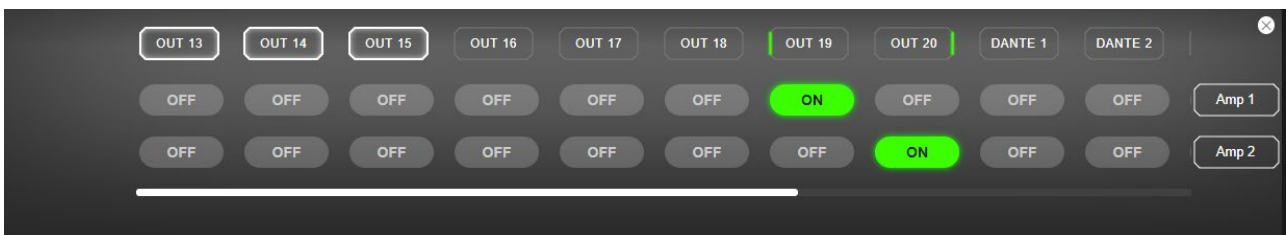


Figure 43: Selecting Outputs to Amplifier

Amplifier outputs are defined.

# Setting USB/SPDIF Selectable Ports Inputs and Outputs

(i) This section is for **AFM-20DSP-AEC** only.

In **Digital Inputs** and **Digital Outputs**, users can set the port to route digital USB or SPDIF inputs and outputs. The USB/SPDIF port is a selectable port with two signals (right and left).

Note – USB is the default for inputs and outputs.

**To set the USB/SPDIF input:**

1. In the Navigation List, click **DSP**.

2. Below **Digital Inputs**, select **USB 1.1**. The USB 1.1 window opens.

3. In the drop-down box, select either USB.B or SPDIF. In this screenshot, SPDIF is selected.



Figure 44: Digital Input routing set to SPDIF

Note - This selection automatically changes both the right and left signal to SPDIF:
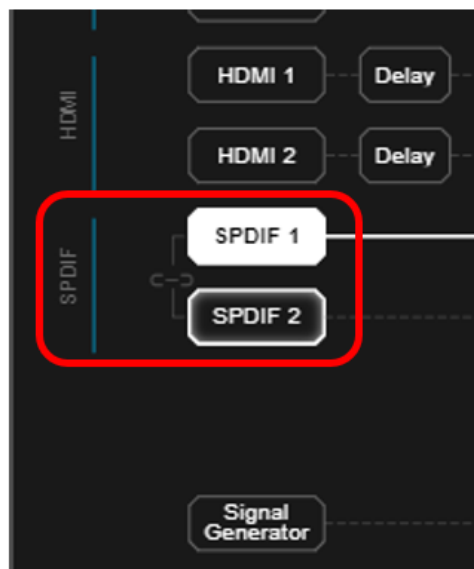


Figure 45: Digital input selectable port set to SPDIF (right and left)

4. Do these actions:

- Move the volume fader to set the input audio level (both sliders are identical).
- To mute / unmute the output audio, click 🅜 / 🅜.

- To inverse polarity (used for troubleshooting), click ⌀.

The selectable port input is set.

**To set the SPDIF/USB output:**

ⓘ Volume control does not support compressed SPDIF audio output.

1. In the Navigation List, click **DSP**.

2. Below **Digital Outputs**, select **USB 1.1**. The USB 1.1 window opens.

3. Do these actions:

   - Move the volume fader to set the output audio level (both sliders are identical).

   - To mute / unmute the output audio, click Ⓜ / Ⓜ.

   - To inverse polarity (used for troubleshooting), click ⌀.

The selectable port output is set.

# Mixing Audio Signals

Mix the audio signals and store/recall mixing snapshots via the Mixer.

**AFM-20DSP** enables you to do these tasks:

-
-

## Defining Input and Output Parameters

Set audio parameters for each input and output.

**To set input/output parameters:**

1. In the Navigation List, click **Mixer**.

ⓘ An input/output frame with a white rim indicates that this input/output is currently connected to an output/input, respectively.

2. To set the volume, use the slider or enter a value and click **Enter**.
   View the current gain and the input/output name (see ).

3. Set the following:

   - To set the signal volume before and after using the modules, select **Pre** or **Post**.

   - To mute / unmute the input audio, click Ⓜ / Ⓜ.

   - To inverse polarity (used for troubleshooting), click ⌀.

For analog audio inputs only:

- To select audio line in, click ⬡.

- To select dynamic microphone, click 🎤.

- To select condenser microphone (the title changes from IN to MIC), click 48V.
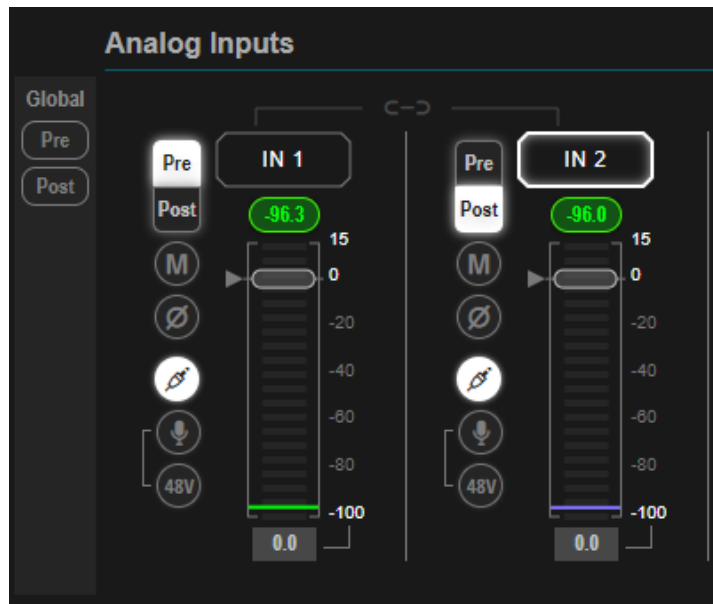


Figure 46: Mixer Page – Analog Audio Settings

Audio parameters are defined.

# Defining Snapshots

To store the current configuration state, recall a snapshot, set to default or clear a snapshot, use Store a snapshot (inputs, outputs, and amplifier)

**Storing Snapshots**

**To store a snapshot:**

1. In the Navigation List, click **Mixer**.

2. Set input and output mixers.

ⓘ When the parameters change, the Default button turns yellow. To restore default settings, click **Default**.
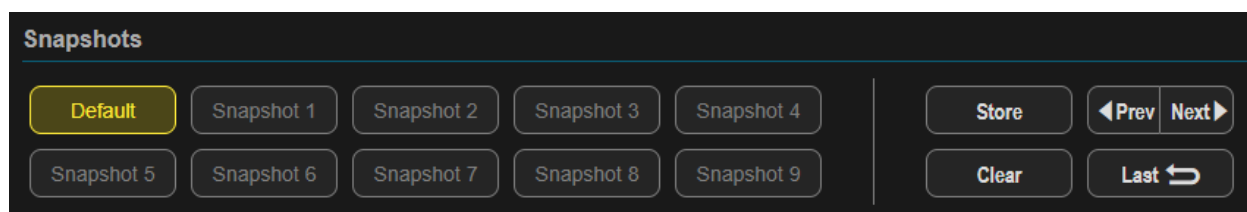


Figure 47: Mixer Page – Snapshots

3. Click **Store**.
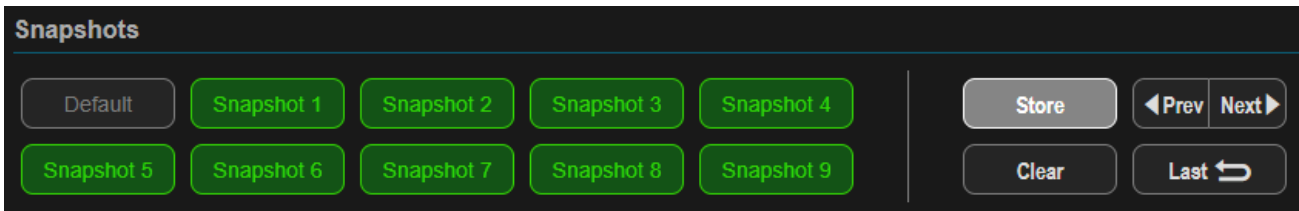


Figure 48: Mixer Page – Storing Snapshots

4. Click a Snapshot button (for example, **Snapshot 1**).
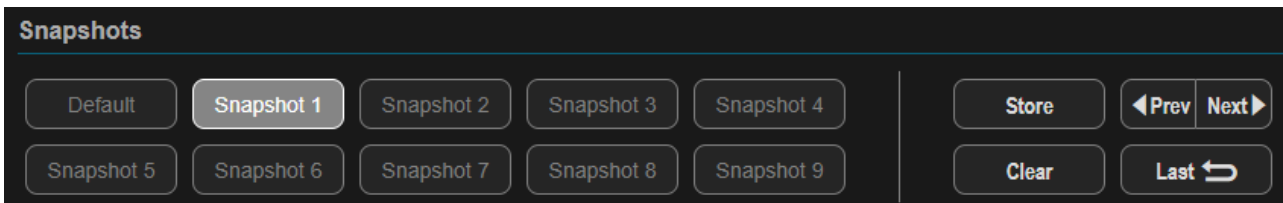


Figure 49: Mixer Page – Selecting a Snapshot

The current configuration is stored to Snapshot 1.

**Clearing Snapshots**

**To clear a snapshot configuration:**

1. From the Navigation List, click **Mixer**.

2. Click **Clear**, the Snapshot buttons turn blue.
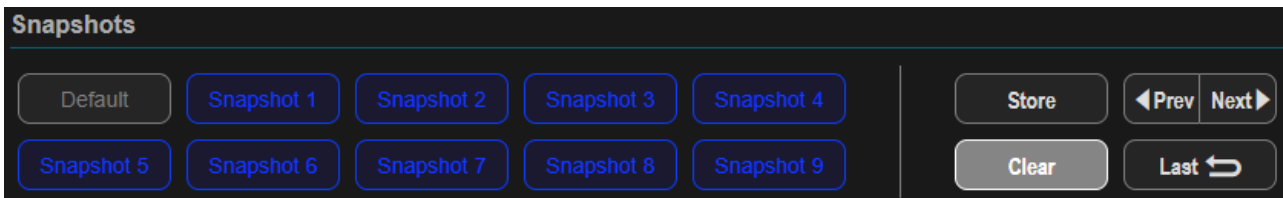


Figure 50: Mixer Page – Clearing a Snapshot

3. Select the snapshot to be cleared. The snapshot cleared returns to its default values.

**Loading Snapshots**

**To load a snapshot:**

1. In the Navigation List, click **Mixer**.

2. To load the desired snapshot, do any of the following:

   ▪ Click **Snapshot** (1 to 9).

   ▪ To load the next snapshot configuration, click **Next**.

   ▪ To load the previous snapshot configuration, click **Prev**.

   ▪ To load the latest configured snapshot, click **Last**. Note – If you click **Last** again, then it goes to the previously configured snapshot and so on.

The selected snapshot is loaded.

# Defining Audio Settings

To set the **AFM-20DSP** analog audio I/O configuration, system presets and amplifier settings, use the A/V Settings.

ⓘ    Amplifier settings are only relevant to **AFM-20DSP** and **AFM-20DSP-AEC**.

**To define audio settings:**

1. In the Navigation List, click **A/V Settings**.

2. In the I/O Config drop-down box, select analog input x output configuration > click **Set**.

3. In the **System Preset** drop-down box, select a preset and click **Load** or **Save as**.
   The current preset is loaded or saved.

   ⓘ    System Preset does not include I/O configuration.

4. Define amplifier parameters:

   ▪ Click **Hi-Z/Lo-Z**,

   ▪ Click **100V/70V**

   ▪ Click **Left Only** or **Stereo Down Mix** when Hi-Z is selected.

Audio settings are defined.

# Defining Video Settings

To set the **AFM-20DSP** HDMI input and output labels, Force RGB and/or Force 2LPCM, and video pattern (if required), using the Video tab in the **A/V Settings** page.

**To define video settings:**

1. In the Navigation List, click **A/V Settings**.

2. Select Video tab.

3. Enter HDMI input and output labels > click **Set**.

4. For HDMI input, select or unselect the checkbox **Force RGB** and/or **Force 2LPCM**.

5. If necessary, select a **Video Pattern** from the drop-down box.

Video settings are defined.

# Defining AEC Settings

ⓘ  This section is for **AFM-20DSP-AEC** only.

AEC, Acoustic Echo Cancellation is used to cancel echo (or feedback) during conference calls. The AEC feature consists of one remote input and two individual microphone inputs. When AEC is enabled, it looks for the remote echo audio that was picked up by the individual microphone and then cancels the echoed audio in the microphone input. Besides removing the echo, AEC does Noise Reduction and Comfort Noise Generation.

Note - Far side input is configured into the AEC reference module. AEC module uses this Far side configuration as reference to remove echo from the microphones.

The steps below illustrate a typical conference call setup in which AEC is turned on to remove the Far Side echo. The microphone is connected to analog input port 1 ("MIC 1") and the digital input, USB, is connected to a computer with a speaker system.

**To use the AEC:**

1. From the Navigate List, select **DSP**.

2. Below **Analog Inputs** select the port to which the microphone is connected. In this screenshot, the microphone is connected to port "MIC 1":



Figure 51: MIC connected to analog IN 1

3. Select **AEC Mic** and then click **AEC**.
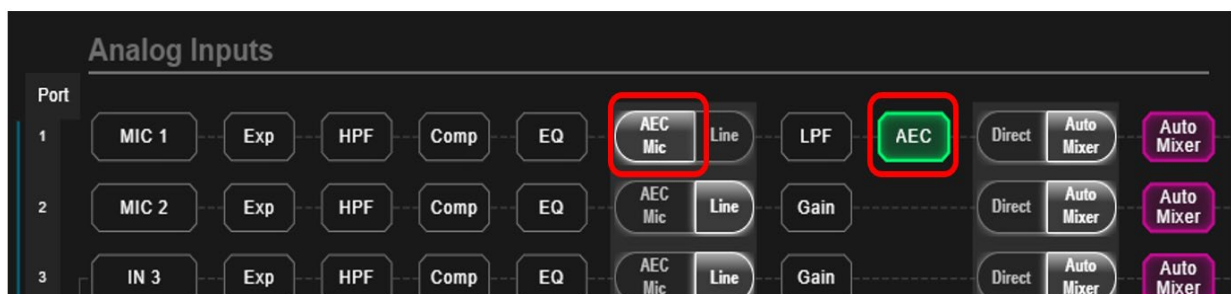


Figure 52: ACE Mic and AEC start up

The AEC Configuration window opens.



Figure 53: AEC Settings

4. Set the AEC settings based on the AEC parameters table below.

We recommend using the default settings. If you changed the default settings and later decide to return to the default settings, double-click the words **Acoustic Echo Cancellation**.

**AEC Parameters Table:**

| Parameter | Description | Value |
|---|---|---|
| Echo Cancelling | Enables the AEC function. If this is disabled, the module does not perform any AEC functions and all mic inputs to the module are directly passed to the direct output of the module. | On/Off Default: On |
| Noise Reduction | Enables Noise reduction on individual Mic Inputs. If this parameter is enabled, the noise reduction algorithm is applied to individual mic inputs and suppress the detected noise by the noise reduction level. | On/Off Default: On |
| DC Filter | Removes DC | On/Off Default: On |
| Noise Reduction Level | Set how many dB suppress the noise when Noise Reduction is enabled. | 40 to 0 Default: -10 |
| Double Talk Echo Reduction | When both local end (mics) and far end (remote) audio sources are present at the same time, this is a Double Talk situation. Under this scenario an additional echo reduction algorithm is applied, and it uses the Double Talk Echo Reduction setting to configure the amount of echo to reduce. | - 50 to 0 Default: -6 |
| Comfort Noise Generator | If enabled, a background comfort noise is generated and applied to the individual output if it is detected that the input mic is completely silent. This comfort noise is useful so that remote end user does not hear a complete silent channel and mistakenly think that the line has dropped. | On/Off Default: On |
| Comfort Noise Level: | The noise level generated when Comfort Noise Generator is enabled. If you are mixing a lot of Mics before sending to the remote end, you must reduce this Comfort Noise level as all noise is summed before sending to remote end. | -60 to -30 Default: -50.0 |
| Delay | Delay to be applied to all Mic Inputs. | 0 to 50 Default: 0 |
| Reset | Resets the AEC | |

5. Below **Digital Inputs** > click **USB** and select **USB 1.1**.
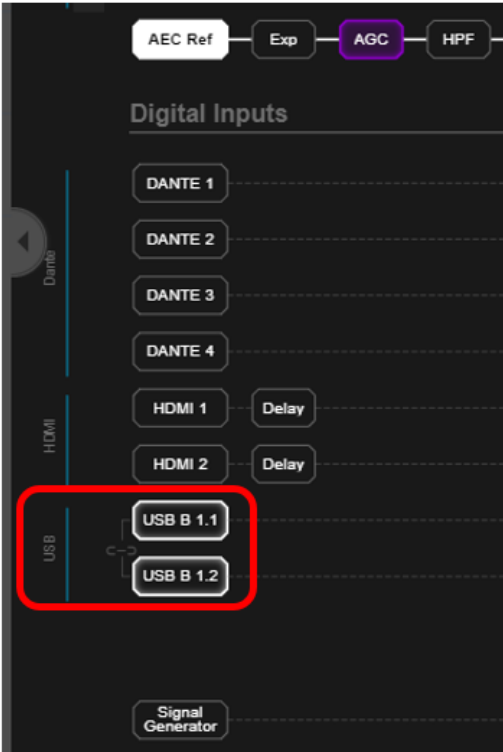


Figure 54: USB Digital Input Selection

6. In the USB 1.1 window, from the drop-down box select the **USB_B** audio channel. The DSP now process the USB as a digital input.



Figure 55: USB B and SPDIF Settings Window

7. Select **AEC Ref**.
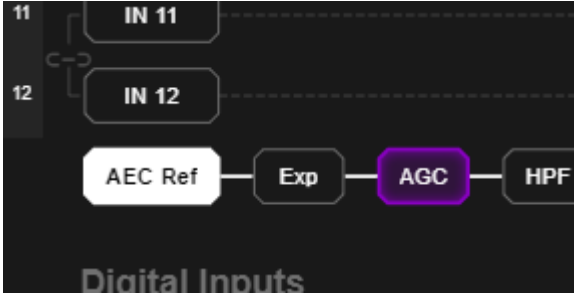


Figure 56: AEC Ref for Far Side Input Selector

The Far Side Selector Configuration window opens.



Figure 57: Fare Side Input Selector Configuration

8. In the drop-down menu, the **Far Side Input Selector** must be set to the input port that receives the Far Side audio signal. In this illustration, it is the selectable port **IN_USB_B.1**.



Figure 58: Far Side Input Selector with USB port selected

9. From the Navigation List, select **Matrix** and route the inputs to the outputs.
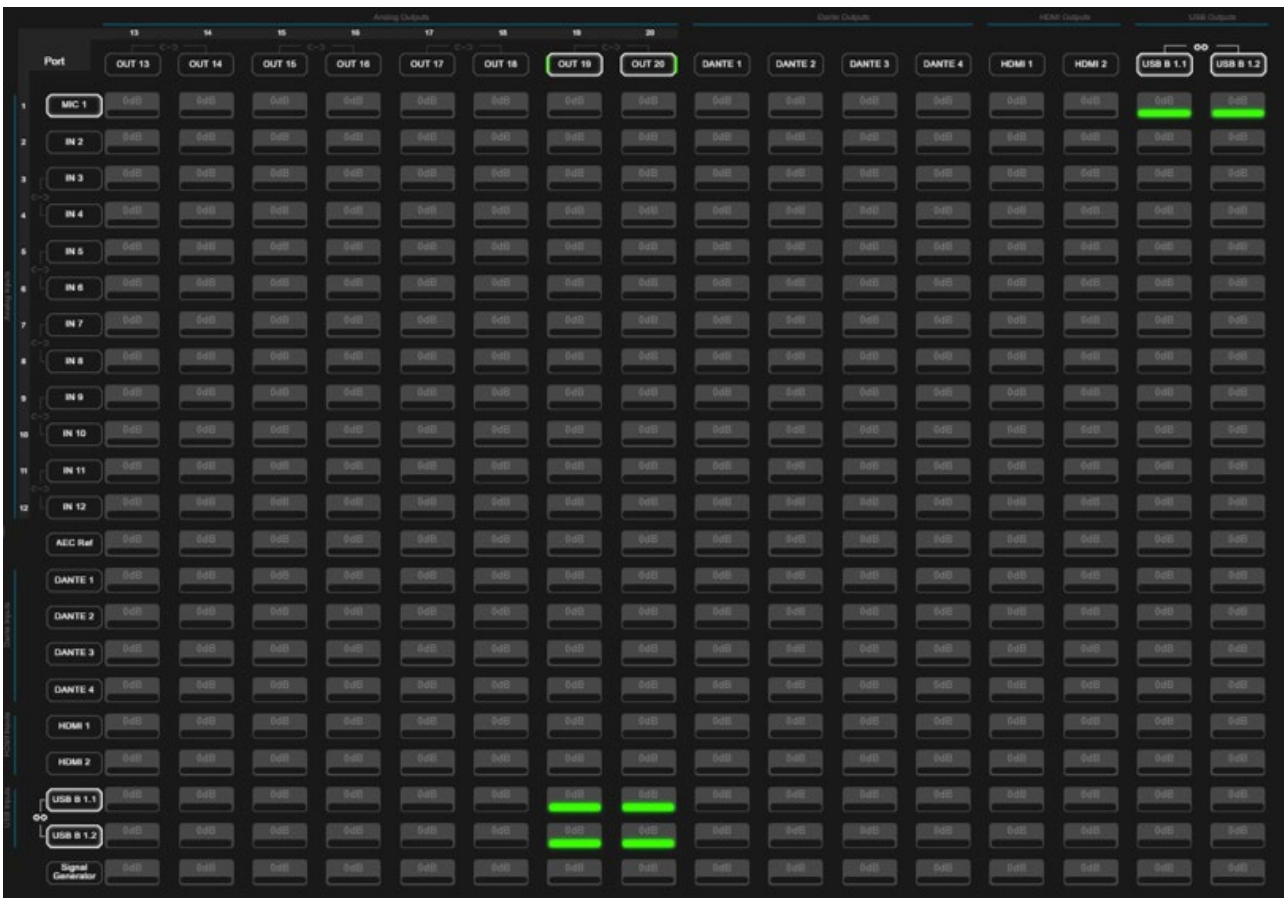


Figure 59: Example Matrix routed MIC using USB B

The AEC feature is now active.

# Auto Mixer

Auto Mixer is typically used in a conference setting where multiple MICs are in use, but only one (or a few) should be on at any time. This module turns on MICs based on their input signal as compared to the level of the other MICs.

## Gain Sharing Auto Mixer

The Gain Sharing Auto Mixer is an automatic microphone mixing process that allows the automatic mixing of input channels to one output channel based on input signal levels. The louder the input channel, the louder it is at the output channel.



Figure 60: Gain Sharing Auto Mixer

Users can select to pass the signal through the input directly to the Matrix, or to first pass the data to the Auto Mixer and then to the Matrix.

**To send input data directly to the Matrix:**

1. From the Navigate List, select **DSP**.

2. For each port number, select **Direct**.

The input is now set to go directly to the Matrix.

**To send input to the Auto Mixer and then to the Matrix:**

1. From the Navigate List, select **DSP**.

2. For each port, select the first **Auto Mixer** icon.

3. Select the second **Auto Mixer** icon.
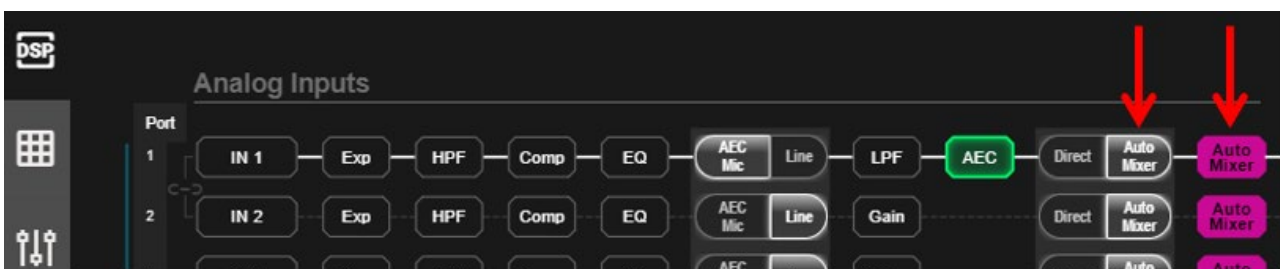


Figure 61: Auto Mixer option selected

As shown in this screenshot the input first goes to the Auto Mixer and then to the Matrix:
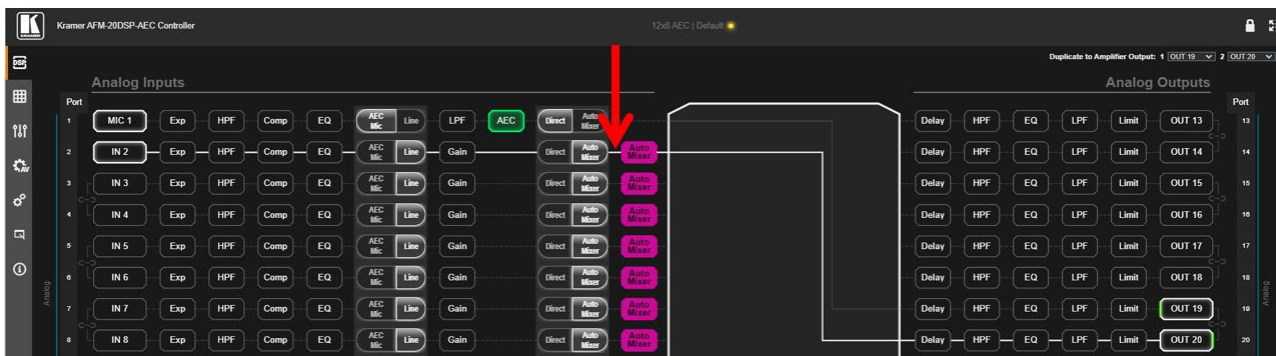


Figure 62: Input sent to Auto Mixer before going to the Matrix

The input is now set to enter the Auto Mixer before going to the Matrix.

**Gain Sharing Auto Mixer Inputs**

Each input includes:

| Mute | -100 to 16 dB, 0.01dB steps. |
|---|---|
| RMS Meter | -80 to 40 dB, 0.1 dB steps. |
| Auto Gain Meter | -100 to 0 dB, 0.1 dB steps (Shows calculated gain for each channel). |
| Manual On | Changes the gain from automatic (off) to fixed (on).<br>Note - While Manual On, the gain for the channel is fixed and does not impact other channels. |

**Gain Sharing Auto Mixer Outputs**

Each output includes:

| Gain | -100 to 16 dB, 0.01 dB steps and Mute control. |
|---|---|
| Priority | Ranges from 1 to 11 (with 1 being the highest and 11 the lowest).<br>An input channel with a higher priority will have a larger gain applied dependent on the Slope value and difference in priority between channels. |
| Slope | 1 to 3, 0.001 steps determine the gain difference between priorities.<br>With a Slope of 1 there is no gain.<br>With a Slope of 2, 2dB for each point of priority difference between channels.<br> A Slope of 3 creates a 4dB gain per point of priority. |
| Gain Response Time | The amount of time (in milliseconds) it takes to apply a new gain value to a microphone channel.<br>(0.2 to 2000 ms, 0.1 ms steps) |

The Auto Mixer is now configured.

# FAR AGC (Automatic Gain Control)

FAR AGC keeps the volume at a set level. When the input is below a threshold, it amplifies to bring the level up to the Target Output Level. When the input above threshold, it reduces the gain to bring it back below the Target output Level.



Figure 63: FAR AGC Settings window

**FAR AGC Parameters**

| Target Output Level | -40 to 0dB Detection Threshold (-80 to -20 dB) is the point at which the AGC begins to raise the gain of the signal. |
|---|---|
| Response Time | 1ms to 40,000ms is the period of time before the AGC begins to act when the level is over or under the Target output Level. |
| Recover Time | 1ms to 100,000ms is the amount of time after the Target Output level is below the set level before the AGC begins to increase the gain. |
| Ratio | 1:1 to 5:1 is how much the change can increase/decrease the gain between samples. |
| Contour HPF | (On/Off) allows higher frequencies to pass regardless of the level. |
| Noise Threshold | -100 to -40dB is where the noise floor can be set. |
| Leakage Enable | (On/Off) enables leakage on the ALC so that short-term instances of over/under. |
| Target Output Level | Target Output Levels are ignored for this amount of time. Leakage Time (100ms to 100,000ms) is how long the leakage is allowed before the gain begins to compensate. |

# Restarting and Resetting the Device

To restart the **AFM-20DSP** or reset it to its factory default parameters, use **Settings**.

## Restarting the Device

**To restart the device:**

1. In the Navigation List, click **Settings**.

2. Click **Restart**. The device restarts immediately.
   Wait for the device to reload after device restart. Note - There is no pop-up message before the device restarts.

## Resetting the Device

**To reset the device to its default parameters:**

1. In the Navigation List, click **Settings**.

2. Click **Factory reset**. The following message appears:



Would you like to factory reset?

⚠ All the settings will be restored to defaults.
After this action, current WEB session may be disconnected.

Do you want to continue?

No                                    Yes
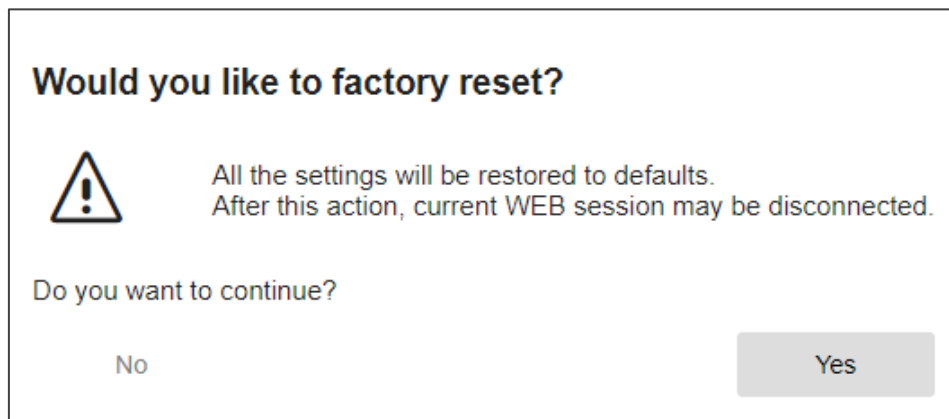
Figure 64: Settings Page – Factory Reset Message

3. Click **Yes**.

The device resets to its factory default parameters.

# Defining Settings

To change the device name, view the model and serial number and firmware version, navigate to the **General** tab in **Settings**, which also enables:

- Importing/Exporting Global Settings on page 54.
- Setting Access Security on page 54.
- Defining Communication Settings on page 55.
- Performing Firmware Upgrade on page 56.
- Setting Date and Time on page 57.
- Configuring Device Automation on page 57.

## Importing/Exporting Global Settings

You can export a Global Settings file to a different **AFM-20DSP** device or import a file to your device.

**To import/export global settings:**

1. From the Navigation List, click **Settings**.

2. In the General tab, in the Global System Settings area:

   - To import a file, click **Import** > select the system setting ".bin" file from the Open window > click **Open**.
     The imported system settings file is uploaded to the device.

   - To export a file, click **Export**. The current system setting ".bin" file is downloaded to your PC and can be exported to other devices.
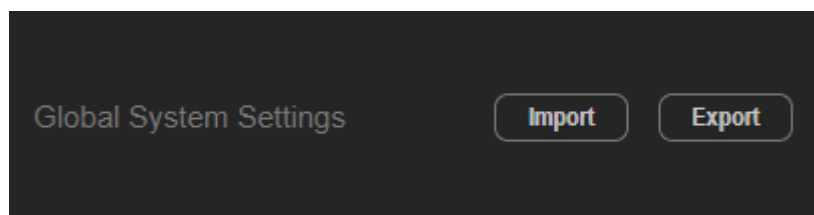


Figure 65: General Settings Tab – Importing / Exporting Global Settings

Global system settings are imported/exported.

## Setting Access Security

By default, the webpages are secured and require access permission (the default username and password are both: **Admin**).

**AFM-20DSP** enables you to do the following security actions:

- Enabling/Disabling Security on page 55.

-

## Enabling/Disabling Security

**To enable/disable security:**

1. From the Navigation List, click **Settings** > **General**.

2. In the **Security** field, slide the toggle button to **On** or **Off**.

3. Enter the current password > click **Save**.

Security is now enabled/disabled. The security-disabled icon appears ( ).

Or,

Security is enabled. The security-enabled icon appears ( ).

## Changing the Security Password

**To change the Security password:**

1. From the Navigation List, click **Settings** > **General** > below **Change security properties** enter the necessary password details.

2. Click the lower white bar.

3. Click **OK**.

The Security password has changed.

## Defining Communication Settings

To set the **AFM-20DSP** communication parameters, including the IP Address, Mask, gateway, and more, use the **Communication** tab.

**AFM-20DSP** enables you to do these tasks:

-
-

## Changing Ethernet Settings

**To change the Ethernet settings:**

1. From the Navigation List, click **Settings** > **Communication**.

2. If DHCP is set to Off, change any of the parameters (**IP Address**, **Mask** and/or **Gateway**).

3. If necessary, change the TCP port number.

4. Click **Save**.

After changing the IP address, reload the webpage with the new IP address.

If DHCP is On, reload the webpage with the new IP address (see below).

Ethernet settings have changed.

## Setting Parameters when DHCP is On

**To set parameters when DHCP is set to On:**

1. From the Navigation List, click **Settings** > **Communication**.

   Note the Device Name in the General tab as you will need it after the page reloads.

2. Set DHCP to **ON**.

3. Click **Save**.

4. Type the device name in the address bar of your browser to reload the page.
   You can read the new IP address from the Communication Settings page.

Parameters are set.

# Performing Firmware Upgrade

To perform **AFM-20DSP** firmware upgrade, use the **Upgrade** tab in the **Settings**.

**To perform firmware upgrade:**

1. From the Navigation List, click **Settings** > **Upgrade**.

2. Click **Upgrade** and select the new firmware file.
   The following message opens:
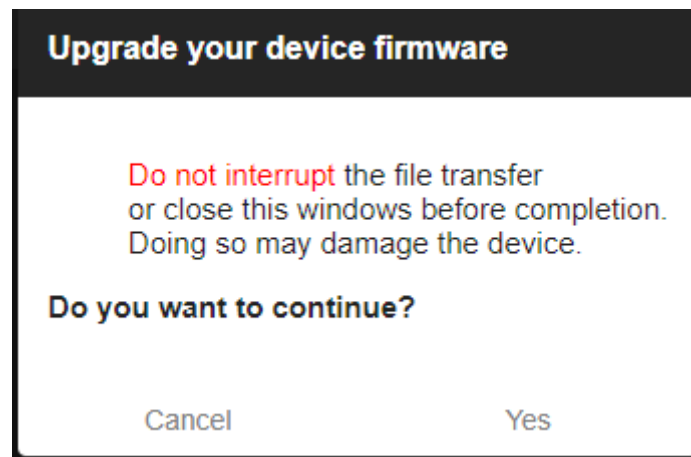


Figure 66: Upgrade Settings Tab – Firmware Upgrade Message

3. Click **Yes** and wait for the upgrade to finish.

4. Wait for the device to restart.

Firmware upgrade is complete.

# Setting Date and Time

**To set the time and date:**

1. From the Navigation List, click **Settings** > **Time and date**.

2. In **Device Date**, click inside the tab and select a date.

3. Click **OK**.

4. Set the **Time Zone**.

5. Click **Save**.

6. If necessary, use time server (disables setting the device date):

   a. Slide the Use Time Server (NTP) button to **Yes**.

   b. Enter the **Time Server Address**.

   c. View **Server Status**.

   d. Click **Save**.

Date and time are set.

# Configuring Device Automation

Access Kramer Maestro V1.5 room automation via **AFM-20DSP**. Maestro is a powerful tool that enables you to configure single-trigger room element automation scenarios without the need for complicated programming.

To use room automation, you need to define triggers that, upon an event, execute scripts which include a sequence of actions (commands, which can appear in different scenarios) that are carried out via any defined ports.

Download the Kramer Maestro User Manual from the Kramer website at: www.kramerav.com/downloads/AFM-20DSP to learn how to use Kramer Maestro.

ⓘ Note that all the ports, actions, and triggers that are relevant to **AFM-20DSP** are included in the Kramer Maestro, and ports, actions and triggers that are relevant to other Kramer devices.

ⓘ DSP model only - The Panel tab in the Automation page is currently unavailable.

**To access Kramer Maestro:**

1. From the Navigation List, click **Automation**.

2. Configure the ports, actions, scripts, and triggers as described in the Kramer Maestro User Manual.

When the triggers are defined, they activate the scripts configured in the automation page. For example, the Scheduling trigger can activate a series of actions that follow a preset schedule.

# Viewing Device Information

In the Navigation pane, click **About** to view the **AFM-20DSP** webpage version and Kramer Electronics Ltd details.

# Upgrading Firmware

Use the Kramer **K-UPLOAD** software to upgrade the firmware via the Ethernet port only (set connection method to Ethernet).

> ⓘ When upgrading the firmware, select either TCP port or UDP port.

The latest version of **K-UPLOAD** and installation instructions can be downloaded from our website at: www.kramerav.com/support/product_downloads.asp.

> ⓘ Note - To use the micro USB port, you must install the Kramer USB driver, available at: www.kramerav.com/support/product_downloads.asp.

# Technical Specifications

## AFM-20DSP Technical Specifications

| Inputs/Outputs | 20 Balanced Mono Audio | On 3-pin terminal blocks |
|---|---|---|
| Inputs | 1 HDMI | On a female HDMI connector |
| | 1 S/PDIF | On an RCA connector |
| Outputs | 1 HDMI | On a female HDMI connector |
| | 1 S/PDIF | On an RCA connector |
| | 120W Amplifier | On a 4-pin large terminal block |
| Ports | Dante | On an RJ-45 female connector |
| | Mini USB | On a female mini USB connector |
| | RS-232 | On a 3-pin terminal block connector |
| | Ethernet | On an RJ-45 female connector |
| Line/Mic Level Input | Impedance Unbalanced<br>Impedance Balanced<br>Impedance Microphone | 7.6kΩ<br>3.8kΩ<br>3.8kΩ |
| | Nominal level Unbalanced<br>Nominal level Balanced | 0dBV (0.77Vrms)<br>+6.8dBu (1.54Vrms) |
| | Maximum level (Balanced) | +8dBu (2Vrms) |
| | Sensitivity Unbalanced<br>Sensitivity Balanced | Full power @ 0dBV (0.77Vrms)<br>Full power @ +6dBu (1.54Vrms) |
| | Phantom Power | 48 VDC on/off per input |
| Line Level Output | Impedance Unbalanced<br>Impedance Balanced | 50Ω<br>50Ω |
| | Frequency Response | 20Hz - 20kHz @ +/-1dB |
| | S/N Ratio: | >100 dB, 20Hz - 20kHz, at unity gain (unweighted) |
| | Audio THD + Noise: | <0.01%, 20 Hz - 20 kHz, at unity gain |
| | Crosstalk | <-85 dB, 20Hz to 20kHz |
| Amplifier | Class | D |
| | Input Sensitivity | Attains full power @ 0.3V (–10dBV) |
| | Output Power | 2 x 60W @ 4Ω or 8Ω<br>1 x 120W @70V or 100V |
| | Maximum Voltage Gain | 26dB SE / 32dB BTL |
| | Dynamic Range | 119dB |
| | Frequency Response | 20Hz to 20kHz @ +/-1dB |
| | S/N Ratio | 80dB: 10dBV; 20 Hz: 20 kHz |
| | Audio THD + Noise | THD+N (1kHz @ 1W) 0.003 % |
| | Audio 2nd Harmonic | 0.08% @ 75W RMS @ 4Ω 6.67kHz |
| | Crosstalk | <-85 dB, 20Hz to 20kHz |
| Total System Efficiency | | 89% |
| Video | Max Bandwidth | 10.2Gbps (3.4Gbps per graphic channel) |
| | Max Resolution | 4K UHD @60Hz (4:2:0) 24bpp resolution |
| | Compliance | HDMI and HDCP 1.4 |
| User Interface | Front Panel LEDs | 1 status, 20 analog audio ports, 4 Dante I/O, HDMI embed, HDMI de–embed, 2 S/PDIF I/O, and 2 amplifier channels |

| Control RS-232 | Baud Rate | 115200 |
|---|---|---|
| Supported Web Browsers | Windows 7 | Chrome |
| | Windows 10 | |
| | MAC 10.11 | |
| Power | Consumption | 190VA |
| | Source | 100-240V AC 50/60Hz |
| Environmental Conditions | Operating Temperature | 0° to +40°C (32° to 104°F) |
| | Storage Temperature | -40° to +70°C (-40° to 158°F) |
| | Humidity | 10% to 90%, RHL non-condensing |
| Regulatory Compliance | Safety | CE |
| | Environmental | RoHs, WEEE |
| Enclosure | Size | 19" 1U |
| | Type | Aluminum |
| | Cooling | Fans |
| General | Net Dimensions (W, D, H) | 43.6cm x 23.7cm x 4.4cm (17.2" x 9.3" x 1.7") |
| | Shipping Dimensions (W, D, H) | 52.5cm x 33cm x 10.7cm (20.7" x 13" x 4.2") |
| | Net Weight | 1.6kg (3.5lbs) |
| | Shipping Weight | 2.7kg (5.9lbs) approx. |
| Accessories | Included | Power cord |
| Specifications are subject to change without notice at www.kramerav.com | | |

# AFM-20DSP-LE Technical Specs

| Inputs/Outputs | 20 Balanced Mono Audio | On 3-pin terminal blocks |
|---|---|---|
| Ports | Mini USB | On a female mini USB connector |
| | RS-232 | On a 3-pin terminal block connector |
| | Ethernet | On an RJ-45 female connector |
| Line/Mic Level Input | Impedance Unbalanced Impedance Balanced Impedance Microphone | 7.6kΩ 3.8kΩ 3.8kΩ |
| | Nominal level Unbalanced Nominal level Balanced | 0dBV (0.77Vrms) +6.8dBu (1.54Vrms) |
| | Maximum level (Balanced) | +8dBu (2Vrms) |
| | Sensitivity Unbalanced Sensitivity Balanced | Full power @ 0dBV (0.77Vrms) Full power @ +6dBu (1.54Vrms) |
| | Phantom Power | 48 VDC on/off per input |
| Line Level Output | Impedance Unbalanced Impedance Balanced | 50Ω 50Ω |
| | Frequency Response | 20Hz - 20kHz @ +/-1dB |
| | S/N Ratio | >100 dB, 20Hz - 20kHz, at unity gain (unweighted) |
| | Audio THD + Noise | <0.01%, 20 Hz - 20 kHz, at unity gain |
| | Crosstalk | <-85 dB, 20Hz to 20kHz |
| User Interface | Front Panel LEDs | 1 status, 20 analog audio ports, 4 Dante I/O, HDMI embed, HDMI de–embed, 2 S/PDIF I/O, and 2 amplifier channels |
| Control RS-232 | Baud Rate | 115200 |

| Supported Web Browsers | Windows 7 | Chrome |
| --- | --- | --- |
| | Windows 10 | |
| | MAC 10.11 | |
| Power | Consumption | 31.5VA |
| | Source | 100-240V AC 50/60Hz |
| Environmental Conditions | Operating Temperature | 0° to +40°C (32° to 104°F) |
| | Storage Temperature | -40° to +70°C (-40° to 158°F) |
| | Humidity | 10% to 90%, RHL non-condensing |
| Regulatory Compliance | Safety | CE |
| | Environmental | RoHs, WEEE |
| Enclosure | Size | 19" 1U |
| | Type | Aluminum |
| | Cooling | Fans |
| General | Net Dimensions (W, D, H) | 43.6cm x 23.7cm x 4.4cm (17.2" x 9.3" x 1.7") |
| | Shipping Dimensions (W, D, H) | 52.5cm x 33cm x 10.7cm (20.7" x 13" x 4.2") |
| | Net Weight | 1.6kg (3.5lbs) |
| | Shipping Weight | 2.7kg (5.9lbs) approx. |
| Accessories | Included | Power cord |
| Specifications are subject to change without notice at www.kramerav.com | | |

# AFM-20DSP-AEC Technical Specifications

| Inputs/Outputs | 20 Balanced Mono Audio | On 3-pin terminal blocks |
| --- | --- | --- |
| Ports | Mini USB | On a female mini USB connector |
| | RS-232 | On a 3-pin terminal block connector |
| | Ethernet | On an RJ-45 female connector |
| Line/Mic Level Input | Impedance Unbalanced Impedance Balanced Impedance Microphone | 7.6kΩ 3.8kΩ 3.8kΩ |
| | Nominal level Unbalanced Nominal level Balanced | 0dBV (0.77Vrms) +6.8dBu (1.54Vrms) |
| | Maximum level (Balanced) | +8dBu (2Vrms) |
| | Sensitivity Unbalanced Sensitivity Balanced | Full power @ 0dBV (0.77Vrms) Full power @ +6dBu (1.54Vrms) |
| | Phantom Power | 48 VDC on/off per input |
| Line Level Output | Impedance Unbalanced Impedance Balanced | 50Ω 50Ω |
| | Frequency Response | 20Hz - 20kHz @ +/-1dB |
| | S/N Ratio | >100 dB, 20Hz - 20kHz, at unity gain (unweighted) |
| | Audio THD + Noise | <0.01%, 20 Hz - 20 kHz, at unity gain |
| | Crosstalk | <-85 dB, 20Hz to 20kHz |
| User Interface | Front Panel LEDs | 1 status, 20 analog audio ports, 4 Dante I/O, HDMI embed, HDMI de–embed, 2 S/PDIF I/O, and 2 amplifier channels |
| Control RS-232 | Baud Rate | 115200 |

| Supported Web Browsers | Windows 7 | Chrome |
|---|---|---|
| | Windows 10 | |
| | MAC 10.11 | |
| Power | Consumption | 190VA |
| | Source | 100-240V AC 50/60Hz |
| Environmental Conditions | Operating Temperature | 0° to +40°C (32° to 104°F) |
| | Storage Temperature | -40° to +70°C (-40° to 158°F) |
| | Humidity | 10% to 90%, RHL non-condensing |
| Regulatory Compliance | Safety | CE |
| | Environmental | RoHs, WEEE |
| Enclosure | Size | 19" 1U |
| | Type | Aluminum |
| | Cooling | Fans |
| General | Net Dimensions (W, D, H) | 43.6cm x 23.7cm x 4.4cm (17.2" x 9.3" x 1.7") |
| | Shipping Dimensions (W, D, H) | 52.5cm x 33cm x 10.7cm (20.7" x 13" x 4.2") |
| | Net Weight | 1.6kg (3.5lbs) |
| | Shipping Weight | 2.7kg (5.9lbs) approx. |
| Accessories | Included | Power cord |
| Specifications are subject to change without notice at www.kramerav.com | | |

# Default Communication Parameters

| RS-232 Control / Protocol 3000 | | | |
|---|---|---|---|
| Baud Rate: | 115,200 | Parity: | None |
| Data Bits: | 8 | Command Format: | ASCII |
| Stop Bits: | 1 | | |
| Example: (adjust the amplified audio from analog audio 1 to -10dB): #x-aud-lvl out.amplified_audio.1.audio.1,-10 | | | |
| **Default Ethernet Parameters** | | | |
| IP Address: | 192.168.1.39 | UDP Port #: | 50000 |
| Subnet mask: | 255.255.0.0 | TCP Port #: | 5000 |
| Gateway: | 192.168.0.1 | Security User/Password | Admin/Admin |
| **Factory Reset** | | | |
| Recessed Button | Press and hold for 5 seconds to reset the configuration to its default parameters. | | |
| Protocol 3000: | "#factory" command. | | |
| Webpages: | In the Settings page, click Reset. | | |

# Default AFM-20DSP EDID

Monitor
```
  Model name............... AFM-20DSP
  Manufacturer............. KMR
  Plug and Play ID......... KMR1200
  Serial number............ 295-883450100
  Manufacture date......... 2014, ISO week 255
  Filter driver............ None
  ----------------------
  EDID revision............ 1.3
  Input signal type........ Digital
  Color bit depth.......... Undefined
  Display type............. Monochrome/grayscale
  Screen size.............. 520 x 320 mm (24.0 in)
  Power management......... Standby, Suspend, Active off/sleep
  Extension blocs.......... 1 (CEA-EXT)
  ----------------------
  DDC/CI................... n/a
```

Color characteristics
```
  Default color space...... Non-sRGB
  Display gamma............ 2.20
  Red chromaticity......... Rx 0.674 - Ry 0.319
  Green chromaticity....... Gx 0.188 - Gy 0.706
  Blue chromaticity........ Bx 0.148 - By 0.064
  White point (default).... Wx 0.313 - Wy 0.329
  Additional descriptors... None
```

Timing characteristics
```
  Horizontal scan range.... 30-83kHz
  Vertical scan range...... 56-76Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:10)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
```

Standard timings supported
```
   720 x  400p at  70Hz - IBM VGA
   720 x  400p at  88Hz - IBM XGA2
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  67Hz - Apple Mac II
   640 x  480p at  72Hz - VESA
   640 x  480p at  75Hz - VESA
   800 x  600p at  56Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  72Hz - VESA
   800 x  600p at  75Hz - VESA
```

```
   832 x  624p at  75Hz - Apple Mac II
  1024 x  768i at  87Hz - IBM
  1024 x  768p at  60Hz - VESA
  1024 x  768p at  70Hz - VESA
  1024 x  768p at  75Hz - VESA
  1280 x 1024p at  75Hz - VESA
  1152 x  870p at  75Hz - Apple Mac II
  1280 x 1024p at  75Hz - VESA STD
  1280 x 1024p at  85Hz - VESA STD
  1600 x 1200p at  60Hz - VESA STD
  1024 x  768p at  85Hz - VESA STD
   800 x  600p at  85Hz - VESA STD
   640 x  480p at  85Hz - VESA STD
  1152 x  864p at  70Hz - VESA STD
  1280 x  960p at  60Hz - VESA STD
```

EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Not supported
  YCbCr 4:2:2.............. Not supported
  Native formats........... 1
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:10)
    Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1280x720p at 60Hz (16:10)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #4....... 720x480p at 60Hz (16:10)
    Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)
  LPCM    2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE video identifiers (VICs) - timing/formats supported
  1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
  1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
  1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
   720 x  480p at  60Hz - EDTV (16:9, 32:27)
   720 x  480p at  60Hz - EDTV (4:3, 8:9)
   720 x  480i at  60Hz - Doublescan (16:9, 32:27)
   720 x  576i at  50Hz - Doublescan (16:9, 64:45)
   640 x  480p at  60Hz - Default (4:3, 1:1)
  NB: NTSC refresh rate = (Hz*1000)/1001

CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz

CE speaker allocation data
  Channel configuration.... 2.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. No
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No

Report information
  Date generated........... 03/04/2017
  Software revision........ 2.90.0.1020
  Data source.............. File
  Operating system......... 6.1.7601.2.Service Pack 1

Raw data

00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,01,01,01,01,FF,18,01,03,80,34,20,78,E2,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FF,00,32,39,35,2D,38,38,33,34,35,30,31,30,30,00,00,00,FC,00,56,
53,2D,38,38,55,54,0A,20,20,20,20,20,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,01,E6,
02,03,1B,C1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,77
```

# Default AFM-20DSP-AEC EDID

```
Monitor
  Model name............... AFM-20DSP-AEC
  Manufacturer............. KMR
  Plug and Play ID......... KMR1200
  Serial number............ 295-883450100
  Manufacture date......... 2014, ISO week 255
  Filter driver............ None
  -----------------------
  EDID revision............ 1.3
  Input signal type........ Digital
  Color bit depth.......... Undefined
  Display type............. Monochrome/grayscale
  Screen size.............. 520 x 320 mm (24.0 in)
  Power management......... Standby, Suspend, Active off/sleep
  Extension blocs.......... 1 (CEA/CTA-EXT)
  -----------------------
  DDC/CI................... n/a

Color characteristics
  Default color space...... Non-sRGB
  Display gamma............ 2.20
  Red chromaticity......... Rx 0.674 - Ry 0.319
  Green chromaticity....... Gx 0.188 - Gy 0.706
  Blue chromaticity........ Bx 0.148 - By 0.064
  White point (default).... Wx 0.313 - Wy 0.329
  Additional descriptors... None

Timing characteristics
  Horizontal scan range.... 30-83kHz
  Vertical scan range...... 56-76Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1920x1080p at 60Hz (16:9)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

Standard timings supported
    720 x  400p at  70Hz - IBM VGA
    720 x  400p at  88Hz - IBM XGA2
    640 x  480p at  60Hz - IBM VGA
    640 x  480p at  67Hz - Apple Mac II
    640 x  480p at  72Hz - VESA
    640 x  480p at  75Hz - VESA
    800 x  600p at  56Hz - VESA
    800 x  600p at  60Hz - VESA
    800 x  600p at  72Hz - VESA
    800 x  600p at  75Hz - VESA
    832 x  624p at  75Hz - Apple Mac II



   1024 x  768i at  87Hz - IBM
   1024 x  768p at  60Hz - VESA
   1024 x  768p at  70Hz - VESA
   1024 x  768p at  75Hz - VESA
   1280 x 1024p at  75Hz - VESA
   1152 x  870p at  75Hz - Apple Mac II
   1280 x 1024p at  75Hz - VESA STD
   1280 x 1024p at  85Hz - VESA STD
   1600 x 1200p at  60Hz - VESA STD
   1024 x  768p at  85Hz - VESA STD
    800 x  600p at  85Hz - VESA STD
    640 x  480p at  85Hz - VESA STD
   1152 x  864p at  70Hz - VESA STD
   1280 x  960p at  60Hz - VESA STD

EIA/CEA/CTA-861 Information
  Revision number.......... 3
  IT underscan............. Supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Not supported
  YCbCr 4:2:2.............. Not supported
  Native formats........... 1
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:10)
    Modeline............... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1280x720p at 60Hz (16:10)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #4....... 720x480p at 60Hz (16:10)
    Modeline............... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)
  LPCM    2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE video identifiers (VICs) - timing/formats supported
    1920 x 1080p at  60Hz - HDTV (16:9, 1:1) [Native]
```

```
    1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
    1280 x  720p at  60Hz - HDTV (16:9, 1:1)
     720 x  480p at  60Hz - EDTV (16:9, 32:27)
     720 x  480p at  60Hz - EDTV (4:3, 8:9)
     720 x  480i at  60Hz - Doublescan (16:9, 32:27)
     720 x  576i at  50Hz - Doublescan (16:9, 64:45)
     640 x  480p at  60Hz - Default (4:3, 1:1)
    NB: NTSC refresh rate = (Hz*1000)/1001

 CE vendor specific data (VSDB)
   IEEE registration number. 0x000C03
   CEC physical address..... 1.0.0.0
   Maximum TMDS clock....... 165MHz

 CE speaker allocation data
   Channel configuration.... 2.0
   Front left/right......... Yes
   Front LFE................ No
   Front center............. No
   Rear left/right.......... No
   Rear center.............. No
   Front left/right center.. No
   Rear left/right center... No
   Rear LFE................. No

 Report information
   Date generated........... 10/19/2021
   Software revision........ 2.91.0.1043
   Data source.............. File - NB: improperly installed
   Operating system........ 10.0.19042.2

 Raw data
   00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,01,01,01,01,FF,18,01,03,80,34,20,78,E2,B3,25,AC,51,30,B4,26,
   10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,02,3A,80,18,71,38,2D,40,58,2C,
   45,00,A0,5A,00,00,00,1E,00,00,00,FF,00,32,39,35,2D,38,38,33,34,35,30,31,30,30,00,00,00,FC,00,41,
   46,4D,2D,32,30,44,53,50,2D,41,45,43,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,01,D8,
   02,03,1B,C1,23,09,07,07,48,90,05,04,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
   38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
   1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
   00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,77
```

# Protocol 3000

Kramer devices can be operated using Kramer Protocol 3000 commands sent via serial or Ethernet ports.

## Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.

- **Command format**:

| Prefix | Command Name | Constant (Space) | Parameter(s) | Suffix |
|---|---|---|---|---|
| # | Command | ␣ | Parameter | **<CR>** |

- **Feedback format**:

| Prefix | Device ID | Constant | Command Name | Parameter(s) | Suffix |
|---|---|---|---|---|---|
| ~ | nn | @ | Command | Parameter | **<CR><LF>** |

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([ and ]).

- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).

- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<…>) and must be separated by a period (.).

The command framing varies according to how you interface with the **VS-88UT**. The following figure displays how the # command is framed using terminal communication software (such as Hercules):

## Protocol 3000 Commands

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| # | Protocol handshaking. ⓘ Validates the Protocol 3000 connection and gets the machine number. Step-in master products use this command to identify the availability of a device. | **COMMAND** <br> `#<CR>` <br> **FEEDBACK** <br> `~nn@ OK<CR><LF>` | | `#<CR>` |
| AUD-MONO-MODE | Set HI-Z mono selection. ⓘ These commands are active only when the state is HI-Z, otherwise an error is returned. To set, the MonoMode parameter must be used. | **COMMAND** <br> `#AUD-MONO-MODE␣MonoMode<CR>` <br> **FEEDBACK** <br> `~nn@AUD-MONO-MODE␣MonoMode<CR><LF>` | **MonoMode** – The mono output mode <br> 0 – output is "stereo mix to mono" – both left and right mix to one channel <br> 1 – output is "left to mono" – duplicate left channel information to the right and play both | Set the output to mix to mono: <br> `#AUD-MONO-MODE␣0<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| AUD-MONO-MODE? | Get HI-Z mono selection.<br><br>ⓘ These commands are active only when the state is HI-Z, otherwise an error is returned.<br><br>To set, the MonoMode parameter must be used. | **COMMAND**<br>**#AUD-MONO-MODE?\_<CR>**<br>**FEEDBACK**<br>**~nn@AUD-MONO-MODE\_MonoMode<CR><LF>** | **MonoMode** – The mono output mode<br>0 – output is "stereo mix to mono" – both left and right mix to one channel<br>1 – output is "left to mono" – duplicate left channel information to the right and play both | Get the output to mix to mono:<br>**#AUD-MONO-MODE?\_<CR>** |
| AV-SW-TIMEOUT | Set auto switching timeout. | **COMMAND**<br>**#AV-SW-TIMEOUT\_action,time_out<CR>**<br>**FEEDBACK**<br>**~nn@AV-SW-TIMEOUT\_action,time_out<CR><LF>** | **action** –<br>4 – Disable 5V on video output if no input signal detected.<br>**time_out** – Timeout in seconds<br>30 - 60000 | Set the auto switching timeout to 5 seconds in the event of 5V disable when no input signal is detected:<br>**#AV-SW-TIMEOUT\_4,5<CR>** |
| AV-SW-TIMEOUT? | Get auto switching timeout. | **COMMAND**<br>**#AV-SW-TIMEOUT?\_action<CR>**<br>**FEEDBACK**<br>**~nn@AV-SW-TIMEOUT\_action,time_out<CR><LF>** | **action** –<br>4 – Disable 5V on video output if no input signal detected<br>**time_out** – Timeout in seconds<br>30 - 60000 | Get the Disable 5V on video output if no input signal detected timeout:<br>**#AV-SW-TIMEOUT?\_4<CR>** |
| BUILD-DATE? | Get device build date. | **COMMAND**<br>**#BUILD-DATE?\_<CR>**<br>**FEEDBACK**<br>**~nn@BUILD-DATE\_date,time<CR><LF>** | **date** – Format: YYYY/MM/DD where<br>YYYY = Year<br>MM = Month<br>DD = Day<br>**time** – Format: hh:mm:ss where<br>hh = hours<br>mm = minutes<br>ss = seconds | Get the device build date:<br>**#BUILD-DATE?<CR>** |
| CPEDID | Copy EDID data from the output to the input EEPROM.<br><br>ⓘ Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).<br><br>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.<br><br>In certain products Safe_mode is an optional parameter. See the HELP command for its availability. | **COMMAND**<br>**#CPEDID\_src_type,src_id,dst_type,dest_bitmap<CR>**<br>or<br>**#CPEDID\_src_type,src_id,dst_type,dest_bitmap,safe_mode<CR>**<br>**FEEDBACK**<br>**~nn@CPEDID\_src_stg,src_id,dst_type,dest_bitmap<CR><LF>**<br>**~nn@CPEDID\_src_stg,src_id,dst_type,dest_bitmap,safe_mode<CR><LF>** | **src_type** – EDID source type (usually output)<br>0 – Input<br>1 – Output<br>2 – Default EDID<br>3 – Custom EDID<br>**src_id** – Number of chosen source stage<br>0 – Default EDID source<br>1 – Output 1<br>**dst_type** – EDID destination type (usually input)<br>0 – Input<br>1 – Output<br>2 – Default EDID<br>3 – Custom EDID<br>**dest_bitmap** – Bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.<br>0 – indicates that EDID data is not copied to this destination.<br>1 – indicates that EDID data is copied to this destination.<br>**safe_mode** –<br>0 – device accepts the EDID as is without trying to adjust<br>1 – device tries to adjust the EDID (default value if no parameter is sent) | Copy the EDID data from the Output (EDID source) to the Input:<br>**#CPEDID\_1,1,0,0x1<CR>**<br>Copy the EDID data from the default EDID source to the Input:<br>**#CPEDID\_2,0,0,0x1<CR>** |
| DISPLAY? | Get output HPD status. | **COMMAND**<br>**#DISPLAY?\_out_id<CR>**<br>**FEEDBACK**<br>**~nn@DISPLAY\_out_id,status<CR><LF>** | **out_id** – Output number<br>1 – HDMI output<br>**status** – HPD status according to signal validation<br>0 – Signal or sink is not valid<br>1 – Signal or sink is valid<br>2 – Sink and EDID is valid | Get the output HPD status of Output 1:<br>**#DISPLAY?\_1<CR>** |
| DSP-ACTION | Set DSP parameter. | Internal – for web only. | | |
| DSP-ACTION? | Get DSP parameter. | Internal – for web only. | | |
| DSP-METER-REGISTER | Register DSP meters. | Internal – for web only. | | |
| DSP-METER-UNREGISTER | Unregister DSP meters. | Internal – for web only. | | |
| EDID-AUDIO | Set audio capabilities for EDID. | **COMMAND**<br>**#EDID-AUDIO\_input_id,audio_format<CR>**<br>**FEEDBACK**<br>**~nn@EDID-AUDIO\_input_id,audio_format <CR><LF>** | **input_id** – 1<br>**Audio_format** – Audio block added to EDID:<br>0 – Auto<br>1 – LPCM 2CH<br>2 – LPCM 6CH<br>3 – LPCM 8CH<br>4 – Bitstream<br>5 – HD | Set HDMI IN audio capabilities for EDID (LPCM 6CH):<br>**#EDID-AUDIO\_1,2<CR>** |
| EDID-AUDIO? | Get audio capabilities for EDID. | **COMMAND**<br>**#EDID-AUDIO?\_input_id<CR>**<br>**FEEDBACK**<br>**~nn@EDID-AUDIO\_input_id,audio_format<CR><LF>** | **input_id** – 1<br>**Audio_format** – Audio block added to EDID:<br>0 – Auto<br>1 – LPCM 2CH<br>2 – LPCM 6CH<br>3 – LPCM 8CH<br>4 – Bitstream<br>5 – HD | Get HDMI IN 1 audio capabilities for EDID:<br>**#EDID-AUDIO?\_1<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| EDID-CS | Set EDID color space.<br><br>ⓘ Set command might change the current EDID. | **COMMAND**<br>**#EDID-CS**␣input_id,ColSpace**<CR>**<br>**FEEDBACK**<br>**~nn@EDID-CS**␣input_id,ColSpace**<CR><LF>** | **input_id** – 1<br>**ColSpace** – Color space<br>  0– RGB<br>  4 – auto | Set HDMI IN 1 EDID color space to RGB (enabled):<br>**#EDID-CS**␣1,0**<CR>** |
| EDID-CS? | Get EDID color space.<br><br>ⓘ Get command might change the current EDID. | **COMMAND**<br>**#EDID-CS?**␣input_id**<CR>**<br>**FEEDBACK**<br>**~nn@EDID-CS**␣input_id,ColSpace**<CR><LF>** | **input_id** – 1<br>**ColSpace** – Color space<br>  0– RGB<br>  4 – auto | Get EDID color space:<br>**#EDID-CS?**␣1**<CR>** |
| ETH-PORT | Set Ethernet port protocol.<br><br>ⓘ If the port number you enter is already in use, an error is returned.<br>The port number must be within the following range: 0-(2^16-1). | **COMMAND**<br>**#ETH-PORT**␣portType,ETHPort**<CR>**<br>**FEEDBACK**<br>**~nn@ETH-PORT**␣portType,ETHPort**<CR><LF>** | **portType** – TCP/UDP<br>**ETHPort** – TCP/UDP port number (0 – 65535) | Set the Ethernet port protocol for TCP to port 12457:<br>**#ETH-PORT**␣0,12457**<CR>** |
| ETH-PORT? | Get Ethernet port protocol. | **COMMAND**<br>**#ETH-PORT?**␣portType**<CR>**<br>**FEEDBACK**<br>**~nn@ETH-PORT**␣portType,ETHPort**<CR><LF>** | **portType** – TCP/UDP<br>  0– TCP<br>  1– UDP<br>**ETHPort** – TCP / UDP port number (0 – 65535) | Get the Ethernet port protocol for UDP:<br>**#ETH-PORT?**␣1**<CR>** |
| FACTORY | Reset device to factory default configuration.<br><br>ⓘ This command deletes all user data from the device. The deletion can take some time.<br><br>Your device may require powering off and powering on for the changes to take effect. | **COMMAND**<br>**#FACTORY<CR>**<br>**FEEDBACK**<br>**~nn@FACTORY**␣OK**<CR><LF>** | | Reset the device to factory default configuration:<br>**#FACTORY<CR>** |
| FEATURE-LIST? | Get feature state according to the feature ID. | **COMMAND**<br>**#FEATURE-LIST?**␣feature_id**<CR>**<br>**FEEDBACK**<br>**~nn@FEATURE-LIST**␣feature_id,ir_state**<CR><LF>** | **Feature_Id** – Feature ID<br>  1– Maestro<br>  2– Room Controller<br>**Ir_State** – IR Interface<br>  0– Disabled<br>  1– Enabled | Get the room controller feature state (for the room controller 1):<br>**#FEATURE-LIST?**␣1**<CR>** |
| HDCP-MOD | Set HDCP mode.<br><br>ⓘ Set HDCP working mode on the device input:<br><br>HDCP supported - HDCP_ON [default].<br><br>HDCP not supported - HDCP OFF.<br><br>HDCP support changes following detected sink - MIRROR OUTPUT.<br><br>When you define 3 as the mode, the HDCP status is defined according to the connected output in the following priority: OUT 1, OUT 2. If the connected display on OUT 2 supports HDCP, but OUT 1 does not, then HDCP is defined as not supported. If OUT 1 is not connected, then HDCP is defined by OUT 2. | **COMMAND**<br>**#HDCP-MOD**␣inp_id,mode**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-MOD**␣inp_id,mode**<CR><LF>** | **inp_id** – Input number:<br>  1– IN 1 HDMI<br>  2– IN 2 HDBT<br>**mode** – HDCP mode:<br>  0 – HDCP Off<br>  3 – HDCP defined according to the connected output | Set the input HDCP-MODE of IN 1 to Off:<br>**#HDCP-MOD**␣1,0**<CR>** |
| HDCP-MOD? | Get HDCP mode.<br><br>ⓘ Set HDCP working mode on the device input:<br><br>HDCP supported - HDCP_ON [default].<br><br>HDCP not supported - HDCP OFF.<br><br>HDCP support | **COMMAND**<br>**#HDCP-MOD?**␣inp_id**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-MOD**␣inp_id,mode**<CR><LF>** | **inp_id** – Input number:<br>  1– IN 1 HDMI<br>  2– IN 2 HDBT<br>**mode** – HDCP mode:<br>  0 – HDCP Off<br>  3 – HDCP defined according to the connected output | Get the input HDCP-MODE of IN 1 HDMI:<br>**#HDCP-MOD?**␣1**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| HELP | Get command list or help for specific command. | **COMMAND**<br>**#HELP<CR>**<br><br>**#HELP␣command_name<CR>**<br>**FEEDBACK**<br>1. Multi-line:<br>**~nn@Device␣command,␣command…<CR><LF>**<br><br>To get help for command use: HELP (COMMAND_NAME)**<CR><LF>**<br>**~nn@HELP␣command:<CR><LF>**<br>**description<CR><LF>**<br>**USAGE:usage<CR><LF>** | **command** – Name of a specific command | Get the command list:<br>**#HELP<CR>**<br><br>To get help for<br>**#AV-SW-TIMEOUT:**<br>**HELP␣AV-SW-TIMEOUT<CR>** |
| LOGIN | Set protocol permission.<br><br>ⓘ For devices that support security, LOGIN allows the user to run commands with an End User or Administrator permission level.<br>When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level<br>When set, login must be performed upon each connection<br><br>The permission system works only if security is enabled with the "SECUR" command.<br><br>It is not mandatory to enable the permission system in order to use the device<br><br>In each device, some connections allow logging in to different levels. Some do not work with security at all.<br><br>Connection may logout after timeout. | **COMMAND**<br>**#LOGIN␣login_level,password<CR>**<br>**FEEDBACK**<br>**~nn@LOGIN␣login_level,password␣OK<CR><LF>**<br>or<br>**~nn@LOGIN␣ERR␣004<CR><LF>**<br><br>(if incorrect password was entered) | **login_level** – Level of permissions required ( User or Admin)<br>**password** – Predefined password (by PASS command). Default password is an empty string | Set the protocol permission level to Admin (when the password defined in the PASS command is 33333):<br>**#LOGIN␣Admin,33333<CR>** |
| LOGIN? | Get current protocol permission level.<br><br>ⓘ For devices that support security, LOGIN allows the user to run commands with an End User or Administrator permission level.<br><br>In each device, some connections allow logging in to different levels. Some do not work with security at all.<br><br>Connection may logout after timeout.<br><br>The permission system works only if security is enabled with the "SECUR" command. | **COMMAND**<br>**#LOGIN?␣<CR>**<br>**FEEDBACK**<br>**~nn@LOGIN␣login_level<CR><LF>** | **login_level** – Level of permissions required (User or Admin) | Get current protocol permission level:<br>**#LOGIN?<CR>** |
| LOGOUT | Cancel current permission level.<br><br>ⓘ Logs out from End User or Administrator permission levels to Not Secure. | **COMMAND**<br>**#LOGOUT<CR>**<br>**FEEDBACK**<br>**~nn@LOGOUT␣OK<CR><LF>** | | **#LOGOUT<CR>** |
| LOG-TAIL? | Get the last "n" lines of message logs.<br><br>ⓘ Used for advanced troubleshooting. Helps find error root causes and gets details not displayed in the error code number. | **COMMAND**<br>**#LOG-TAIL?␣line_num<CR>**<br>**FEEDBACK**<br>Get:<br>**~nn@LOG-TAILnn<CR><LF>**<br>**Line content #1<CR><LF>**<br>**Line content #2<CR><LF>**<br>Etc... | **Line_num** – Optional, default *line_num* is 10 | Get the last "2" lines of message logs:<br>**#LOG-TAIL?␣2<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| MATRIX-STATUS? | Get routing status of all output ports.<br><br>(i) This syntax uses the new convention of using brackets to define a list of fields "[ ]". | **COMMAND**<br>**#MATRIX-STATUS?_<CR>**<br>**FEEDBACK**<br>Multi-line:<br>~nn@MATRIX-STATUS_[[<direction_type1>.<port_type1>.<port_index1>.<signal_type1>.<index1>,[[<direction_type2>.<port_type2>.<port_index2>.<signal_type2>.<index2>],..]<CR><LF> | The following attributes comprise the output signal ID (suffix 1) and input signal ID (suffix 2 or greater):<br>▪ **<direction_type>**— IN<br>▪ **<port_type>**—<br> o HDMI<br> o HDBT<br> o ANALOG_AUDIO<br> o AMPLIFIED_AUDIO<br> o TOS<br> o SPDIF<br> o MIC<br> o RS-232<br> o IR<br> o USB_A<br> o USB_B<br>▪ **<port_index>**— The port number as printed on the front or rear panel<br>▪ **<signal_type>**—<br> o VIDEO<br> o AUDIO<br> o ARC<br> o RS232<br> o IR<br> o USB<br>▪ **<index>**— Indicates a specific channel number when there are multiple channels of the same type | Get the room controller current matrix state:<br>**#MATRIX-STATUS?_<CR>** |
| MODEL? | Get device model.<br><br>(i) This command identifies equipment connected to **AFM-20DSP** and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests. | **COMMAND**<br>**#MODEL?_<CR>**<br>**FEEDBACK**<br>~nn@MODEL_model_name<CR><LF> | **model_name** – String of up to 19 printable ASCII chars | Get the device model:<br>**#MODEL?_<CR>** |
| NAME | Set machine (DNS) name.<br><br>(i) The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on). | **COMMAND**<br>**#NAME_machine_name<CR>**<br>**FEEDBACK**<br>~nn@NAME_machine_name<CR><LF> | **machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end) | Set the DNS name of the device to room-442:<br>**#NAME_room-442<CR>** |
| NAME? | Get machine (DNS) name.<br><br>(i) The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on). | **COMMAND**<br>**#NAME?_<CR>**<br>**FEEDBACK**<br>~nn@NAME_machine_name<CR><LF> | **machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end) | Get the DNS name of the device:<br>**#NAME?_<CR>** |
| NAME-RST | Reset machine (DNS) name to factory default.<br><br>(i) Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number. | **COMMAND**<br>**#NAME-RST<CR>**<br>**FEEDBACK**<br>~nn@NAME-RST_OK<CR><LF> | | Reset the machine name (S/N last digits are 0102):<br>**#NAME-RST_KRAMER_0102<CR>** |
| NET-CONFIG | Set a network configuration.<br><br>(i) Parameters, [DNS1] and [DNS2] are optional.<br><br>(i) For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.<br><br>(i) If the gateway address is not compliant to the subnet mask used for the host IP, the command will return an error. Subnet and gateway compliancy specified by RFC950. | **COMMAND**<br>**#NET-CONFIG_id,ip,net_mask,gateway,[DNS1],[DNS2]<CR>**<br>**FEEDBACK**<br>~nn@NET-CONFIG_id,ip,net_mask,gateway<CR><LF> | **id** – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….<br>**ip** – Network IP<br>**net_mask** – Network mask<br>**gateway** – Network gateway | Set the device network parameters to IP address 192.168.113.10, net mask 255.255.0.0, and gateway 192.168.0.1:<br>**#NET-CONFIG_0,192.168.113.10,255.255.0.0,192.168.0.1<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| NET-CONFIG? | Get a network configuration. | **COMMAND**<br>`#NET-CONFIG?␣id<CR>`<br>**FEEDBACK**<br>`~nn@NET-CONFIG␣id,ip,net_mask,gateway<CR><LF>` | `id` – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….<br>`ip` – Network IP<br>`net_mask` – Network mask<br>`gateway` – Network gateway | Get network configuration:<br>`#NET-CONFIG?␣id<CR>` |
| NET-DHCP | Set DHCP mode.<br><br>ⓘ Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device.<br><br>Connecting Ethernet to devices with DHCP may take more time in some networks.<br><br>To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the `NAME` command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.<br><br>For proper settings consult your network administrator.<br><br>ⓘ For Backward compatibility, the `id` parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port. | **COMMAND**<br>`#NET-DHCP␣id,mode<CR>`<br>**FEEDBACK**<br>`~nn@NET-DHCP␣id,mode<CR><LF>` | `id` – 0<br>`mode` –<br>1– Try to use DHCP. (If unavailable, use the IP address set by the factory or the `NET-IP` command). | Enable DHCP mode for port 1, if available:<br>`#NET-DHCP␣1,1<CR>` |
| NET-DHCP? | Get DHCP mode.<br>ⓘ For Backward compatibility, the `id` parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port. | **COMMAND**<br>`#NET-DHCP?␣id<CR>`<br>**FEEDBACK**<br>`~nn@NET-DHCP␣id,mode<CR><LF>` | `id` – 0<br>`mode` –<br>0– Do not use DHCP. Use the IP set by the factory or using the `NET-IP` or `NET-CONFIG` command.<br>1– Try to use DHCP. If unavailable, use the IP set by the factory or using the `NET-IP` or `NET-CONFIG` command. | Get DHCP mode for port 1:<br>`#NET-DHCP?␣1<CR>` |
| NET-DNS? | Get DNS name server. | N/A | | |
| NET-GATE | Set gateway IP.<br><br>ⓘ A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator. | **COMMAND**<br>`#NET-GATE␣ip_address<CR>`<br>**FEEDBACK**<br>`~nn@NET-GATE␣ip_address<CR><LF>` | `ip_address` – Format: xxx.xxx.xxx.xxx | Set the gateway IP address to 192.168.0.1:<br>`#NET-GATE␣192.168.000.001<CR>` |
| NET-GATE? | Get gateway IP.<br><br>ⓘ A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems. | **COMMAND**<br>`#NET-GATE?␣<CR>`<br>**FEEDBACK**<br>`~nn@NET-GATE␣ip_address<CR><LF>` | `ip_address` – Format: xxx.xxx.xxx.xxx | Get the gateway IP address:<br>`#NET-GATE?␣<CR>` |
| NET-IP | Set IP address.<br><br>ⓘ For proper settings consult your network administrator. | **COMMAND**<br>`#NET-IP␣ip_address<CR>`<br>**FEEDBACK**<br>`~nn@NET-IP␣ip_address<CR><LF>` | `ip_address` – Format: xxx.xxx.xxx.xxx | Set the IP address to 192.168.1.39:<br>`#NET-IP␣192.168.001.039<CR>` |
| NET-IP? | Get IP address. | **COMMAND**<br>`#NET-IP?␣<CR>`<br>**FEEDBACK**<br>`~nn@NET-IP␣ip_address<CR><LF>` | `ip_address` – Format: xxx.xxx.xxx.xxx | Get the IP address:<br>`#NET-IP?␣<CR>` |
| NET-MAC? | Get MAC address.<br>ⓘ For backward compatibility, the `id` parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port. | **COMMAND**<br>`#NET-MAC?␣id<CR>`<br>**FEEDBACK**<br>`~nn@NET-MAC␣id,mac_address<CR><LF>` | `id` – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….<br>`mac_address` – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit | `#NET-MAC?␣id<CR>` |
| NET-MASK | Set subnet mask.<br>ⓘ For proper settings consult your network administrator. | **COMMAND**<br>`#NET-MASK␣net_mask<CR>`<br>**FEEDBACK**<br>`~nn@NET-MASK␣net_mask<CR><LF>` | `net_mask` – Format: xxx.xxx.xxx.xxx | Set the subnet mask to 255.255.0.0:<br>`#NET-MASK␣255.255.000.000<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| NET-MASK? | Get subnet mask. | **COMMAND**<br>#NET-MASK?␣<CR><br>**FEEDBACK**<br>~nn@NET-MASK␣net_mask<CR><LF> | net_mask – Format: xxx.xxx.xxx.xxx | Get the subnet mask:<br>#NET-MASK?<CR> |
| PASS | Set password for login level.<br>ⓘ The default password is an empty string. | **COMMAND**<br>#PASS␣login_level,password<CR><br>**FEEDBACK**<br>~nn@PASS␣login_level,password<CR><LF> | login_level – Level of login to set (End User or Administrator).<br>password – Password for the login_level. Up to 15 printable ASCII chars | Set the password for the Admin protocol permission level to 33333:<br>#PASS␣Admin,33333<CR> |
| PASS? | Get password for login level.<br>ⓘ The default password is an empty string. | **COMMAND**<br>#PASS?␣login_level<CR><br>**FEEDBACK**<br>~nn@PASS␣login_level,password<CR><LF> | login_level – Level of login to set (End User or Administrator).<br>password – Password for the login_level. Up to 15 printable ASCII chars | Get the password for the Admin protocol permission level:<br>#PASS?␣Admin<CR> |
| PORTS-LIST? | Get the port list of this machine.<br>ⓘ The response is returned in one line and terminated with <CR><LF>.<br>The response format lists port IDs separated by commas.<br>This is an Extended Protocol 3000 command. | **COMMAND**<br>#PORTS-LIST?␣<CR><br>**FEEDBACK**<br>~nn@PORTS-LIST␣[<direction_type>.<port_type>.<port_index>,..]<CR><LF> | The following attributes comprise the port ID:<br>▪ <direction_type> –<br>  o IN<br>  o OUT<br>▪ <port_type> –<br>  o HDMI<br>  o ANALOG_AUDIO<br>  o AMPLIFIED_AUDIO<br>  o SPDIF<br>  o MIC<br>  o DANTE<br>▪ <port_index> – The port number as printed on the front or rear panel | Get the ports list:<br>#PORTS-LIST?␣<CR> |
| PROT-VER? | Get device protocol version. | **COMMAND**<br>#PROT-VER?␣<CR><br>**FEEDBACK**<br>~nn@PROT-VER␣3000:version<CR><LF> | version – XX.XX where X is a decimal digit | Get the device protocol version:<br>#PROT-VER?␣<CR> |
| RESET | Reset device.<br>ⓘ To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port. | **COMMAND**<br>#RESET<CR><br>**FEEDBACK**<br>~nn@RESET␣OK<CR><LF> | | Reset the device:<br>#RESET<CR> |
| SECUR | Start/stop security.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command. | **COMMAND**<br>#SECUR␣security_mode<CR><br>**FEEDBACK**<br>~nn@SECUR␣security_mode<CR><LF> | security_mode –<br>0– OFF (disables security)<br>1– ON (enables security) | Enable the permission system:<br>#SECUR␣0<CR> |
| SECUR? | Get current security state.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command. | **COMMAND**<br>#SECUR?␣<CR><br>**FEEDBACK**<br>~nn@SECUR␣security_mode<CR><LF> | security_mode –<br>0– OFF (disables security)<br>1– ON (enables security) | Get current security state:<br>#SECUR?␣<CR> |
| SIGNAL? | Get input signal status. | **COMMAND**<br>#SIGNAL?␣inp_id<CR><br>**FEEDBACK**<br>~nn@SIGNAL␣inp_id,status<CR><LF> | inp_id – Input number<br>1– HDMI<br>status – Signal status according to signal validation:<br>0– Off<br>1– On | Get the input signal lock status of IN 1:<br>#SIGNAL?␣1<CR> |
| SIGNALS-LIST? | Get signal ID list of this machine.<br>ⓘ The response is returned in one line and terminated with <CR><LF>.<br>The response format lists signal IDs separated by commas.<br>This is an Extended Protocol 3000 command. | **COMMAND**<br>#SIGNALS-LIST?␣<CR><br>**FEEDBACK**<br>~nn@SIGNALS-LIST␣[<direction_type>.<port_type>.<port_index>.<signal_type>.<index>,..]<CR><LF> | The following attributes comprise the signal ID:<br>▪ <direction_type> –<br>  o IN<br>  o OUT<br>▪ <port_type> –<br>  o HDMI<br>  o ANALOG_AUDIO<br>  o AMPLIFIED_AUDIO<br>  o SPDIF<br>  o MIC<br>  o DANTE<br>▪ <port_index> – The port number as printed on the front or rear panel<br>▪ <signal_type> –<br>  o AUDIO<br>  o VIDEO<br>▪ <index> – Indicates a specific channel number when there are multiple channels of the same type | Get signal ID list:<br>#SIGNALS-LIST?␣<CR> |
| SN? | Get device serial number. | **COMMAND**<br>#SN?␣<CR><br>**FEEDBACK**<br>~nn@SN␣serial_number<CR><LF> | serial_number – 14 decimal digits, factory assigned | Get the device serial number:<br>#SN?␣<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **TIME?** | Get device time and date.<br><br>ⓘ The year must be 4 digits.<br><br>The device does not validate the day of week from the date.<br><br>Time format - 24 hours.<br><br>Date format - Day, Month, Year. | **COMMAND**<br>**#TIME?␣<CR>**<br>**FEEDBACK**<br>**~nn@TIME␣**day_of_week,date,time**<CR><LF>** | **day_of_week** – One of {SUN,MON,TUE,WED,THU,FRI,SAT}<br>**date** – Format: YYYY/MM/DD where<br>YYYY = Year<br>MM = Month<br>DD = Day<br>**time** – Format: hh:mm:ss where<br>hh = hours<br>mm = minutes<br>ss = seconds | Get device time and date:<br>**#TIME?<CR>** |
| **TIME-LOC?** | Get local time offset from UTC/GMT.<br><br>ⓘ If the time server is configured, device time calculates by adding UTC_off to UTC time (that it got from the time server) + 1 hour if daylight savings time is in effect.<br><br>TIME command sets the device time without considering these settings. | **COMMAND**<br>**#TIME-LOC?␣<CR>**<br>**FEEDBACK**<br>**~nn@TIME-LOC␣**UTC_off,DayLight**<CR><LF>** | **UTC_off** – Offset of device time from UTC/GMT (without daylight time correction)<br>**DayLight** –<br>0– no daylight saving time<br>1– daylight saving time | Get local time offset from UTC/GMT:<br>**#TIME-LOC?<CR>** |
| **TIME-SRV?** | Get time server.<br><br>ⓘ This command is needed for setting UDP timeout for the current client list. | **COMMAND**<br>**#TIME-SRV?␣<CR>**<br>**FEEDBACK**<br>**~nn@TIME-SRV␣**mode,time_server_ip,time_server_Sync_Hour,server_status**<CR><LF>** | **mode** – On/Off<br>0– Off<br>1– On<br>**time_server_ip** – Time server IP address<br>**time_server_Sync_Hour** – Hour in day for time server sync<br>**server_status** –<br>0– Off<br>1– On | Get time server:<br>**#TIME-SRV?<CR>** |
| **UPGRADE** | Perform firmware upgrade.<br><br>ⓘ Not necessary for some devices.<br><br>Firmware usually uploads to a device via a command like LDFW.<br><br>Reset the device to complete the process. | **COMMAND**<br>**#UPGRADE<CR>**<br>**FEEDBACK**<br>**~nn@UPGRADE␣**OK**<CR><LF>** | | Perform firmware upgrade:<br>**#UPGRADE<CR>** |
| **VERSION?** | Get firmware version number. | **COMMAND**<br>**#VERSION?␣<CR>**<br>**FEEDBACK**<br>**~nn@VERSION␣**firmware_version**<CR><LF>** | **firmware_version** – XX.XX.XXXX where the digit groups are: major.minor.build version | Get the device firmware version number:<br>**#VERSION?␣<CR>** |
| **X-5V?** | Get 5V state of a port. | **COMMAND**<br>**#X-5V?␣**<direction_type>.<port_type>.<port_index>**<CR>**<br>**FEEDBACK**<br>**~nn@X-5V␣**<direction_type>.<port_type>.<port_index>,mode**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>○ OUT<br>▪ **<port_type>** –<br>○ HDMI<br>▪ **<port_index>** – 1<br>**mode** – OFF/ON, (not case sensitive) | Get the 5V state of HDMI 1:<br>**#X-5V?␣**OUT.HDMI.1**<CR>** |
| **X-AUD-HI-Z** | Set Hi-Z state.<br><br>ⓘ This is an Extended Protocol 3000 command.<br><br>ⓘ Active only when state is high. Ignore everything else. | **COMMAND**<br>**#X-AUD-HI-Z␣**<direction_type>.<port_type>.<port_index>,<hizstate>,<hizvolt>**<CR>**<br>**FEEDBACK**<br>**~nn@X-AUD-HI-Z␣**<direction_type>.<port_type>.<port_index>,<hizstate 0:OFFN,1:ON>,<HiZVolt 0:70v,1:100v>**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>○ OUT<br>▪ **<port_type>** –<br>○ AMPLIFIED_AUDIO<br>▪ **<port_index>** – 1<br>▪ **<hizstate>** –<br>○ 0– Off<br>○ 1– On<br>▪ **<hizvolt>** –<br>○ 0 – 70v<br>○ 1 – 100v | Set the line level output to Hi-Z and 70V:<br>**#X-AUD-HI-Z␣**OUT.AMPLIFIED_AUDIO.1,1,0**<CR>** |
| **X-AUD-HI-Z?** | Get Hi-Z/Lo-Z configuration.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**# X-AUD-HI-Z?␣**<direction_type>.<port_type>.<port_index>,<hizstate>,<hizvolt>**<CR>**<br>**FEEDBACK**<br>**~nn@X-AUD-HI-Z?**<direction_type>.<port_type>.<port_index>,<HiZState 0:OFFN,1:ON>,<HiZVolt 0:70v,1:100v>**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>○ OUT<br>▪ **<port_type>** –<br>○ AMPLIFIED_AUDIO<br>▪ **<port_index>** – 1<br>▪ **<hizstate>** –<br>○ 0– Off<br>○ 1– On<br>▪ **<hizvolt>** –<br>○ 0 – 70v<br>○ 1 – 100v | Get the line level output to Hi-Z and 70V:<br>**#X-AUD-HI-Z?␣**OUT.AMPLIFIED_AUDIO.1**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-AUD-LVL | Set audio level of a specific signal.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-AUD-LVL**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,audio_level**\<CR>**<br>**FEEDBACK**<br>**~nn@X-AUD-LVL**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,audio_level**\<CR>\<LF>** | The following attributes comprise the signal ID:<br>▪ **`<direction_type>`** –<br>　○ IN<br>　○ OUT<br>▪ **`<port_type>`** –<br>　○ ANALOG_AUDIO<br>　○ AMPLIFIED_AUDIO<br>　○ SPDIF<br>　○ DANTE<br>　○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>　○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type<br>**audio_level** – Audio level in dB (range between -60 to +30) depending of the ability of the product.<br>++ (increase current value by 0.5dB)<br>–– (decrease current value by 0.5dB) | Set the audio level of analog audio specific signal to 10:<br>**#X-AUD-LVL**␣IN.ANALOG_AUDIO.5.AUDIO.1,10**\<CR>** |
| X-AUD-LVL? | Get audio level of a specific signal.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-AUD-LVL?**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`**\<CR>**<br>**FEEDBACK**<br>**~nn@X-AUD-LVL**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,audio_level**\<CR>\<LF>** | The following attributes comprise the signal ID:<br>▪ **`<direction_type>`** –<br>　○ IN<br>　○ OUT<br>▪ **`<port_type>`** –<br>　○ ANALOG_AUDIO<br>　○ AMPLIFIED_AUDIO<br>　○ SPDIF<br>　○ DANTE<br>　○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>　○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type<br>**audio_level** – Audio level in dB (range between -60 to +30) depending of the ability of the product | Get the audio level of a specific signal:<br>**#X-AUD-LVL?**␣OUT.ANALOG_AUDIO.1.AUDIO.1**\<CR>** |
| X-AUD-LVL-RANGE? | Get the range of audio level in the product.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-AUD-LVL-RANGE?**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`**\<CR>**<br>**FEEDBACK**<br>**~nn@X-AUD-LVL-RANGE**␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,audio_level_range**\<CR>\<LF>** | The following attributes comprise the analog_output_id:<br>▪ **`<direction_type>`** –<br>　○ IN<br>　○ OUT<br>▪ **`<port_type>`** –<br>　○ ANALOG_AUDIO<br>　○ AMPLIFIED_AUDIO<br>　○ SPDIF<br>　○ DANTE<br>　○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>　○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type | get the analog output 3 audio level range:<br>**#X-AUD-LVL-RANGE?**␣OUT.ANALOG_AUDIO.3.AUDIO.1**\<CR>** |
| X-GROUP | Create/update group.<br><br>ⓘ This is an Extended Protocol 3000 command. | Internal – for web only. | | |
| X-GROUP? | Create/update group.<br><br>ⓘ This is an Extended Protocol 3000 command. | Internal – for web only. | | |
| X-GROUP-RM | Remove a group or all groups.<br><br>ⓘ This command is designed to enable pattern on any signal. commonly pattern makes sense for video, but on some products audio pattern is also supported. In the future, data pattern will be also supported to generate some data on RS232 lines.<br><br>This is an Extended Protocol 3000 command. | Internal – for web only. | | |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-LABEL | Set the port label.<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-LABEL␣<direction_type>.<port_type>.<port_index>.<signal_type>.<label_text><CR>`<br>**FEEDBACK**<br>`~nn@X-LABEL␣<direction_type>.<port_type>.<port_index>.<signal_type>.label_text<CR><LF>` | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<port_type>** –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ SPDIF<br>  ○ DANTE<br>  ○ MIC<br>▪ **<port_index>** – The port number as printed on the front or rear panel<br>▪ **<signal_type>** –<br>  ○ AUDIO<br>▪ **label_text** – Enter label text | Set the analog input label to Port1:<br>`#X-LABEL␣IN.ANALOG_AUDIO.1.AUDIO,Port1<CR>` |
| X-LABEL? | Get the port label.<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-LABEL?␣<direction_type>.<port_type>.<port_index>.<signal_type>.<index><CR>`<br>**FEEDBACK**<br>`~nn@X-LABEL?␣<direction_type>.<port_type>.label_text<CR><LF>` | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<port_type>** –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ SPDIF<br>  ○ MIC<br>▪ **<port_index>** – The port number as printed on the front or rear panel<br>▪ **<signal_type>** –<br>  ○ AUDIO<br>▪ **<index>** – Indicates a specific channel number when there are multiple channels of the same type<br>▪ **label_text** – Enter label text | Get the analog input:<br>`#X-LABEL?␣IN.ANALOG_AUDIO.1.AUDIO.1<CR>` |
| X-LINK-GROUP | SET LINK-MODE feature:<br><br>Get linked signals groups info, this is a way to define group of signals for which any action made on one of them will be applied to all the members of the group.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-GROUP␣<direction_type>.<group_type>.<group_index>,linked_state<CR>`<br>**FEEDBACK**<br>`~nn@X-GROUP␣<direction_type>.<group_type>.<group_index>,linked_state<CR><LF>` | The following attributes comprise the group ID (all Caps – case sensitive):<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<group_type>** –<br>  ○ ANALOG_AUDIO<br>▪ **<group_index>** – The group index (1,3,5,7,9,11,13,15,17 or 19)<br>  ○ **Linked_state** – OFF/ON (not case sensitive) | Set the selected id of selectable ports groups of all available groups<br>Set the link for group 7 (analog inputs 7 and 8) to off:<br>`#X-LINK-GROUP␣IN.ANALOG_AUDIO.7,OFF<CR>` |
| X-LINK-GROUP? | GET LINK-MODE feature:<br><br>Get linked signals groups info, this is a way to define group of signals for which any action made on one of them will be applied to all the members of the group.<br><br>ⓘ This is an Extended Protocol 3000 command.<br>Used essentially by the web command. | **COMMAND**<br>`#X-GROUP?␣<direction_type>.<group_type>.<group_index><CR>`<br>**FEEDBACK**<br>`~nn@X-GROUP␣<direction_type>.<group_type>.<group_index>,linked_state<CR><LF>` | The following attributes comprise the group ID (all Caps – case sensitive):<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<group_type>** –<br>  ○ ANALOG_AUDIO<br>▪ **<group_index>** – The group index (1,3,5,7,9,11,13,15,17 or 19)<br>**Linked_state** – OFF/ON (not case sensitive) | Get the groups link status:<br>`#X-LINK-GROUP?␣IN.ANALOG_AUDIO.1<CR>` |
| X-LINK-GROUPS-LIST? | LINK-MODE feature:<br><br>Get linked signals groups info, this is a way to define group of signals for which any action made on one of them will be applied to all member of the group.<br>The LINK mode of a group is defined using the command: **X-LINK-GROUP**<br><br>ⓘ This is an Extended Protocol 3000 command.<br>Used essentially by the web | **COMMAND**<br>`#X-LINK-GROUPS-LIST?<CR>`<br>**FEEDBACK**<br>`~nn@X-POE␣[[group_id,is_linked,[signal_id,...,signal_id]]<CR><LF>` | **group_id** – The following attributes comprise the port ID:<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<group_type>** –<br>  ○ AUDIO<br>▪ **<group_index>** – The port number as printed on the front or rear panel<br>▪ **<is_linked>** – OFF/ON (not case sensitive)<br>**signal_id** – also includes:<br>▪ **<signal_type>** –<br>  ○ ANALOG_AUDIO<br>▪ **<index>** – 1<br>▪ **state** – OFF/ON (not case sensitive) | Get the PoE state for all ports:<br>`#X-LINK-GROUPS-LIST?<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| `X-MIC-TYPE` | Set microphone type.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-MIC-TYPE_<direction_type>.<port_type>.<port_index>,mic_type<CR>`<br>**FEEDBACK**<br>`~nn@X-MIC-TYPE_<direction_type>.<port_type>.<port_index>,mic_type<CR><LF>` | The following attributes comprise the port ID:<br>▪ `<direction_type>` –<br>  ○ IN<br>▪ `<port_type>` –<br>  ○ MIC<br>▪ `<port_index>` – The port number as printed on the front or rear panel and according to IO Config. 1 (Mic 1) to 16 (Mic 16)<br>`mic_type` – Dynamic/Condenser (not case sensitive) | Set MIC 3 type to condenser:<br>`#X-MIC-TYPE_IN.MIC.3,condenser<CR>` |
| `X-MIC-TYPE?` | Get microphone type.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-MIC-TYPE?_<direction_type>.<port_type>.<port_index><CR>`<br>**FEEDBACK**<br>`~nn@X-MIC-TYPE_<direction_type>.<port_type>.<port_index>,mic_type<CR><LF>` | The following attributes comprise the port ID:<br>▪ `<direction_type>` –<br>  ○ IN<br>▪ `<port_type>` –<br>  ○ MIC<br>▪ `<port_index>` – The port number as printed on the front or rear panel and according to IO Config. 1 (Mic 1) to 16 (Mic 16)<br>`mic_type` – Dynamic/Condenser (not case sensitive) | Get MIC 3 type:<br>`#X-MIC-TYPE?_IN.MIC.3<CR>` |
| `X-MIX-LVL` | Set DSP matrix cross-point MIX level in dB.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-MIX-LVL_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index>,dB<CR>`<br>**FEEDBACK**<br>`~nn@X-MIX-LVL_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index>,dB<CR><LF>` | The following attributes comprise the primary signal ID (suffix 1) and follower signal ID (suffix 2 or greater):<br>▪ `<direction_type>` – IN<br>  ○ IN<br>  ○ OUT<br>▪ `<port_type>` –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ DANTE<br>  ○ SPDIF<br>  ○ MIC<br>▪ `<port_index>` – The port number as printed on the front or rear panel<br>▪ `<signal_type>` –<br>  ○ AUDIO<br>▪ `<index>` – Indicates a specific channel number when there are multiple channels of the same type | Set analog audio 13 and Dante 1 cross-point level to -25.2dB:<br>`#X-MIX-LVL_OUT.ANALOG_AUDIO.13.AUDIO.1,IN.DANTE.1.AUDIO.1,-25.2<CR>` |
| `X-MIX-LVL?` | Get DSP matrix cross-point MIX level in dB.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-MIX-LVL?_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index><CR>`<br>**FEEDBACK**<br>`~nn@X-MIX-LVL_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index>,dB<CR><LF>` | The following attributes comprise the primary signal ID (suffix 1) and follower signal ID (suffix 2 or greater):<br>▪ `<direction_type>` – IN<br>  ○ IN<br>  ○ OUT<br>▪ `<port_type>` –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ DANTE<br>  ○ SPDIF<br>  ○ MIC<br>▪ `<port_index>` – The port number as printed on the front or rear panel<br>▪ `<signal_type>` –<br>  ○ AUDIO<br>▪ `<index>` – Indicates a specific channel number when there are multiple channels of the same type | Get analog audio 13 and Dante 1 cross-point level:<br>`#X-MIX-LVL_OUT.ANALOG_AUDIO.13.AUDIO.1,IN.DANTE.1.AUDIO.1<CR>` |
| `X-MIX-MUTE` | Set DSP matrix cross-point mute state.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-MIX-MUTE_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index>,dB<CR>`<br>**FEEDBACK**<br>`~nn@X-MIX-MUTE_OUT.<port_type>.<port_index>.<signal_type>.<index>,IN.<port_type>.<port_index>.<signal_type>.<index>,<mute_state><CR><LF>` | The following attributes comprise the primary signal ID (suffix 1) and follower signal ID (suffix 2 or greater):<br>▪ `<direction_type>` – IN<br>  ○ IN<br>  ○ OUT<br>▪ `<port_type>` –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ DANTE<br>  ○ SPDIF<br>  ○ MIC<br>▪ `<port_index>` – The port number as printed on the front or rear panel<br>▪ `<signal_type>` –<br>  ○ AUDIO<br>▪ `<index>` – Indicates a specific channel number when there are multiple channels of the same type<br>▪ `<mute_state>` –<br>  ○ ON<br>  ○ OFF | Mute analog audio 13 and Dante 1 cross-point:<br>`#X-MIX-MUTE_OUT.ANALOG_AUDIO.13.AUDIO.1,IN.DANTE.1.AUDIO.1,ON<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-MIX-MUTE? | Get DSP matrix cross-point mute state.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-MIX-MUTE?** ␣OUT.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,IN.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`**<CR>**<br><br>**FEEDBACK**<br>**~nn@X-MIX-MUTE** ␣OUT.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,IN.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,`<mute_state>`**<CR><LF>** | The following attributes comprise the primary signal ID (suffix 1) and follower signal ID (suffix 2 or greater):<br>▪ **`<direction_type>`** – IN<br>  ○ IN<br>  ○ OUT<br>▪ **`<port_type>`** –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ DANTE<br>  ○ SPDIF<br>  ○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>  ○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type<br>▪ **`<mute_state>`** –<br>  ○ ON<br>  ○ OFF | Get analog audio 13 and Dante 1 cross-point mute state:<br>**#X-MIX-MUTE** ␣OUT.ANALOG_AUDIO.13.AUDIO.1,IN.DANTE.1.AUDIO.1,ON**<CR>** |
| X-MUTE | Set the mute state of the signal.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-MUTE** ␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,state**<CR>**<br><br>**FEEDBACK**<br>**~nn@X-MIC-TYPE** ␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,state**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **`<direction_type>`** –<br>  ○ IN<br>  ○ OUT<br>▪ **`<port_type>`** –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ SPDIF<br>  ○ DANTE<br>  ○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>  ○ VIDEO<br>  ○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type<br>**state** – OFF/ON (not case sensitive) | Set the mute state of Mic 2 input to off:<br>**#X-MUTE** ␣IN.MIC.2.AUDIO.1,OFF**<CR>** |
| X-MUTE? | Get the mute state of the signal.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-MUTE?** ␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`**<CR>**<br>**FEEDBACK**<br>**~nn@X-MUTE** ␣`<direction_type>`.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,state**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **`<direction_type>`** –<br>  ○ IN<br>  ○ OUT<br>▪ **`<port_type>`** –<br>  ○ HDMI<br>  ○ ANALOG_AUDIO<br>  ○ AMPLIFIED_AUDIO<br>  ○ SPDIF<br>  ○ DANTE<br>  ○ MIC<br>▪ **`<port_index>`** – The port number as printed on the front or rear panel<br>▪ **`<signal_type>`** –<br>  ○ VIDEO<br>  ○ AUDIO<br>▪ **`<index>`** – Indicates a specific channel number when there are multiple channels of the same type<br>**state** – OFF/ON (not case sensitive) | Get the mute state of Mic 3 input to off:<br>**#X-MUTE?** ␣IN.MIC.3.AUDIO.1**<CR>** |

**#X-MIX-MUTE?** ␣OUT.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`,IN.`<port_type>`.`<port_index>`.`<signal_type>`.`<index>`**<CR>**

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-PATTERN | Set a pattern on the selected output.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PATTERN␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>,pattern_id**<CR>**<br>**FEEDBACK**<br>**~nn@X-PATTERN␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>,pattern_id**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<port_type>** –<br>  ○ HDMI<br>▪ **<port_index>** – The port number as printed on the front or rear panel<br>▪ **<signal_type>** –<br>  ○ VIDEO<br>▪ **<index>** – Indicates a specific channel number when there are multiple channels of the same type<br>**Pattern_id** – pattern ID<br>  ○ 0 : none<br>  ○ 1 : Black screen<br>  ○ 2 Blue screen<br>  ○ 3: White screen<br>  ○ 4: Four blue squares<br>  ○ 5: Vertical RGB colors bar<br>  ○ 6: H grey scale<br>  ○ 7: Split Bar<br>  ○ 8: BW-12 (Vertical mixed bar BW)<br>  ○ 9: Cross chess B&W<br>  ○ 10: Black squares chess<br>  ○ 11: V grey scale split bar | Set the pattern on analog audio 13 to pattern 2 (blue screen):<br>**#X-PATTERN␣**OUT.HDMI.1.VIDEO AUDIO.1,2**<CR>** |
| X-PATTERN? | Get the pattern on a selected output.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PATTERN?␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>**<CR>**<br>**FEEDBACK**<br>**~nn@X-PATTERN␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>,pattern_id**<CR><LF>** | The following attributes comprise the signal ID:<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<port_type>** –<br>  ○ HDMI<br>▪ **<port_index>** – The port number as printed on the front or rear panel<br>▪ **<signal_type>** –<br>  ○ VIDEO<br>▪ **<index>** – Indicates a specific channel number when there are multiple channels of the same type<br>**Pattern_id** –pattern ID<br>  ○ 0 : none<br>  ○ 1 : Black screen<br>  ○ 2 Blue screen<br>  ○ 3: White screen<br>  ○ 4: Four blue squares<br>  ○ 5: Vertical RGB colors bar<br>  ○ 6: H grey scale<br>  ○ 7: Split Bar<br>  ○ 8: BW-12 (Vertical mixed bar BW)<br>  ○ 9: Cross chess B&W<br>  ○ 10: Black squares chess<br>  ○ 11: V grey scale split bar | Get the pattern on HDMI output:<br>**#X-PATTERN?␣**OUT.HDMI.1.VIDEO.1**<CR>** |
| X-PATTERN-LIST? | Get the pattern list of a selected output.<br><br>ⓘ This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PATTERN-LIST?␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>**<CR>**<br>**FEEDBACK**<br>**~nn@X-PATTERN-LIST␣**<direction_type>.<port_type>.<port_index>.<signal_type>.<index>,pattern_list**<CR><LF>** | The following attributes comprise the signal ID (case sensitive):<br>▪ **<direction_type>** –<br>  ○ IN<br>  ○ OUT<br>▪ **<port_type>** –<br>  ○ HDMI<br>▪ **<port_index>** – The port number as printed on the front or rear panel<br>▪ **<signal_type>** –<br>  ○ VIDEO<br>▪ **<index>** – Indicates a specific channel number when there are multiple channels of the same type<br>**Pattern_id** –pattern ID<br>  ○ 0: none<br>  ○ 1: Black screen<br>  ○ 2 Blue screen<br>  ○ 3: White screen<br>  ○ 4: Four blue squares<br>  ○ 5: Vertical RGB colors bar<br>  ○ 6: H grey scale<br>  ○ 7: Split Bar<br>  ○ 8: BW-12 (Vertical mixed bar BW)<br>  ○ 9: Cross chess B&W<br>  ○ 10: Black squares chess<br>  ○ 11: V grey scale split bar | Get the pattern list for analog audio 14:<br>**#X-PATTERN-LIST␣**OUT.ANALOG_AUDIO.14.AUDIO.1**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-PORT-SELECT | Select ID from selectable ports group. <br> ⓘ User may query group names using command: **#X-PORT-SELECT-LIST?** <br> ⓘ This command is designed to be used by machines and not by users. This command is used for feature auto-discovery mechanism. <br> ⓘ This is an Extended Protocol 3000 command. | **COMMAND** <br> **#X-PORT-SELECT␣**group_name,selected_id**<CR>** <br> **FEEDBACK** <br> **~nn@X-PORT-SELECT␣**group_name,selected_id,[option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>],…,option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>]]**<CR><LF>** | **group_name** – These are predefined groups names, related to a specific product. <br> **selected_id** – Currently selected option ID. <br> **option_id** – Each option has an ID. Only one option may be selected at the same time. When a specific option is selected, all related port-id members become selected and all port-id members from other, unselected options, become unselected. The following attributes comprise the port ID: <br> ▪ **<direction_type>** – <br> ○ IN <br> ○ OUT <br> ▪ **<port_type>** – <br> ○ ANALOG_AUDIO <br> ○ MIC <br> ▪ **<port_index>** – The port number as printed on the front or rear panel <br> ▪ **<selected_id>** – the selected group ID | Select ID 0 from selectable ports group: <br> **#X-PORT-SELECT␣**ANALOG_AUDIO.1,0**<CR>** |
| X-PORT-SELECT? | Get selected ID of selectable ports group. <br> ⓘ User may query group names using command: **#X-PORT-SELECT-LIST?.** <br> This command is designed to be used by machines and not by users. This command is used for feature auto-discovery mechanism. <br> This is an Extended Protocol 3000 command. | **COMMAND** <br> **#X-PORT-SELECT?␣**group_name**<CR>** <br> **FEEDBACK** <br> **~nn@X-PORT-SELECT␣**group_name,selected_id,[option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>],…,option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>]]**<CR><LF>** | **group_name** – These are predefined groups names, related to a specific product. <br> **selected_id** – Currently selected option ID. <br> **option_id** – Each option has an ID. Only one option may be selected at the same time. When a specific option is selected, all related port-id members become selected and all port-id members from other, unselected options, become unselected. The following attributes comprise the port ID: <br> ▪ **<direction_type>** – <br> ○ IN <br> ○ OUT <br> ▪ **<port_type>** – <br> ○ ANALOG_AUDIO <br> ○ MIC <br> ▪ **<port_index>** – The port number as printed on the front or rear panel <br> ▪ **<selected_id>** – the selected group ID | Get selected ID of ports group: <br> **#X-PORT-SELECT␣**ANALOG_AUDIO.1**<CR>** |
| X-PORT-SELECT-LIST? | Get selected id of selectable ports groups of all available groups. <br> ⓘ User may query group names using command: **#X-PORT-SELECT-LIST?.** <br> This is an Extended Protocol 3000 command. | **COMMAND** <br> **#X-PORT-SELECT-LIST?␣<CR>** <br> **FEEDBACK** <br> **~nn@X-PORT-SELECT-LIST?␣**[[group_name,selected_id,[option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>],…,option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>]], …,[group_name,selected_id,[option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>],…,option_id:[<direction_type>.<port_type>.<port_index>,…,<direction_type>.<port_type>.<port_index>]]]**<CR><LF>** | The following attributes comprise the port ID: <br> ▪ **<direction_type>** – <br> ○ IN <br> ○ OUT <br> ▪ **<port_type>** – <br> ○ ANALOG_AUDIO <br> ○ MIC <br> ▪ **<port_index>** – The port number as printed on the front or rear panel | Get the selected id of selectable ports groups of all available groups: <br> **#X-PORT-SELECT-LIST?<CR>** |
| X-PRST-CURR? | Get the current preset loaded per type. <br> To get the list of preset types existing in your product use the command: <br> **X-PRST-TYPES?** <br> This is an Extended Protocol 3000 command. | **COMMAND** <br> **#X-PRST-CURR?␣**preset_type**<CR>** <br> **FEEDBACK** <br> **~nn@X-ROUTE␣**<preset_type,[preset_id:name:lock_state]**<CR><LF>** | ▪ **preset_type** – <br> ○ I/O Config – IOCONFIG <br> ○ System Preset – IOCONFIG.SYSTEM <br> ○ Snapshot – IOCONFIG.SYSTEM.MIXER <br> ▪ **<preset_id>** – preset index <br> ▪ **<name>** – the name of the preset in URL encode format <br> ▪ **<lock_state>** – <br> ○ ON <br> ○ OFF | Get current mixer preset: <br> **#X-PRST-CURR?␣**IOCONFIG.SYSTEM.MIXER**<CR>** <br> **~01@X-PRST-CURR** IOConfig.SYSTEM.MIXER,[2:Snapshot%201:OFF]**<CR><LF>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-PRST-LOCK | Set LOCK state of a preset per type.<br><br>(i) this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>X-PRST-TYPES?<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-LOCK␣preset_type,<preset_id>,<lock_state><CR>`<br>**FEEDBACK**<br>`~nn@X-ROUTE␣<preset_type,[preset_id:name:lock_state]<CR><LF>` | ▪ **preset_type** –<br>○ I/O Config – IOCONFIG<br>○ System Preset – IOCONFIG.SYSTEM<br>○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **<preset_id>** – preset index<br>▪ **<lock_state>** –<br>○ ON<br>○ OFF | lock mixer preset 9:<br>`X-PRST-LOCK␣IOCONFIG.SYSTEM.MIXER,9<CR>`<br>`~01@X-PRST-CURR IOConfig.SYSTEM.MIXER,[2:Snapshot%201:OFF]<CR><LF>` |
| X-PRST-LOCK? | Get LOCK state of a preset per type.<br><br>(i) this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>X-PRST-TYPES?<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-LOCK?␣preset_type,<preset_id>,<lock_state><CR>`<br>**FEEDBACK**<br>`~nn@X-ROUTE␣<preset_type,[preset_id:name:lock_state]<CR><LF>` | ▪ **preset_type** –<br>○ I/O Config – IOCONFIG<br>○ System Preset – IOCONFIG.SYSTEM<br>○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **<preset_id>** – preset index<br>▪ **<lock_state>** –<br>○ ON<br>○ OFF | Get lock mixer preset 9 status:<br>`#X-PRST-LOCK?␣IOCONFIG.SYSTEM.MIXER,9<CR>`<br>`~01@X-PRST-CURR IOConfig.SYSTEM.MIXER,[2:Snapshot%201:OFF]<CR><LF>` |
| X-PRST-LST? | Get the preset list of a specific preset type.<br><br>(i) this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>X-PRST-TYPES?<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-LST?␣preset_type<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-LST␣<preset_type,[preset_id:name:lock_state]<CR><LF>` | ▪ **preset_type** –<br>○ I/O Config – IOCONFIG<br>○ System Preset – IOCONFIG.SYSTEM<br>○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **<name>** – the name of the preset<br>▪ **<lock_state>** –<br>○ ON<br>○ OFF | Get the IO configuration list:<br>`#X-PRST-LST?␣IOCONFIG<CR>`<br>`[[1:4x16:ON],[2:6x14:ON],[3:8x12:ON],[4:10x10:ON],[5:12x8:ON],[6:14x6:ON],[7:16x4:ON]]` |
| X-PRST-NAME | Set the name of a preset per type.<br><br>(i) this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>X-PRST-TYPES?<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-NAME␣preset_type,preset_id,name<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-NAME␣preset_type,preset_id,name<CR><LF>` | ▪ **preset_type** –<br>○ I/O Config – IOCONFIG<br>○ System Preset – IOCONFIG.SYSTEM<br>○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **preset_id** – preset index<br>▪ **name** – the name of the preset in URL encode format (no spaces) | Set the name of a preset (per type):<br>`#X-PRST-NAME␣IOCONFIG.SYSTEM.MIXER,9,ROOM1<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-PRST-NAME? | Get the name of a preset per type.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>**X-PRST-TYPES?**<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PRST-NAME?**␣preset_type,preset_id,name**<CR>**<br>**FEEDBACK**<br>**~nn@X-PRST-NAME**␣preset_type,preset_id,name**<CR><LF>** | • **preset_type** –<br>  o I/O Config – IOCONFIG<br>  o System Preset – IOCONFIG.SYSTEM<br>  o Snapshot – IOConfig.SYSTEM.MIXER<br>• **preset_id** – preset index<br>• **name** – the name of the preset in URL encode format | Get the name of a preset (per type):<br>**#X-PRST-NAME?**␣IOCONFIG.SYSTEM.MIXER,9**<CR>**<br>**~01@X-PRST-NAME?**␣IOConfig.SYSTEM.MIXER,9,Room1**<CR><LF>** |
| X-PRST-RCL | Recall saved preset list per type.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>**X-PRST-TYPES?**<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PRST-RCL**␣preset_type,preset_id**<CR>**<br>**FEEDBACK**<br>**~nn@X-PRST-RCL**␣preset_type,preset_id**<CR><LF>** | • **preset_type** –<br>  o I/O Config – IOCONFIG<br>  o System Preset – IOCONFIG.SYSTEM<br>  o Snapshot – IOCONFIG.SYSTEM.MIXER<br>• **preset_id** – preset index | Recall mixer preset 8:<br>**#X-PRST-RCL?**␣IOCONFIG.SYSTEM.MIXER,8**<CR>** |
| X-PRST-RCL-LAST | Recall LAST preset per type, this command just retrieves the last preset loaded from the history of preset activity and RECALLs it.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>**X-PRST-TYPES?**<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PRST-RCL-LAST**␣preset_type,preset_id**<CR>**<br>**FEEDBACK**<br>**~nn@X-PRST-RCL-LAST**␣preset_type,preset_id**<CR><LF>** | • **preset_type** –<br>  o I/O Config – IOCONFIG<br>  o System Preset – IOCONFIG.SYSTEM<br>  o Snapshot – IOCONFIG.SYSTEM.MIXER<br>• **preset_id** – preset index | Recall the last mixer preset:<br>**#X-PRST-RCL-LAST**␣IOCONFIG.SYSTEM.MIXER**<CR>** |
| X-PRST-RCL-NEXT | Recall NEXT preset per type, this command increments by one the current preset id loaded and loads it. If the index is the highest, recall will fail.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>**X-PRST-TYPES?**<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>**#X-PRST-RCL-NEXT**␣preset_type,preset_id**<CR>**<br>**FEEDBACK**<br>**~nn@X-PRST-RCL-NEXT**␣preset_type,preset_id**<CR><LF>** | • **preset_type** –<br>  o I/O Config – IOCONFIG<br>  o System Preset – IOCONFIG.SYSTEM<br>  o Snapshot – IOCONFIG.SYSTEM.MIXER<br>• **preset_id** – preset index | Recall next mixer preset:<br>**#X-PRST-RCL-NEXT**␣IOCONFIG.SYSTEM.MIXER**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| `X-PRST-RCL-PREV` | Recall previous preset per type, this command increments by one the current preset id loaded and loads it. If the index is the lowest, recall will fail.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>`X-PRST-TYPES?`<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-RCL-PREV␣preset_type,preset_id<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-RCL-PREV␣preset_type,preset_id<CR><LF>` | ▪ **preset_type** –<br>  ○ I/O Config – IOCONFIG<br>  ○ System Preset – IOCONFIG.SYSTEM<br>  ○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **preset_id** – preset index | Recall previous mixer preset:<br>`#X-PRST-RCL-PREV␣IOCONFIG.SYSTEM.MIXER<CR>` |
| `X-PRST-RESET` | Reset preset per type<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>`X-PRST-TYPES?`<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-RESET␣preset_type,preset_id<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-RESET␣preset_type,preset_id<CR><LF>` | ▪ **preset_type** –<br>  ○ I/O Config – IOCONFIG<br>  ○ System Preset – IOCONFIG.SYSTEM<br>  ○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **preset_id** – preset index | Reset mixer preset 9:<br>`#X-PRST-RESET␣IOCONFIG.SYSTEM.MIXER,9<CR>` |
| `X-PRST-SAVED?` | Get SAVED status for a preset type. This flag indicates to the WEB if a change have been made since the last RECALL and has not been saved.<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>`X-PRST-TYPES?`<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-SAVED?␣preset_type<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-SAVED␣preset_type,saved_status<CR><LF>` | ▪ **preset_type** –<br>  ○ I/O Config – IOCONFIG<br>  ○ System Preset – IOCONFIG.SYSTEM<br>  ○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **Saved_status** – preset index<br>  ○ 0 – False (not saved)<br>  ○ 1 – True (saved) | Get saved status of mixer preset:<br>`#X-SAVED?␣IOCONFIG.SYSTEM.MIXER<CR>` |
| `X-PRST-STO` | Store current changes into a preset (per type).<br><br>ⓘ this is an extended preset command using preset type as first parameter. This is used essentially when we have different types of Presets inside the same system.<br><br>To get the list of preset types existing in your product use the command:<br>`X-PRST-TYPES?`<br><br>This is an Extended Protocol 3000 command. | **COMMAND**<br>`#X-PRST-STO␣preset_type,preset_id<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-STO␣preset_type,saved_status<CR><LF>` | ▪ **preset_type** –<br>  ○ I/O Config – IOCONFIG<br>  ○ System Preset – IOCONFIG.SYSTEM<br>  ○ Snapshot – IOCONFIG.SYSTEM.MIXER<br>▪ **preset_id** – preset index | Store changes into mixer preset 9:<br>`#X-PRST-STO␣IOCONFIG.SYSTEM.MIXER,9<CR>` |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| X-PRST-TYPES? | Get the types of presets that the system supports and their hierarchy. | **COMMAND**<br>`#X-PRST-TYPES?_<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-TYPES_preset_type<CR><LF>` | • **preset_type** –<br>  o IOCONFIG – used for I/O configuration setup presets:<br>    o 1: 4x16<br>    o 2 6x14<br>    o 3: 8x12<br>    o 4: 10x10<br>    o 5: 12x8<br>    o 6: 14x6<br>    o 7: 16x4<br>    o 8: 12x8<br>  o IOCONFIG.SYSTEM – used for system preset per IOConfig, we have 10 preset banks per IOConfig setup, Preset #1 is the default system preset for this setup and is READ ONLY, Preset #2 is used for the first user system preset, Preset #3 for the second etc.<br>  o IOCONFIG.SYSTEM.MIXER – used for a Mixer snapshot of a specific system preset per IOConfig. There are 10 MIXER snapshots per System presets in each IOConfig setup, Snapshot #1 is the default MIXER snapshot and is READ ONLY. Snapshot #2 is used for the first user Mixer snapshot, Snapshot #3 for the second etc. | Get preset types:<br>`#X-PRST-TYPES?_<CR>` |
| X-SIGNAL-PIPE | Set a pipe between Two outputs. This is when we want to "tee" a signal to another output.<br>Used essentially into **AFM-20DSP** to output audio signal to AMPLIFIED outputs.<br><br>ⓘ This is an Extended Protocol 3000 command. | Internal – for web only. | | |
| X-SIGNAL-PIPE? | Get a pipe configuration for an output port. This is when we want to "tee" a signal to another output.<br>Used essentially into **AFM-20DSP** to output audio signal to AMPLIFIED outputs.<br><br>ⓘ This is an Extended Protocol 3000 command. | Internal – for web only. | | |
| | | **COMMAND**<br>`#X-PRST-TYPES?_<CR>`<br>**FEEDBACK**<br>`~nn@X-PRST-TYPES_preset_type<CR><LF>` | • **preset_type** –<br>  o IOCONFIG – used for I/O configuration setup presets: | Get preset types:<br>`#X-PRST-TYPES?_<CR>` |

# Result and Error Codes

## Syntax

In case of an error, the device responds with an error message. The error message syntax:

- **~NN@ERR XXX<CR><LF>** – when general error, no specific command
- **~NN@CMD ERR XXX<CR><LF>** – for specific command
- **NN** – machine number of device, default = 01
- **XXX** – error code

## Error Codes

| Error Name | Error Code | Description |
|---|---|---|
| P3K_NO_ERROR | 0 | No error |
| ERR_PROTOCOL_SYNTAX | 1 | Protocol syntax |
| ERR_COMMAND_NOT_AVAILABLE | 2 | Command not available |
| ERR_PARAMETER_OUT_OF_RANGE | 3 | Parameter out of range |
| ERR_UNAUTHORIZED_ACCESS | 4 | Unauthorized access |
| ERR_INTERNAL_FW_ERROR | 5 | Internal FW error |
| ERR_BUSY | 6 | Protocol busy |
| ERR_WRONG_CRC | 7 | Wrong CRC |
| ERR_TIMEDOUT | 8 | Timeout |
| ERR_RESERVED | 9 | (Reserved) |
| ERR_FW_NOT_ENOUGH_SPACE | 10 | Not enough space for data (firmware, FPGA…) |
| ERR_FS_NOT_ENOUGH_SPACE | 11 | Not enough space – file system |
| ERR_FS_FILE_NOT_EXISTS | 12 | File does not exist |
| ERR_FS_FILE_CANT_CREATED | 13 | File can't be created |
| ERR_FS_FILE_CANT_OPEN | 14 | File can't open |
| ERR_FEATURE_NOT_SUPPORTED | 15 | Feature is not supported |
| ERR_RESERVED_2 | 16 | (Reserved) |
| ERR_RESERVED_3 | 17 | (Reserved) |
| ERR_RESERVED_4 | 18 | (Reserved) |
| ERR_RESERVED_5 | 19 | (Reserved) |
| ERR_RESERVED_6 | 20 | (Reserved) |
| ERR_PACKET_CRC | 21 | Packet CRC error |
| ERR_PACKET_MISSED | 22 | Packet number isn't expected (missing packet) |
| ERR_PACKET_SIZE | 23 | Packet size is wrong |
| ERR_RESERVED_7 | 24 | (Reserved) |
| ERR_RESERVED_8 | 25 | (Reserved) |
| ERR_RESERVED_9 | 26 | (Reserved) |
| ERR_RESERVED_10 | 27 | (Reserved) |
| ERR_RESERVED_11 | 28 | (Reserved) |
| ERR_RESERVED_12 | 29 | (Reserved) |
| ERR_EDID_CORRUPTED | 30 | EDID corrupted |
| ERR_NON_LISTED | 31 | Device specific errors |
| ERR_SAME_CRC | 32 | File has the same CRC – not changed |
| ERR_WRONG_MODE | 33 | Wrong operation mode |
| ERR_NOT_CONFIGURED | 34 | Device/chip was not initialized |

The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

**What is Covered**

This limited warranty covers defects in materials and workmanship in this product.

**What is Not Covered**

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product. Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

**How Long this Coverage Lasts**

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, ring mounted adapters, portable power chargers, Kramer speakers, and Kramer touch panels are all covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

**Who is Covered**

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

**What Kramer Electronics Will Do**

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product. If a direct or similar replacement product is supplied, the original product's end warranty date remains unchanged and is transferred to the replacement product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

**What Kramer Electronics Will Not Do Under This Limited Warranty**

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

**How to Obtain a Remedy Under This Limited Warranty**

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, visit our web site at www.kramerav.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

**Limitation of Liability**

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

**Exclusive Remedy**

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPLICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

**Other Conditions**

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, visit our web site at www.kramerav.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

# KRAMER

ISO 9001 · Certified Quality Management System
MGMT. SYS. RvA C 560
ISO 14001 · Certified Environmental Management System
ISO 45001:2018 · Certified O.H.S Management System
ISO 27001:2013 · Certified Information Security Management System

CE   22 PAP

**HDMI**™
HIGH-DEFINITION MULTIMEDIA INTERFACE

P/N:  2900-301204          Rev:  5

⚠ **SAFETY WARNING**
Disconnect the device from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our website where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

www.KramerAV.com
info@KramerAV.com