

# DIGITAL MATRIX PROCESSOR

## USER' S MANUAL



Thank you for purchasing our products.  
Please read the owner' s manual thoroughly prior to using the system.  
Please keep the manual for future reference.

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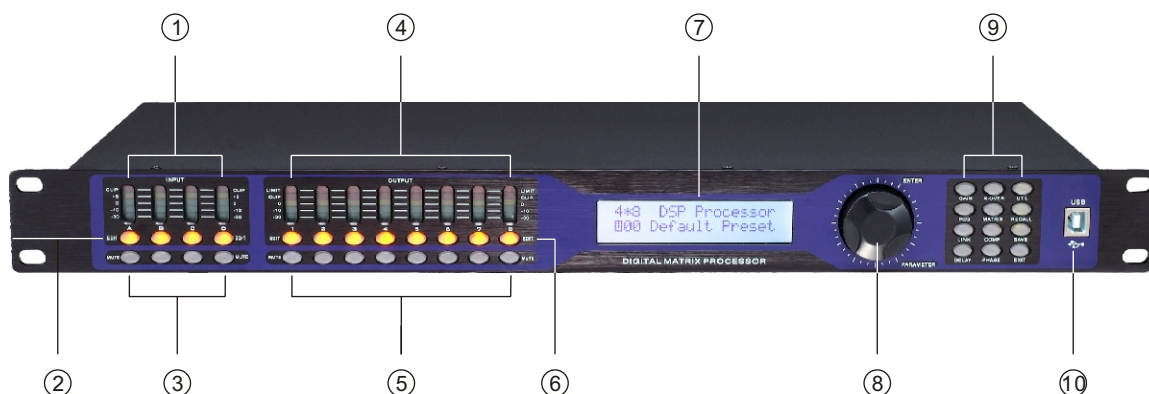
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## FUNCTIONS

- 96kHz sampling rate, 40-bit DSP processor, 24-bit AD/DA convertor.
- Input processing includes Gain, Mute, Link, High-cut, Low-cut, Noise gate, 8PEQ, 31 segment graphic equalizer, Phase, Delay.
- Output processing includes Crossover, 5PEQ, Gain, Mute, Compressor/Limiter, Phase, Delay, Link.
- Every input and output can do matrix assign freely.
- Adjustable PEQ frequency, Gain and Bandwidth, the gain step is 0.1dB, we can choose style: Peak, H-shelf, L-shelf, LP-6dB, LP-12dB, HP-6dB, HP-12dB, ALLPASS1, ALLPASS2.
- The style of all High-cut, Low-cut filter and Distributor Unit: Butterworth, Linkwitz- Riley, Bessel, Slope is-6dB/oct ~-48dB/oct.
- Adjustable compressor/limiter threshold, soft knee, ratio, attack time and release time. Noise gate's threshold, hold time, attack time and release time can be adjustment.
- The parameters of input and output adjusting are linkable, revisable input and output channels.
- All delay module's delay time can reach over 680ms the step is: 0.021ms.
- Parameter setting of each channel can copy freely, build-in signal generator.
- Input and Output on the front panel are equipped with 5-segment high precision level indicators, key indicators, security protection function.
- 20 user preset, 1 factory preset, device parameter and single preset file can save in computer; it also can download from computer and save in the device. The device itself can store multiple preset parameters and recall freely. With PC software, one-key online made the operation more convenient.
- USB and RS232 controlling ports, Online remote control and 255 units linkable through Rs485, and also can realize wired and wireless connection controlled in long distant through port.

## FRONT PANEL



### 1, Input Level Indicators

5-segment high precision LED show the situation of current input channel's level.

### 2, Input Edit Keys

Press to enter into relevant channel, parameters will show on the edit key and LCD.

### 3, Input Mute Keys

Mute channel by pressing and exit by pressing again.

### 4, Output Level Indicators

4-segment high precision LED and 1 compressor signal LED shows the status of output level and compressor on current channel.

### 5, Output Mute Keys

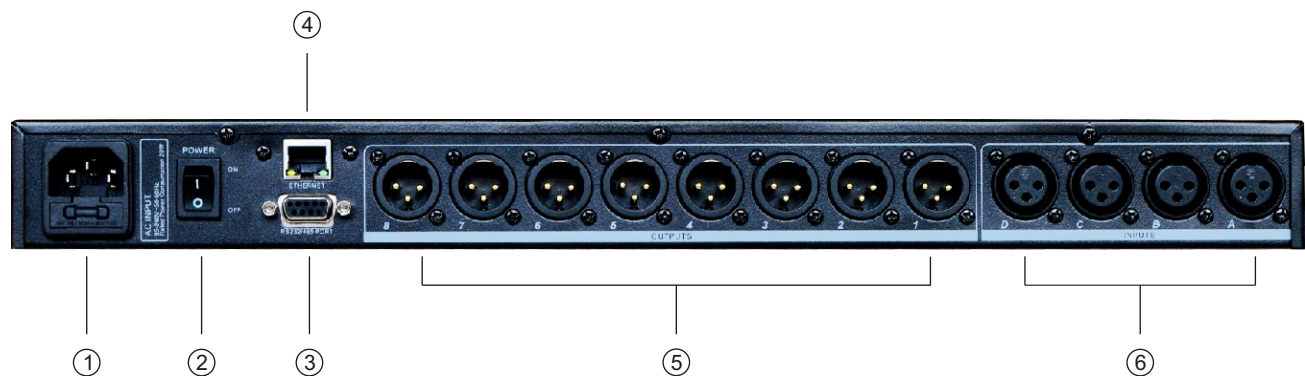
Mute channel by pressing and exit by pressing again.

### 6, Output Edit Keys

Press to enter into relevant channel edit status parameter will show on the edit, Key and LCD.

- 7, LCD  
Show all the related operation parameter and status of current operation.
- 8, Parameter Edit Knob  
Edit the whole menu and parameter setting confirm by press.
- 9, Parameter edit keys  
Choose all the system menu/input parameter/output parameter, exit by pressing "exit" key.
- 10, USB  
Used to connect with PC and center-control equipment, remote control.

REAR PANEL



- 1, Power Socket  
The voltage is 95V-250V.
- 2, Power on/off Switch
- 3, RS232/485 interface  
Center-control by RS232, cascade control by RS485.
- 4, Ethernet control interface, achieve long-distance control by wire or WIFI
- 5, Output interface  
Male XLR balanced output 1-8.
- 6, Signal input interface  
Female XLR balanced input A-D.

OPERATION GUIDANCE

| Below status after power on:        |  |
|-------------------------------------|--|
| 4*8II DSP Processor<br>Version 1.0  | Power on, show brand, model and version.   |
| DSP Processor<br>F00 Default Preset | After self-check, show brand, model and current user preset.   |
|                                     | Press UTIL key, enter below setting status   |
| ID Number Select<br>ID 1            | Press the first time, enter ID number setting: the ID number of the units, should be different when cas cade connection, the setting scale is1-254. (If cas cade connection units are over 16 or long distance, a loaded 120 ohms resistance should be parallel connected by RS 485. |

|   |  |
|---|--|
| Manual IP Setting<br>192.168.1.101                | Press the second time, enter IP address setting: factory default is 192.168.1.101, users can set different IP address for each device for different applications.  |
| Unit Lock<br>Password 1234                        | Press the third time, enter password setting: users can choose all the words or numbers to set the password they want, the initial password is 1234.   |
| Input Source Select<br>Analog Input               | Press the fourth time, enter signal source selection: pink noise, white noise and sine wave 20Hz-20kHz.  |
| Copy channel select<br>InA ► InB                  | Press the fifth time, enter copy channel selection: input or output channel can copy freely.   |
| Delay Units Select<br>ms                          | Press the sixth time, enter delay unit setting: ms, m, ft can be chosen.   |
| Press RECALL/SAVE key, enter below setting status |  |
| Load preset<br>F00 Default Preset                 | Press RECALL key, enter preset transfer. Users can transfer the saved Settings U01-U20 and the initial setting F00.  |
| Store preset<br>U01 Default Preset                | Press SAVE key, enter preset save. Users can save the adjust status in U01-U20.  |
| Press INPUT EDIT enter the settings as follows    |  |
| INA<br>GAIN -60.0dB                               | Default preferred option is gain the scale is -60dB-+12dB.   |
| PEQ:1 F: 50.7 Q:3.00<br>G: 0.0dB PEAK ON          | Press PEQ/GEQ enter PEQ parameter setting PEQ current filter number is 8, the scale of "F" is 20Hz-20kHz, "Q" is 0.4-128, "G" is -12dB- +12dB, the style of filter are Peak, Low-shelf, High-shelf, Low-cut, High-cut, Allpass1, Allpass2, Bypass(ON/OFF). |
| GEQ:1 Freq: 20.0Hz<br>GAIN: 50.0dB                | Press the second time "PEQ/GEQ" key, enter Graphic Equalizer parameter setting interface: 31 GEQ in each input channel. Freq adjustment scale is 20Hz-20kHz, GAIN adjustment scale is -12dB---+12dB.   |
| INLINK<br>A: ✓ B: X C: X ID: X                    | Press "LINK", enter linking adjustment selection: If the current channel is INA, you can choose INB, INC, IND channel to adjust parameter simultaneously, together.  |
| INA<br>DELAY 0.000ms                              | Press "DELAY", enter delay parameter setting: the scale is 0-680mS, 0-234m, 0-766ft.   |
| HP: 19.6 BYPASS<br>LP: 20K15 BYPASS               | Press "X-OVER" enter low-high pass parameter setting, the scale of the "HP" is 20Hz -20kHz, "LP" is 20Hz -20kHz, 3 different slanting rate for low/ high pass filter Butterworth, Bessel, Linkwitz-Riley, Slanting rate is -6dB--48dB.                     |
| GATE T: -90.0 HT: 100<br>AT: 1ms RT: 100ms        | Press "COMP/GATE" key, enter Input channel noise gate parameter interface: noise gate threshold "T" scale is -90-0dB, hold time "HT" adjustment scale is 10-999ms, attached time "AT" scale is 1-999ms, release time "RT" scale is 10-3000ms.              |
| INA<br>PHASE 0                                    | Press "PHASE", enter phasic adjust setting, adjustment scale is (0/180).   |

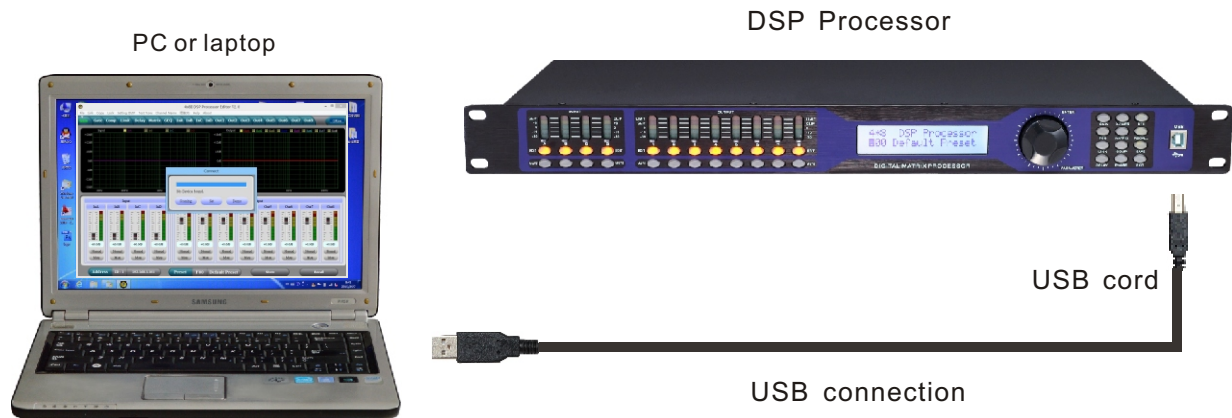
| Press OUTPUT EDIT enter the settings as follow  |   |
|---|---|
| OUT1<br>GAIN            +0.0dB                  | Default preferred option is gain, the scale is- 60dB--12dB.   |
| PEQ: 1 F: 40.2 Q: 3.00<br>G: 0.0dB      PEAK ON | Press "PEQ", enter PEQ PARAMETER SETTING: "PEQ" current number is 9, the scale of "F" is 20Hz-20kHz, "Q" is 0. 4-128 "G" is -12dB- +12dB, the style of filter are Peak, Low-shelf, High-shelf, High-cut, Low-cut, Allpass1, Allpass2, Bypass(ON/OFF). |
| OUTLINK 1:√ 2:X 3:X<br>4:X 5:X 6:X 7:X 8:X      | Press "LINK", enter linking adjustment selection: if the current channel is "OUT1", you can choose OUT2, OUT3, OUT4, OUT5, OUT6, OUT7, OUT8 channel to adjust parameter simultaneously.   |
| OUT1<br>DEALY          0.000ms                  | Press "DELAY" enter delay parameter setting: the scale is 0-680mS, 0-234m, 0-766ft .  |
| HP: 19.6      BYPASS<br>LP: 20K15    BYPASS     | Press "X-OVER" enter low-high pass parameter setting: the scale of "HP" is 20Hz-20kHz, "LP" is 20Hz- 20kHz, 3 different slanting rate for low/high pass filter: Butterworth, Bessel, Linkwitz-Riley, Slanting rate is -6dB--48dB.                     |
| OUT1 MATRIX SELECT<br>A:√ B:X C:X D:X           | Press "MATRIX" enter matrix setting, all the output channel can choose one or several input signal freely.  |
| OUT1 A: +0.0 B: +0.0<br>MIX C: +0.0 D: +0.0     | Press the second time "MATRIX" key, enter matrix route output gain interface: factory default is 0dB, adjustment scale is -60dB-0dB.  |
| COMP TH: +20.0 R: 1.0<br>K: 0dB A: 50 RT: 1500  | Press "COMP/GATE" enter compressor setting: the scale of threshold is -60dB~ +12dB, startup time is 1-999ms, attached time is 10-3000ms, ratio is 1:1, 1:10-LIMIT.  |
| LIMIT TH: +20.0dB<br>AT: 50ms RT: 500ms         | Press the second time "COMP/GATE" key enter peak limiter parameter interface: threshold "T" adjustment scale is -90dB-+20dB, attached time "AT" adjustment scale is 1-999ms, release time "RT" adjustment scale is 10-3000ms.                         |
| OUT1<br>PHASE            0                      | Press "PHASE" enter phase parameter setting: the scale is 0/180.  |



## PC SOFTWARE

**Notice:** User manual, PC software are on the attached CD, due to the software upgrades time by time, Please do control your DSP processor ONLY by this CD!

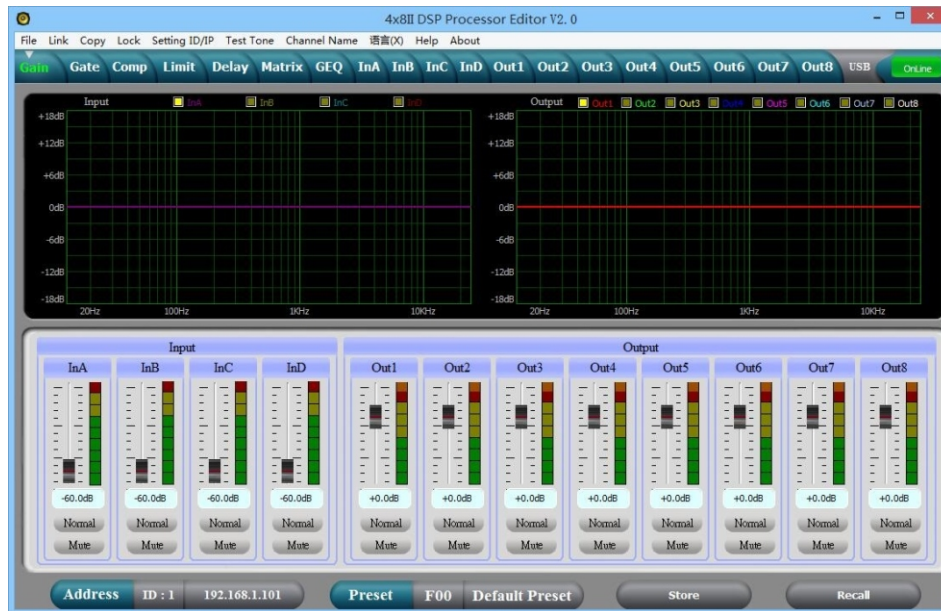
### USB connection steps



- 1, Click the PC software on the CD, press next step to continue according to the instruction until Finish setup, then exit.



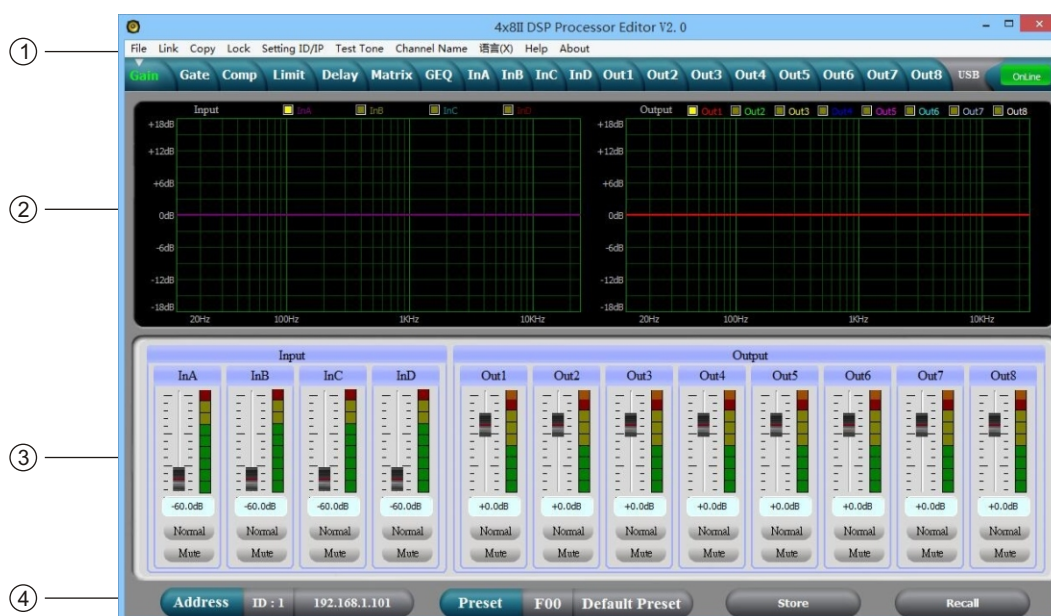
- 2, Connect the processor to the computer by USB, after turning on the device, the computer will Searching new hardware automatically, during setup new hardware there will show the. Warnings: hardware setup success and can be used.
- 3, Open PC controlling software, PC software will find USB and connect device, after that the on-Line key change into green at the top right corner and show "Online", you can operate the Processor by controlling software, Click "Online" button before exit.





## PC SOFTWARE SPECIFICATIONS

### THE FIRST: VOLUME CONTROL INTERFACE



#### 1, Menu

|               |  |
|---------------|--|
| File          | Open and save preset parameter, the whole date upload to the computer and download to the device.                                    |
| Link          | Input and output channels can be set freely to adjust all of the parameters.   |
| Copy          | Parameter copy freely between the input and Output channels.   |
| Lock          | Setting password of the panel to ensure the safety of the device.  |
| Setting ID/IP | To cascade control more than 254 device by setting different ID, Setting ID/IP address for Long- distance and wireless WIFI control. |
| Test Tone     | Buid-in signal generator, outputting pink noise, white noise and sine wave.  |
| Channel Name  | The whole channel name are revisable.  |
| Language      | Chinese and English menu is switchable.  |
| Help          | RS232 control protocol codes for reference.  |

#### 2, Spectrum Area:

You can choose PEQ and phase freely which show the input and output channels.

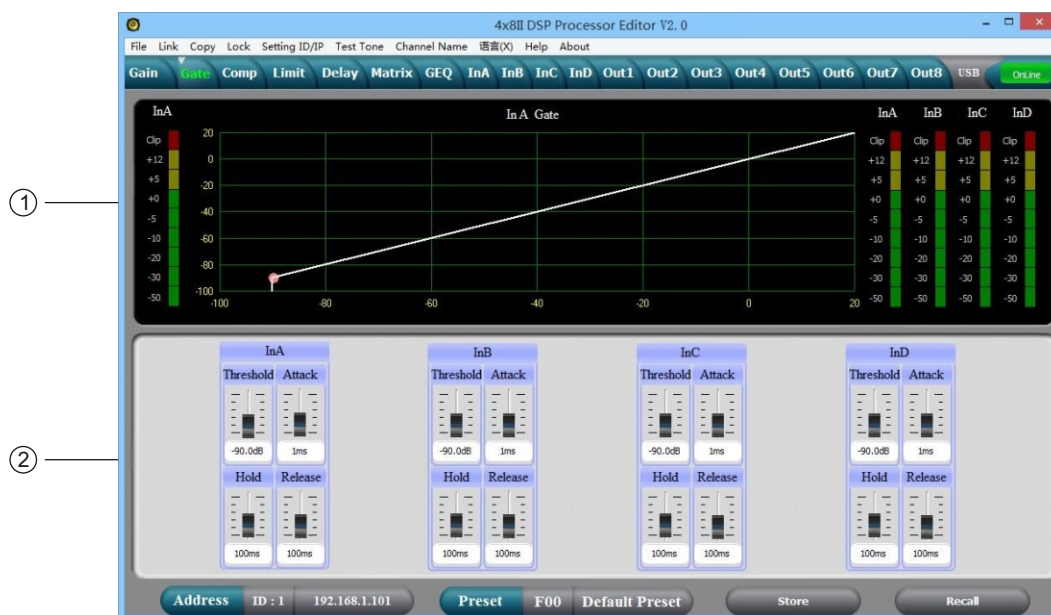
#### 3, The Volume Control Area:

Gain, Phase, Mute control for all input & output channels.

#### 4, Preset Operation Area:

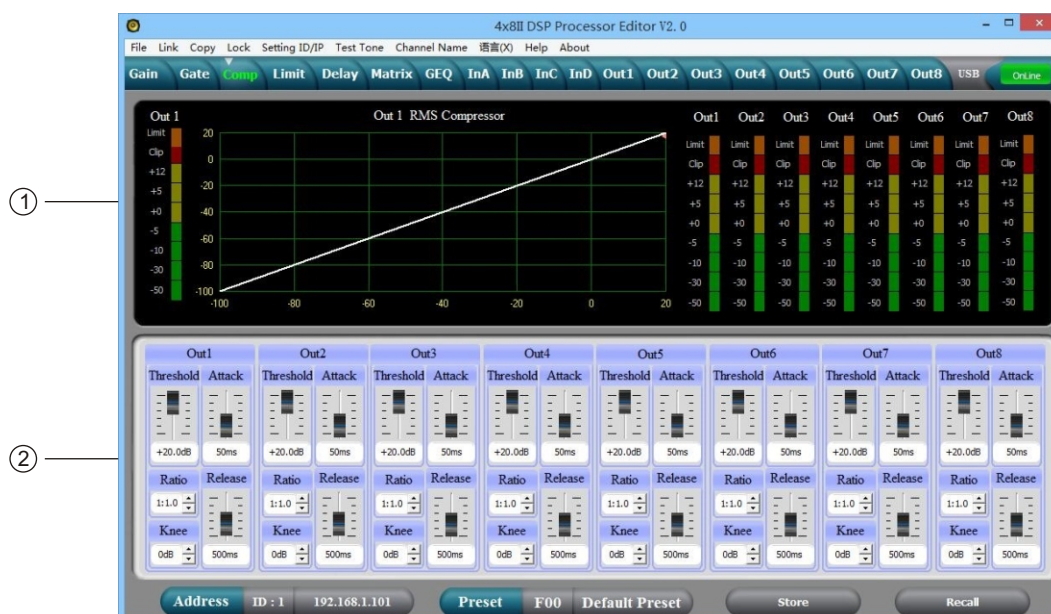
Save or convert preset parameter and show current preset parameter status.

## THE SECOND: NOISE GATE INTERFACE



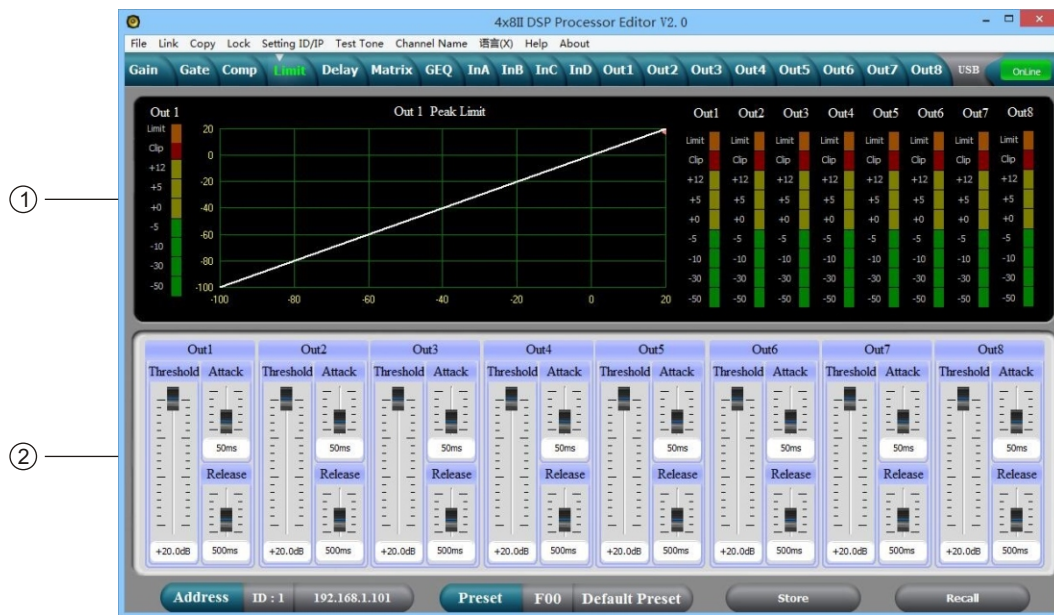
- 1, display the current noise gate status curve and input channels level indicators.
- 2, all input channels noise gate parameters can be set. Noise gate threshold(-60~0dB), attach time(1~999ms), hold time(10~999ms), release time(10~3000ms) can be adjustable continuously for input.

## THE THIRD: COMPRESSOR INTERFACE



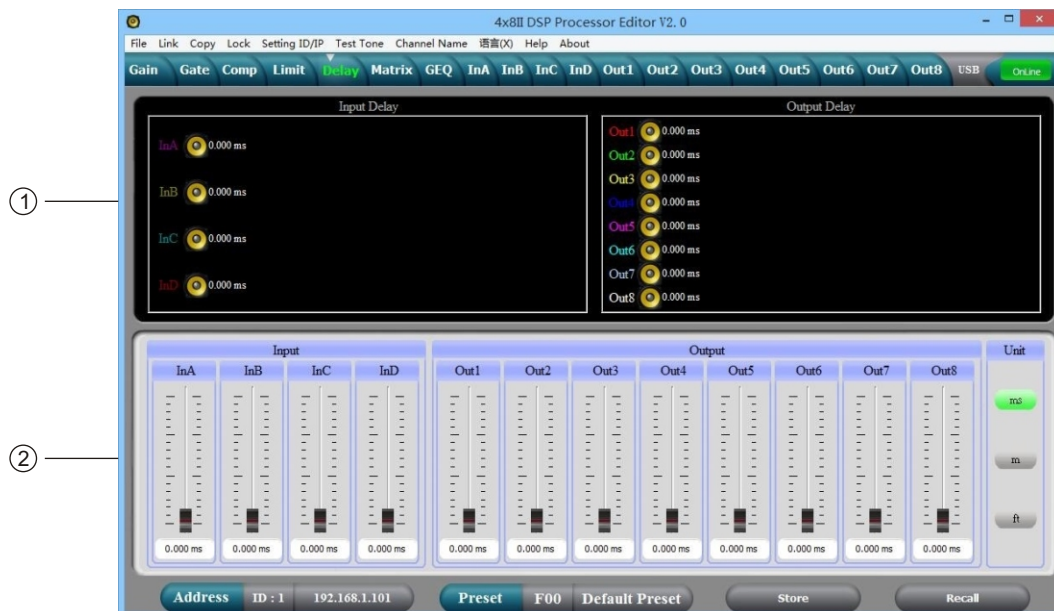
- 1, Show compression status, level indicators and impression status of all channels.
- 2, Set the whole compression parameters for output channel, the compression range is -60dB~+20dB, soft knee adjustment is 0dB~+12dB, rate is 1:1, 1:10, LIMIT, start time is: 1-999ms, recovery time is 10-3000ms.

## THE FOURTH: LIMIT INTERFACE



- 1, Show compression status, level indicators and impression status of all channels.
- 2, Set the whole compression parameters for output channel, the compression range is -60dB–+20dB, soft knee adjustment is 0dB–+12dB, rate is 1:1, 1:10, LIMIT, start time is: 1-999ms, recovery time is 10-3000ms.

## THE FIFTH: DELAY INTERFACE



- 1, Show the delay parameter status of all channels.
- 2, Can adjust delay parameter of all channels, the scale is 0-680ms, there are millisecond, meter and feet units for converting.

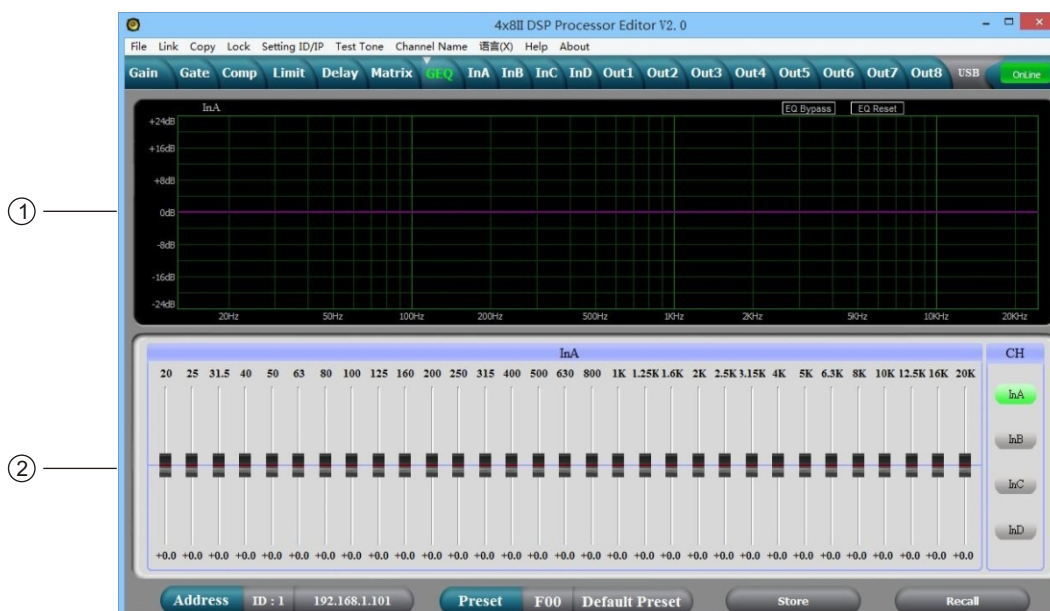


## THE SIXTH: MATRIX INTERFACE



- 1, Show connections of the device, users can enter and edit relevant channel by clicking the square , every channel name is revisable.
- 2, All output channels can choose any input channels, and each route channel volume can be set alone.

## THE : SEVENTH: GEQ INTERFACE



1. Display current channel GEQ curve status. When mouse pitching on the pushrod, the point of GEQ curve will display the parameters.
2. Adjust the current channel 31 segment graphic equalizer parameter, select INA, INB, INC, IND key on the right can enter different input channel interface.

## THE EIGHTH: INPUT INTERFACE



- 1, Select "Mag" interface, you can adjust the PEQ, High-cut, Low-Cut of the input channel, select "PHASE" interface, you can adjust the current phase channel, also you can choose the non-current PEQ and phase curve to show in sync.
- 2, Adjustable Gain, Mute, Q, Frequency, Type of all PEQ, Bypass key is optional, we can choose PEQ style: Balance, High-shelf, Low-shelf, High-cut, Low-cut, Phase 180°, Phase 360°.
- 3, The Gain, Q, Frequency of PEQ can be adjusted by putter, and can be controlled by pressing the UP, DOWN, LEFT, RIGHT key on the keyboard.
- 4, Low-cut frequency 20HZ-20KHZ is adjustable, you can choose slope rate: Butterworth, Bessel, Linkwitz-Riley, the scale is: -6dB-- -48dB.
- 5, High-cut frequency 20HZ-20KHZ is adjustable, you can choose slope rate: Butterworth, Bessel, Linkwitz-Riley, the scale is: -6dB-- -48dB.
- 6, The Gain, Mute, Phase of the input channel can control separately, as same as the level display Light.

## THE NINTH: OUTPUT INTERFACE



1. Select "Mag" interface, you can adjust the PEQ, High-cut, Low-Cut of the output channel, select "PHASE" interface, you can adjust the current phase channel, also you can choose the non-current PEQ and phase curve to show in sync.
2. Adjustable Gain, Mute, Q, Frequency, Type of all PEQ, Bypass key is optional, we can choose PEQ style: Balance, High-shelf, Low-shelf, High-cut, Low-cut, Phase 180°, Phase 360°.
3. The Gain, Q, Frequency of PEQ can be adjusted by putter, and can be controlled by pressing the UP, DOWN, LEFT, RIGHT key on the keyboard.
4. Low-cut frequency 20HZ-20KHZ is adjustable, you can choose slope rate: Butterworth, Bessel, Linkwitz-Riley, the scale is: -6dB-- -48dB.
5. High-cut frequency 20HZ-20KHZ is adjustable, you can choose slope rate: Butterworth, Bessel, Linkwitz-Riley, the scale is: -6dB-- -48dB.
6. The Gain, Mute, Phase of the output channel can control separately, as same as the level display light.



## SPECIFICATION

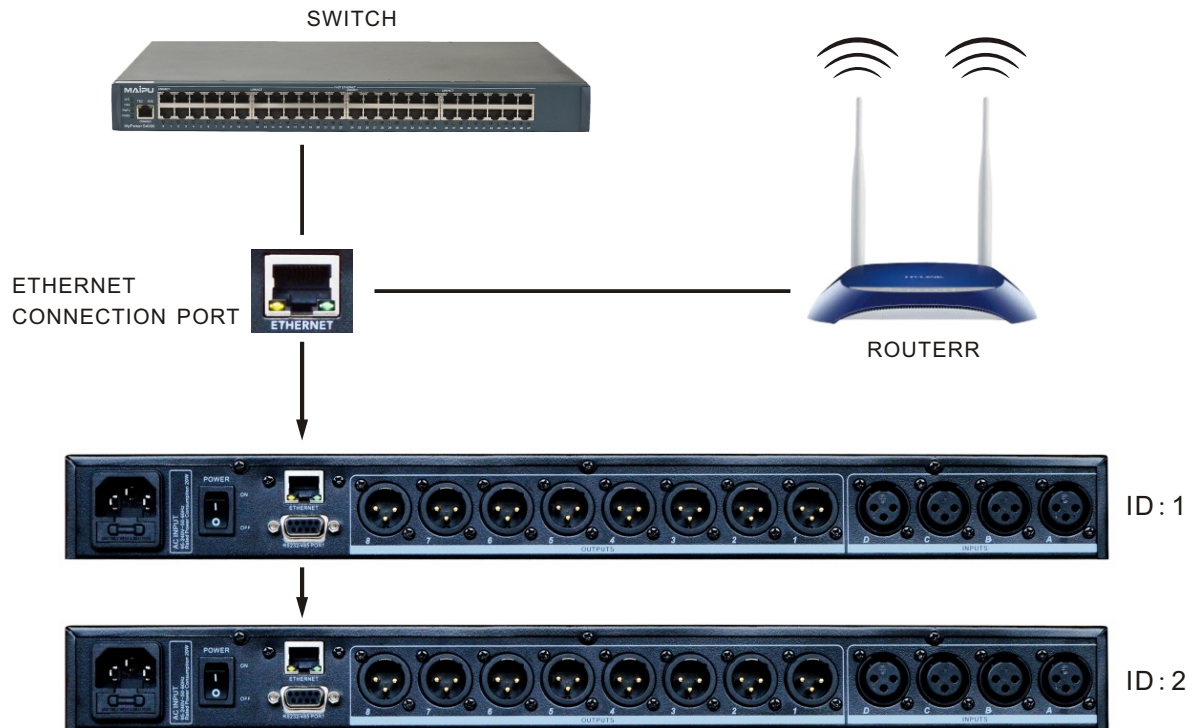
|                      |  |  |
|----------------------|--|--|
| System Specification | Frequency Response   | 20Hz~20kHz, -0.3dBu                      |
|                      | S/N Ratio  | >115 dBu                                 |
|                      | Distortion (THD)   | <0.005at1kHz (0dBu)                      |
|                      | Cross-talk   | <100dB below full scale                  |
| Input Section        | Type   | Balanced XLR                             |
|                      | Max. Input Level   | +18dBu                                   |
|                      | Impedance  | 1M/ $\Omega$ Stereo; 500k $\Omega$ /MONO |
| Output Section       | Type   | Balanced XLR                             |
|                      | Max. Output Level (bypass)                                 | +20dBu                                   |
|                      | Impedance  | <500 $\Omega$                            |
| Digital Processing   | 24-bit sigma - delta converters                            |  |
|                      | 96kHz Sampling Rates                                       |  |
| Display              | 20x2LCD Display For Parameters Setting And Function Select |  |
| Power Supply         | AC~95V-264V FUSE 250VAC/2A FAST                            |  |
| Dimension (LxWxH)    | 48x24. 5x4. 5CM  |  |
| Weight               | 2. 62kg  |  |

## ACCESSORIES

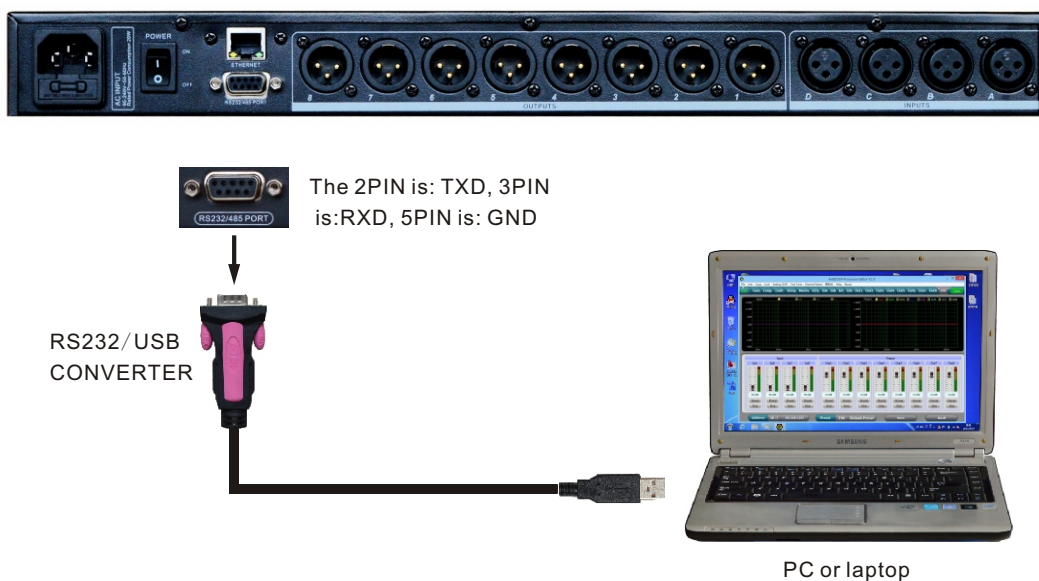
1. CD (Include PC software and user's manual).
2. One USB cord.
3. One electrical cord.

## REAR PANEL CONTROL PORT CONNECTION

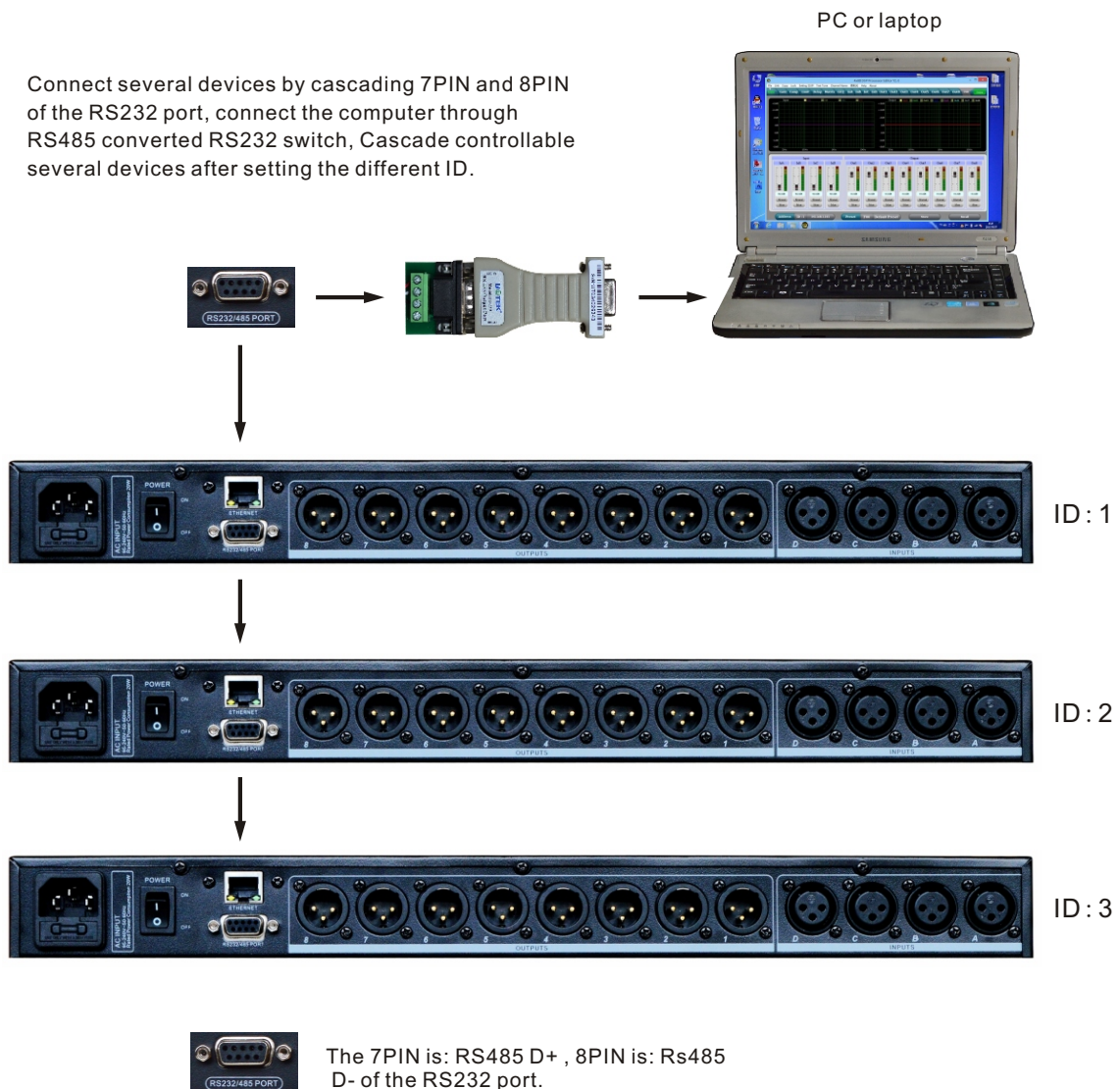
- 1, Ethernet connection port: you can choose to connect the computer by wire, connect several devices by switch, or use WIFI by router to control, but need to set different IP address and ID code for each device, or they can't connect successfully due to the IP addresses conflict.



2. RS232 connection port: Central control and connect to PC through RS232 port.



3. RS485 cascade contro port: Cascade connect several devices by RS485, you can choose different ID to control separately.



## Extend Remote control Protocol

### 1, Control package Format

|        | 0    | 1    | 2                 | 3           | 4     | 5     | 6     | 7    | 8    |
|--------|------|------|-------------------|-------------|-------|-------|-------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD         | Data1 | Data2 | Date3 | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x41 ~ 0x4A | 0x??  | 0x??  | 0x??  | 0x7D | 0x7B |

### 2, Command Detail

#### (1) Gain Control(0x41)

|        | 0    | 1    | 2                 | 3    | 4            | 5       | 6          | 7    | 8    |
|--------|------|------|-------------------|------|--------------|---------|------------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | In/Out       | Channel | +/-        | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x41 | In: 0 Out: 1 | 0~3     | +: 0, -: 1 | 0x7D | 0x7B |

Example (increase input channel 1 gain): 7B7D01410000007D7B

#### (2) Mute Control(0x42)

|        | 0    | 1    | 2                 | 3    | 4            | 5       | 6          | 7    | 8    |
|--------|------|------|-------------------|------|--------------|---------|------------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | In/Out       | Channel | No/Yes     | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x42 | In: 0 Out: 1 | 0~3     | No:0 Yes:1 | 0x7D | 0x7B |

Example (input channel 1 mute): 7B7D01420000017D7B

#### (3) Load Preset Control(0x43)

|        | 0    | 1    | 2                 | 3    | 4            | 5      | 6    | 7    | 8    |
|--------|------|------|-------------------|------|--------------|--------|------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | Factory/User | Preset | 0x30 | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x43 | F: 0 U: 1    | 0 ~ 31 | 0    | 0x7D | 0x7B |

Example (recall user preset U00): 7B7D01430100007D7B

## (4) Input Volume Control(0x44)

|        | 0    | 1    | 2                 | 3    | 4       | 5      | 6      | 7    | 8    |
|--------|------|------|-------------------|------|---------|--------|--------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | Channel | HI-VOL | LO-VOL | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x44 | 00 ~ 07 | 0x??   | 0x??   | 0x7D | 0x7B |

Example(InA volume +0. 0dB): 7B7D01440001187D7B

## (5) Output Volume Control(0x45)

|        | 0    | 1    | 2                 | 3    | 4       | 5      | 6      | 7    | 8    |
|--------|------|------|-------------------|------|---------|--------|--------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | Channel | HI-VOL | LO-VOL | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x45 | 00 ~ 07 | 0x??   | 0x??   | 0x7D | 0x7B |

Example (Out2 volume -3. 0dB): 7B7D01450100FA7D7B

## (6) Get Now Gain(0x48)

|        | 0    | 1    | 2                 | 3    | 4            | 5       | 6    | 7    | 8    |
|--------|------|------|-------------------|------|--------------|---------|------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | In/Out       | Channel | 0x30 | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x48 | In: 0 Out: 1 | 0 ~ 3   | 0    | 0x7D | 0x7B |

MCU Return:0x00 ~ 0x90=-60dB ~ +12dB,0.5dB/Step

Example (read input channel 1 gain parameter): 7B7D01480000007D7B

## (7) Get Now Mute(0x49)

|        | 0    | 1    | 2                 | 3    | 4            | 5       | 6    | 7    | 8    |
|--------|------|------|-------------------|------|--------------|---------|------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | In/Out       | Channel | 0x30 | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1 ~ 254           | 0x49 | In: 0 Out: 1 | 0 ~ 3   | 0    | 0x7D | 0x7B |

MCU Return : 0x00 or 0x01=Un-Mute or Mute

Example (read input channel 1 mute parameter): 7B7D01490000007D7B

## (8) Get Now Preset(0x4A)

|        | 0    | 1    | 2                 | 3    | 4    | 5    | 6    | 7    | 8    |
|--------|------|------|-------------------|------|------|------|------|------|------|
|        | DLE  | STX  | Device<br>Assress | CMD  | 0x30 | 0x30 | 0x30 | STX  | DLE  |
| Packet | 0x7B | 0x7D | 1~254             | 0x4A | 0    | 0    | 0    | 0x7D | 0x7B |

MCU Return : 0x00 ~ 0x32=0: F00, 1 ~ 32: U00 ~ U31

Example (read preset parameter): 7B7D014A0000007D7B

|                            |                 |        |           |         |
|----------------------------|-----------------|--------|-----------|---------|
| Communication<br>parameter | Bits per second | 115200 | Stop bits | 1       |
|                            | Data bits       | 8      | Step      | > =20ms |
|                            | Parity          | None   | ID        | 1       |



## SAFETY INSTRUCTION



Intended to alert the user to the presence of uninsulated “dangerous voltage” within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



Intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

**CAUTION:** Risk of electrical shock — **DO NOT OPEN!**

**CAUTION:** To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

**WARNING:** To prevent electrical shock or fire hazard, this apparatus should not be exposed to rain or moisture, and objects filled with liquids, such as vases, should not be placed on this apparatus. Before using this apparatus, read the operating guide for further warnings.

## IMPORTANT SAFETY INSTRUCTIONS

**WARNING:** When using electrical products, basic cautions should always be followed, including the following:

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding plug. The wide blade or third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point they exit from the apparatus.
11. Only use attachments/accessories provided by the manufacturer.
12. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Never break off the ground pin. Write for our free booklet “Shock Hazard and Grounding.” Connect only to a powersupply of the type marked on the unit adjacent to the power supply cord.

16. If this product is to be mounted in an equipment rack, rear support should be provided.
17. Exposure to extremely high noise levels may cause a permanent hearing loss. Individuals vary.

Considerably insusceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a sufficient time. The U.S. Government's Occupational and Health Administration (OSHA) has specified the following permissible noise level exposures:

| <b>Duration Per Day In Hours</b> | <b>Sound Level dBA, Slow Response</b> |
|----------------------------------|---------------------------------------|
| 8                                | 90                                    |
| 6                                | 92                                    |
| 4                                | 95                                    |
| 3                                | 97                                    |
| 2                                | 100                                   |
| 1½                               | 102                                   |
| 1                                | 105                                   |
| ½                                | 110                                   |
| <b>1/4 or less</b>               | <b>115</b>                            |

According to OSHA, any exposure in excess of the above permissible limits could result in some hearing loss. Ear plugs or protectors to the ear canals or over the ears must be worn when operating this amplification system in order to prevent a permanent hearing loss, if exposure is in excess of the limits as set forth above. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels such as this amplification system be protected by hearing protectors while this unit is in operation.

**SAVE THESE INSTRUCTIONS!**