



## **VLDT-AP1010**

Audio Processor



# **User Manual**

**VER 1.02**

# Thank you for purchasing this product

Please read these instructions carefully for optimum performance and safety before connecting, operating, or adjusting this product. Please keep this manual for future reference.

## A surge protection device recommended

This product contains sensitive electrical components that electrical spikes may damage, surges, electric shocks, lightning strikes, etc. The use of surge protection systems is highly recommended to protect and extend the life of your equipment.

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# 1. Introduction

This digital audio processor is typically used for video conferences, distant learning, and telemedicine. It features 4-ch MIC inputs, 6-ch linear, and 10-ch linear outputs. Each analog I/O channel has a knob to control the volume. A DANTE port is also provided to ensure low latency in the audio process. Apart from HDMI audio embedding and de-embedding, the product can also process audio signals with algorithms, such as complete-band Adaptive Echo Cancellation (AEC), Adaptive Noise Suppression (ANS), Automatic Gain Control (AGC), and Auto Mixer, to output a clear, clean, and resonant sound with a high Signal-to-Noise ratio. Concise but intelligent, the processor is designed to be applied in scenarios without additional software assistance for debugging. It is ready to use after installation and perfect for project implementation and testing.

The product can be applied in a diverse range of installations and applications across industries, such as intelligent system integration in the small-medium sized conference room, instruction recording and distance teaching in education, court trial recording and virtual court trial in the judiciary, surgery recording, and video consultation in healthcare service, and command center establishment in governmental projects.

# 2. Features

- ☆ HDMI 2.0b compliant
- ☆ Provides 4-ch balanced MIC inputs, 6-ch balanced linear inputs, and 10-ch balanced linear outputs
- ☆ Supports HDMI audio signal input, loop out, audio embedding and de-embedding
- ☆ Provides a standard DANTE network audio interface
- ☆ Supports adaptive feedback suppression function
- ☆ Supports the full-band adaptive acoustic echo cancellation technology
- ☆ Dynamic adaptive noise reduction technology is provided to reduce noise with signal level up to 18dB
- ☆ Auto Mixer function is provided to set the order of priority when multiple microphones are input at one time
- ☆ Inclusive of Digital signal processing modules such as Expander, Equalizer, Compressor, Auto Gain Control, Limiter, High Pass Filter, Low Pass Filter, and Delay
- ☆ Supports volume control, meter, scene control, etc.
- ☆ Capable of switching matrix routings
- ☆ 48V phantom power supply for 4-ch MIC inputs
- ☆ 48KHz sampling rate, 24-bit for A/D or D/A conversion
- ☆ Separated I/O volume knobs
- ☆ Supports monitoring function
- ☆ Compatible to run on Win 7 and Win 10, with standard RJ45 interface control
- ☆ Supports RS-232 serial commands control

### 3. Package Contents

- ① 1 x Digital Audio Processor
- ② 1 x AC 100~240V 50/60Hz Power Cord
- ③ 22 x Phoenix Connector (3-pin, 3.81mm)
- ④ 1 x User Manual

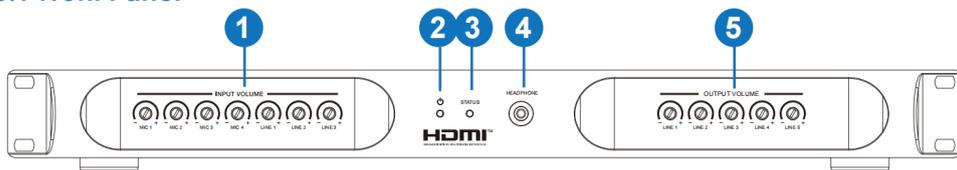
### 4. Specifications

Technical	
HDMI Compliance	HDMI 2.0b
Amplitude-frequency (20Hz~20KHZ@+4dBu)	MIC input: -0.5 / -0.5dB
	Linear input: -0.2 / -0.2dB
THD+N (1KHZ@+4dBu)	≤ 0.01%
EIN (MIC input)	≤ -125dBu
SNR (linear input)	≥ 90dB
Dynamic Range	≥ 100dB
Channel Level Difference	-0.5 / -0.5dB
Channel Isolation	≥ 80dB
Channel Phase Difference	≤ 0.5°
Max Input Level	20dBu
Max MIC Gain	40dB
Input Impedance	20KΩ
Output Impedance	300Ω
Sampling Frequency	48KHZ
A/D and D/A Conversion	24Bit
Phantom Power	+48 VDC
Connection	
Inputs	4 × Balanced MIC [3-pin phoenix connector] 6 × Balanced LINE [3-pin phoenix connector] or 3 × Stereo Audio [3-pin phoenix connector]
Outputs	10 × Balanced LINE [3-pin phoenix connector] or 5 × Stereo audio [3-pin phoenix connector] 1 × Stereo audio [3.5mm L/R]
Controls	1 × LAN [RJ45] 1 × RS-232 [3-pin phoenix connector]
Digital Audio Interfaces	1 × HDMI IN [Type A 19-pin female] 1 × HDMI OUT [Type A 19-pin female] 1 × Dante [RJ45]

Mechanical	
Housing	Metal Enclosure
Color	Black
Dimensions	482mm (W)×250mm (D)×45mm (H)
Weight	2.9kg
Power Supply	AC 100 - 240V 50/60Hz
Power Consumption	11W(Max)
Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F
Relative Humidity	20~90% RH (non-condensing)

## 5. Operation Controls and Functions

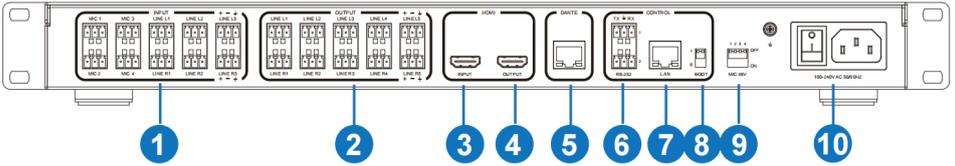
### 5.1 Front Panel



No.	Name	Function Description
1	INPUT VOLUME	Knobs to control the volume of MIC and linear inputs. Use a screwdriver in the clockwise direction to turn up the volume; counterclockwise to turn it down.
2	Power LED	When the device is powered on, the red LED will light on.
3	STATUS LED	When the device runs at normal, the green STATUS LED will flash.
4	HEADPHONE	3.5mm headphone listening port. <b>Note:</b> this listening port outputs the same audio as OUTPUT LINE 5. Select the corresponding input channel in the AUTO MIXER module if you want to enable the listening function. For details, please refer to “6.8 Auto Mixer”.
5	OUTPUT VOLUME	Knobs to control the volume of linear outputs. Use a screwdriver in the clockwise direction to turn up the volume; counterclockwise to turn it down.

Note that turning the I/O knobs allows you to turn up/down the stereo volume. For instance, if you turn the knob of LINE 1 clockwise, the volume both for LINE L1 and LINE R1 will be turned up at the same time.

## 5.2 Rear Panel



No.	Name	Function Description
1	INPUT	4-ch MIC and 6-ch balanced linear inputs are used to connect audio source devices via phoenix connectors.
2	OUTPUT	10-ch balanced linear outputs, used for connecting Amplifiers or speakers via phoenix connectors.
3	HDMI INPUT	HDMI signal input port, used for connecting HDMI source device via HDMI cable.
4	HDMI OUTPUT	HDMI signal output port, used for connecting HDMI display device via HDMI cable.
5	DANTE	Standard DANTE network audio transmission interface.
6	RS-232	Used for connecting PC or control system via phoenix connector. RS-232 (1) is used for transmitting RS-232 control commands; RS-232 (2) for firmware upgrades.
7	LAN	Standard RJ45 interface for network connection.
8	BOOT 2-PIN DIP Switch	Used for firmware upgrade. <b>Note:</b> it can only be used when the device is in a factory. Boot 2-pins should be switched to “1” when the device is in service; if not, the device won’t kick off.
9	DIP Switch	Function reserved.
10	Power Switch & Power Port	Power switch and AC 100-240V power input port.

## 6. Host Computer Control

### 6.1 Connection

The audio processor admits the control of a host computer in the windows system (WIN 7 or WIN 10). Take a cable to connect to the LAN port of the processor with the computer for network connection, as the following steps are instructed.

**Step 1:** Install the “HDP-AU88P.exe” application on the host computer and change the computer’s IP address to ensure that the IP addresses of the host computer and the processor (Default IP address: 192.168.0.199, Subnet mask: 255.255.255.0) are within the same network segment, as shown in the figure below.

Obtain an IP address automatically  
 Use the following IP address:

IP address:	192 . 168 . 0 . XXX
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

**Step 2:** Double-click the “HDP-AU88P. exe” icon (see the figure below) to run the application on the host computer.



**Step 3:** When the application is open, the startup page appears, and then comes the HOMEpage, as shown below.



**Step 4:** Check the Network icon on the toolbar, as shown below.



If there is a red X at the top-right corner of this icon, as the figure above shown, it means the host computer has not yet connected with the audio processor. In such a case, click this icon, then a dialog box with a list of IP addresses of all connected devices will pop out, as the following figure shows.



**Step 5:** Choose the audio processor’s IP address and click CONNECT. Then the processor will relate to the host computer. After connection, the CONNECT & SETUP box (see the figure below) will pop out. You may close it directly if no such operation is needed.



If the audio processor has successfully related to the host computer, the Network icon will appear, as shown below.



## 6.2 Volume Meter

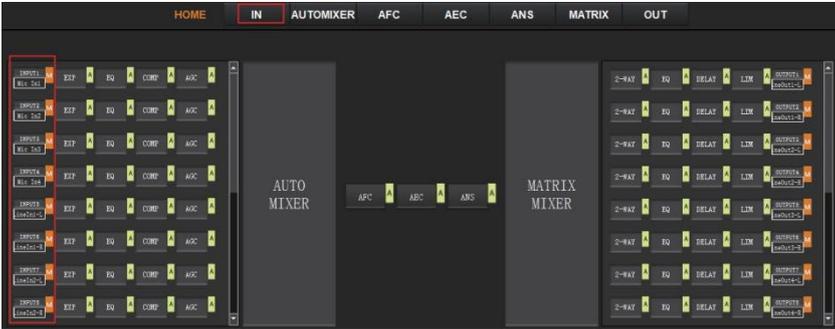
The volume meter typically denotes the signal level of the I/O volume.



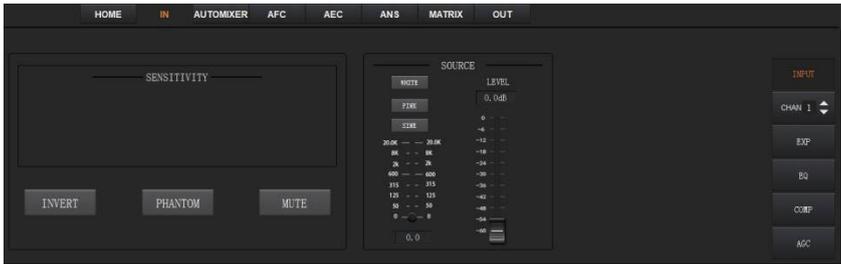
The meter has three colors (Red, Yellow, and Green) to denote signal levels for the volume of 16-ch inputs and 16-ch outputs; red means that the volume may be too high to be limited, and yellow indicates the volume is within a reasonable range.

### 6.3 Input Settings

As shown below, you will enter the INPUT setting page by clicking the INPUT module on the HOME page or the IN tab on the menu bar.



The following figure shows the details of the INPUT setting page.



**SENSITIVITY:** Indicates the sensitivity level of the input signal, which could be adjusted to ensure the sensitivity on the input channel is adaptable to the MIC or linear input (function reserved).

**INVERT:** When pressed, inverts the polarity of the signal on the input channel.

**PHANTOM:** When pressed, turns on 48V phantom power for the channel.

**MUTE:** When pressed, mutes the input channel, equivalent to clicking the letter M at the INPUT module on the HOME page.

**WHITE:** When pressed, it generates white noise for signal testing.

**PINK:** When pressed, it generates pink noises for signal testing.

**SINE:** When pressed, it generates sinusoidal signals for testing; the meter below shows the frequency of the sine wave.

**FADER:** Controls the signal level of the testing signal.

You can set the signal parameters of an input channel by entering its CHAN No. On the right panel of the IN page. Audio process modules, such as EXPANDER, EQUALIZER, COMPRESSOR, and AUTO GAIN CONTROL, are available on the right panel for your setting.

## 6.4 Expander

The Expander, which can effectively extend the dynamic range of the input signal, is used to eliminate noise under the threshold level.

As shown below, clicking the EXP module  on the HOME page or the EXP button on the right panel of the IN page will give you the option to enter the EXP setting page.



The following figure shows complete information to configure the expander module.



**THRESHOLD:** The signal below will be identified as noise and attenuated, with a range of [-60.0, 0.0] dB.

**RATIO:** The compression ratio for signals below the threshold, with a scale of [1.0, 20.0]. If the ratio is 2.0, the sign below the entry will be reduced to  $\frac{1}{2}$  of the original.

**KNEE:** The curve setting of the inflection point of the expander, with a scale of [0.0, 20.0]. 0 indicates a stiff knee; others show a soft knee.

**ATTACK:** The time required by the expander to begin the Expander process once a signal drops below the threshold. Values are squashed between [1, 500] ms.

**RELEASE:** The time required by the expander to stop the Expander process once a signal is over the threshold. Values are squashed between [1, 10000] ms.

**G.R. (Gain Reduction):** Indicates the amount of gain attenuation of the input signal (in dB) in the Expander process.

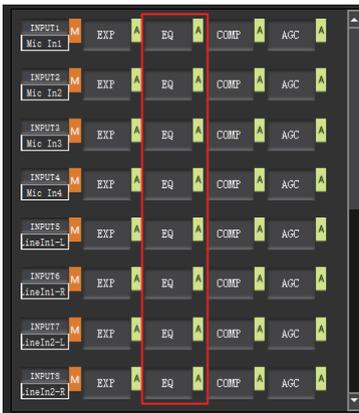
**ACTIVE:** Activates the EXP process. The function is equivalent to clicking the green letter A at the EXP module  on the HOME page.

Clicking the pair of UP-DOWN arrows of the CHAN No. The right panel of the IN page will give you an option to select an input channel for the Expander configuration.

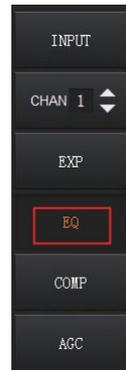
## 6.5 Equalizer

Each I/O channel has an 8-band parametric equalizer for voice processing, with each band's frequency, gain, and bandwidth adjustable.

As shown below, by clicking the EQ module  on the left panel of the HOME page or the EQ button on the IN page, you will enter the EQ setting page of the input channel.



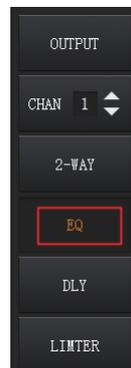
or



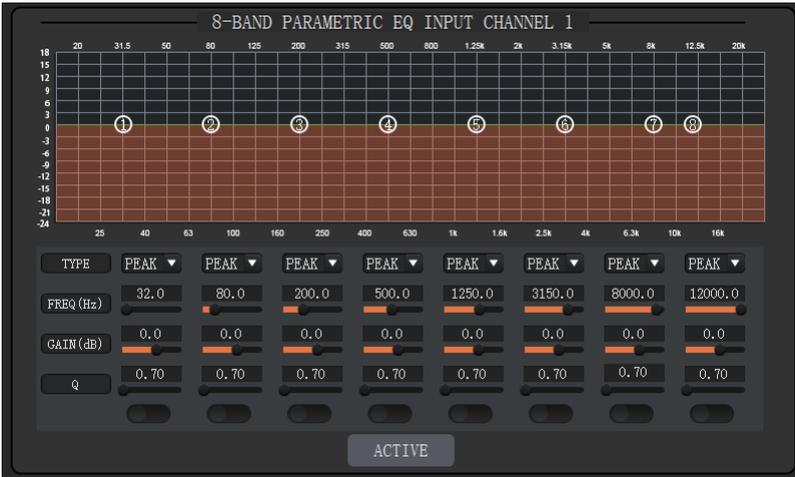
As shown below, click the EQ module  on the right panel of the HOME page or the EQ button on the OUT page, and you will enter the EQ setting page of the output channel.



or



The figure below shows the setting page of the EQ module.



**TYPE:** Provides 3 types of band/filters, with High Pass, Low Pass, and Peak optional.

**FREQUENCY:** In High/Low Pass Filter, it means the cut-off frequency of the EQ band; In Peak Filter, it means the center frequency point of the EQ band, with a scale of [20, 20000] Hz.

**GAIN:** In High/Low Pass Filter, fixed to 0dB; In Peak Filter, squashed between [-24.0, +18.0] dB.

**Q FACTOR:** value is squashed between [0.02, 50.00].

**SWITCH:** Each band has a switch. When pressed, the EQ function in this band will be disabled.

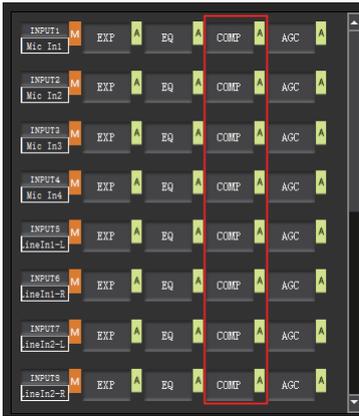
**ACTIVE:** Activates the EQ process. The function is equivalent to clicking the letter A at the EQ module  on the HOME page.

A pair of UP-DOWN arrows on the right panel is provided for you to select an input channel for the Equalizer configuration.

## 6.6 Compressor

The compressor is used to reduce the signal's dynamic range above a user-determined threshold so that output sounds can be more solid.

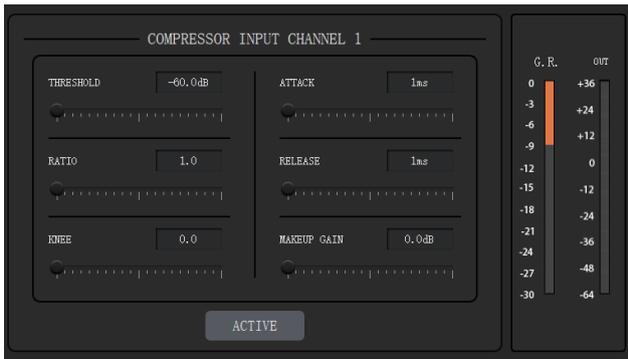
As shown below, click the COMP module  on the HOME page or the COMP button On the IN page's right panel, you will enter the Compressor setting page.



or



The figure below shows the setting page of the compressor.



**THRESHOLD:** The level that the signal above it will be compressed, with a scale of [-60.0, 0.0]dB.

**RATIO:** The compression ratio for signals with levels above threshold, with a scale of [1.0, 20.0]. When the ratio sets to 2.0, the signal with a level below the threshold will be reduced to  $\frac{1}{2}$  of the original.

**KNEE:** The curve setting of the inflection point of the compressor, with a scale of [0.0, 20.0]. 0 indicates a stiff knee, and other values for a soft knee.

**ATTACK:** The time required by the compressor to begin the Compressor process once a signal is over the threshold, with a scale of [1, 500] ms.

**RELEASE:** The time required by the compressor to stop the Compressor process once a signal drops below the threshold, with a scale of [1, 10000] ms.

**MAKEUP GAIN:** Since the compressor can reduce the gain level, the Makeup Gain gives you the option to compensate for the gain level, with a scale of [-12.0, +18.0] dB.

**G.R. (Gain Reduction):** Indicates the amount of gain attenuation of the input signal (in dB).

**OUT:** Meter indicates the output signal level after the Compressor process.

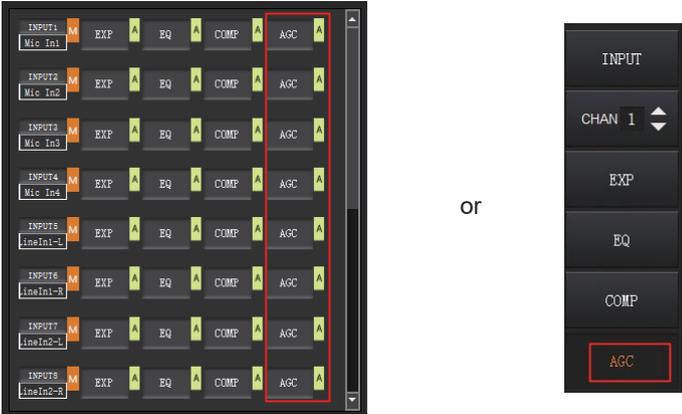
**ACTIVE:** Activates the COMP process. The function is equivalent to clicking the letter A at the COMP module  on the HOME page.

A pair of UP-DOWN arrows on the right panel is also provided for you to select any input channel for the Compressor configuration.

### 6.7 Auto Gain Control

Automatic Gain Control (AGC) intends to control the audio signal within a range to extend the distance of pick-up sounds. The AGC process aims to attenuate the signal with excessive-high signal levels and boost the signal with low signal levels up to the target level.

As shown below, by clicking the AGC module  on the HOME page or the AGC button on the right panel of the IN page, you will enter the AGC setting page.



The following figure shows the setting page of the AGC module.



**TARGET LEVEL:** The desired output signal level, with a scale of [-20.0, 0.0] dB.

**RATIO:** The compression ratio for signals above the target level, with a scale of [1.0, 20.0]. Suppose the value sets to 2.0, signs above the target level will be reduced to  $\frac{1}{2}$  of the original.

**MAX GAIN:** Indicates the maximum amount of gain that the signal with a low level can be added to by the AGC process, with a scale of [0.0, 12.0] dB.

**THRESHOLD:** Signals below the threshold will remain unchanged, while those between threshold and target level will be amplified (at a ratio determined by the MAX GAIN).

To ensure the work of the AGC process, the Target Level must be set higher than the Threshold. The threshold is recommended to be set with a range of [-60.0, 0.0]dB.**IN:** Meter indicates the detected signal level before the AGC process.

**OUT:** Meter indicates the output signal level after the AGC process.

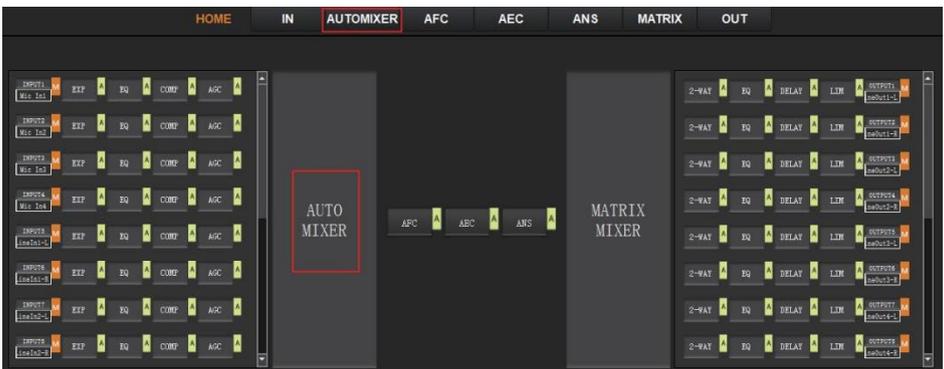
**ACTIVE:** Activates the AGC process. The function is equivalent to clicking the green letter A at the AGC module  on the HOME page.

A pair of up-down arrows on the right panel allows you to select an input channel for the AGC configuration.

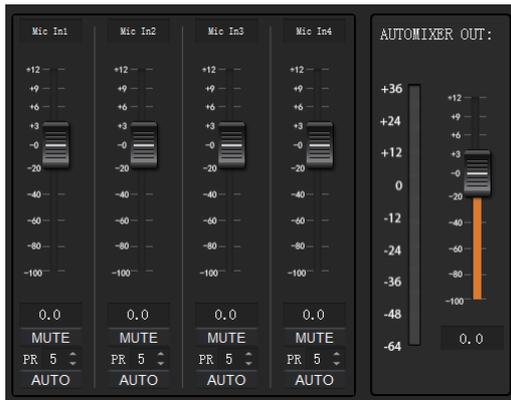
## 6.8 Auto Mixer

The AUTO MIXER is built to set the order of priority for MIC inputs when 4-ch microphones are open simultaneously.

As shown below, by clicking the AUTO MIXER section on the HOME page or the AUTOMIXER tab on the menu bar, you will enter the AUTO MIXER setting page.



The figure below shows the setting page of the Auto Mixer module.



**FADER:** Each MIC input channel has a fader to adjust its signal level. It controls the mixed volume on the input channel.

**MUTE:** Each MIC input channel has a MUTE button. Clicking it will enable you to mute the channel.

**PR (Priority):** Sets the priority of the MIC input, 0 = lowest and 10 = highest priority. The channel of higher priority will override the one of lower priority to be prioritized in the auto mixer’s algorithm. If two or more channels are at the same focus, the channel for the main speaker will be prioritized in the AUTO MIXER process.

**AUTO:** When pressed, the input MIC will be added to the auto-mixing system; otherwise, it won’t be auto-mixed.

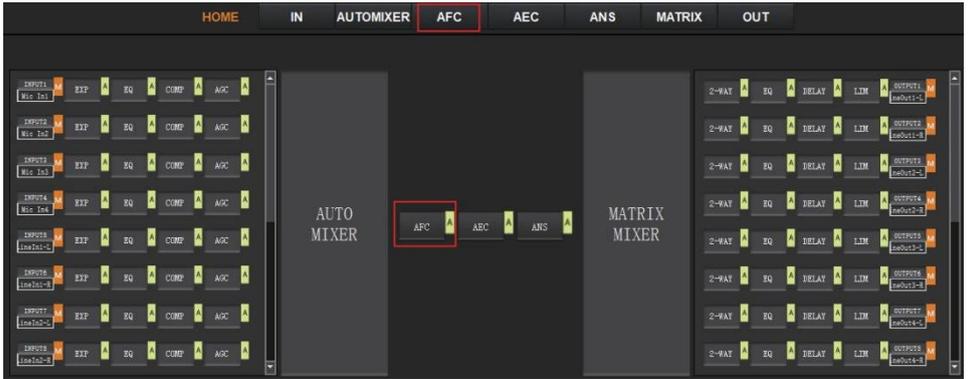
**METER:** Indicates the output volume after the AUTO MIXER process.

**OUT:** Fader to control the output volume after the AUTO MIXER process.

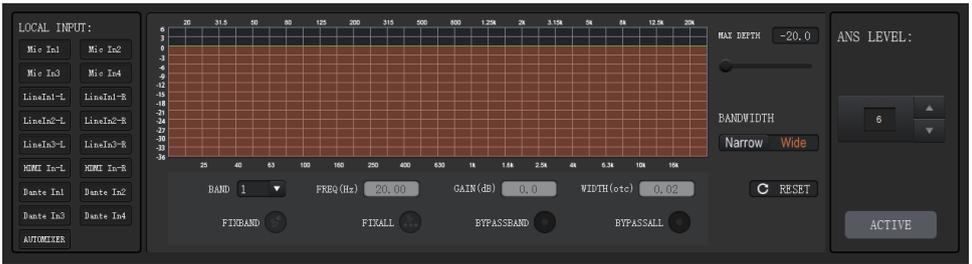
## 6.9 Adaptive Feedback Cancellation

The Adaptive Feedback Cancellation (AFC, also known as the Feed Back Suppression) module can detect and suppress the frequency point of the acoustic feedback in the audio field. The AFC module allows you to see and suppress the frequency points of the auditory input for 8 bands. Parameters on this module are open to being configured.

As shown below, by clicking the AFC module  on the HOME page or the AFC tab on the menu bar, you will enter the setting page of the AFC module.



The following figure shows the AFC setting page in detail.



**MAX DEPTH:** The maximum amount of gain the module allows to reduce, with a scale of  $[-20.0, 0.0]$  dB.

**BANDWIDTH:** The bandwidth of the filter, with Narrow and Wide optional.

**RESET:** When pressed, the filter will go back to initial settings, and the module will re-detect the frequency point of the acoustic feedback.

**FIXBAND:** When pressed, fixed values of parameters, such as Frequency, Gain, and Width, will be applied to configure the filter in a selected band. You are allowed to design the filter by setting its parameters.

**FIX ALL:** When pressed, all bands will be processed in a fixed mode or USER-EDITING mode.

**BYPASSBAND:** When pressed, the filter of the related band will be disabled. **BYPASS ALL:** When pressed, the AFC module will be disabled, equivalent to pressing the green letter A at the AFC module on the HOME page.

**ANS LEVEL:** The Adaptive Noise Suppression (ANS) module is provided to suppress noises with signal levels up to 18dB. Clicking the ACTIVE button will give you the option to activate this function.

## 6.10 Adaptive Echo Cancellation

The 48kHz full-band Adaptive Echo Cancellation (AEC) algorithm is set to eliminate echoes coming from the far end in a remote video conference.

As shown below, clicking the AEC module  on the HOME page or the AEC tab on the menu bar will allow you to enter the AEC configuration page.



The following figure shows the setting page of the AEC module.



**LOCAL INPUT:** This shows source signals available to access the AEC process. AUTOMIXER refers to mixed signals after the AUTOMIXER process.

**NONLINEAR PROCESSING:** Determines the audio effect for both ends of the video conference, with soft, medium, and aggressive optional.

**ACTIVE:** Activates the AEC process. The function is equivalent to clicking the green letter A at the AEC module on the HOME page.

**ANS LEVEL:** The Adaptive Noise Suppression (ANS) function is provided to suppress noises with signal levels up to 18dB. Pressing the ACTIVE button, the process will be enabled. **REMOTE REFERENCE:** Indicates available signals for the AEC algorithm to learn how to eliminate analogous echoes in practice.

As shown in the figure above, we choose LineIn1-L and LineIn1-R as reference signals; in such case, we need to connect the INPUT LINE (L+R) 1 port of the processor to the terminal of the video conference and connect the OUTPUT LINE (L+R) 1 port to an external speaker. As the reference signal after the AEC algorithm will be sent to the far end by the terminal, we also need to configure selected input channels in the matrix routing. The figure below gives an example of configuring the matrix routing.

CLEAR	Mic In1	Mic In2	Mic In3	Mic In4	LineIn1-L	LineIn1-R	LineIn2-L	LineIn2-R	LineIn3-L	LineIn3-R	HDMI In-L	HDMI In-R	Dante In1	Dante In2	Dante In3	Dante In4	AM	AFC	AEC	ANS
LineOut1-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut1-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut2-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut2-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut3-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut3-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut4-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut4-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut5-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LineOut5-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HDMI Out-L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HDMI Out-R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dante Out1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dante Out2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dante Out3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dante Out4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### 6.11 Adaptive Noise Suppression

The 48kHz full-band Adaptive Noise Suppression (ANS) algorithm can effectively increase the signal-to-noise (S/N) ratio and suppress noises from the blower or air conditioner.

As shown below, by pressing the ANS module  on the HOME page or the ANS tab on the menu bar, you will enter the ANS configuration page.



The following figure shows the details of the ANS setting page.



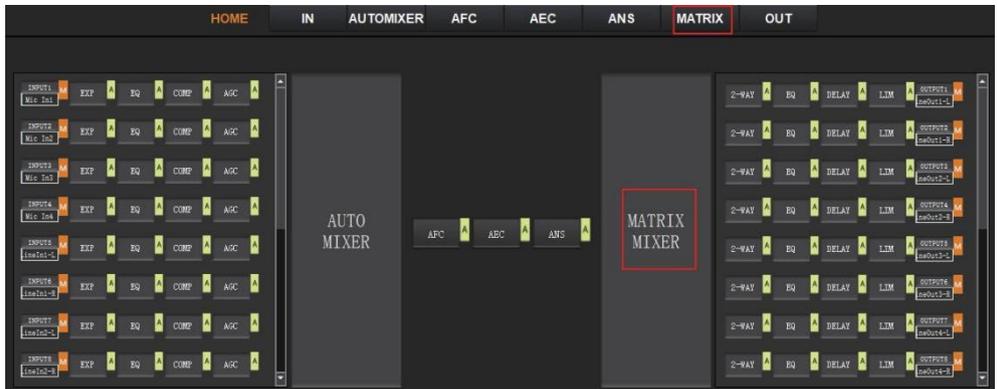
**LOCAL INPUT:** This shows source signals that are available to access the ANS process. AUTOMIXER refers to mixed signals after the AUTOMIXER process.

**ANS LEVEL:** The ANS module provides 12 noise suppression levels, ranging from 6dB to 18dB.

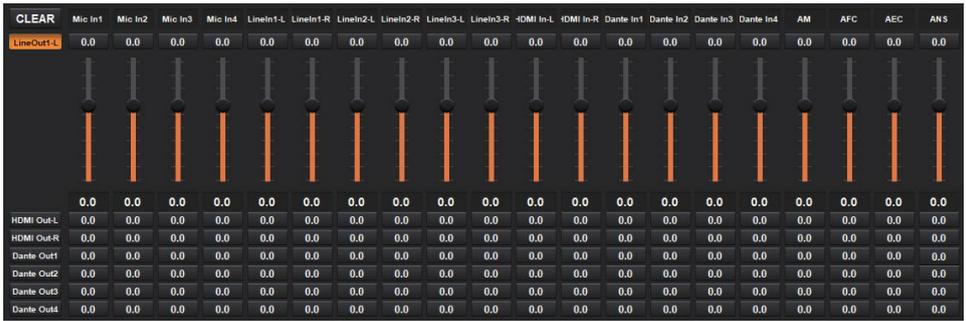
**ACTIVE:** Activates the ANS process. The function is equivalent to clicking the green letter A at the ANS module on the HOME page.

## 6.12 Matrix Mixer

The Matrix Mixer allows you to choose the audio route by matrix mode freely. As shown below, clicking the MATRIX MIXER section on the HOME page or the MATRIX tab on the menu bar will enable you to enter the MATRIX MIXER configuration page.



The following figure shows the configuration page in detail.



As shown above, the horizontal line stands for output channels, and the vertical for input channels (AM, AFC, AEC, and ANS acceptable).

**AM:** Indicates the output signal after the AUTO MIXER process.

**AFC:** Indicates the output signal after the AFC process.

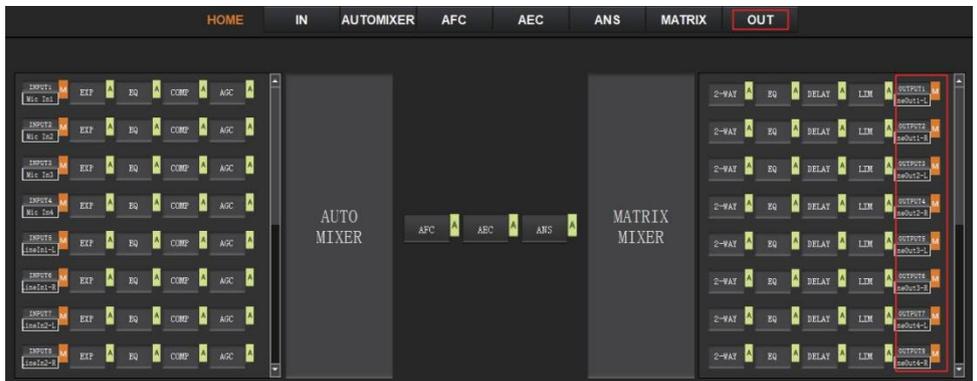
**AEC:** Indicates the output signal after the AEC process.

**ANS:** Indicates the output signal after the ANS process.

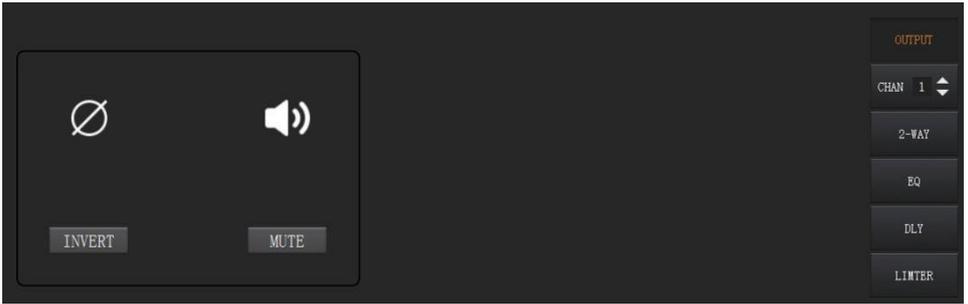
**Fader:** Each channel has a fader to control the output volume.

### 6.13 Output Settings

As shown below, clicking the OUTPUT module **OUTPUT1** on the HOME page or the OUT tab in the menu bar will allow you to enter the OUTPUT setting page.



The figure below shows the details of the setting page.



**INVERT:** When pressed, inverts the polarity of the signal on the channel.

**MUTE:** When pressed, mutes the output channel. This function is equivalent to pressing the letter M at the output module on the HOME page.

On the right panel of the OUT page, modules such as 2-way crossover, equalizer, delay, and limiter are also available for you to set.



A trumpet icon on the toolbar enables you to mute all output channels at one time (see the figure above). If it is in red, it indicates that all output channels are mute; otherwise, it will be green.

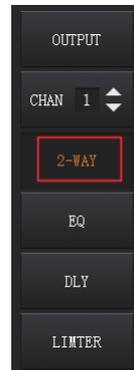
## 6.14 Two-way Crossover

The two-way crossover consists of a High Pass Filter and a Low Pass Filter, which can divide the input signal into 2 discreet audio bands (Low and High).

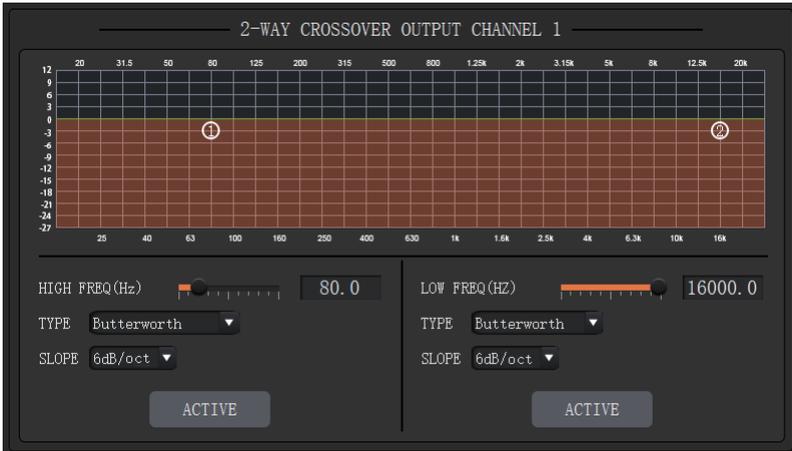
As shown below, you will enter the configuration page by pressing the 2-WAY module / on the HOME page or the 2-WAY button on the right panel of the OUT page.



or



The figure below shows the setting page.



**ACTIVE:** When pressed, you will activate/inactivate the frequency filter (High Pass or Low Pass). The activation can be realized by clicking the green letter A at the 2-WAY module  on the HOME page. The difference is that clicking the letter A will activate/inactivate the High Pass Filter and the Low Pass Filter simultaneously while clicking an ACTIVE button on the setting page will only activate/inactivate the corresponding frequency filter.

**FREQUENCY:** Indicates the cut-off frequency of the filter.

**TYPE:** Butterworth filter by default.

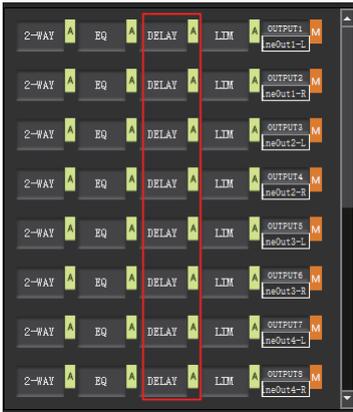
**SLOPE:** 6dB/oct by default.

A pair of UP-DOWN arrows on the right panel is available for you to select an output channel for the Two-way Crossover configuration.

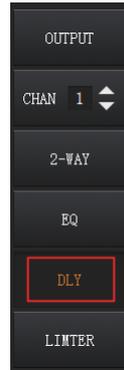
## 6.15 Delay

The Delay module is typically used to delay the output speed of audio signals, which can be applied to meet the purpose of Lip Sync in a video conference.

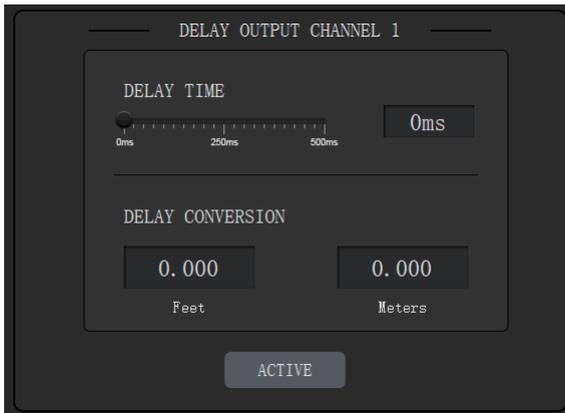
By clicking the DELAY module  on the HOME page or the DLY button on the OUT page, you will enter the configuration page of the Delay module.



or



The figure below shows the setting page of this function.



**DELAY TIME:** Adjusts the delay time of the output audio signal, measured in milliseconds.

**DELAY CONVERSION:** Displays the amount of delay measured in both Feet and Meters.

**ACTIVE:** When pressed, you will activate or inactivate the Delay module. This function can be realized by clicking the green letter A at the DELAY module  on the HOME page.

A pair of UP-DOWN arrows on the right panel is also provided for you to select an output channel for the Delay configuration.

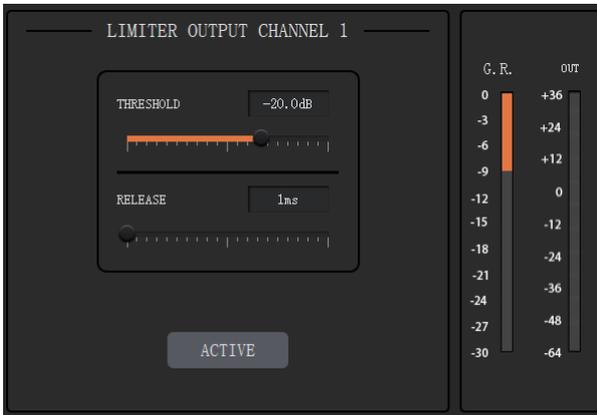
### 6.16 Limiter

A Limiter can reduce the dynamic range of signals by strictly limiting the maximum output level to ensure that the connected amplifier won't be overloaded because of signals with high signal levels.

By clicking the LIM module on the HOME page  or the LIMITER button on the OUT page, you will enter the LIMITER configuration page.



The figure below shows the setting page of this module.



**THRESHOLD:** This shows that level signals above the threshold will be attenuated, with a scale of[-60.0, 0.0] dB.

**RELEASE:** The time required by the Limiter to stop the LIMITER process once a signal is below the threshold, with a scale of [1, 1000] ms.

**G.R. (Gain Reduction):** Shows the amount of gain attenuation of the input signal, measured in dB.

**OUT:** Meter indicates output signal level after the LIMITER process.

**ACTIVE:** When pressed, you will activate/inactivate the function of the Limiter module.

The function is equivalent to clicking the green letter A at the LIM module on the HOME page.

You can also click the UP/DOWN arrow on the right panel of the setting page to select an output channel for the LIMITER configuration.

## 6.17 Scene Management

Up to 8 scenes are available to be managed in this audio processor. By clicking “Tools”> “Scene” on the menu bar, you will enter the setting page as shown below.



**Load:** When pressed, the scene saved in this processor will be exported.

**Upload:** When pressed, the configuration file saved in the host computer will be sent to the processor. The UPLOAD function is equivalent to clicking the OPEN icon on the toolbar, as shown below.



The processor can only read XML configuration files.

**Download:** The present scene will be downloaded to the host computer when pressed. The DOWNLOAD function is equivalent to clicking the SAVE icon on the toolbar, as shown below.



By default, the file is saved in .xml file format.

**Modify Name:** When pressed, the scene name displayed on the window will be changed.

**Save:** When pressed, the scene currently configured will be saved.

**Reset:** When pressed, the processor will return to the factory settings.

## 6.18 Serial Settings

You can configure the RS-232 serial parameters by clicking “Tools” > “Serial” on the toolbar to enter its setting page, as shown below.

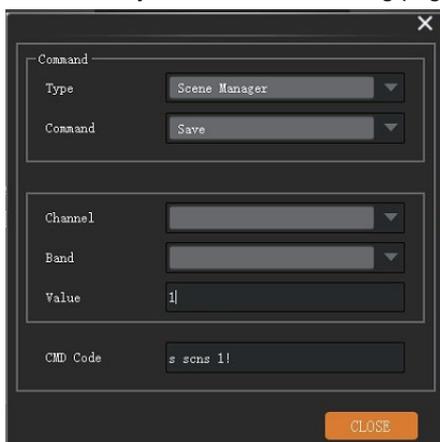


**Baud Rate:** 9600 by default, open to change.

**Reset:** Click it to restore the system's default settings.

## 6.19 Control Commands

The audio processor is controllable via Control Commands. As shown below, by clicking “Tools” > “Command” on the toolbar, you will enter the setting page.



All RS-232 control commands, such as Scene Management, I/O Control, Modules' Configuration, and Device Information, can be found on the page. The command code will be listed at the bottom of this page once you have selected the Type, Command, Channel, and Band from the drop-down box and entered its value.

## 7. Troubles and Solutions

If the output audio is abnormal, you may need to check the following items at first:

- ☆ Whether the STATUS LED is normal.
- ☆ Whether the INPUT/OUTPUT VOLUME is turned down to the lowest level.
- ☆ Whether cables are in the proper connection.
- ☆ Whether the matrix mixer is configured correctly.
- ☆ Whether the audio modules are applied correctly.

If echo persists when the processor is working, you need to check:

- ☆ Whether the processor is in regular operation.
- ☆ Whether the AEC module is activated.
- ☆ Whether the matrix routing is correctly configured.
- ☆ Whether the connection of Amplifier or Speaker for outputting reference signals is consistent with the matrix routing.

## 8. Application Example

The audio processor supports microphone input, computer, DVD, mixer, and other audio source input. It can be combined with a video conference terminal, a recording and broadcasting system, and a mixing console. The following figure shows the general connection diagram. Users can connect the devices based on actual requirements.

