TS-P1212D/TS-P1616D

Audio ProcessorUser Manual

Preface:

Thank you for purchasing our product. Please read this manual to be familiar with the product.

Note:

- This manual uses the full function audio processor matrix as an example and can be used as a reference for other processors.
- This manual is only for user operation instructions, not for maintenance service purposes.
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Product Introduction

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Important Safety Precautions

In order to ensure the reliable use of equipment and the safety of personnel, please follow the following rules when installing, using and maintaining:

- When the device is installed, make sure that the ground wire in the power line is well grounded, the chassis grounding site is well grounded, do not use two plug.Ensure that the input power of the equipment is 100v-240v, 50/60hz alternating current.

- Maintain the good ventilation of the working environment, so that the heat emitted by the device during the work can be discharged in time, so as not to damage the equipment due to the high temperature.

- In wet condensation environment or long time not used, should turn off the main power supply of the equipment

- Be sure to unplug the AC power cord of the device from the socket before the following operations:
  A. Remove or reinstall any parts of the device.
  B. Disconnect or reconnect any electrical plug or connection to the device.

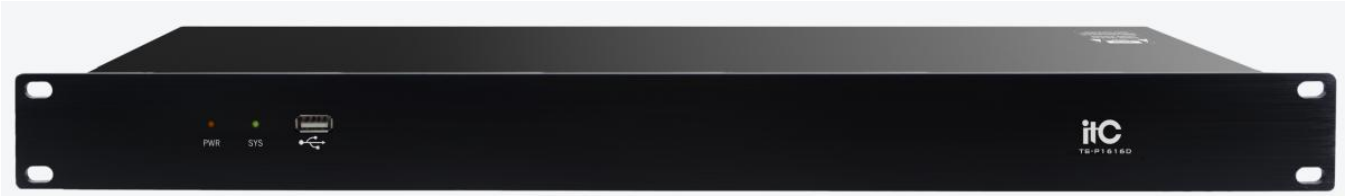
- There are AC high-voltage components in the equipment. Non-professionals are not allowed to disassemble the equipment without permission to avoid the risk of electric shock. Do not repair without permission, so as not to increase the damage of the equipment.

- Do not spill any corrosive chemicals or liquids on or near the device

- The disconnecting device of this product is an appliance coupler. The appliance coupler is located at the back shell of the product. When not using this product, please unplug the power cord from the product through the appliance coupler. No other objects should be placed near the appliance coupler , So as not to hinder the disconnection of the processor and the power supply.

1.Product Overview

1.1 Appearance



1.2 Function introduction

The equipment supports up to analog channel 16 input and 16 output and 1 USB extended recording channels, high-quality 21 pre amplification circuit, DSP processing bus structure, built in function of feedback cancellation, noise cancellation, the echo cancellation etc.,It is mainly used in various kinds of large sites, can satisfy the application requirements of theatre,music hall, remote video conferencing, gymnasium, Chapel, conference centers, theme parks and other public sound reinforcement system etc..

The operation is simple, intelligent control:

1. Comprehensive matrix mixing function, 24bit / 48KHz sampling frequency, high-performance A / D D / A converter and 32-bit floating point DSP processor.
2. High precision input sensitivity adjustment, total 21 level, step size 3dB, maximum input gain 51dB
3. Efficient processing algorithm: AFC, AEC, ANS, AUTOMIXER, EQ, GATE, AGC etc..
4. Rich interface expansion: support 8-channel custom input and output GPIO, level support external input 3.3 ~ 24V;
   USB interface supports recording and playback function;
   RS-485 supports automatic camera tracking function, easily realize video conference;
   RS-232 bidirectional serial control interface: can send or receive control, such as video matrix, camera and other equipment.
5. Support multiple sets of scene presets, scene save and other functions,
6. Fast operation: web control mode, support Android, IOS system.
7. The IOS application has been launched .

1.3 Device parameters

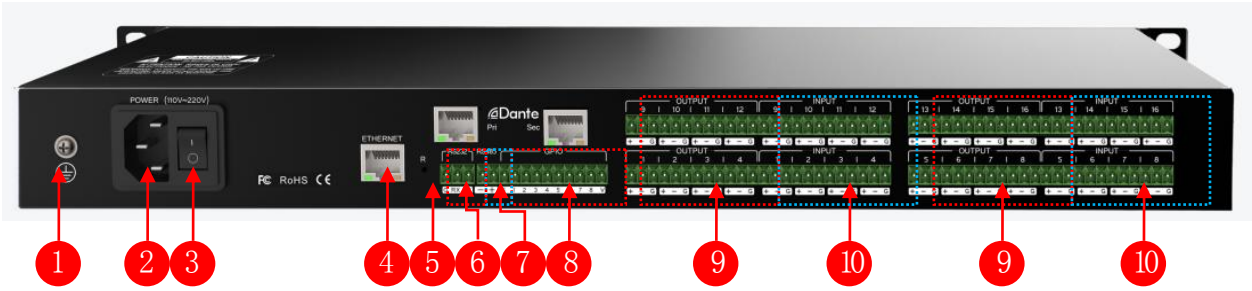
Number of input channel	16
Number of output channel	16
Number of 232	1
Number of 485	1
Number of GPIO	8，Freely configurable input and output
Number of RJ45	1
Number of USB	1，Support recording and playback
Maximum analog gain	51dB
Phantom	48V
Sampling rate	48KHz/24bit
A/D Dynamic range	120dB
Input CMRR	80 dB @ +24dBu @60Hz
Input impedance	20kΩ balance，10kΩ unbalance
Maximum input gain	18dBu
D/A Dynamic range	114dB
Channel isolation	104dB
Frequency Response	20～20kHz (±0.25dB)
(THD+N)	≤0.003% @1kHz，+4dBu
Output Impedance	100 Ω balance，50 unbalance
Maximum output gain	18dBu
Power supply	AC 110V/220V 50Hz/60Hz
Operating Temperature	-10 to 50
Size	482x258x45(mm)

2.Device Interface

2.1 Front panel

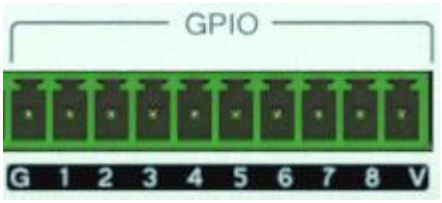
- （1）PWR:The power indicator light indicates that the power supply is normal, otherwise the power supply is abnormal;
- （2）SYS: Status indicator light, flashing indicates the equipment is running normally,
- （3）USB：The system supports USB recording and playback function.

2.2 Rear panel



- （1）Chassis ground；
- （2）Power plug, supporting AC 100V~240V power supply, 50~60Hz；
- （3）Power switch;
- （4）ETHERNET:10M/100M Ethernet interface, used to connect the control end (PC, router, etc.);
- （5）RESET: Restore factory Settings, long press for 5 seconds ;
- （6）RS232:Support central command and camera tracking,RX: receive data,TX: send data,G: ground wire;
- （7）RS485：Support camera tracking;
- （8）GPIO：GPIO control
- （9）OUTPUT: Analog output;
- （10）INPUT : Analog input;

2.3 GPIO



G: Ground

1~8: 8 GPIO ports,Port 2-8 are freely configurable input or output, port 1 only input function.

V: The default GPIO power output pin(5V to 12V).

GPIO state of software:

Note: ● Output high; ● Input high; ● Output low; ● Input low ● Disable

Port output: each output port is OC output, the default reference voltage 5V and the reference voltage can also be external is less than 15V, take the default reference voltage, the total output ports is 200mA:

Input port: Port input level > 2V will be recognized as high level;When there is no external power supply, the highest port input level is 5.5v; when there is an external power supply of 12V, the highest port input level is 12.5v.Input level< 0.3V is recognized as low.

Use of GPIO:

1.Output: When a parameter matrix of internal changes (such as mute), cause the change of the output level of a GPIO output pins, to drive an external circuit.

Audio matrix internal change -> GPIO pin level change ->external driving circuit.

2.Input: GPIO is an input pin level changes due to the external circuit is changed, thus a parameter matrix changes.

The external circuit state changes -> GPIO pin level change -> audio matrix internal change.

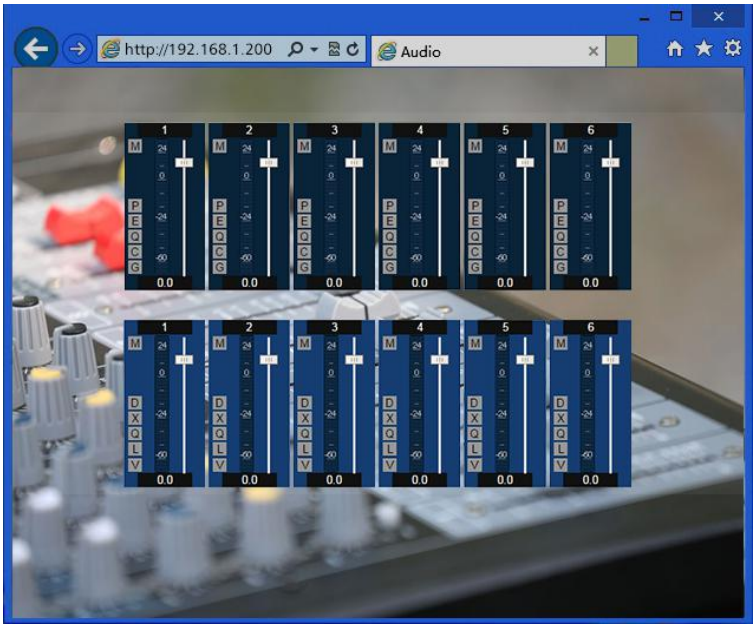
3. Software Operation

3.1 Web Control and Software Download

Device default IP address ex factory is 192.168.1.200, please add IP address fallen into the same network segment as the device.

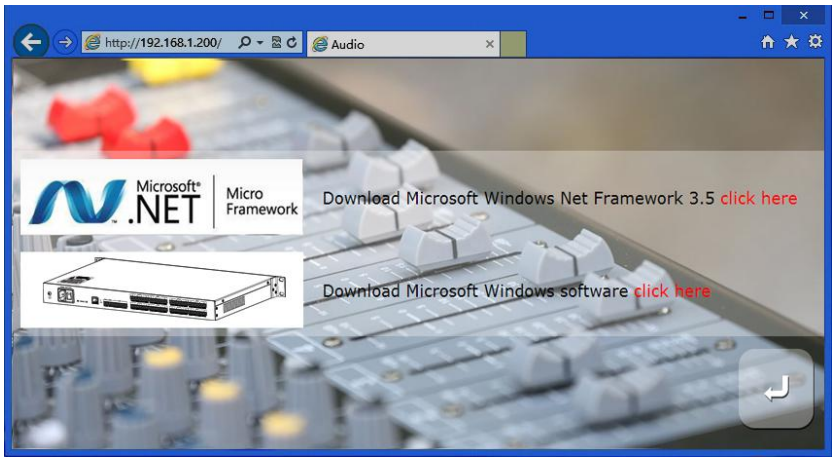
After the device started, input address, in webpage http://192.168.1.200/:

Control： Control channel parameters and the opening and closing of each processor.



Scene ：Fast change and save scene.

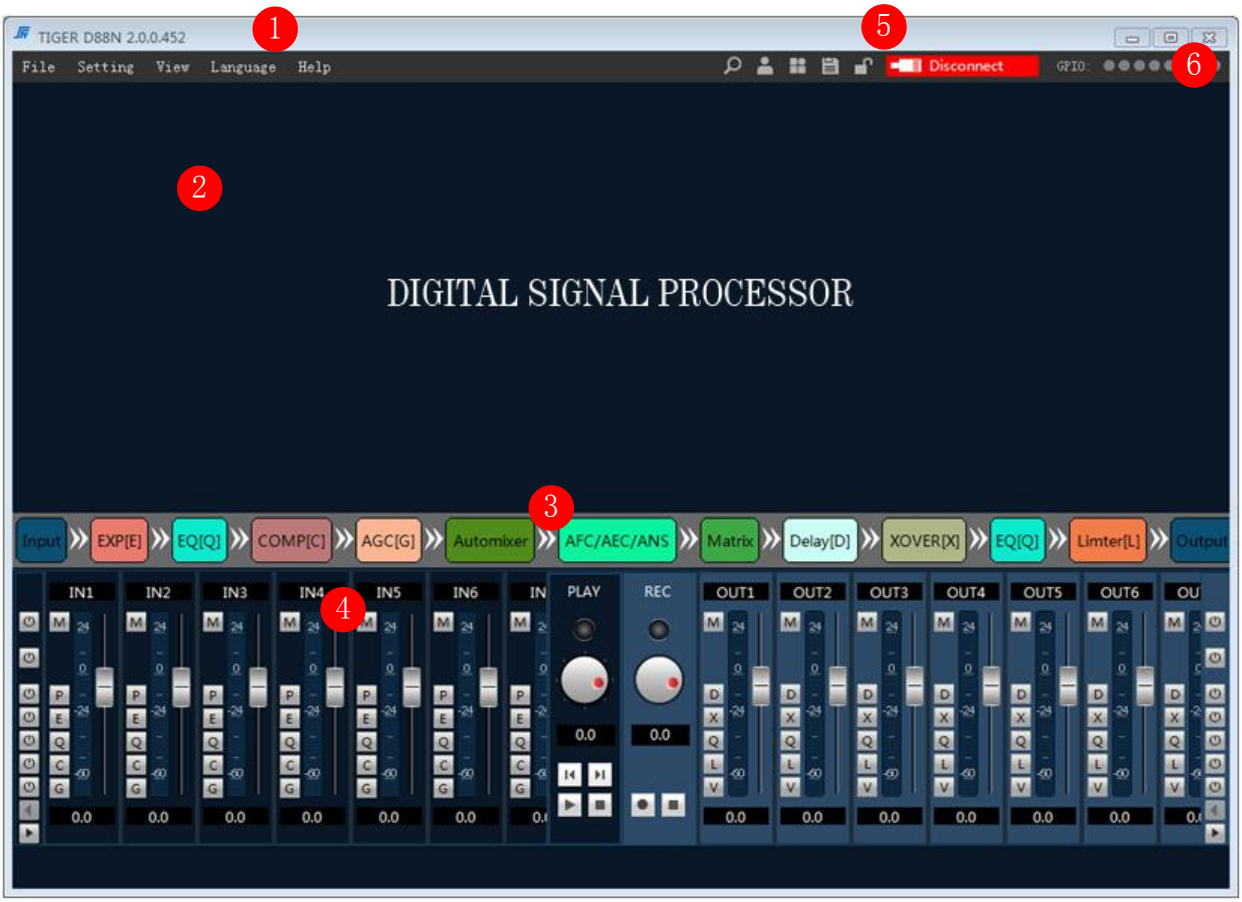
Download：Download the control software, the software supports XP, Win7, Win8 operating system.



Before you install the software, please ensure that the PC terminal has been installed Net Framework3.5 or above version.

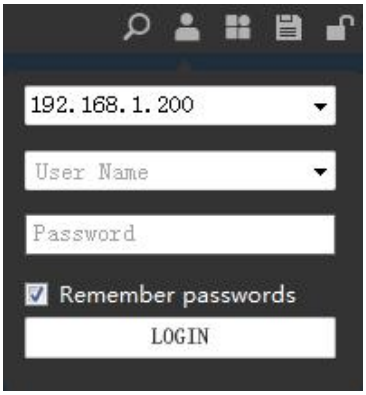
Note: In some systems (such as WIN8) to install the software, will pop-up operation "user account control information", please click "OK" to run upgrade the software permission.

Software installation is completed, open the PC control software are as follows:

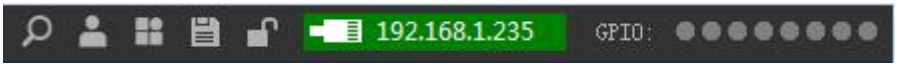


1. The menu bar and toolbar menu bar: various functions of software menu
2. The processor parameters control area: the hidden part can drag or scroll the mouse display, supports copy / paste function.
3. Process control area: audio data flow chart, click icon to set the parameters of each processing module in detail.
4. Input / output channel : Display the level and gain of each channel, and the quick on / off button of each processor, support copy / paste function.
5. The device list and scene control: Displays the current scenario and the currently online device.
6. The status bar: display the current connection equipment login user name, IP, GPIO state, the scene the download progress.

Click on the lower right corner of the "search equipment" button. Double click on the list of devices corresponding to the IP device, and pop-up authentication:



Enter the user name and password (default username “admin”\ password “123456”), click the Login, the status bar indicate the following:



You can be controlled device after the scene is downloaded.

3.2 System

Signal processing flow chart

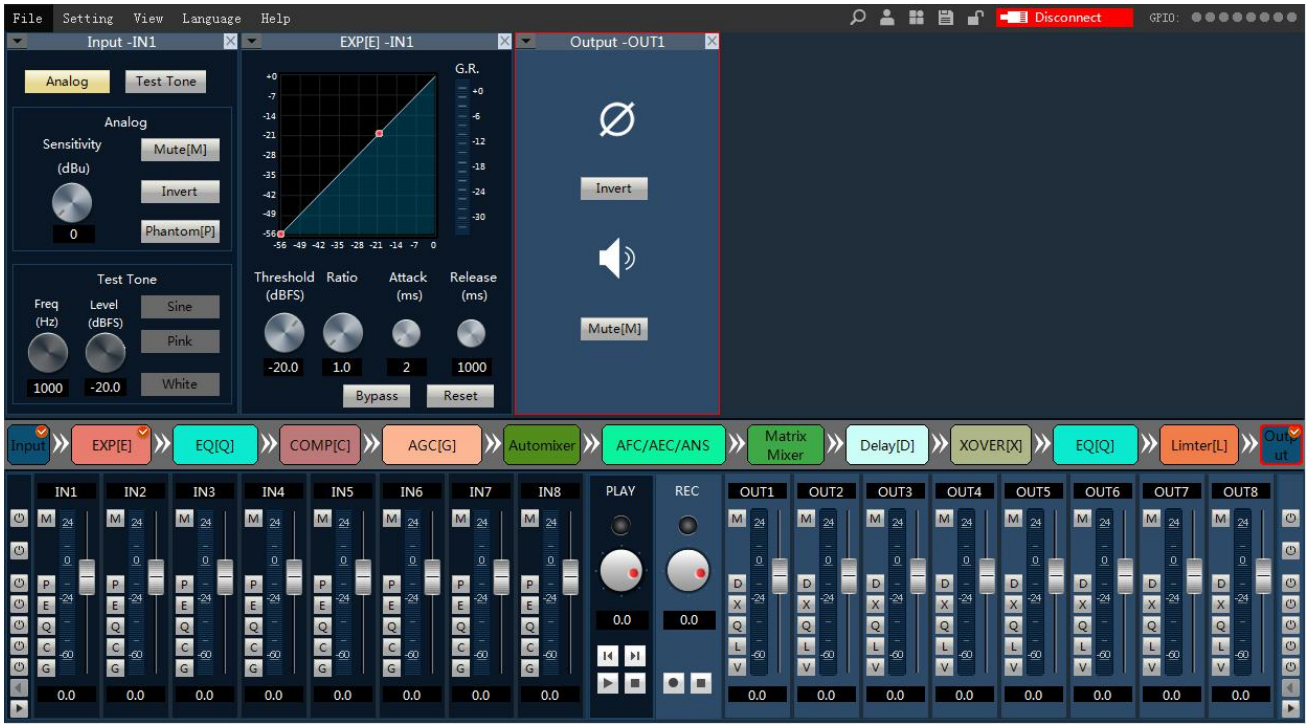
Standard configuration	Input: Test signal / Mute / Expander /5 segment equalizer / Compress / AGC Output: Delay / XOVER/31 segment graphic equalizer/ Limiter / Output invert / Mute
Advanced configuration	AFC/AEC/ANS/AutoMixer

3.3 Software features

Switching between flow chart and processor control module:

Window 2 is the detailed parameter display area for the processor, **window 3** for processing flow chart, also It is a fast channel opening and closing the processor.

Double-click on the window of 3 processor, can open/close the window 2 corresponding control module, such as double click on the "input/expander/output" :



As shown in the figure above, the setting interfaces of "Input", "Extender", and "Output" are arranged in Window 2 in the order shown in the flowchart,At the same time, the processor that has been opened in window 3 will be marked with a red tick in the upper right corner; if the selected processor is output, the corresponding module in window 3 will also be marked with a red box.

The module of detailed parameter setting has been opened. You can double-click the module in the flowchart to close the corresponding interface of detailed parameter setting.

Identified in the upper part of the detailed Settings window area, display the current control of the channel number, have shown above, input and output channels of 1 parameter.

Above the input part of a display channel 8 parameters control, the output part of a display channel for six parameters control.

When the channel name revised, detailed parameters control module channel names will change accordingly.

Fast control area:

Part 4 is input and output channel fast control mode, each channel of the processor can quickly bypass and active, select different channels, automatically switching the display part 2 channel information.

If the channel number is more than displayable area, you can drag or rolling middle mouse wheel to display a hidden part;

Input:

1）You can modified channel name in edit box.After modification, the identification area of the detailed parameter control interface in window 2 changes accordingly.

2）M、P、E、Q、C、G is shortcut operation mode:

M show mute state	Q show EQ state
P show phantom state	C show compress state
E show EXP. state	G show AGC state

The left-most button indicates quick control of the opening and closing of all input channels, and the left and right arrows below can quickly switch input channels.

3) The level meter displays the current input channel frequency.

4) The thruster adjusts the digital gain of the current input channel.

5) The level meter displays the input level of the current input channel. You can drag left or right or scroll the middle mouse button to show the hidden channel.Click the channel to switch the channel parameters of the function module above.

Output:

1）You can modified channel name in edit box.After modification, the identification area of the detailed parameter control interface in window 2 changes accordingly.

2）M、P、E、Q、C、G is shortcut operation mode:

M show mute state	Q show EQ state
D show delay state	L show limiter state
X show XOVER state	V show invert state

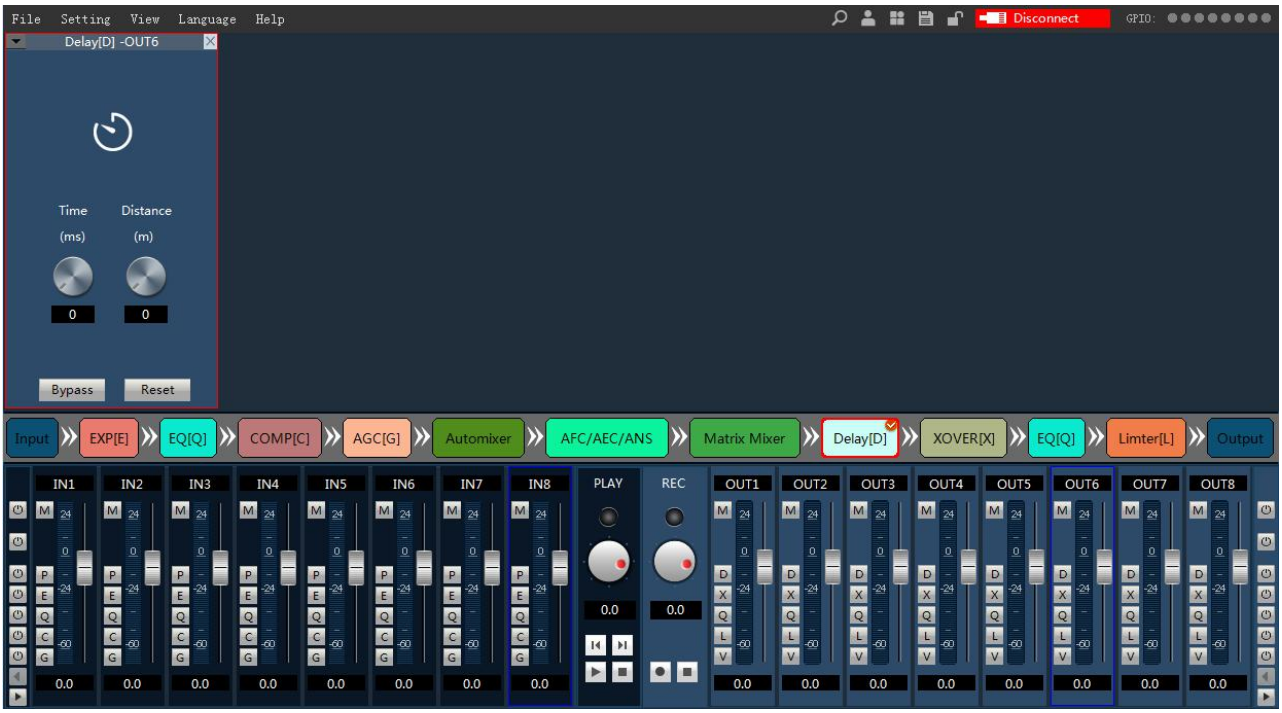
The button on the far right indicates quick control over the opening and closing of all output channels, and the left and right arrows below can quickly switch the output channels.

3) The level meter displays the output level of the current output channel

4) The thruster adjusts the digital gain of the current output channel.

5) The level meter displays the output level of the current input channel, and you can drag left or right or scroll the middle mouse button to show the hidden channel.Click the channel to switch the channel parameters of the function module above.

Example: click on the full enable fast button of the delayer, as shown below, and all delayers of the output channel will be fully enabled.



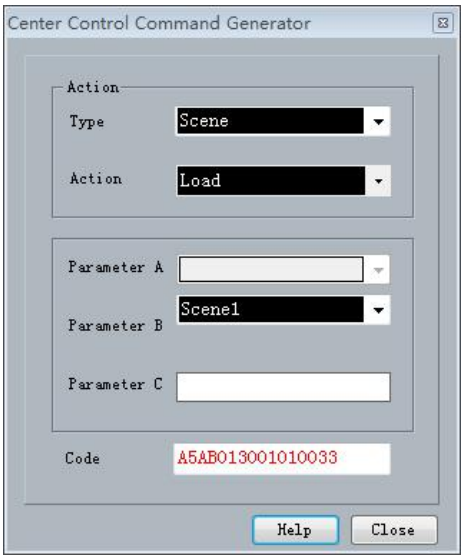
3.4 Menu and Status

3.4.1 Files

1. New : Create a new scene, parameters for the factory configuration, available offline.
2. Open : Open the local scene file, available offline.
3. Save as：Save the current configuration to a local file, available offline.
4. Exit：Close the software.
5. Language switch: support simplified Chinese, traditional Chinese, English 3 languages.

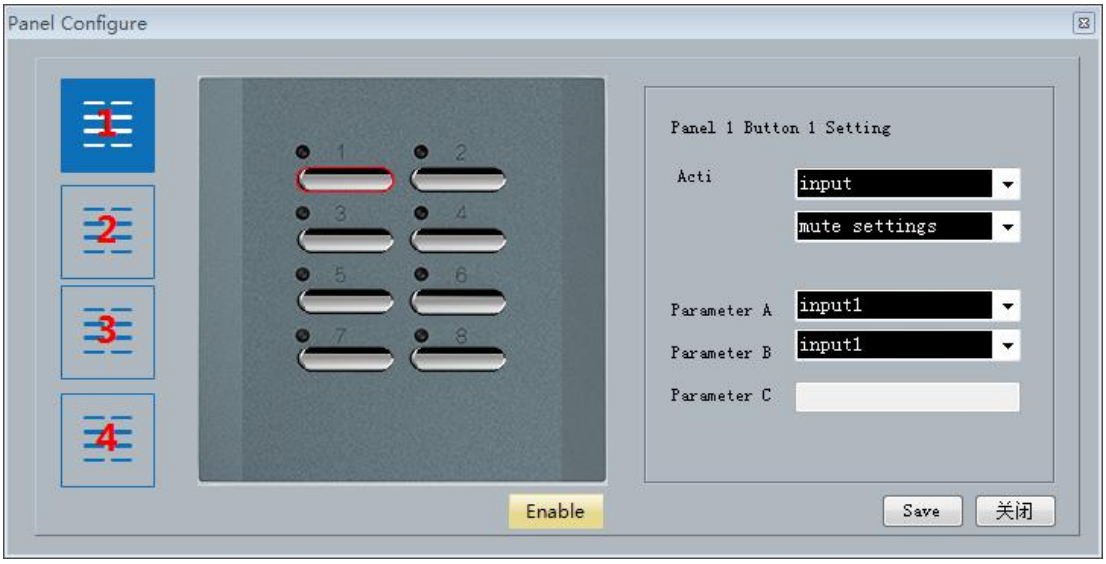
3.4.2 Center control

The central control command generator can convert frequently used operations into a 16-character command code to facilitate the transfer of external devices. Each command contains different parameters within three groups. Control command types: Scene, Input, Output, Mixer, PEQ(Parameter Equalization), GEQ(Graphic Equalization), EXP, COMP, AGC, Delay, XOVER, Limiter.



2. Panel configure(Optional)

When the processor successfully connect with the control panel, we also need to set control panel above the keyboard.



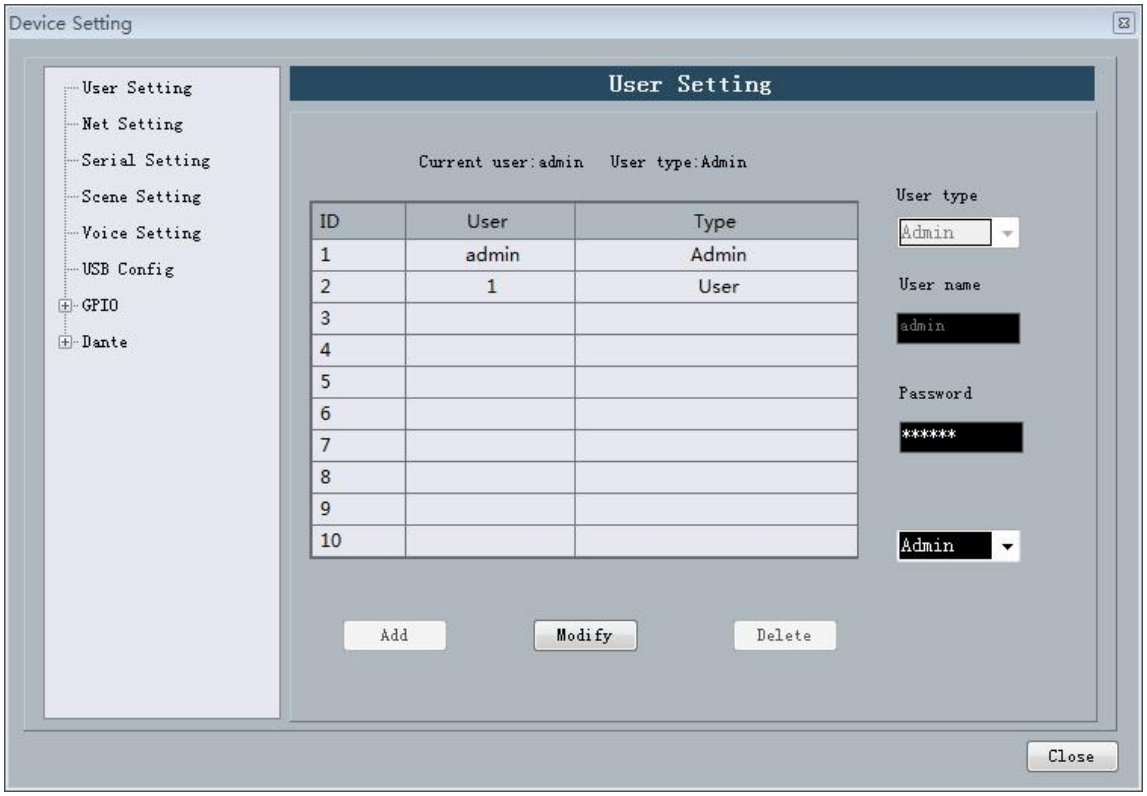
At present, up to 4 panels can be connected in series. According to the serial sequence of the panels, panel 1 to panel 4 can be automatically numbered. Select the panel to be set, and then select the corresponding button on the middle panel.

For example: selected in panel 2 above the first button, select "input" "volume increase", choose "enter 1 channel" in the parameter 1, select the "input 4 channel" in parameters 2,, input "1" in the parameter 3, click "save".That is, complete the function setting of the first button of panel 2, and press this button to input the volume of channel 1 to 4 to increase by 1dB.

3. Device setting

Device Settings include User Setting, Network Setting, Port Setting, Scene Setting, Camera Tracking, GPIO.

1) User Setting



1, The initial user name of the device is admin/ password 123456.Administrators can add, delete and modify all user information;Ordinary users can only modify personal information.

2, Modify user: first, select the user to be modified in the list of users. The edit box of user name and password displays the information of the currently selected user. Enter new information and click the "modify" button.

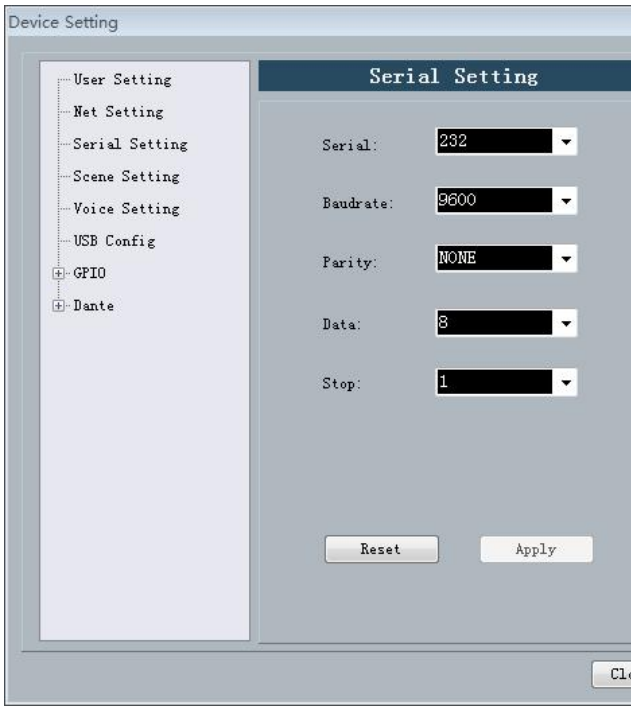
3, Delete user: select the row to be deleted from the list of users and click the "delete" button to delete the user.

4, Add user: select the blank line in the list on the left, and enter the information of the new user in the edit box of username and password on the right. Click "add" button to add a new user

2) Network Setting

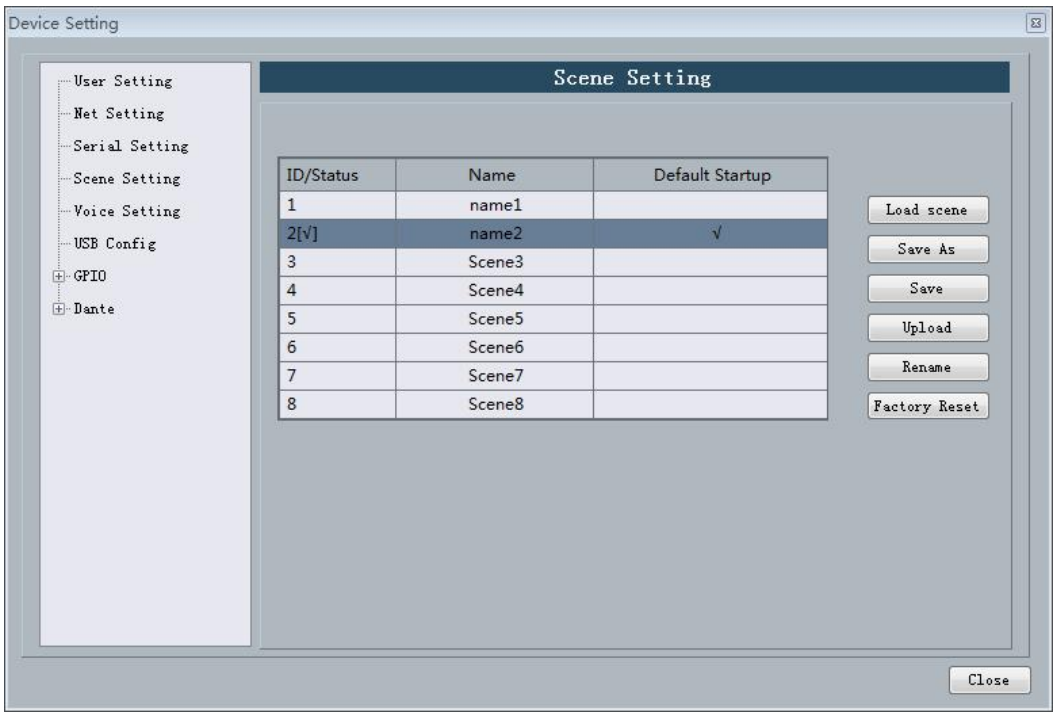
To view and modify the equipment of network address information, in the position of the corresponding input IP address, subnet mask, gateway, click apply button modification is completed.

3) Serial Setting



To view and modify the current equipment serial port information, set up and then click the "apply" button to modify the current equipment serial port information; If you want to return to the default, just click "reset" button, Settings cannot be empty.

4) Scene Setting



1. Modify the name: modify the selected scene name.
2. Upload scene: upload the scene on PC and overwrite the selected scene.
3. Save the scene: save the currently running parameters to the selected scene.
4. Save as: save the current running parameters to the PC in the way of the scene.
5. Load scene: enable the currently selected scene, which is usually used for scene replacement.
6. Restore factory Settings: restore all scenario configurations to the default configuration.

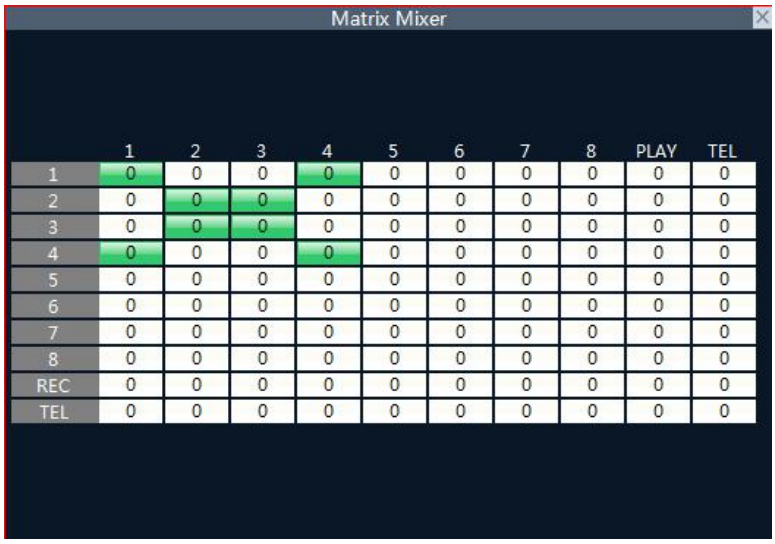
Notes:This equipment support offline save scene and online save scene in two ways.

Offline save is to save the scene that has been set on the PC, which is convenient for subsequent recall and scene copy between different devices.

Online save scenario is to save scene directly on the device, after the next opening device can be change directly.

Example 1：Offline save scene

1.1 Open the software, disconnect device, modify the parameters; If modify the mixer as below:



1.2 Click “File” ->“Save as”，Named “ test”。

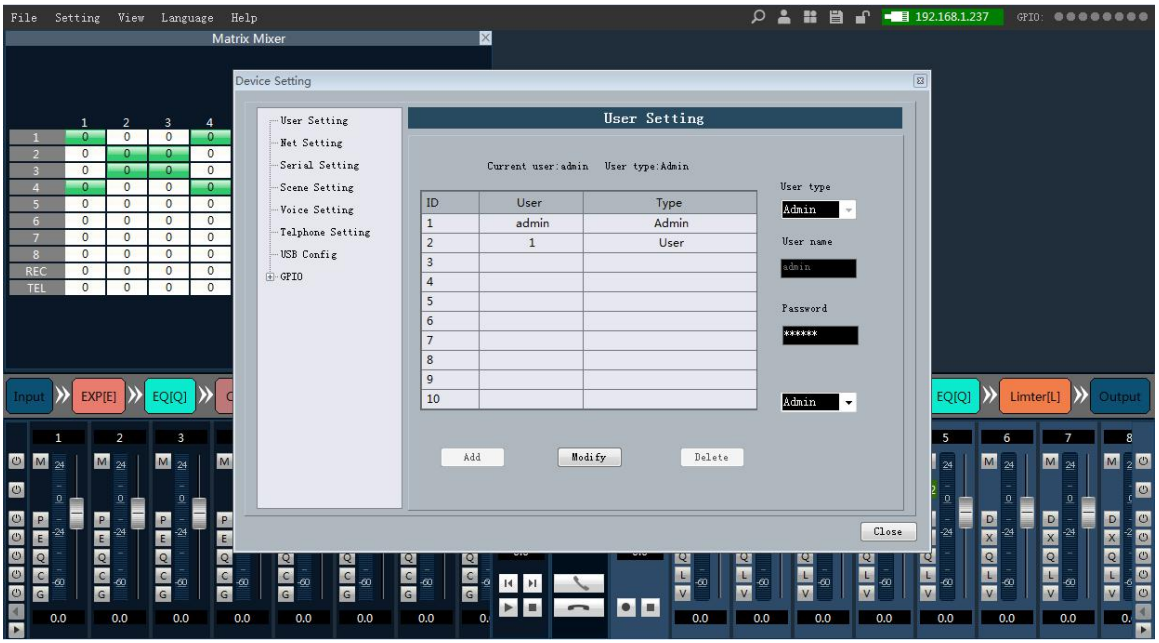
1.3 Next time offline using this scenario, only need to open in the absence of any device connected to (" file " menu bar - >" open ").

Note: due to the file open and save as offline operation. Therefore, it cannot take effect immediately on any device. Please refer to Example 2 for how to use the offline saved scene on the device.

Example 2：How to use offline saved scenes on the device?

2.1 For example, after saving the scene offline. Search and connect the corresponding device on the right side of the software interface：

2.2 After the device is connected, set -> device setting -> scene setting in the menu bar, select the scene to be set, such as the current scene 5, click the "upload scene" on the right, select the test file saved in example 1, the parameters saved in example 1 are automatically loaded, and the results are as follows:

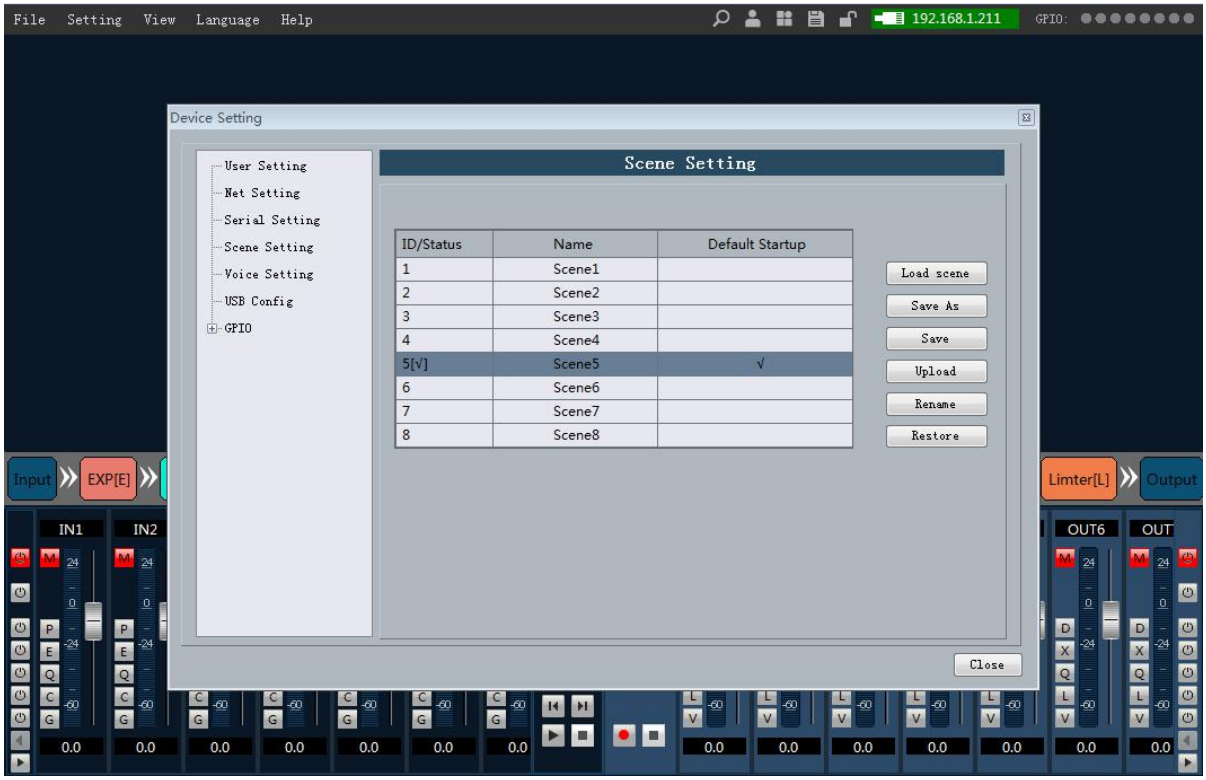


Example 3：Save the scene online

3.1 If you only need to operate the scene on a certain device, you do not need to save the scene offline and then load it, you can directly use online save the scene, the steps are as follows:

3.2 After connecting device, parameter change scene, open all the mute as follows:

3.3 In the menu bar Settings - > device Settings - > setting - > click "save"

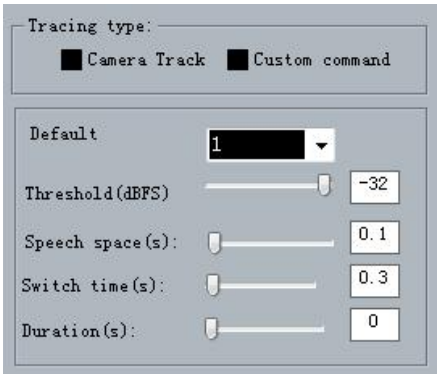


3.4 After the saving is successful, whether it is to restart the device or switch scenes, the mute button of scene 5

is always on, and scene 5 has been successfully saved..

4) Camera tracking

Save camera tracking parameters: each scene can save different camera tracking parameters. First, after the camera tracking interface is set, click "apply";Then click "save" in the "scene control" interface, and the parameters of camera tracking are automatically saved to the corresponding scene.



- **Camera tracking type:** There are camera tracking and custom commands. Camera tracking is used for channel input signal to control camera rotation; custom command sending is used for channel input signal control to send corresponding custom commands to corresponding ports.

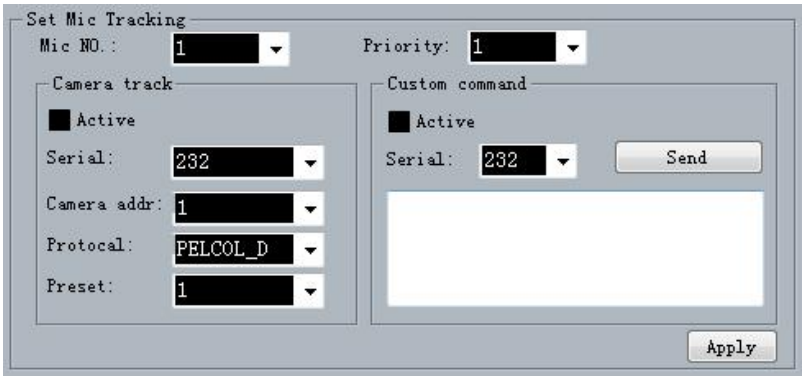
- **Tracking threshold:** It means that the detected input signal must be greater than or equal to the tracking threshold, and the system automatically enables the tracking parameter.

- **The default microphone:** It refers to when all microphones are not input, turn the camera to the position of the default MIC setting or send the associated command defined by the default microphone. The # sign indicates a virtual number, which can only be used to set the default microphone.

- **Reaction time:** the maximum discontinuous time of the effective signal.If the microphone is used to speak, the response time is set to 3 seconds, and the signal is considered to be valid within 3 seconds of the pause in the middle of the speech, and invalid after 3 seconds.

- **Switching time:** the shortest speaking time required for the camera to switch to an effective position.If the speaking time must be longer than the "switching time" when using the microphone, the channel signal is deemed to be valid, and the camera will automatically switch to the set position.The "switching time" is usually greater than the "reaction time".

- **Rotation time:** the interval between sending a camera switch command or a custom command, such as 0 for special processing, triggered only once.



- **The microphone number generally corresponds to the input channel of the device,** that is, the channel number connected by the microphone.The microphone number with a # sign is a virtual number and can only be used to set the default microphone..

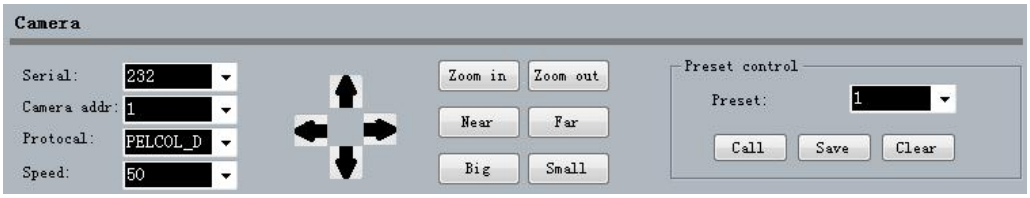
- **Priority series is smaller, the higher priority level**,If two mics speak at the same time, the camera will automatically rotate to the preset position corresponding to the mics with low priority (i.e. high priority) or send the command corresponding to the mics with low priority (i.e. high priority).However, if the two mics have the same priority, the signal that is checked first is the one that prevails.

- **Enable the MIC setting:** All microphone parameters can be set in advance, but when in use, according to the actual situation, only some of them are enabled.

- **The preset point, serial port number, camera address, protocol and camera are related,** and must correspond to the actual connection of the camera.

- **Custom command** means that when the matrix microphone detects that there is an input signal (usually when someone is speaking), it automatically sends the corresponding command to the defined serial port. Secondly, the command can also be set in advance, but do not check "Enable custom commands", the device will not automatically send, but you can still click the "send" button to send the command in the input box to the specified serial port at any time.

- **Click "Save" to save the parameters to the device.** At this time, the microphone of the channel has been associated with the corresponding camera address. Then use the "Enable Microphone Settings" option to determine whether the microphone settings are effective when tracking is enabled..



- **The camera setting** is a camera debugging interface. Generally, the camera position is debugged before the tracking starts. Finally, the parameters of this part will be saved on the camera.

- **First set up the serial port,** there are 2 serial ports (RS232,RS 485), corresponding to the connected real panel;

- **The second is the camera address and protocol type**. For the camera address, please refer to the actual address of the camera.

- **Finally, the preset point number is the identification defined by the user for the camera**, and then adjust the parameters such as up, down, left, right, and focal length, aperture to define the camera position and Settings;

- **Click "save" to save parameters on the camera,** click on the "remove" to delete the current precast point information, click the "call" point of view the current preset saved by the camera position.

Note: a camera address may contain multiple preset points, but one preset point corresponds to only one camera address.Camera Settings and microphone Settings have preset point, serial port number, camera address, several parameters of the protocol, the application needs to consider the actual situation.

How to switch RS232 and RS485?

For example, after a camera is connected to the audio processor in RS232 port, it is disconnected from another audio processor to 485 port with the position unchanged.There is no need to reset the parameters in the camera, just adjust the microphone Settings, but the port should choose 485..

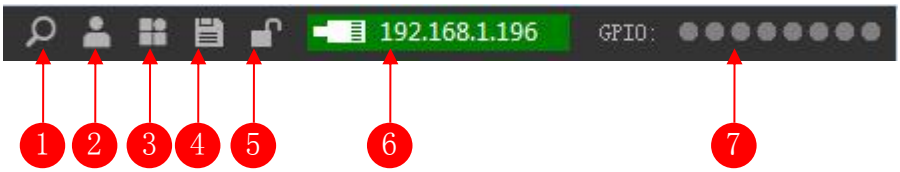
5) USB

The USB recording and playback module can turn on the functions of automatic playback and automatic recording to realize automatic playback or recording when inserting the USB device.

6) GPIO setting

Please refer to the below appendix.

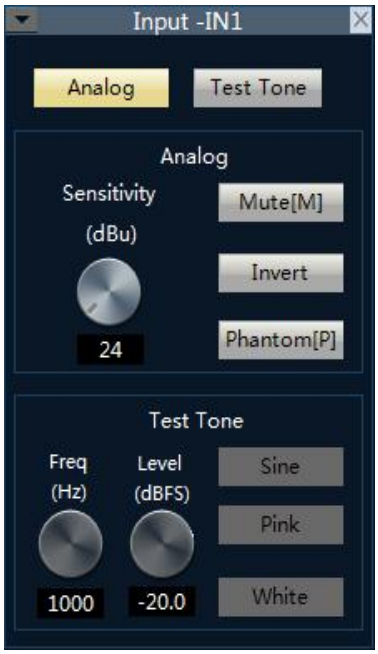
3.4.5 The status bar



The status bar displays and operating equipment status, specific function as follows.

1) **Device check and search:** click to display the IP address of the current online device, and double click on the device IP will pop up the login info.
2) **Switch users**: in the pop-up box directly enter the IP address, user name and password to connect and log in.
3) **Scene setting:** Only works if the device is connected, and you can choose from eight different scenarios.
4) Save the scene: Save (overwrite) the parameter changes to the selected scenario.
5) Lock screen button: Click will lock the software interface to prevent misoperation;Click in the locked state to enter the login interface to unlock
6) **Connection status:** when not connected,it will be show red, after the connection is successful,It will be change to green and display device IP address.
7) **GPIO status:** detailed in 2.3 and the appendix.

3.5 Module of Device



3.5.1 Input Source

Input signal has two options: external analog signals and the test signal inside the equipment, including analog signal adjustable parameter is as follows:

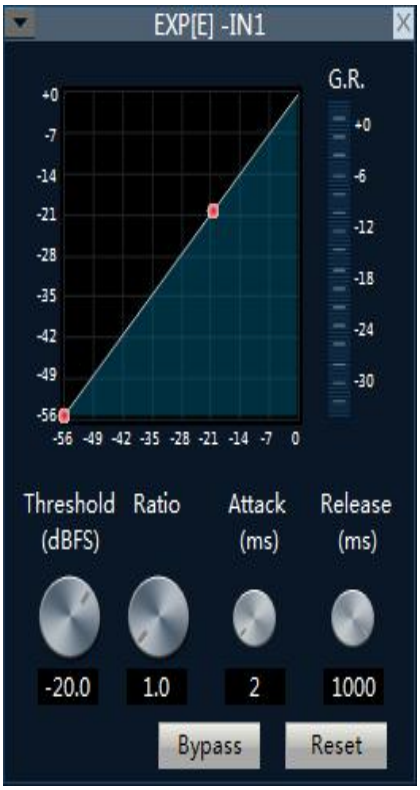
Sensitivity: adjust the analog input;-27~24dBu，dBu, step by 3dB;

Mute: select the channel mute;

Reverse phase: will be 180 degree phase signal processing;

Phantom power supply: used in capacitive microphone power supply, input line or the capacitive microphone do not open, in case of fire.

The test signal including sine, pink, white noise signal, enabling the test signal system will automatically block analog input signal.



3.5.2 Exp/Gate

The extender is increases the input dynamic range according to user needs.

When the input signal is less than the "threshold", the expander compresses the input signal according to the set "ratio", the output level = threshold-(threshold-input level) / ratio; when the input signal is greater than the "threshold", then Press 1: 1 output, output level = input level.

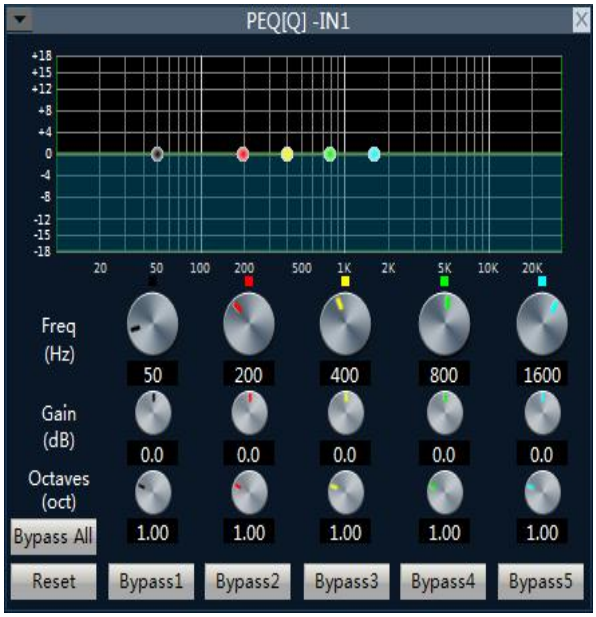
Bypass:Whether the extender is valid

Ratio: The decibel number of the dynamic change of the input signal of the expander / the decibel number of the dynamic change of the extended output signal.

Attack time: The time required for the input signal less than the "threshold value" of the expander from entering the expanded state to output at the set expansion ratio.

Release time: The time required for the input signal to return from the extended state to the original non-extended state.

Reset: all parameters are reset to the factory settings.



3.5.3 EQ

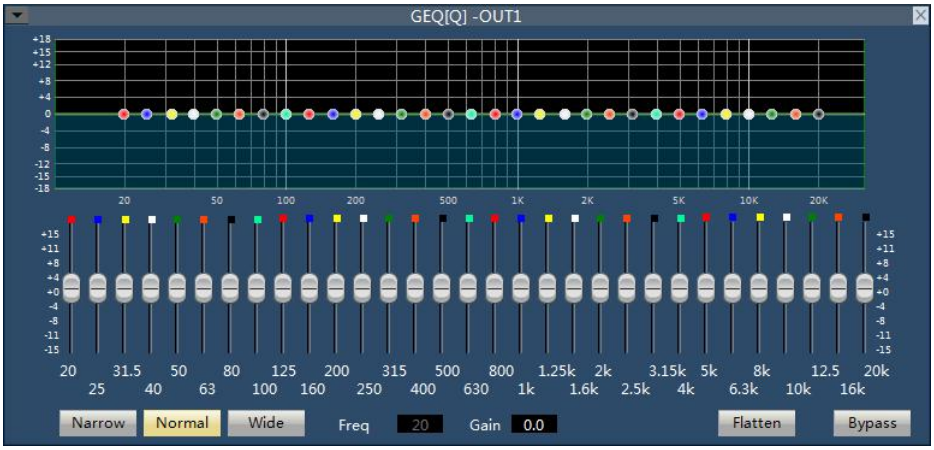
Bypass All: Whether the equalizer is valid.

Segment Bypass/enabled: whether the segment equalizer is valid.

Frequency: the center frequency that needs to be equalized.

Gain: the gain/attenuation value of the frequency center.

Bandwidth(oct): that is, the influence range of the segment around the center frequency. The greater the value, the greater the bandwidth and the greater the influence range.



Graphics EQ

31 frequency points can be individually adjusted gain, so as to achieve the purpose of strengthening and weakening of some frequency points, to achieve different effects.

Bypass: the signal input is bypassed and not be processed.

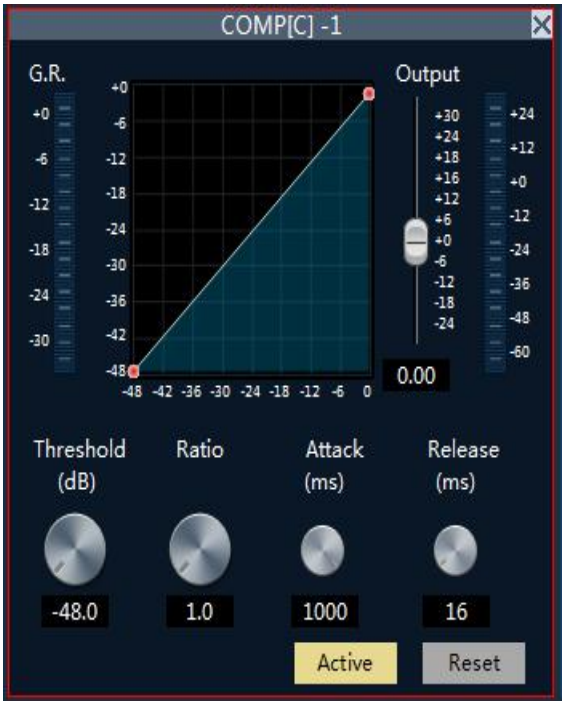
Gain: the gain/attenuation at the center of frequency. When the value is 0, the center frequency and Q value shall be invalid.

Flatten: all band gain recovery to 0dB.

Narrow Band: bandwidth (Q), value is smaller than normal.

Normal: bandwidth (Q), value is common bandwidth.

Wide Band: bandwidth (Q), value is larger than normal.



3.5.4 Compress

Compressors are used to reduce the dynamic range of signals above the user-determined threshold.The signal level below the threshold remains unchanged.

Threshold: The signal level is higher than this threshold to start to reduce the gain. The point of inflection in the input / output curve. For peak stop, the threshold to be set is just below the peak level.

Ratio:I/o compression ratio

Attack time: Refers to a gain reduction in processing speed that starts with the compressor.The attack time is more shorter,the The signal changes greatly in an instant.

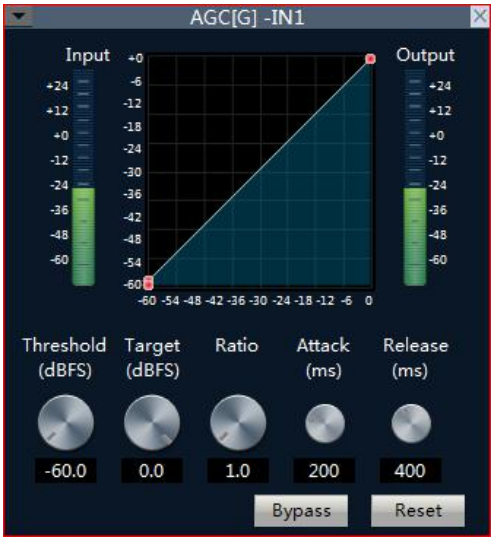
Release time: The release time determines the time - to - time gain of the compressor.

Output: the actually compressed level value.

3.5.5 AGC

The purpose of automatic gain control is to bring the signal of uncertain level to the target level while maintaining the dynamic range of volume.

Typical application scenarios: for example, when the user is speaking in front of the microphone, the distance between the mouth and the microphone will appear as far and near as possible, thus causing the output volume to rise and fall, or even feel intermittent speech.Automatic gain is to set the threshold value, the input signal below the threshold is output in a 1:1 ratio, and the level above the threshold is directly increased in accordance with the ratio, set the target level, the sound signal can be stable output.



Threshold: When the signal level is below the threshold, the input / output ratio is 1: 1. When the signal level is above the threshold, input / output = ratio. Set this threshold level slightly above the noise ratio of your input signal.

Target threshold: the required output signal level.

Automatic gain control is to automatically control the amplitude of the gain by changing the input and output compression ratio.When the weak signal is input, the signal is amplified to ensure the strength of the output sound signal; when the input signal strength reaches a certain level, the signal is compressed to reduce the sound output amplitude.

3.5.6 Auto Mixer

Automatic mixer adjust gain from each input channel in real-time to adapt the general level, through improving the high signal gain, reducing low level signal gain to maintain the overall system gain.

Each channel of an automatic mixer has an input, gain level meter, and an automatic gain, channel fader , priority, and channel mute.

Channel control: each channel has an automatic" AUTO " button, turn on the channel into the automatic mixing.
If you need a background music channel at a fixed level, or need to be a "chairman" Mic always remains in the open state, then you need to push the “AUTO” off button on the automatically key. When a channel to select" AUTO " off the automatically key, the gain will be automatically regulated, the channel signal level will not affect the other channel gain (such as no longer affects automatic mixer gain calculation).

Channel mute and fader are automatic gain type,In order to mute a signal and prevent the signal effect automatic mixing, please open the mute and turn “AUTO” off.

Automatic mixer. Each channel of the mute function is to mute the channel in mix and mute the output channel directly.

Channel fader control the channel mix level and output level directly.

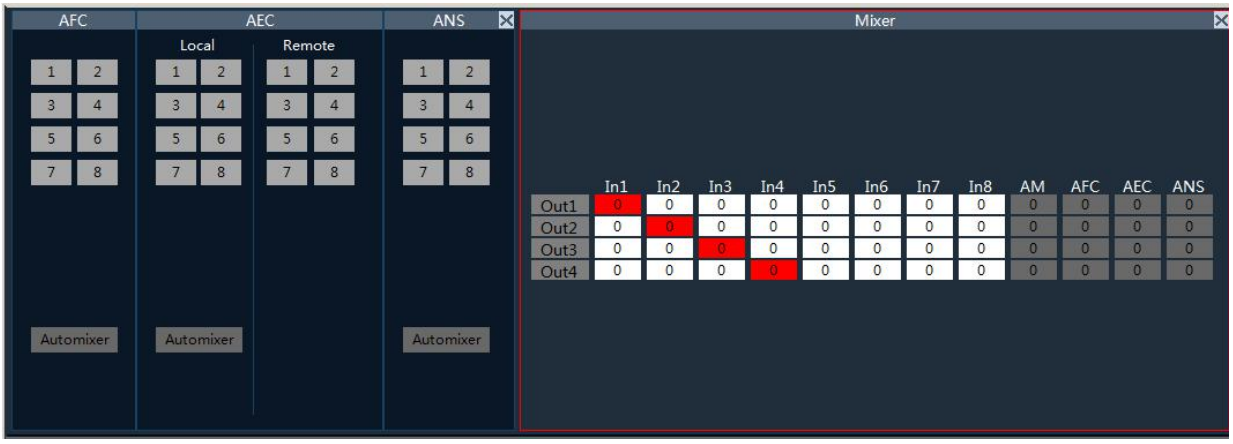
Priority control PR: allows the priority level high channel exceeding level of low passage, thus affecting the automatic audio mixing algorithm.
The control defines the priority as a value between 0 (lowest priority) and 10 (highest priority), and the default value is 5 (standard priority).
If the priority of all channels is equal, please set the priority of all channels to 5.

Example: input 1 and 2 channels to participate in the automatic mixing, and the mixed signal in channel 4, channel 5 output:

1.First, select the automatic button "Auto" of the input channels 1 and 2 of the automatic mixer to indicate that the signal of the channel is sent to the automatic mixer for processing. At the same time, the main switch of the automatic mixer is enabled. (From bypass to Enabled)
2.Select channels 4 and 5 in the output,indicating that the processed signal of the auto mixer is output in channels 4 and 5.

Note: As the output channels 4 and 5 contain the output signals of the automatic mixer, the input channels 1 and 2 of the input signals of the automatic mixer cannot be mixed into the output channels 4 and 5.

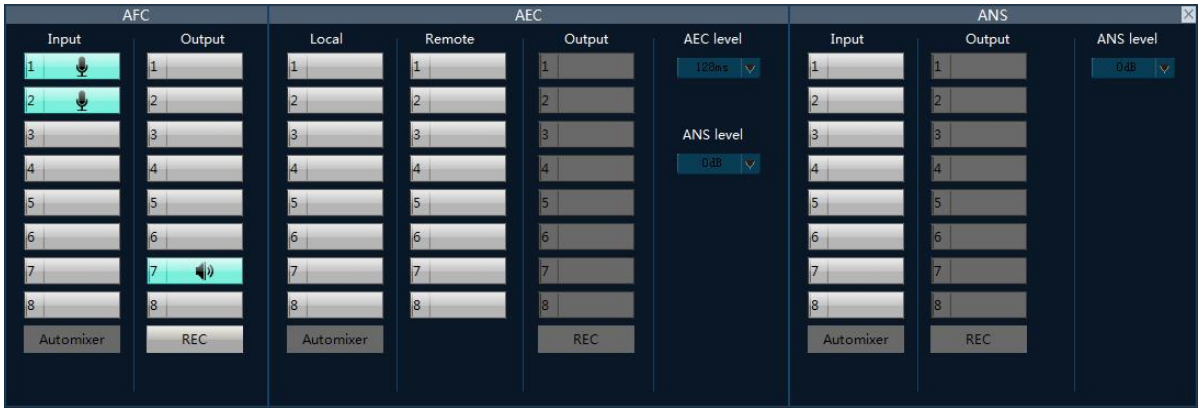
3.5.7 AFC/AEC/ANC/Mixer（Optional）



AFC: select input channel which need the AFC processed, then choose output channel in the mixer.
AEC: select input channel which need the AEC processed, then choose output channel in the mixer.
LOCAL: local MIC output, which requires signal echo processing
Remote: reference signal
ANC: select input channel which need the ANC processed, then choose output channel in the mixer.
Mixer: Mix the signals of the selected input channel into the corresponding output channel

Example 1: AFC

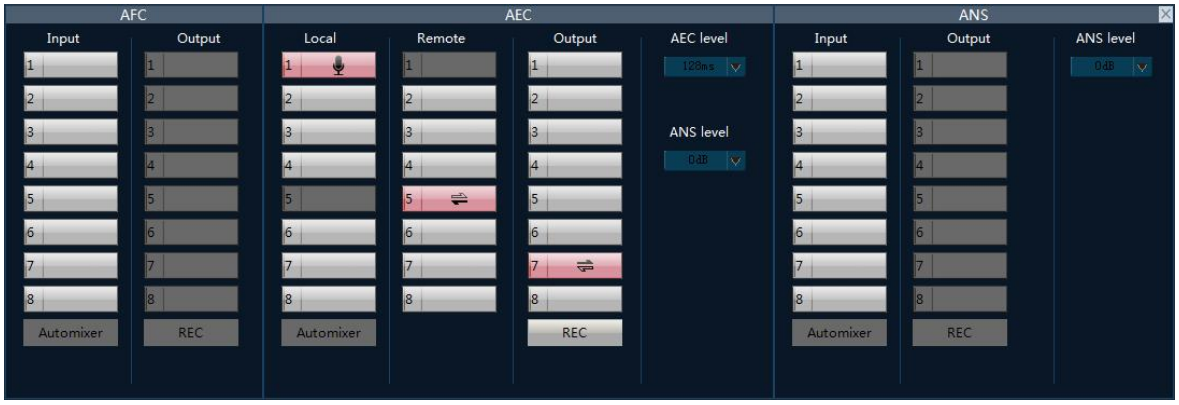
Signal using an AFC of channel 1 and 2, and output in the channel 7, set up as follows:



- Select input channels 1 and 2 in the feedback eliminator to indicate that the signals of input channels 1 and 2 will be sent to the feedback eliminator for processing
- In the "AFC/ feedback elimination" of the mixer, select the corresponding point of OUT7, indicating that the result processed by the feedback eliminator will be sent to the output channel 7 for output.

Example 2: AEC& Mixer

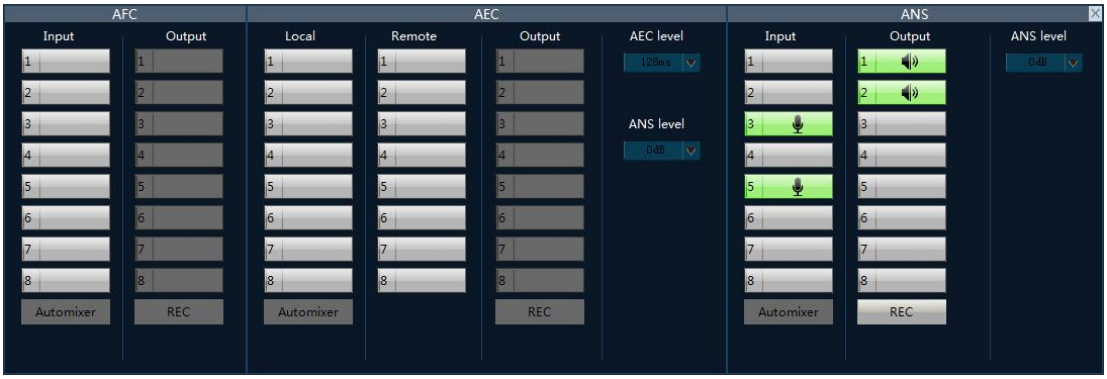
The local signal is input channel 1 and the remote signal is input channel 5, that is, the signal about channel 5 in channel 1 is removed and output in channel 7. The configuration is as follows:



- Select the local signal input channel and remote signal channel 5.
- The results from the channel 7 output.

Example 3: ANC

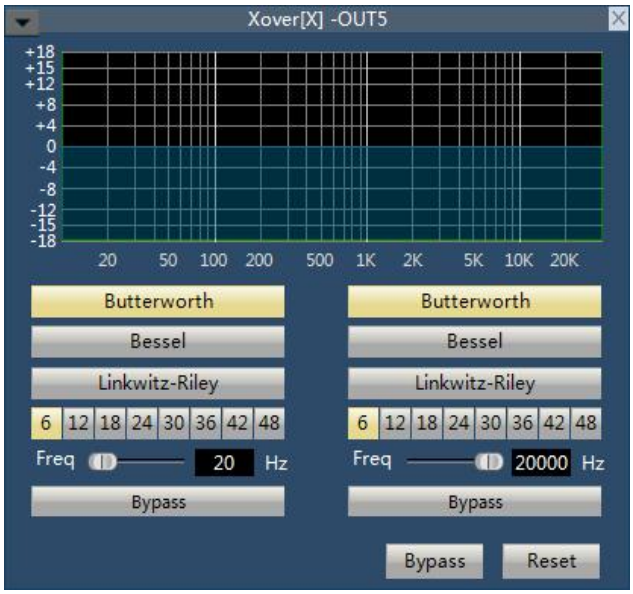
Opening the ANC to channel 3 and 5 of the signal, and output in the channel 1 and 2, the configuration is as follows:



- Open the input channel 3 and 5, 3 and 5 signals using a channel of the ANC.
- Select output channel 1 and 2, means the results output to channel 1 and 2.
-

3.5.8 Delay

Signal from the input to the output of the processor, the processor time interval, usually used to produce reverb or echo effects. Also it can be used for the auxiliary speaker with a larger processing.



3.5.9 XOVER (Crossover)

Left high frequency Bypass/enabled: enable and close the high pass filter.

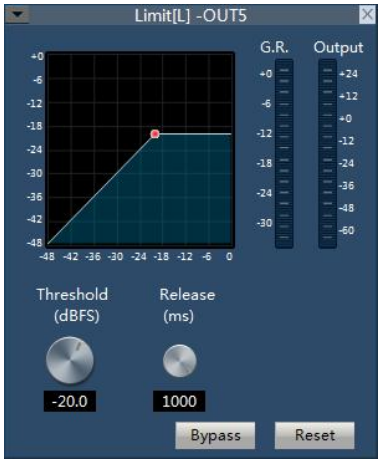
Right low-frequency Bypass/enabled: enable and close the low-pass filter

High-pass frequency: cut-off frequency point of high-pass filtering

Low pass frequency: cutoff frequency point of low pass filtering.

3.5.10 Limiter

The limiter is to limit the signal more than threshold. When the signal input is more than threshold, the signal output is equal to threshold. When the signal input is less than threshold, the signal output is equal to the signal input.



Bypass/Enable: Enable or disable limiter.

Threshold: the initial level for limiter; when the signal is above this limit, the limiter processing module will start to limit excessively large signal.

Release Time: if the input signal is lower than the threshold, it will not immediately turn off the sound channel but rather delay the closing time according to the specified value. As long as some signal is larger than “Threshold” during the delay, the sound channel will continue to open.

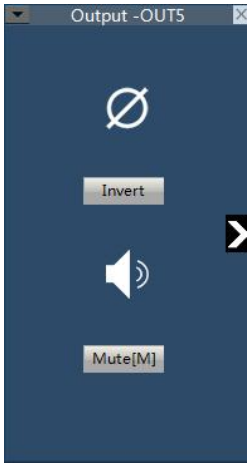
Output Sensitivity: is used to adjust the sensitivity of output level.

Audio Effect Level: is used to show the processing effect of signal after the limiter.

Output Level: used to show the output signal after processed by the limiter.

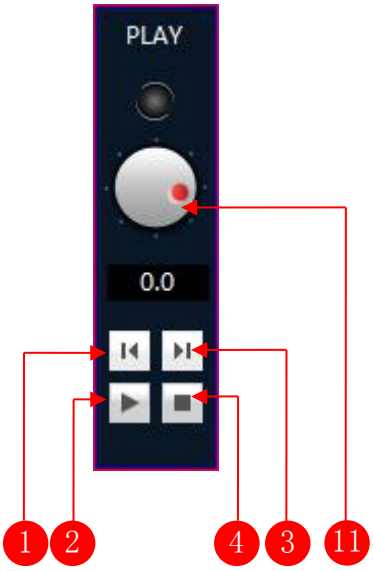
3.5.11 Output setting

The output can be set to invert and mute.



3.5.12 USB function（Optional）

- **USB Playback：**The processor read automatically and select USB drive MP3 and WAV format audio files.
- **USB interface open mode:** click the play window of the quick operation interface to open the playlist. The interface is as follows:



1. Last **2. Play and pause button**

3. Next **4. Stop button**

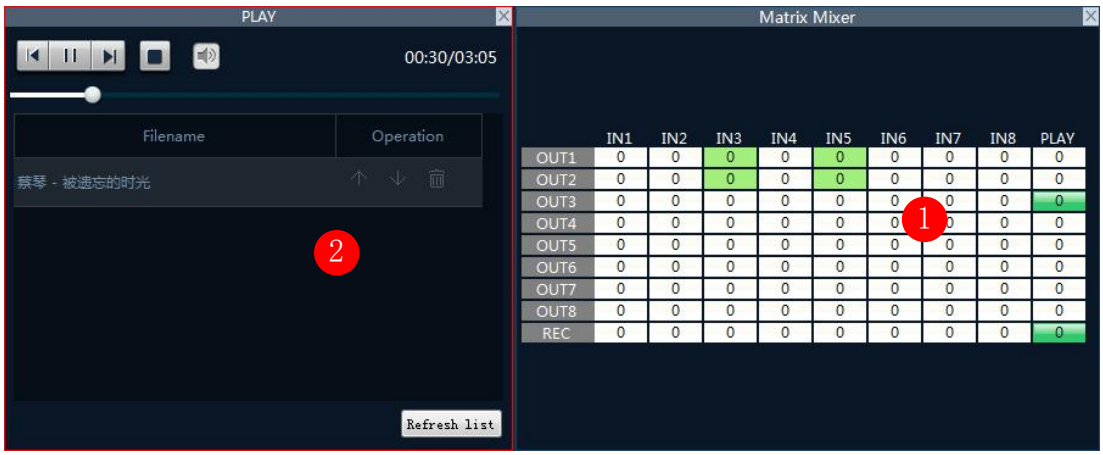
5. Mute and volume control button **6. Play list**

7. Up button **8. Down button**

9. Delete button **10. Refresh play list**

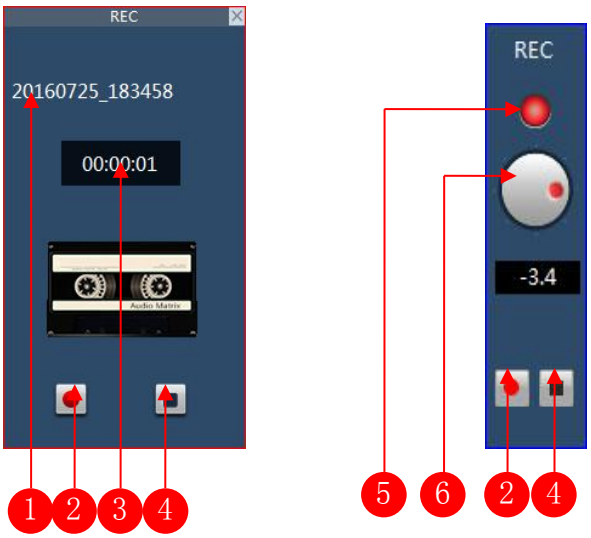
11. The remix button **12. Volume control button**

Example: Play the song on the U disk and send the sound to the output channel 1.



1. Choose "1" switch output corresponding to the matrix in the mixing interface "play" column
2. Double click the name of the song or play button and start playing the song.

USB recording:



1 **File name.** **2 Recording Start & Pause button.**

3 Recording time. **4 Button to stop recording.**

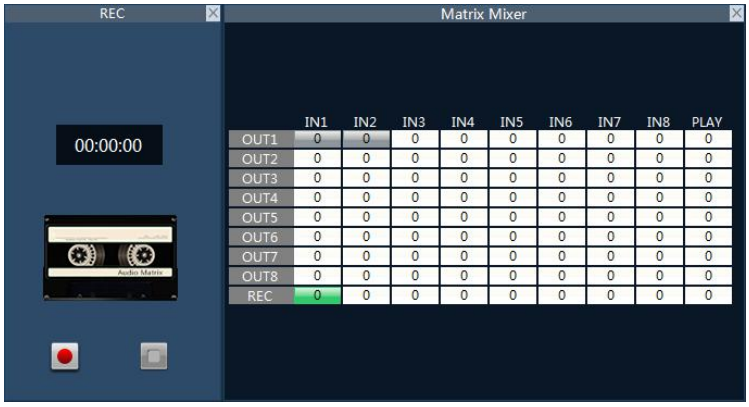
5 The indicator has three states: gray indicates that the device is not connected to the usb flash disk, red indicates that the device is connected to the usb flash disk, and flashing indicates that the device is recording

6 Record volume control button.

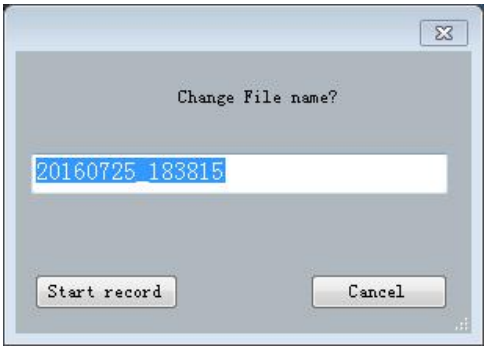
Description of USB recording function

Example：Record the sound of the input channel 1 to the U disk.

- Select the point corresponding to input 1 on the output line of matrix mixing interface REC.



- Click the start recording button, enter the recording file name in the dialog box that pops up, and then click ok.



3.5.13 Dante model（Optional）

A part of the channel in the fast control area of the input/output channel is marked as Dante channel. The interface is as follows:

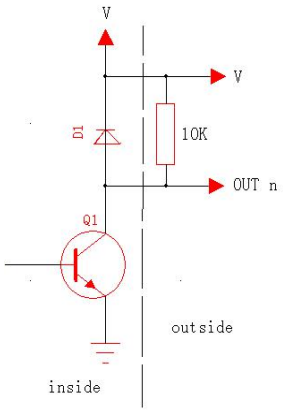
Select the Dante channel in the input part, open the input control, and in the "select device/channel" drop-down list, you can see the list of connected Dante devices and channels in the current network. Select the channel number under the corresponding device to complete the Dante access of the current channel, and the output channel of the corresponding device will become the input signal source of the current device through the Dante module.

The Dante channel in the output section will also be searched by other Dante devices in the network and set up as their input signal source according to their needs.

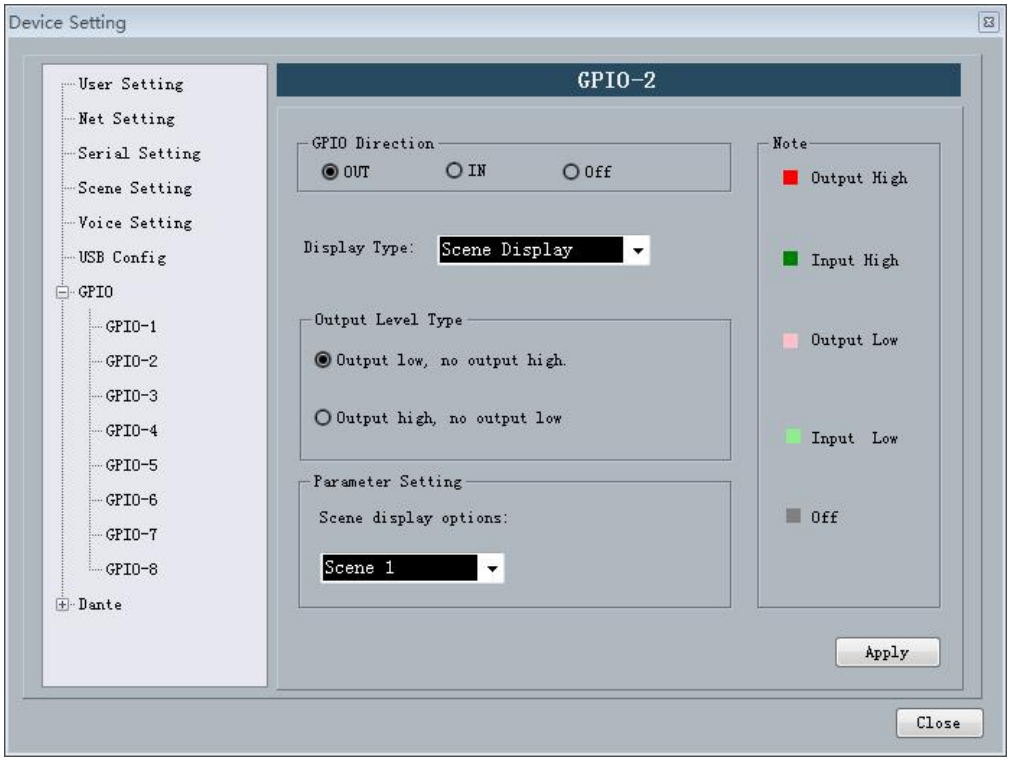
Appendix:GPIO

Output connection method 1:

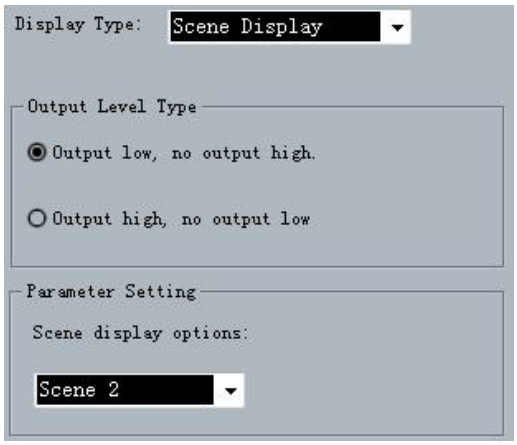
First, connect a GPIO pin (such as port 2) to a 10K/ 0.25w resistor between the device and "V" (as shown in the figure). This pin will output low level 0 or high level 1 according to the matrix state change, which can be used to trigger another GPIO or other device.



In accordance with the above method is also need to follow the following settings on the Software:
Settings ->Device settings ->Select GPIO channel (gpio-2 in this case) -> Set GPIO direction as "output



- **If the Scene Display is selected, the scene loading is selected.PIs see below:**



The scene parameter is “Scene 2”, the output electrical level is“output low, no out put high ”, and the GPIO Enabled State is “ON”. The settings will become effective after the “Apply” button at the bottom is clicked, If Scene 2 is loaded on the scene management interface, PIN-2 will output 0, andremain the same before other scenes are loaded, at which time PIN-2 will output 1;

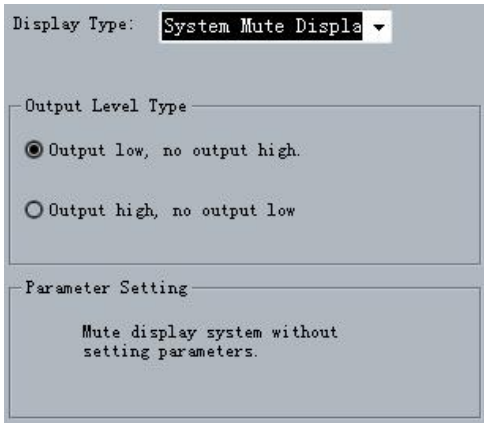
- **The specific settings are as follows if Level Display is selected:**

As the level of input channel 1 of the audio matrix reaches -28 dB, PIN-2 will output 0, and remain the same before the level decreases, at which time PIN-2 will output 1.

- **The specific settings are as follows if Channel Mute Display is selected:**

As the input channel 3 of the matrix is muted, PIN-2 outputs 1 and remains the same before the input channel 3 is not muted,at which time PIN-2 outputs 0.

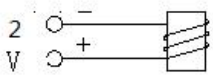
- **The specific settings are as follows if System Mute Display is selected:**



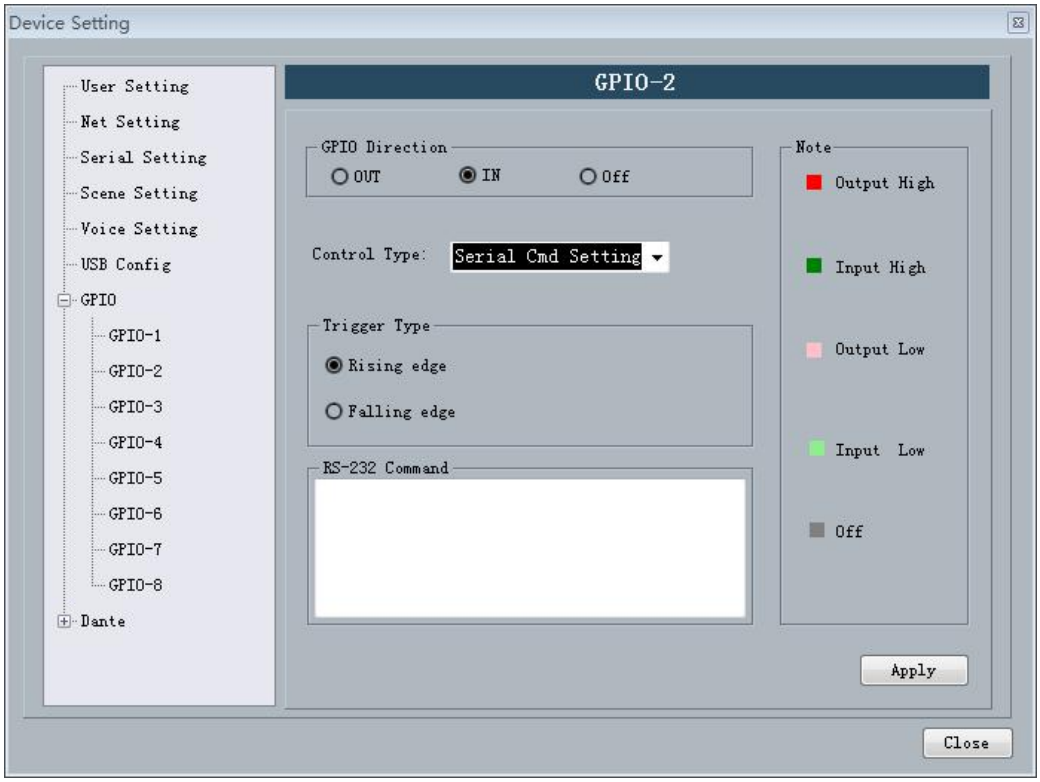
The output channels of the audio matrix are muted, PIN-2 outputs 0, and remains the same before any channel is not muted,at which time PIN-2 outputs 1.

Output connection method 2:

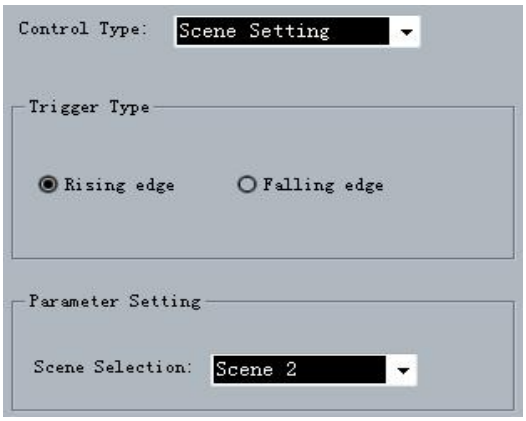
Drive relay: the relay can be used to control the alarm device, etc.



Settings ->Device settings ->Select GPIO channel (gpio-2 in this case) -> Set GPIO direction as "input":

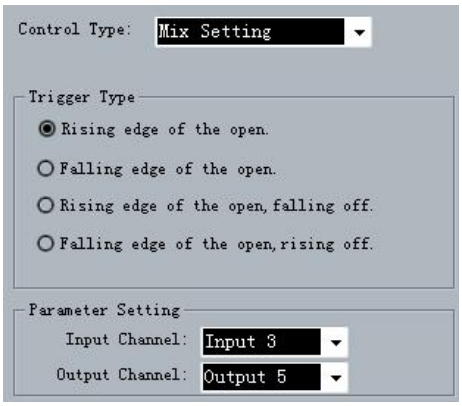


- **Scene Setting**



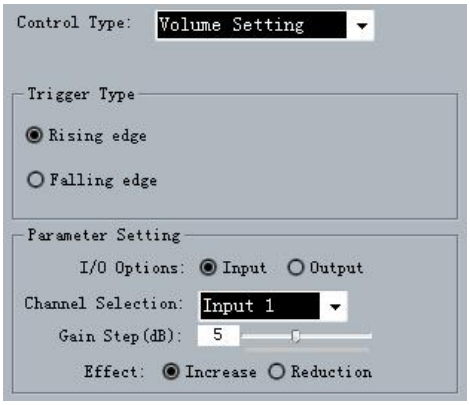
As is shown in the above chart, the audio matrix will load Scene 2 automatically when the level of GPIO input channel 2 is changed from low to high.

- **Mixer Setting**



When the GPIO Channel is input 2, the mixer setting should be selected as the Control Type. As is shown in the chart, when the level of GPIO input channel 2 is changed from low to high, the sound mixing contacts corresponding to input channel 3 and output channel 2 will be opened, and the signals of input channel 3 will be mixed and transmitted to output channel 2 and then the signals will be output. If the trigger type is trigger mode 4 (Falling edge of the open, rising off), the contacts corresponding to the input channel 3 and output channel 2 of the key sound mixer will be closed when electrical level of the pin of GPIO input channel 2 is changed from low to high.

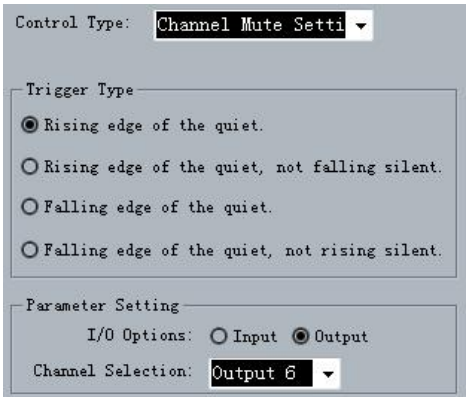
- **Volume Setting**



Input/output type refers to the input sound volume/output sound volume of the control system. Gain Step refers to the dB change corresponding to the step of the adjusted sound volume due to each trigger; and there are two effects, i.e. Increase and Decrease, which refers to the increased or decreased sound volume caused by each trigger.

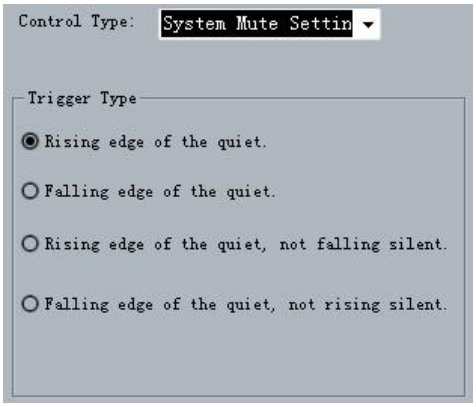
As is shown in the chart, the level of input channel 1 will be increased by 5 dB when electrical level of GPIO input channel2 is changed from low to high.

- **Channel Mute Setting**



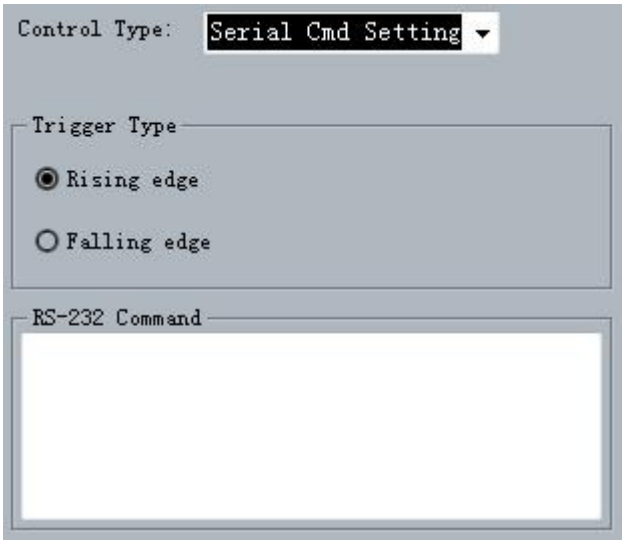
As is shown in the chart, output channel 3 is be muted when the level of the pin of GPIO input channel 2 is changed from low to high.

- **System Mute Setting**



As is shown in the chart, all the system output channels are muted when the level of GPIO input channel 5 is changed from low to high.

- **Serial Command Setting**



Parameter setting: input hexadecimal orders (0~9 and A~F). Two characters constitute one effective order, and if there is only one character, a 0 should be added before such bit, such as 03, 0A, etc. Bland space will be added after each two characters for the convenience of reading automatically by the interface. The blank spaces will be filtered off before the orders are transmitted, so the transmitted orders consist of successive hexadecimal characters.

As is shown in the above chart, the system will perform the hexadecimal order when the level of GPIO input channel 2is changed from low to high.

Notes: the input characters must hexadecimal characters, otherwise the order will not be approved, and such transmission will fail.