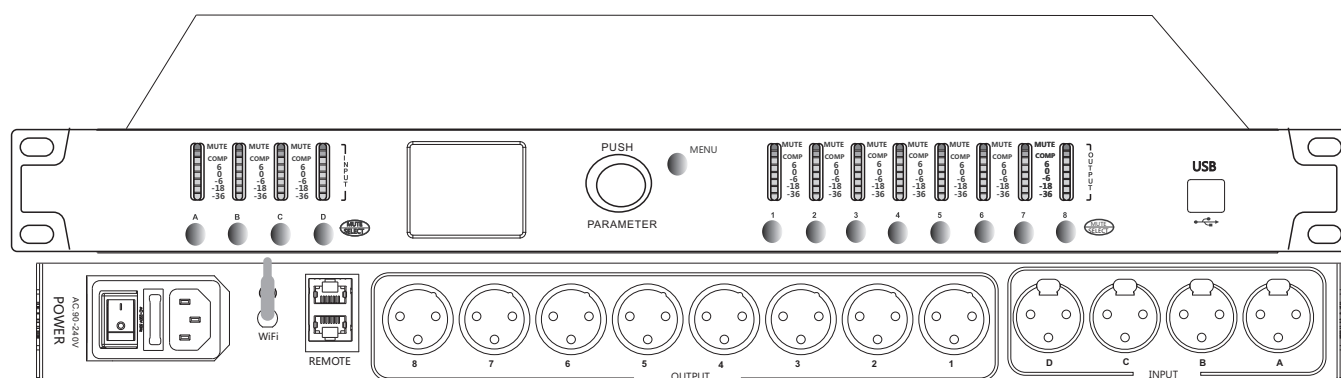


DIGITAL SPEAKER PROCESSOR

Owner's Manual



Catalogue

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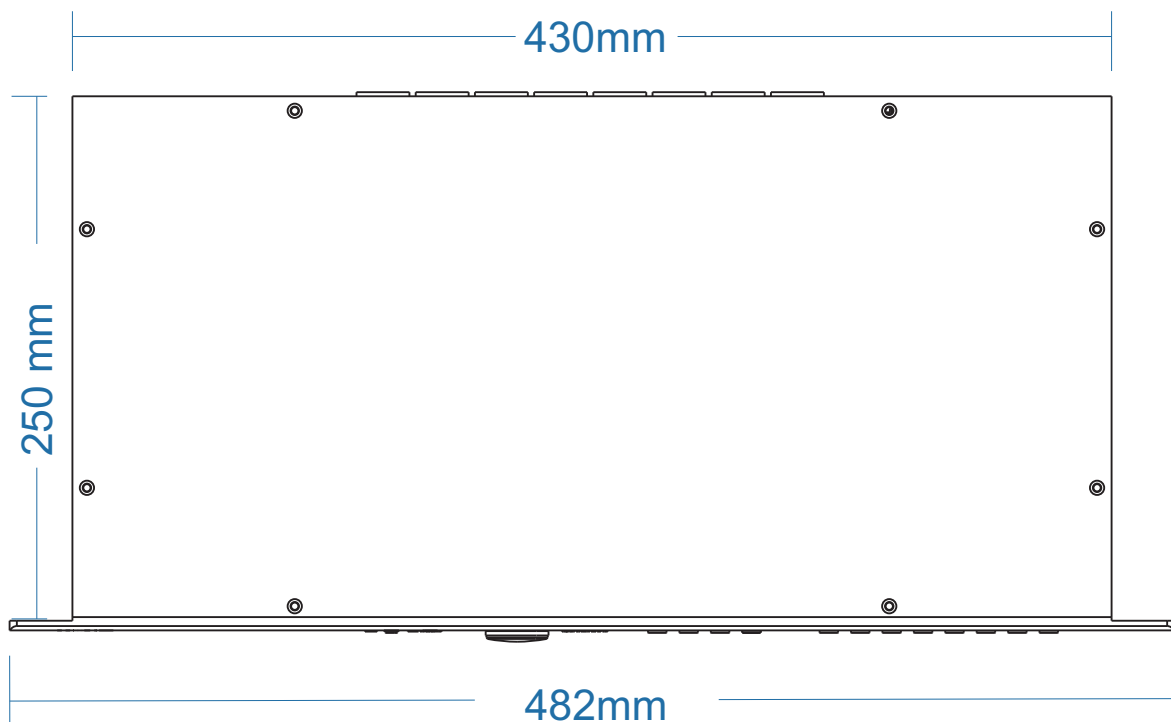
Features

This machine series adopts ADI's latest fourth generation SHARC processor ADSP 21489, with many conventional audio algorithms such as routing / gain / delay / compression / amplitude limiting / mute / equalization / high-low pass filter / all pass filter and phase.

In addition, the following personalized functions are added, and each function is completely closed or opened independently.

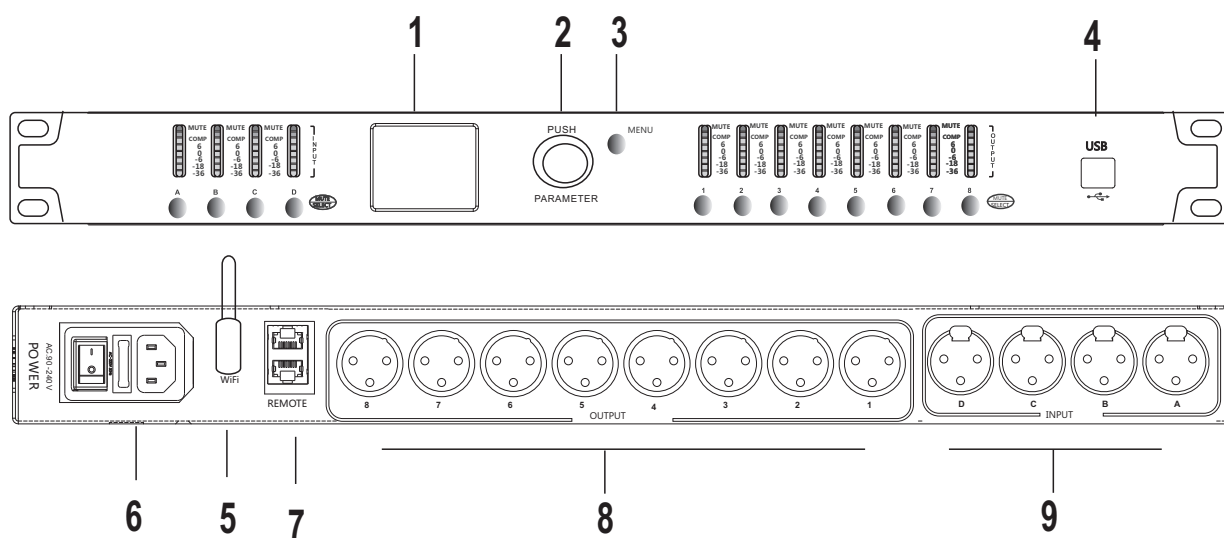
- A. 96KHz / 192KHz sampling rate switching, with both functions, brings more application scenarios.
- B. Dynamic equalizer is automatically optimized for large signal or small signal.
- C. FIR filter can perfectly correct the phase distortion caused by system parameter adjustment.
- D. The delay of each channel is up to 1200ms, and the precision is optimized to 0.01ms with the fine adjustment of sound field or phase.
- E. 4-way input and 8-way output, complete routing assignment, can be set to multiple working modes.
- F. Color LCD display, real-time dynamic level display, Chinese and English interface optional.
- G. One key mute and global total volume control.
- H. Equipped with WiFi / RS485 central control and drive free USB control interface, which can be adjusted by the control software at the PC.

Structure Size



Front and rear panel description

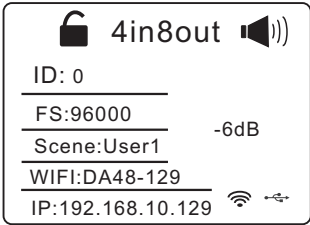
Front and rear panel interface



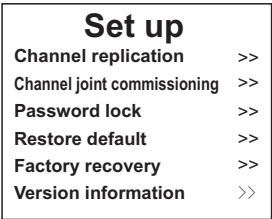
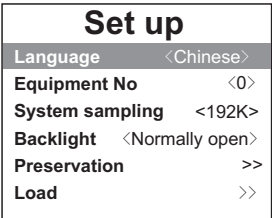
- ① LCD
- ② The editing knob is normally volume and mute control. After entering the menu, you can select items and parameter settings by pressing the button
- ③ Menu entry / exit key
- ④ USB online interface
- ⑤ External WiFi controller can be plugged Online (Password: 12345678)
- ⑥ Power input and switch
- ⑦ Rs485 central control interface
- ⑧ Signal output port
- ⑨ Signal input balance port

System settings

Press the menu key to pop up menu options and rotate the encoder to system options.



Press the encoder again to enter the system function setting



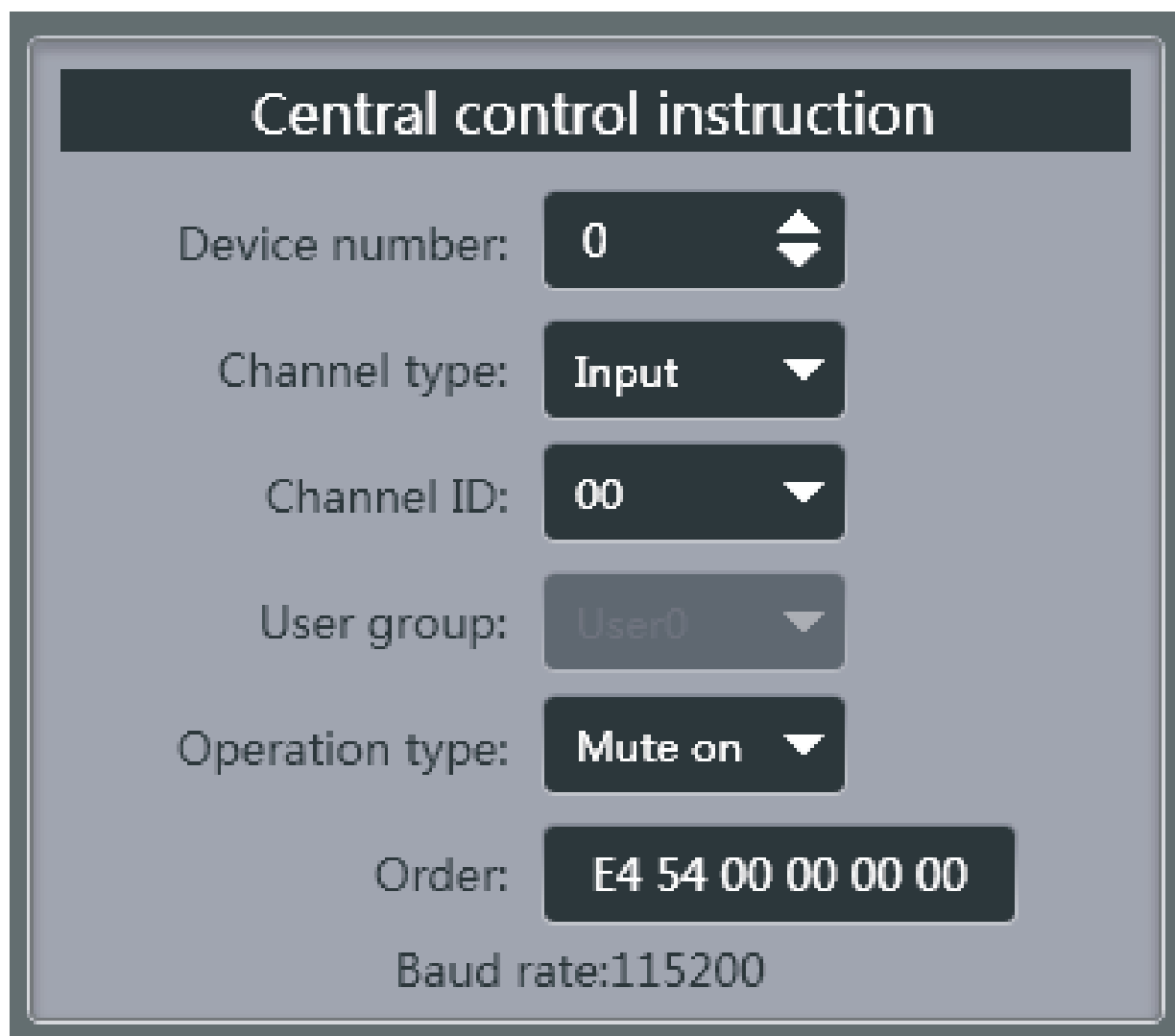
The rotary encoder selects each sub item of the extended function, and after confirmation, the rotary encoder can continue to set the parameters of each sub item.

The language can be set to Chinese or English display globally;
The device number setting is different from the device ID selection suitable for the central control RS485;
System sampling rate: select the current sampling rate of the machine, which can only be set by the machine;
The backlight can set the on-off time of the display screen;
Saving and loading are the memory and call of system parameter settings;
Restore default: only one default value of data is restored;
Factory recovery includes initialization of data and system settings;
The password lock can be used to lock the functions of panel operation. The default value is 0000. After locking, it can only be used for this machine
Volume adjustment and mute control;

After the system is set, press the menu key to return to the previous menu or exit completely

System settings

The machine supports RS485 central control operation. Connect the RS485 interface of the machine, open the PC software, generate the central control command, copy the command to the central control machine, and then control the machine.



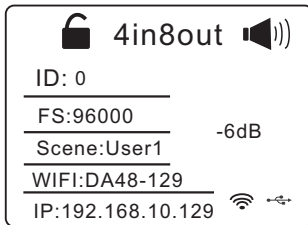
The image shows a software interface titled "Central control instruction". It contains several input fields and buttons for configuring RS485 control:

- Device number:** A numeric input field with the value "0" and a vertical double-headed arrow button to its right.
- Channel type:** A dropdown menu with "Input" selected and a downward arrow button.
- Channel ID:** A numeric input field with the value "00" and a downward arrow button.
- User group:** A dropdown menu with "User0" selected and a downward arrow button.
- Operation type:** A dropdown menu with "Mute on" selected and a downward arrow button.
- Order:** A text input field containing the hexadecimal command "E4 54 00 00 00 00".
- Baud rate:** A text label showing "115200".

In the central control or PC online state, the volume knob of the machine can control the volume or mute of the machine. The display screen can display the adjusted volume parameters or LEDs, and can also be used as corresponding indication reference. The volume setting is automatically saved in real time.

Mix settings

Press the menu key to pop up menu options, rotary encoder to mixing options.



Press the encoder again. The horizontal direction is the output channel and the vertical direction is the input channel. Select which channel the output channel needs to be input. The figure shows the default factory setting, which is:

The input A channel signal is allocated to the output 12 channels

The input B channel signal is allocated to the output 34 channels

The input C channel signal is allocated to the output 56 channels

The input D channel signal is allocated to the output 78 channels

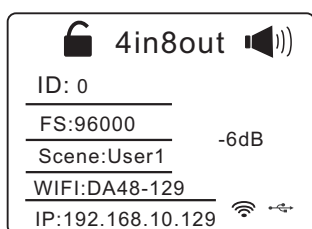
		Output							
		1	2	3	4	5	6	7	8
Input	A	■	■	□	□	□	□	□	□
	B	□	□	■	■	□	□	□	□
	C	□	□	□	□	■	■	□	□
	D	□	□	□	□	□	■	■	■

After the channel selection is configured, press the menu key to exit the setting, and then enter the system menu or PC to save.

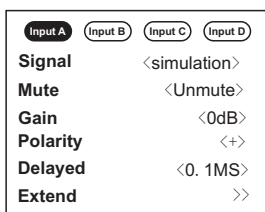
Input channel settings

At 96KHz sampling rate, the local algorithm module has the following advantages with respect to each input channel and each output channel:It is the same.At the sampling rate of 192Khz, the FIR filter is deleted fromthe output 7-8 channels.

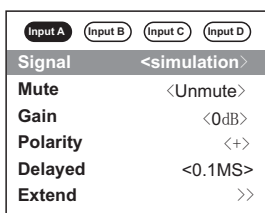
Press the menu key to pop up menu options and rotate the encoder to the input options.



Press the encoder again to enter the input channel selection. The rotary encoder selects an input channel to be set. Press again to enter the function setting of the input channel. Take channel a as an example:



Press the encoder again to enter the signal source selection of the input channel by default. Select a function option to be set by the rotary encoder. Press the encoder again to enter the parameter setting of the function:



The signal source can be an external analog signal input or an internal signal generator (pink noise / white noise / sine wave). As for the frequency and amplitude, it needs to be operated at the PC.

Mute: you can select mute / non mute.

The adjustable range of gain is: - 80dB to + 12dB in steps of 0.1dB.

Polarity adjustable range: 0 ° and 180 °.

The expansion /equalizer / dynamic equalizer has its own adjustment page, as follows:

Input channel settings

Rotate the encoder to the expansion option, press the encoder to enter the expansion function setting:

Extend	
Extended functions	<off>
Start time	<3ms>
Release time:	<100ms>
Extended threshold	<-100dBu>
Ratio	<1.01:1>
Sign out	

The rotary encoder selects each sub item of the extended function, and after confirmation, the rotary encoder can continue to set the parameters of each sub item.

Rotate the encoder to the equalizer option, press the encoder to enter the equalization function setting:

Input A	Input B	Input C	Input D
Equalizer			
Dynamic equalization1	>>		
Dynamic equalization2	>>		
Dynamic equalization3	>>		
Sign out	>>		

The rotary encoder selects each sub item of equalizer function, and after confirmation, the rotary encoder can continue to set the parameters of each sub item.

Equilibrium			
Function	Sign out	Reset	
EQ1	Freq	Q	Gain
	33	28.85	0.0
Eq2	Freq	Q	Gain
	57	28.85	0.0

1. Each channel has 12 sections of EQ that can be adjusted, and the type can be selected as parameter / high / low rack / all pass filter

2. Frequency: 20–20KHz (optional)

3. Q value range: 28.85–0.404

4. Gain range: 20dB, 0.1 step

Rotate the encoder to the dynamic equalizer option, press the encoder to enter the dynamic equalizer function setting:

Input A	Input B	Input C	Input D
Equalizer			
Dynamic equalization1	>>		
Dynamic equalization2	>>		
Dynamic equalization3	>>		
Sign out	>>		

The rotary encoder selects each sub item of the dynamic equalizer function, and after confirmation, the rotary encoder can continue to set the parameters of each sub item.

DEQ1	
DEQfunction	<off>
DEQtype	<EQ>
DEQQ value	<28.85>
DEQgain	<0.0dB>
DEQfrequency	<20Hz>
Start time	<3ms>

1. DEQ type: optional parameter / high and low rack

2. DEQ startup can be set to be higher than the threshold level or lower than the threshold level

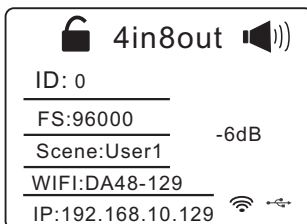
DEQ1	
Release time	<50ms>
Ratio	<2.00:1>
Boot threshold	<20.0BdU>
Sign out	

After setting, press the menu key to return to the previous menu in turn, including complete exit.

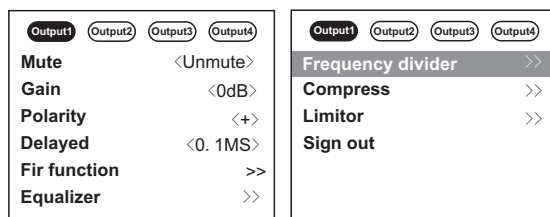
Output channel settings

Compared with the input channel, the output channel adds the high-low pass frequency division / FIR filter / compression / voltage limit algorithm and reduces the dynamic equalizer. Therefore, this section only describes the high-low pass / FIR filter / compression / voltage limit menu as follows, and the operation modes are the same

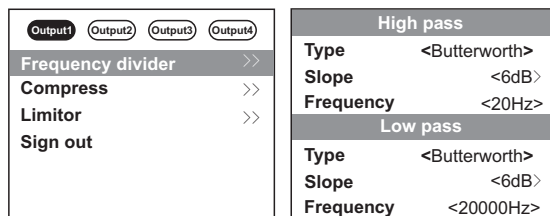
Press the menu key to pop up menu options and rotate the encoder to output options.



Press the encoder again to enter the output channel selection. Select an output channel to be set by the rotary encoder and press again to enter the function setting of the output channel. Take channel 1 as an example:

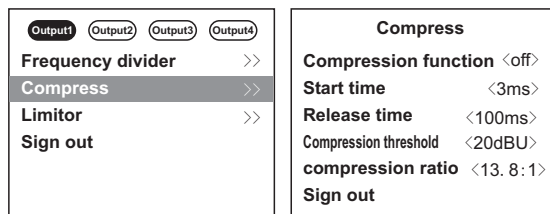


Frequency divider menu:



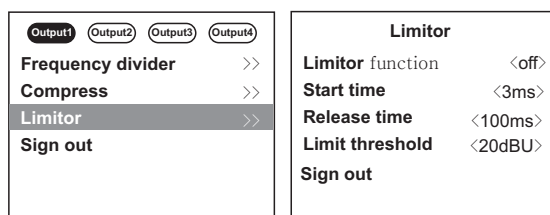
1. Filter type: Butterworth, Bessel and Ningke
2. Filter slope: 6dB / 12dB / 18db / 24dB / 30dB / 36dB/42dB/48dB

Compressor menu:



1. Set the output compression start control level of this channel
2. Set startup and recovery time
3. Set appropriate compression ratio

Pressure limiter menu:



1. Set the output limit level of this channel
2. Set startup and recovery time
3. The default is RMS voltage, and the peak voltage can be selected at PC end

Output channel settings

Fir menu:

Output1	Output2	Output3	Output4
Mute	<Unmute>		
Gain	<0dB>		
Polarity	<+>		
Delayed	<0.1MS>		
FIRfunction	>>		
Equalizer	>>		

FIR	
FIRfunction	<off>
FIRtype	<FIRLow pass>
Window type	<KAISER>
Frequency 1	<20Hz>
Beta value	<0.00>
Sign out	

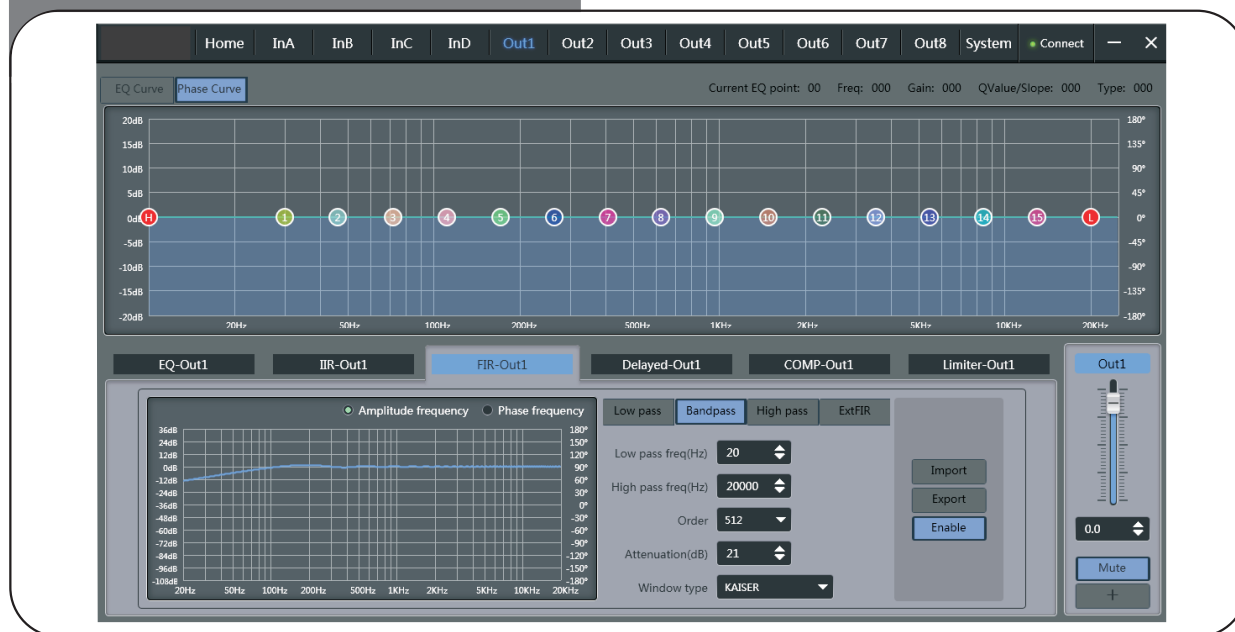
This machine can only set the type of fir as high-low pass and band-pass. If the external coefficient needs to be imported, it needs to be operated by PC.



Online settings

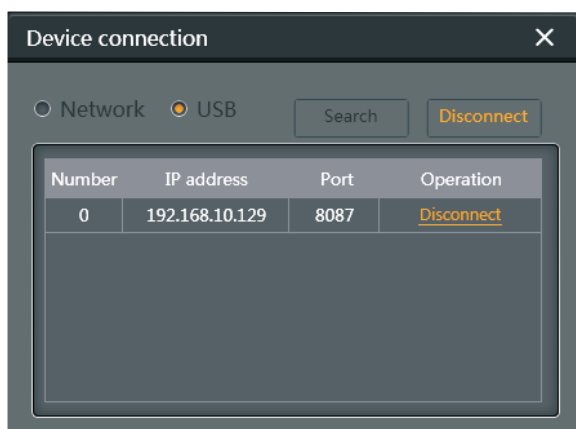
The machine is equipped with PC side control software, which can control the machine remotely through WiFi / RS485 / USB port, and the PC side operation is more intuitive and fast.

PC control interface



Online interface

Open the software and click the [not connected] button in the upper right corner to pop up the online option.



- USB port can be selected for connection. The port does not need to be driven and is plug and play.
- WiFi connection: it is suitable for places where laptops are used. Use the wireless network card of laptops to search for the WiFi of the local machine, select the network connection, and find the IP of the local machine. Then click to connect the device online to avoid the cumbersome wired.

After the connection is successful, the [not connected] button will change to , and the data of this machine will be uploaded to the PC synchronously.

At this time, only the total volume or mute of this machine panel can be controlled.

Functional indicators

Technical Parameter

Specifications	Parameter
Frequency response	$\pm 0.2\text{dB}$ 10Hz-25kHz
THD+ N	$< 0.005\%$ @ 10Hz-25KHz
SNR	$> 118\text{dB}$ at 1% THD+ N 10Hz-25KHz
Maximum input level	+ 20dBu / 7.775Vrms
Maximum output level	+ 20dBu / 7.775Vrms
Gain range	- 80dB to + 12dB per channel
Input impedance	$> 10\text{K ohm}$. XLR input
Output impedance	$< 60\text{ ohms}$. XLR output
test signal	Independent sine wave / white noise / pink noise for each channel is optional.
Input equalization	12 sections (parameter / high / low rack / all pass) + 3 sections dynamic equalization
Extender	Threshold / ratio / start time / recovery time adjustable
High pass type	Ningke / Bessel / Bart 6 / 12 / 18 / 24 / 30 / 36 / 42 / 48
Low pass type	Ningke / Bessel / Bart 6 / 12 / 18 / 24 / 30 / 36 / 42 / 48
Adjustable delay	1200ms / accuracy 0.01ms for each channel
Group delay	2.8ms@96KHz / 1.2ms@192KHZ
Output equalization	16 segments per channel, supporting parameters / high / low frame / all pass filter
Output FIR	Low pass / high pass / band pass direct setting, coefficient support import / export
DRC dynamic control	Clipping (peak or RMS value) + compression
Volume / mute control	Direct panel knob, total volume and mute control
Phase control	Input / output: 0 / 180 degree flip per channel
Online control	Three online modes of USB / WiFi / RS485 central control
Level meter	Dynamic indication of display level
Power range	85V-260V 50Hz-60Hz
weight	Net weight: 3.6kg, gross weight: 5.2kg
Overall dimensions	(46 x 482 x 250mm), excluding interface

The product performance is constantly improved,
and the above specifications may be changed.

System flow

The following figure shows the signal flow and algorithm composition of the machine. Figure 1 shows the online status of the Chinese interface and Figure 2 shows the online status of the English interface.

