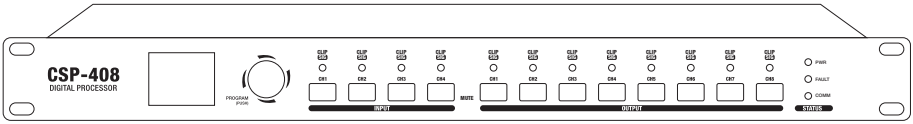
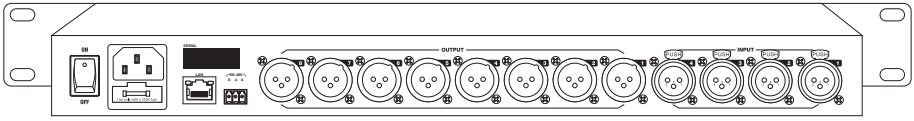
User's Manual

DIGITAL PROCESSOR





CSP-408

Important Safety Instructions

ATTENTION: RISQUE DE CHOC ÉLECTRIQUE NE PAS OUVRIR.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

AVERTISSEMENT: NE PAS EXPOSER CE MATERIEL À LA PLUIE OU L'HUMIDITÉ AFIN DE RÉDUIRE LE RISQUE D'INFLAMMATION OU DE CHOC ÉLECTRIQUE

This symbol, wherever used, alerts you to the resence of un-insulated and dangerous voltages in the product enclosure. These are voltages that may be sufficient to constitute the risk of electric shock or death.

This symbol, wherever used, alerts you to important operating and maintenance instructions. Please read.

Protective Ground Terminal

~ AC mains (Alternating Current)

Hazardous Live Terminal

ON: Denotes the product is turned on.

OFF: Denotes the product is turned off.

CAUTION
Describes precautions that should be observed to prevent damage to the product.

CAUTION : Risk of fire or explosion if the battery is replaced by an incorrect type

ATTENTION : Risque d'incendie ou d'explosion si la batterie est remplacée par un type incorrect

WARNING: Remove batteries if exhausted or if they will not be used again for a long period.
- The incorrect use of batteries can cause electrolyte leakage and will corrode the compartment or cause the batteries to burst, therefore:
- Do not mis battery types, e.g. alkaline with zinc carbonate.
- When inserting new batteries, replace all batteries at the same time.

Dispose of this product should not be placed in municipal waste and should be separate collection.

Service Instructions
- Refer all servicing to authorized 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 operaten normally, or has been dropped.
- Disconnect power cord before servicing.
- Replace critical components only with factory parts or recommended equivalents.
- For AC line powered units: Before returning repaired unit to user, use an ohmmeter to measure from both AC plug blades to all exposed metal parts. The resistance should be more than 2,000,000 ohms.

Warning! This symbol indicates a hot surface. Certain parts of the housing can become hot during operation. After use, wait for a cool-down period of at least 10 minutes before handling or transporting the device.

Warning! This device is designed for use below 2000 metres in altitude.

Warning! This product is not intended for use in tropical climates.

1. Read and keep these instructions. Heed all warnings and follow all instructions.
2. **Warning** (if applicable): Please refer to any important information (e.g., electrical, safety, etc.) printed on the exterior bottom enclosure or rear panel before instaling or operating the product.
3. Clean only with dry cloth.
4. Water and Moisture (if applicable): Do not use this apparatus near water. The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus. Electrical equipment should NEVER be kept or stored in damp environments.
5. (If applicable) Do not block any ventilation openings. install in accordance with the manufacturer's instructions. Do not install this equipment in a confined or "boxed-in" space such as a bookcase or similar unit, and maintain good ventilation conditions. The ventilation should not be impeded by covering the ventilation openings with items such as newspaper, tablecloths, curtains. etc.
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Do not place exposed flame sources such as lighted candles on the apparatus.
7. (If applicable) This product should be connected to a power supply only of the type described in these operating instructions, or as marked on the unit.

8. (if applicable) Be careful not to damage the power cord. When moving or not using the appliance, secure the power cord (e.g., wrap it with a cable tie). Before using it again, make sure the power cord has not been damaged.If the power cord has been damaged at al, bring the unit and cord to a qualified service technician for repair or replacement as specified by the manufacturer.

9. Unplug this apparatus during lightning storms or when unused for long periods of time.
10. Only use attachment/accessories specified by the manufacturer.
11. (If applicable) Use only the 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.
12. Internal/External Voltage Selectors (if applicable): Interal or external voltage selector switches, if any, should only be reset and re-equipped with a proper plug for altemative voltage by a qualified service technician. Do not attempt to alter this yourself.
13. **Caution** (if applicable): Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Batteries (a battery pack or an installed battery) shall not be exposed to excessive heat such as sunshine,fire,etc.
14. (If applicable) Do not defeat the safety purpose of the polarized or grounding-type plug.
15. Protective earthing terminal (if applicable): The apparatus should be connected to a mains socket outlet with a protective earthing connection.
    - Denmark *(Danmark)*: Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giverforbindelse til stikproppens jord.
    - Finland *(Suomi)*: Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.
    - Norway *(Norge)*: Apparatet må tilkoples jordet stikkontakt.
    - Sweden *(Sverige)*: Apparaten skall anslutas till jordat uttag.
16. **For Class ll apparatus only:** This symbol means the equipment is a Class ll or double-insulated electrical appliance. It has been designed in such a way that it does not require a safety connection to electricalearth. When servicing use only identical replacement parts installed by an instructed person or with theuse of ready-made leads or cords.

17. **Warning** (if applicable): Provide an earthing connection before the mains plug is connected to the mains. When isconnecting the earthing connection, be sure to disconnect it after pulling the mains plug out from the mains.
18. (If applicable) Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
19. **Warning** (if applicable): To prevent possible hearing damage, do not listen at high volume levels for longperiods.

20. This apparatus is for professional use only. Intended operational climate: moderate.

FCC STATEMENT

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
   (1)This device may not cause harmful interference, and
   (2) This device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver isconnected.
- Consult the dealer or an experienced radio/TV technician for help.

CE

General Note on the Declaration of Conformity: We hereby declare thatthis device is in accordance with the essential requirements of theEuropean Directive 2014/53/EU or 2014/30/EU (LVD: 2014/35/EU; GPSD:2001/95/EC).

Table of Contents

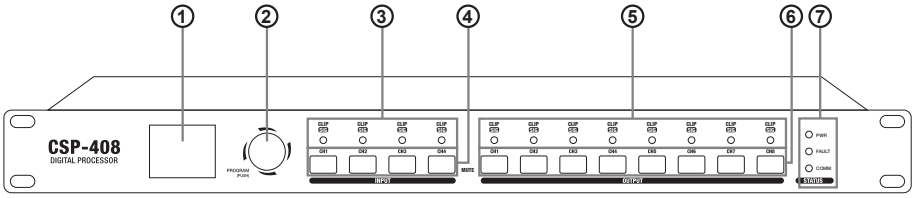
Introduction

The product is an audio matrix processor, with 4 input and 8 output channels, with high-definition LCD to display current status at real time, with network port to expand network devices. It is available for large-scale place, such as theater, broadcast hall, gymnasium and conference center and so on.

Features

- Related functionalities such as Gate/Compression/PEQ/DEQ/GEQ/Delay/FIR equipped for each input channel and can be assigned freely to input or output channels.
- Related functionalities such as FBC/Compression/PEQ/GEQ equipped with each output channel.
- 4 analog inputs & analog outputs supported to configure as 4*8 audio matrix processor.
- Connected with PC software for controlling or upgrading firmware, It is convenient for user's usage.
- Available for user to update MCU & DSP firmware by on-line network.
- Support to be controlled by RS-485 central-control commands.
- Support to be switched between 48K and 96K sampling ratio.

Connections Operations and LED Indicators



1. Display

Equipped with one multi-function OLED screen which used to display parameters settings of relevant function such as GATE/COMP/DELAY/DEQ/FIR/GEQ/SAVE/LOAD/ LOCK and so on. On the system interface,user can view the currrent version information, sampling rate switching and restore the default settings for the device.

2. Multi-function knob

Constructed as a combination(comb) knob and user can enter editing menu and select or edit single menu option by pressing or toggling it.

3. Input Signal indicator (CH1-CH4)

LED	status
SIG(Green)	It means signals input through the terminal of current channel, the green lights up when signals>-40dB.
CLIP(Red)	The signals inputs into current channel is overload, The red lights up when signals>+17dB.

4. Mute Key For Input Channel

Press any key of CH1-4 to light up corresponding red LED.It means to mute signals applied on the selected channels.

5. Output Signal indicator (CH1-CH8)

LED	status
SIG(Green)	It means signals input through the terminal of current channel, the green lights up when signals>-40dB.
CLIP(Red)	The signals inputs into current channel is overload, The red lights up when signals>+17dB.

Connections Operations and LED Indicators

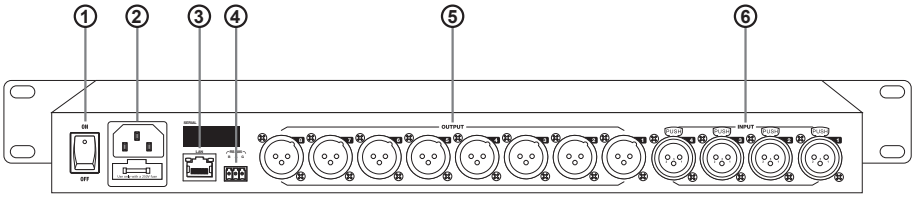
6. Mute Key For Output Channel

Press any key of CH1-8 to light up corresponding red LED.It means to mute signals applied on the selected channels.

7. Status LED Indicator

LED	status
COMM(Green)	The green lights up when the device connected with PC well.
FAULT(Red)	The red lights up when failure happen during DSP operate.
PWR(Blue)	The blue lights up when the device is powered.

Rear Panel



1. Power Switch

Press it to turn on/off the device's power.

2. Power Input Port

Connected to AC 100-240V with frequency 50-60Hz.

3. LAN Port

As Ethernet port and equipped with two LED indicators,The green means good network connection while the yellow means good data transmission.

Indicator	status
Yellow LED off	Transmission issue happen.
Yellow LED on but green LED off	The network detected by device but no connected successfully.
Green LED on	Network connected correctly.

4. RS-485

The port used to remotely control the parameters of CSP-408,such as some channel's preset changes or gain modification. Please refer to centeral control commands in appendix for more details.

5. Output

8* balanced analog outputs.

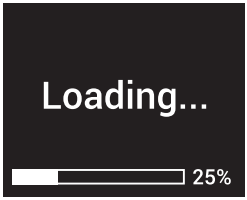
6. Input

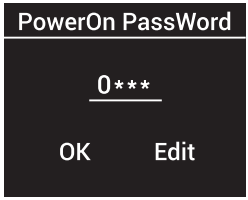
4* balanced analog inputs.

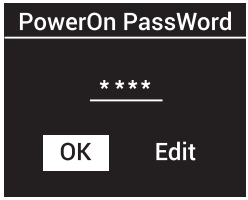
Opearation

1. Power-on Password Interface

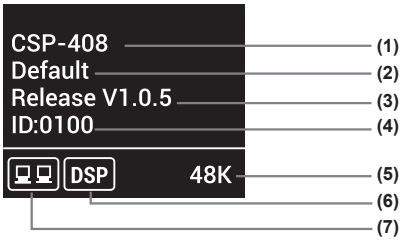
It enters below interface to display boot animation and progress bar once the device powers on. And then key in four-digital passwords and confirm "ok" by toggling the knob to enter the default interface. Remark: Initial password "0000", Super password "8888"







2. Default Interface



1) The model name for current device.
2) The status of current device's presets.
3) The version information of current device.
4) The ID of current device which can be modified by PC software in the range "0100～FF00(256PCS)"
5) The sampling rate of current device.
6) The current symbol means the device doesn't connect with PC software. The symbol will flash alternately once they connected normally.
7) The current symbol means it is successful to proceed DSP communication, It will display "DSP!" if failed.

3. Menu Interface

Under the default interface user can press the COMB knob to enter the main menu interface. The main-menu interface displays 12 submenus ,user can confirm/select corresponding function of this interface by toggling the comb knob. It enters the submenu interface to setup/adjust corresponding parameters , Click the "exit" box on the mainmenu interface to go back to the default interface.

Opearation

4. Channel

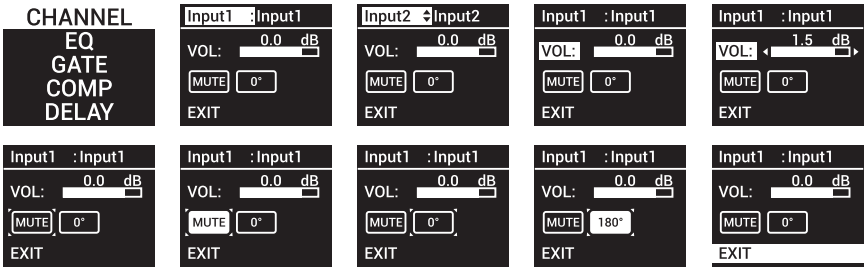
1) Select "channel"submenu and then press the comb knob to enter channel interface and then press the knob again to enter channel options to select I/O channel which user want to setup.

2) Toggle the knob right to the "volume adjustment" position and then user can adjust the volume of current channel in the range "-80dB～ +10dB" .

3) Toggle the knob right to the "mute" position and then press the knob to mute current channel as well as the white background lights up.

4) Toggle the knob right to the "phase" position and then press the knob to reverse signals by 180°

5) Toggle the knob right to the "EXIT" position and then press the knob to exit current submenu and return the main menu.



5. EQ

1) Select "EQ" submenu and then enter EQ interface by pressing the comb knob, Then press the knob to enter EQ channel options to select relevant EQ I/O channel user want to setup

2) Toggle the knob right to the "FREQ" position and then press the comb knob to setup frequency value within range"20.0Hz～ 20KHz" and then press the knob to confirm after settings completed.

3) Toggle the knob right to the "Q" position and then press the comb knob to setup Q value within range "0.03～APS2" and then press the knob to confirm after settings completed.

Opearation

4) Toggle the knob right to the "GAIN" position and then press the comb knob to setup gain value within range "-15dB～+15dB" and then press the knob to confirm after settings completed.

5) When the comb knob rotates to "B" position,the channel can be set by pressing it. Selecting "Y" to activate the function or "N" to close the function, Finally press the knob to confirm after settings completed.

6) Toggle the comb knob right to the " HF" position,Then press it to setup the frequency of HF filter in the range "20.0Hz～20KHz". Finally press it to confirm after settings completed.

Toggle the comb knob right to the" BYPASS" position,Then press it to setup the type of HF filter.Total 21 optional filter type, Finally press it to confirm after settings completed.

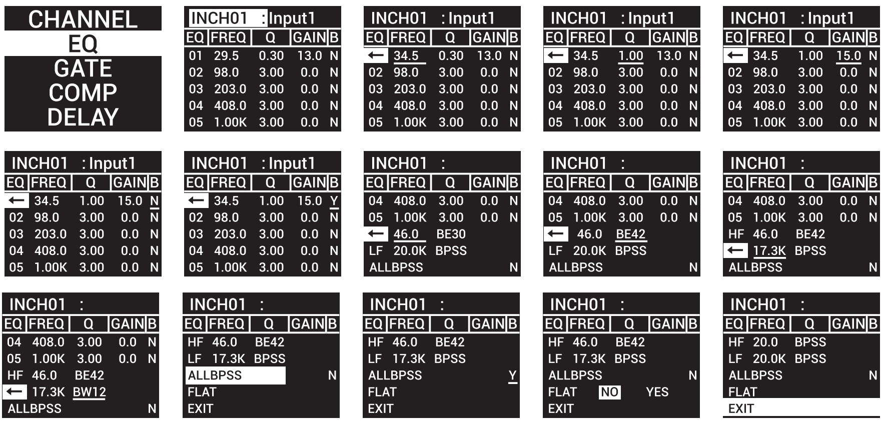
7) Toggle the comb knob right to the "LF" position,Then press it to setup the frequency of LF filter in the range "20.0Hz～20KHz". Finally press it to confirm after settings completed.

Toggle the knob right to the " BYPASS" position,Then press it to setup the type of HF filter.Total 21 optional filter type, Finally press it to confirm after settings completed.

8) Toggle the comb knob right to the " BYPASS" position,Then press it to turn on/off the EQ function ("N"=OFF."Y"=ON),Finally press it to confirm after settings completed.

9) Toggle the comb knob right to the "FLAT" position,Then press it to select "ON/YES" and then confirm all settings. Finally all EQ parameters will be reset as default value.

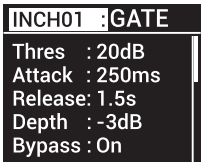
10) Toggle the comb knob right to the " EXIT" position,Then press it to exit current submenu and reture to the main menu.

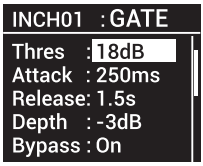


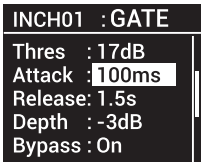
Opearation

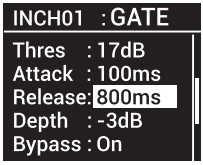
6. GATE

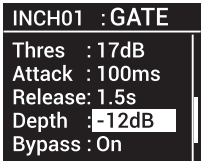
1) Select "GATE" submenu on the main menu and press the comb knob to enter "Gate" interface.Then press it to select the input channel where noise gate setup.
2) Toggle the comb knob right to "THRES" position and then press it to set threshold value in the range "-80dB～20dB", Finally press it to confirm after settings completed.
3) Toggle the comb knob right to the "Attack"position and then press the knob to set Attack value in the range "0ms-250ms", Finally press the knob to confirm after settings completed.
4) Toggle the comb knob right to the "Release" position and then press it to set the "Release value" in the range"5ms-2.0s",Finally press the knob to confirm after settings completed.
5) Toggle the comb knob right to the "Depth" position and then press it to set Depth value in the range "-3dB～-60dB", Finally press it to confirm after settings completed.
6) Toggle the comb knob right to the "Bypass" position and then press the knob to select "off" to activate bypass function.It is default to select "ON" to close the gate.
7) Toggle the comb knob right to the "FLAT" position and then press it to select "ON/YES",Finally press it to confirm and then current parameters applied on all Noise Gate will be reset into default value.
8) Toggle the comb knob to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.

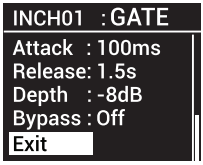








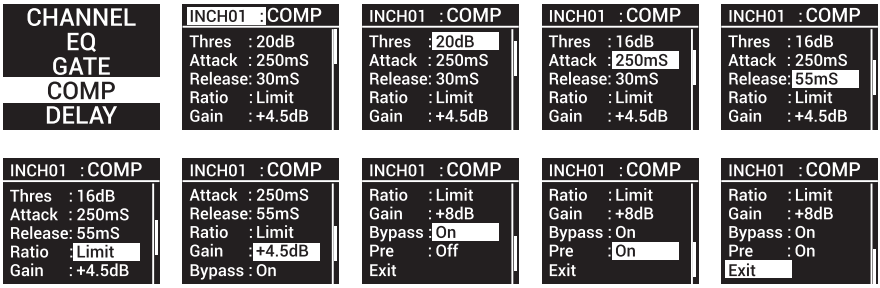




Opearation

7. COMP

1) Select "COMP" submenu and then press the comb knob to enter the COMP interface. Then user can select the I/O channel where COMP value setup by pressing it.
2) Toggle the comb knob right to the "THRES" position and then press it to set threshold value in the range"-80dB~20dB",Finally press it to confirm after settings completed.
3) Toggle the knob right to the "Attack" position and then press it to set "Attack value" in the range"0ms~250ms",Finally press it to confirm after settings completed.
4) Toggle the knob right to "Release" position and then press the knob to set Release value in the range"5ms~2000ms",Finally press the knob to confirm after settings completed.
5) Toggle the knob right to "Ratio" position and then press the knob to set Ratio value in the range"1.0~limit",Finally press the knob to confirm after settings completed.
6) Toggle the knob right to "Gain" position and then press the knob to set Gain value in the range"0dB~+12dB",Finally press the knob to confirm after settings completed.
7) Toggle the comb knob right to the "Bypass" position and then press the knob to select "off" to activate bypass function.It is default to select "ON" to close the gate.
8) Toggle the knob right to "Pre" position and then press the knob to select "on" or "off". "off" as default setting means post EQ compressing ."on" means pre EQ compressing . Finally press the knob to confirm after settings completed.
9) Toggle the knob right to "Default"position and then press the knob to select "ON/YES", If "YES" selected and confirmed by press the knob,all paramters applied on COMP will be restored to the default value.
10) Toggle the knob to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.



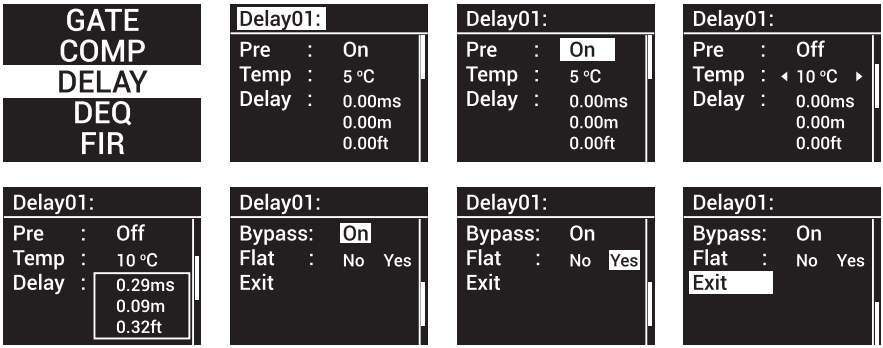
Opearation

8. DELAY

Corresponding principle: Delay 01-08 corresponds to Output1-8 by default based on "off" set for the PRE function.

Delay 01-04 corresponds to Output1-4 by default and Delay 05-08 can't be selected if the "on" set for the PRE function.

1) Toggle the knob right to "Pre" position and then press the knob to select "off" (default) or "on". The delay function will be applied on corresponding input channels if the "on" selected. While the delay function will be applied on corresponding output channels if the "off" selected.
2) Toggle the knob right to "Temp" position and then press the knob to setup ambient temperature within range "0℃～45℃". Finally press the knob to confirm after settings completed.
3) Toggle the knob right to "Delay" position and then press the knob to setup latency time within range "0ms～300.4166ms" as well as latency distance calculated automatically. Finally press the knob to confirm after settings completed.
4) Toggle the comb knob right to the "Bypass" position and then press the knob to select "off" to activate bypass function.It is default to select "ON" to close the gate.
5) Toggle the knob right to "FLAT" position and then press the knob to select "ON/YES", All latency parameters will be restored to the default value.
6) Toggle the knob to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.



Opearation

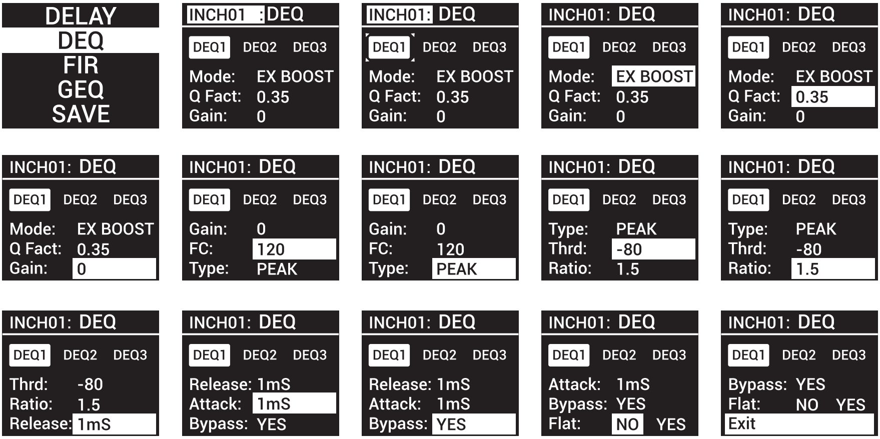
9. DEQ

1) Select "DEQ"submenu and then press the comb knob to enter DEQ interface,Then user can select input channel where DEQ setup by pressing it
2) Each input channel corresponds to three groups of DQE, The default DEQ frequency varies for each group such as 120Hz for DEQ1, 1KHz for DEQ2, 6KHz for DEQ3. Toggle the comb knob right to "DEQ1" position and then press it to confirm selecting DQE1 as well as the background lights white.
3) Toggle the comb knob right to the "Mode" position and then press it to select mode (total 4 optional modes),Finally press it to confirm the selection.
4) Toggle the comb knob right to the "Q Fact" position and then press it to setup Q value within range "0.3～60".Finally press it to confirm after settings completed.
5) Toggle the comb knob right to the "GAIN" position and press it to setup gain value within range "0dB～15dB", Finally press it to confirm after settings completed.
6) Toggle the comb knob right to the "FC" position and press it to setup frequency value within range "20.0Hz～20KHz", (Default 120Hz)Finally press it to confirm after settings completed.
7) Toggle the comb knob right to the "Type" position and press it to select DEQ type, total 3 optional types , finally press it to confirm the selection.
8) Toggle the comb knob right to the "Thrd" position and press it to setup threshold value within range "-80dB～20dB", Finally press it to confirm after settings completed.
9) Toggle the comb knob right to the "Ratio" position and press it to setup Ratio value within range "1.0～Limit", Finally press it to confirm after settings completed.
10) Toggle the comb knob right to the"Release" position and then press it to setup Release value within range "1ms～1.2s", Finally press it to confirm after settings completed.
11) Toggle the comb knob right to the "Attack" position and then press it to setup Attack value within range "1ms～1.2s", Finally press it to confirm after settings completed.
12) Toggle the comb knob right to the "Ratio" position and press it to setup Ratio value within range "1.0～Limit", Finally press it to confirm after settings completed.
13)Toggle the knob right to "FLAT" position and press it to select "ON" or "YES",All DEQ1 parameters will be restored to default value if "YES" selected.

Opearation

14) Remark: please refer to example description of DEQ section of PC software part for more details of actual function.

Toggle the comb knob to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.



10. FIR

Correspondence principle betweend FIR and I/O channels: it is default for

-FIR 1-8 to correspond to output1-8 separately.

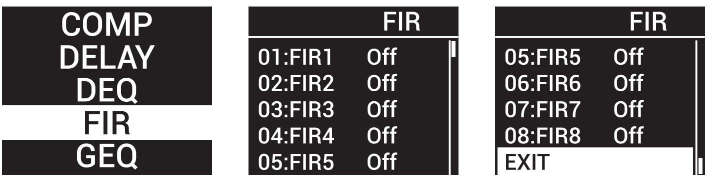
-FIR1-4 corresponds to input 01-04 separately, Please refer to PC-software operating part for more details.

1) Select "FIR" submenu and then press the comb knob to enter FIR interface.

2) Toggle the comb knob right to the "FIR1" position and then press it to select "on" or "off", As default setting that "off" means to close FIR function while "on" means to activate FIR function.Finally press it to confirm after settings completed.

3) Toggle the knob right to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface. Just follow above above steps to activate or close the FIR function applied on FIR2-8.

Remark: Only 2 FIR for 96K sampling rate,That which channel(input channel or output channel) the FIR will be used on can be set on the PC.

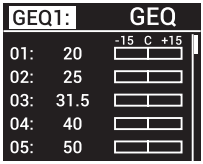


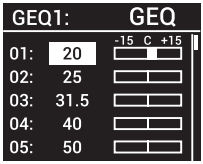
Opearation

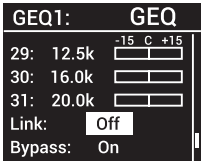
11. GEQ

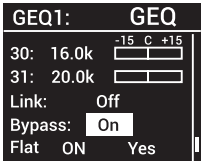
The GEQ1-8 corresponds to Output1-8 based on 48K sampling rate; GEQ1-2 corresponds to Output1-2/3-4/5-6/7-8 based on 96K sampling rate.

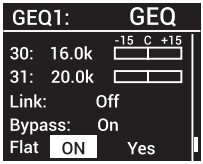
1) Select GEQ on the main menu and press the comb knob to enter GEQ interface.And then select the output channel where GEQ applied by pressing it.
2) Toggle the knob right to the "Frequency"options (F01-F31) and then press it to enter "GAIN setting" interface within the range "-15dB～+15dB". Finally press it to confirm after settings completed.
3) Toggle the comb knob right to the "Link" position and then press it to select "on" or "off", The default "off" means to close Link function, Then "on" means to activate Link function.Finally press it to confirm after settings completed.
4) Toggle the comb knob right to the "Bypass" position and then press it to select " NO" to activate the function,It is default to select "YES" to close the function. Finally press it to confirm after selection completed.
5) Toggle the comb knob right to "FLAT" position and then press it to select "NO/YES" and then all GEQ parameters will be reset to the default value if "YES" selected.
6) Toggle the knob to the the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.

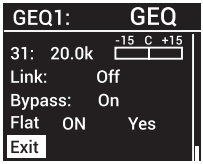












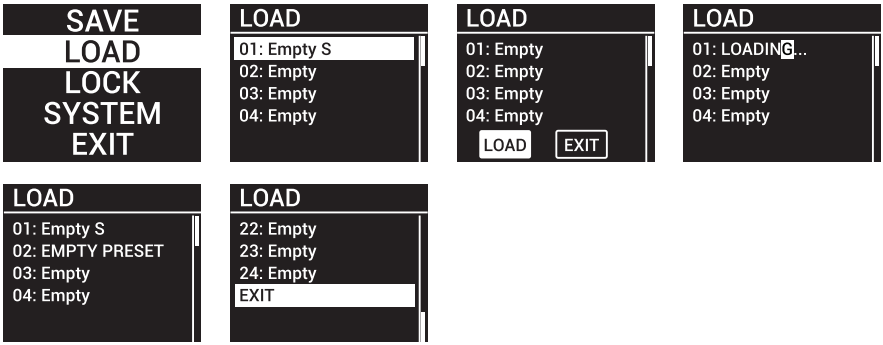
Opearation

12. SAVE

1) Select "SAVE" on the main menu and then press the comb knob to enter "SAVE" interface.Total 24 preset options will be displayed.
2) Press the comb knob to select one preset and then its name can be customized with the maximum 16 characters. Press the knob to select "save" or exit current interface when the last character selected by rotating the knob.
3) Toggle the comb knob right to the " EXIT" position,Then press it to exit current submenu and go back to the main menu.

13. LOAD

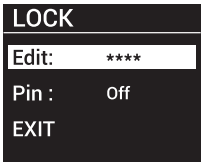
1) Select "LOAD" on the main menu and then press the knob to enter "LOAD" interface, Total 24 preset items will be displayed.
2) On the LOAD interface user can select one preset item and then press the comb knob to select "LOAD" to load relevant presets or "EXIT" to exit loading. It will go back to the LOAD interface after loading completed.
-The tips "preset is empty" will appear if empty presets loaded.
3) Toggle the comb knob right to the "EXIT" position,Then press the knob to exit current submenu and go back to the main menu.

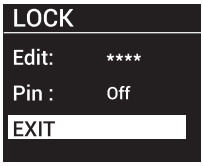


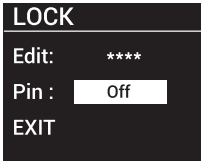
Opearation

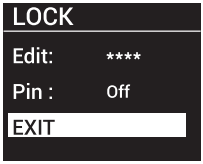
14. LOCK

1) Click the "LOCK" option on the main menu to enter the "LOCK" interface.
2) Toggle the comb knob right to the "Edit" position and press it to enter "Edit" interface, Then user can modify passwords by following steps as below.
   - Firstly key in current correct passward and the it automatically goes back to the "LOCK" interface.
   - Then key in 4-digital new password (only numbers or letters permitted), And select "EXIT" position with cursor after entry completed.
   - Finally press the comb knob to confirm and then cursor will jump automatically onto "Edit" position. It means the password modified successfully.
3) Toggle the comb knob right to the "PIN" postion and then press it to select "OFF" and finally enter into LOCK interface.
4) Toggle the comb knob right to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.







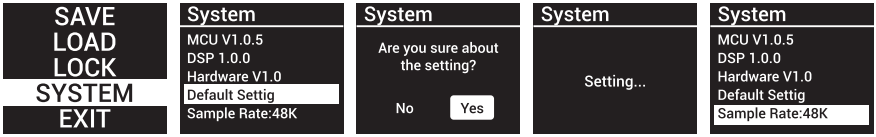


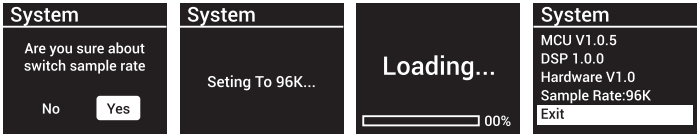
15. SYSTEM

1) Select the " SYSTEM" option on the main menu and then press the comb knob to enter "SYSTEM" interface.
2) User can view the MCU/DSP/Hardware version information of the device once it enters the system interface.
3) Toggle the comb knob right to the "Default Setting"position,And then press the knob to see a tips and finally press it to select "YES" on tips to restore the default settings, if "NO" selected,it won't restore the default settings.

4) Toggle the comb knob right to the "Sample Rate" position,Then press it to switch sampling rate between 48K and 96K , Then to select"YES" on the tips appears and confirm it by pressing the knob again (The unit will restart.) ,If "NO" selected, it won't switch current sampling rate.

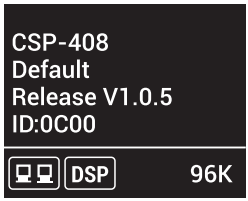
5) Toggle the comb knob to the "EXIT" position and then press it to exit current submenu interface and go back to the main menu interface.





16. EXIT

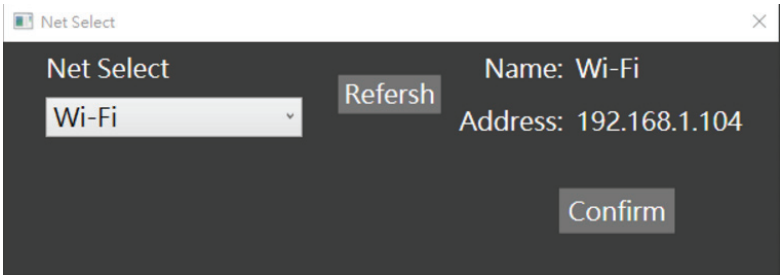
1) Select "EXIT"menu and press the comb knob to confirm and then it will go back to the default interface.



Software Editor

Software Function Description

After the connection of devices completed,Open the CSP-408 system control software to enter the initial page as below:



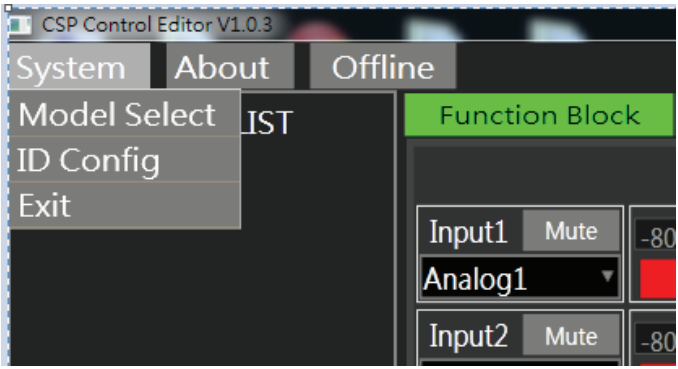
First click "Refresh" to fresh the network(selecting network connection method)

Second,click "Enter" to enter software interface.

1. Software Homepage

Software Editor

2. System Introduction

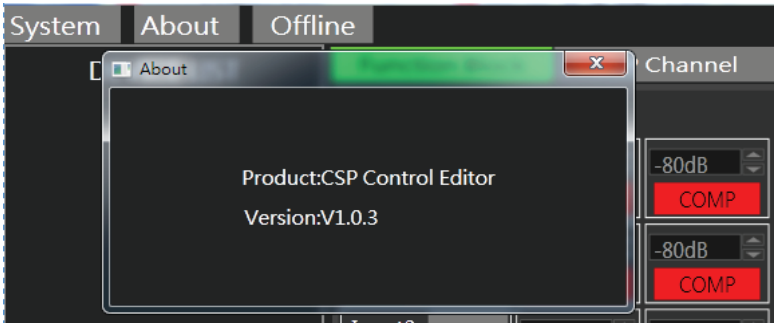


1) Mode Selection: Used to switch mode.

2) ID Config: Used to customize the ID.

3) Exit: Used to exit current software.

3. About Interface Description

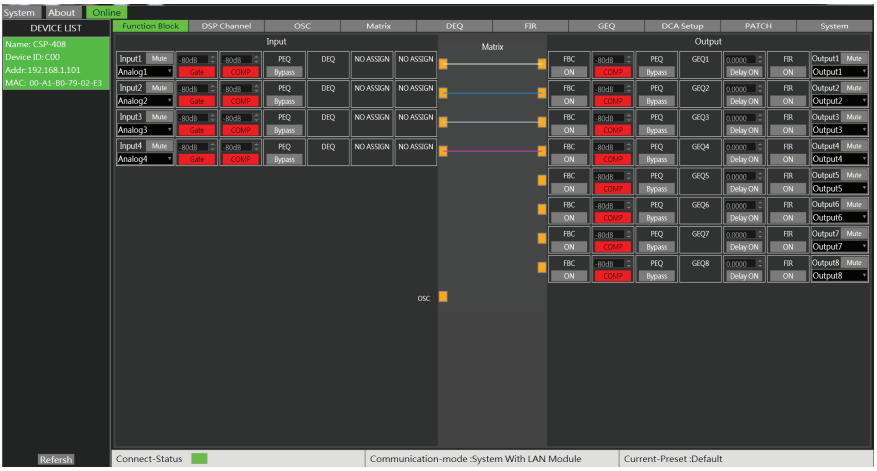


1) Click "About" to display the name/version of current software.

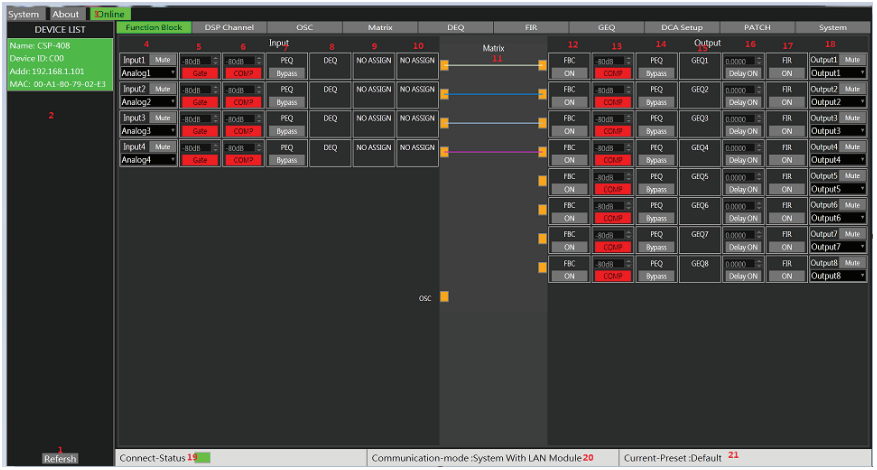
Software Editor

4. Scan Connection

1) Click "Scan" to list all devices which are connected all together in the system, Then click the device"CSP-408" to enter device configuration interface.



5. Function Block Interface



1) Refresh: Clik it to refresh the device list.

2) Refresh searching to find the device display area on the local area network.

Software Editor

3) Click the device for connection,It means current device connected well when the "offline" in gray background become "Online" in green background.

4) As quick control to mute or unmute input channel,or as a quick control to assign input channels instead of accessing PATCH interface.

5) As quick control to open or close the noise gate applied on input channels,Setup the threshold,click the blank to jump directly into the Gate setting interface of current channel.

6) As quick control to open or close the compression gate applied on input channels, Setup the threshod, click the blank to jump directly into the COMP setting interface of current channel.

7) As quick control to activate or disable PEQ function applied on input channels, Click the blank to jump directly into PEQ setting interface of current channel.

8) The DEQ function applied on input channels,click its blank area to jump directly into DEQ setting interface of current channel.

9) As quick control to activate or disable delay function applied on input channels, Click the blank to jump directly into delay setting interface of current channel.(It is default to apply delay function on output terminal,while it can work on input terminal by setting.)

10) As quick control to activate or disable FIR function applied on input channels, Click the blank to jump directly into FIR setting interface of current channel.(It is default to apply FIR function on output terminal,while it can work on input terminal by setting.)

11) As quick control for MATRIX input/output /OSC .Click the connection line to assign the input or output quickly. When the mouse move onto the connection line , it will become thicker. Right-click to delete the connection line. Clicking on a blank area of the control will take you directly to the matrix settings page.

12) As quick control to activate or disable FBC function applied on output channels, Click the blank to jump directly into FBC setting interface of current channel.

13) As quick control to activate or disable the COMP function applied on output channels, To adjust or set the threshold, or clicking on a blank area of the control will take you directly to the COMP setting page.

14) As quick control to activate or disable PEQ function applied on output channels, Click the blank to jump directly into PEQ setting interface of current channel.

15) As quick control to activate or disable GEQ function applied on output channels, Click the blank to jump directly into GEQ setting interface of current channel.

16) As quick control to activate or disable DELAY function applied on output channels, Click the blank to jump directly into DELAY setting interface of current channel.

17) As quick control to activate or disable FIR function applied on output channels, Click the blank to jump directly into FIR setting interface of current channel.

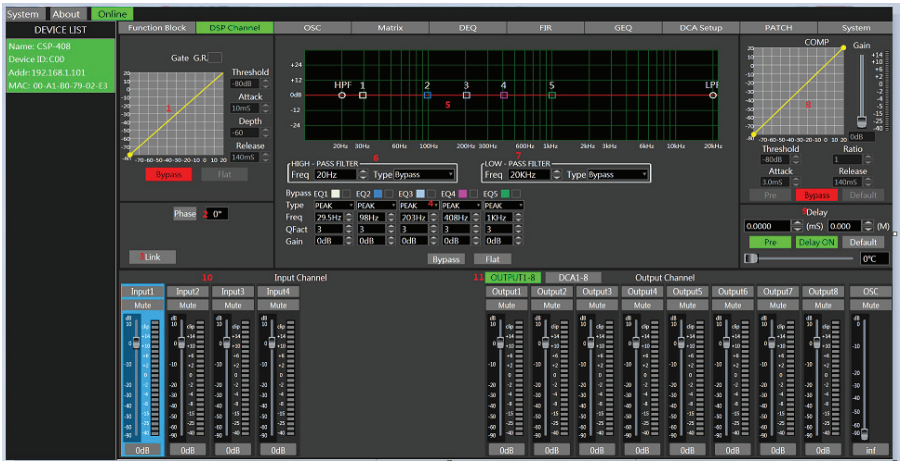
18) As quick control to mute or unmute output channel, Key in quick assignment setting on PATCH page

19) Connection-status indicator: Green= on line（connected); Gray= off line.

20) Connection mode for current device.

21) Preset status of current device.

6. DSP Input channel Interface



1) EXP/Gate: Used to add dynamics to a signal, The expander will strengthen the input signal by a defined ratio when signal is below a certain threshold.

The input signals will keep the same as output signals when signal is above threshold.

It is available to switch the expander to noise gate by adjusting the ratio to the maximum value.

Threshold: -80dB to 20dB

Attack: 0ms to 250ms

Release: 5ms to 2000ms

Depth: -3dB to -60dB

Bypass:The function in this area is invalid when the "Bypass" button become red.

FLAT: Click it to restore the parameters of GATE to the default value.

2) Phase: Used to reverse signals by 180°.

3) LINK: Once link function activates,relevant function(fader,phase,mute,gain, delay , etc.) of both channels will be linked based on current channel.

4) Parameter EQ Setting

5) An equalizer is used to compensate for or alter the spectrum characteristics of a signal to obtain the smoothest possible frequency response.

The module here is parameter 5 band EQ.

Bypass1-5: Temporarily cancel the individual processing of filter 1-5 intead of normal bypass function.

Type: It means filter type(Peak/Low/High/AllpassI/AllpassII)

Freq: The center frequency of filter lays between 20Hz and 20KHz.

Qfact：The selection of filter ,The thinner spectrum processing with more Q value , It can be adjusted between 0.30 and 30.

Gain: Used to increase or attenuate the center frequency from -15dB to +15dB .

6) PQE: The filter settings can be realized by either manual setting or clicking the graphics. Manual setting means to enter letters or numbers by manually. Clicking graphic means to click the frequency response curve with mouse and keep holding the comb knob as well as drag the mouse to realize.

7) HPF: Used to cancel unwanted frequencies above the signal spectrum in order to avoid background noise caused by multi-processing.

Cut-off frequency between 20Hz and 20KHz.

Filter Type(Total 21 optional types)

8) LPF:Used to clear unwanted frequencies below the signal spectrum in order to avoid any background noise caused by multi-processing. Such as 100Hz set for the HP of MIC, 4KHz set for LP of MIC.

Cut-off frequency between 20Hz and 20KHz.

Filter Type(Total 21 optional types)

Bypass: The function in this area is invalid when the "Bypass" button become red.

Flat: Used to restore all EQ parameters into the factory settings.

9) COMP: Used to limit the dynamic range of signals into one certain level.When signals beyond threshold, it will compress it at a ratio greater than 1. When signals below threshold,the input signals and output signals will keep unchanged.Once the signals reach the maximum value by adjusting the ratio.compressor will switch into a limter.

Threshold: -80dB-20dB

Attack: 0ms-250ms

Release: 5ms-2000ms

Ratio: 1.0-Limit

Gain: 0dB-+12dB

Bypass: The function in this area is invalid when the "Bypass" button become red.

Pre:Pre in gray background means post EQ compression, Post in green background means pre EQ compression.

Default: Used to restore COMP parameters into the default value.

10) Delay: Up to 300.4166ms delay can be set for each input by it.

Can be used for audio/video synchronization applications or phase adjustment.

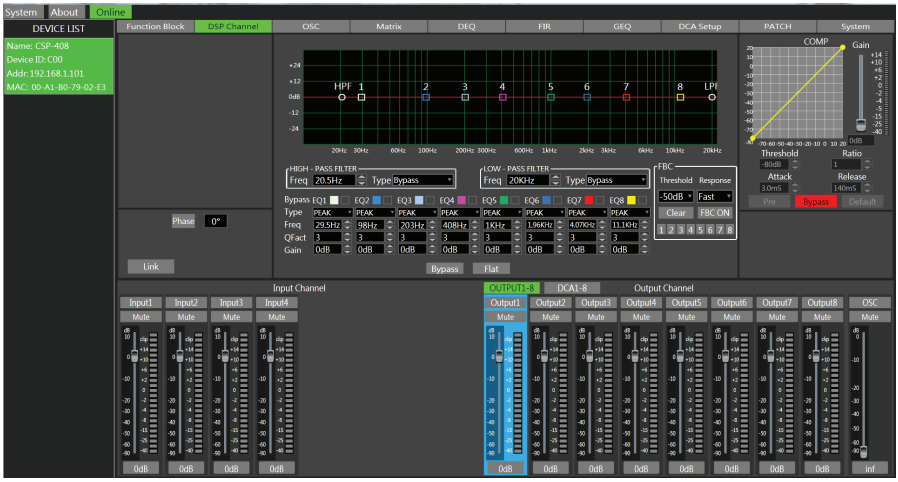
Used to set the delay function on input channel or output channel.it is default for output channel.

Bypass: The function in this area is invalid when the "Bypass" button become red.

11) Input channel 1-4 adjustment: Used to adjust corresponding channels involving gain, mute or customized channel name.

12) Output channel 1-8 adjustment: Used to adjust corresponding channels involving gain, mute or customized channel name.

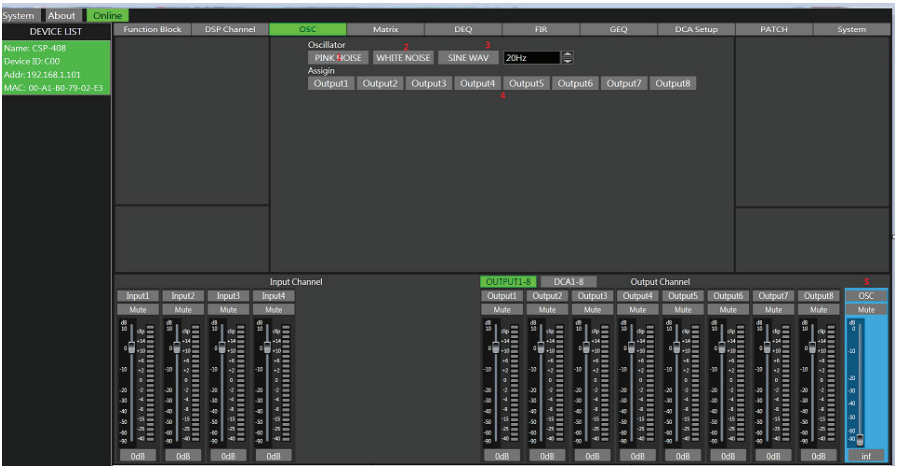
7. DSP Output Channel Interface



Remark:Except no EXP/Gate function, Other function menu is the same as DSP input channel's.There are total 8 band parmater EQ ,Please refer to relevant description of DSP input channel for more details.

Software Editor

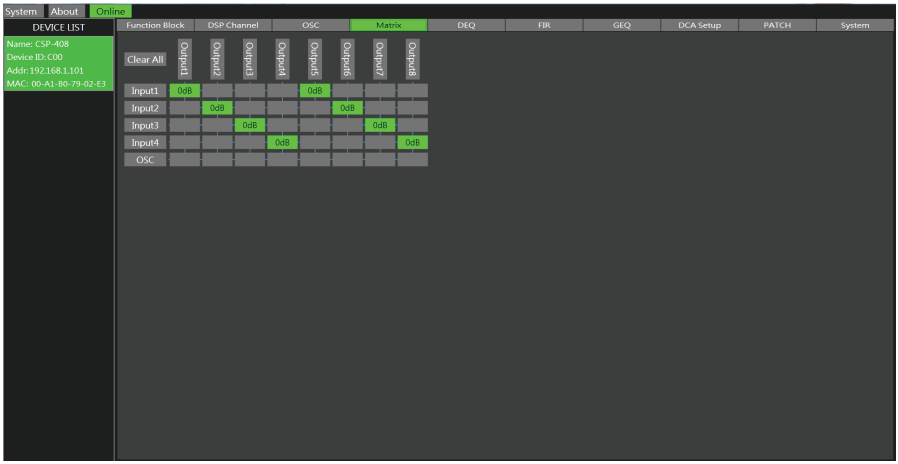
8. OSC



1) PINK NOISE:Touch it to light up the green background to output pink noise.
2) WHITE NOISE:Touch it to light up the green background to output white noise.
3) SINE WAV:Touch it to light up the green background to output sine wave. with an adjustable frequency.
4) Assign:The speaker output channel assigned to Output1-8,It means the output of current channel activates when the green background lights up.
5) Used to adjust the volume or mute control applied on speaker output channels. It is default to set the minimum volume.

Software Editor

9. MATRIX



Used to route inputs into matrix in a graphical representation,Multiple inputs can be assigned into multiple outputs by clicking gray box.

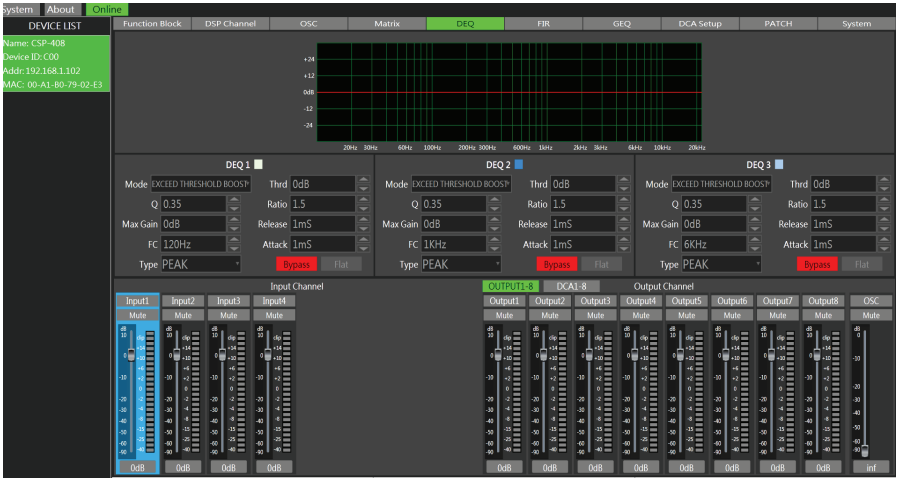
If the connection under working status, the box will become green, otherwise it will stay in gray. Left-clicking the mouse directly enables 0dB distribution, while right-clicking enables and allows you to adjust the volume output.

The matrix can route 4 input signals + OSC into 8 separate output channel. In a word 5×8 matrix.

Clear All: Touch it to clear all assignment settings applied on the matrix.

Software Editor

10. DEQ



Each input channel corresponds to 3 groups of DEQ, As difference that different default frequency applied on different DEQ group,120Hz for DEQ1,1KHz for DEQ2, 6KHz for DEQ3.

Here DEQ1 as an example for further explanation:

Mode:total 4 optional modes:

-EXCEED THRESHOLD BOOST:It takes effects and used to increase the output gain when inputs beyonds the set threshold.

-EXCEED THRESHOLD DECAY:It takes effects and used to attenuate the output gain when inputs beyonds the set threshold.

-BELOW THRESHOLD BOOST:It takes effects and used to increase the output gain when input below the set threshold.

-BELOW THRESHOLD DECAY:It takes effects and used to attenuate the output gain when input below the set threshold.

Q : 0.3-60

Max GAIN: 0dB-15dB

FC: 20.0Hz-20KHz,default by 120Hz

Type: Total 3 options

Thrd: -80dB-20dB

Ratio: 1.0-Limit

Release: 1ms-1200ms

Attack: 1ms-1200ms

Bypass: The function in this area is invalid when the "Bypass" button become red.

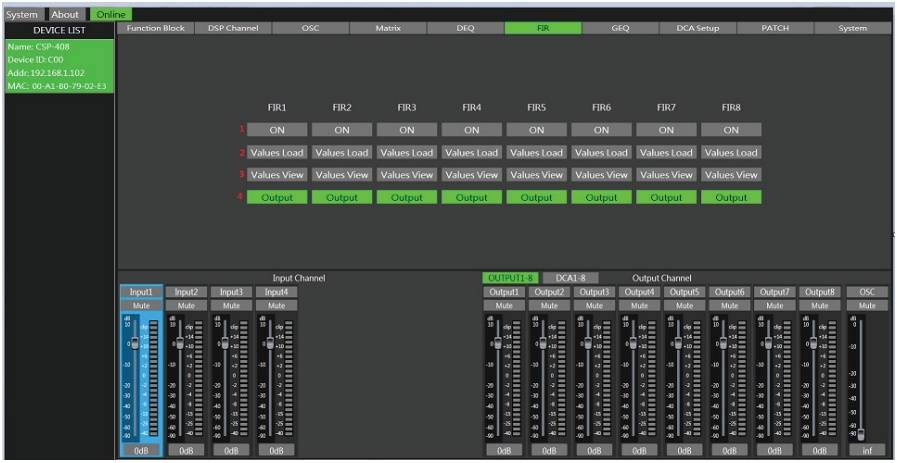
FLAT: Click it to restore the gate parameters into default value.

Configured with square graphic to real-time display the status of current DEQ mode.

Software Editor

Explain the output effects of 4 modes by example way.
Setting: MAX GAIN: 15dB,Thrd: -10dB,FC:1KHz,Input 0dB signal.
EXCEED THRESHOLD BOOST: 10dB actual output applied.
EXCEED THRESHOLD DECAY: -10dB actual output applied.
Setting: MAX GAIN: 15dB,Thrd: -10dB,FC:1KHz,Input -15dB signal.
BELOW THRESHOLD BOOST:-10dB actual output applied.
BELOW THRESHOLD DECAY:-20dB actual output applied.

11. FIR Interface



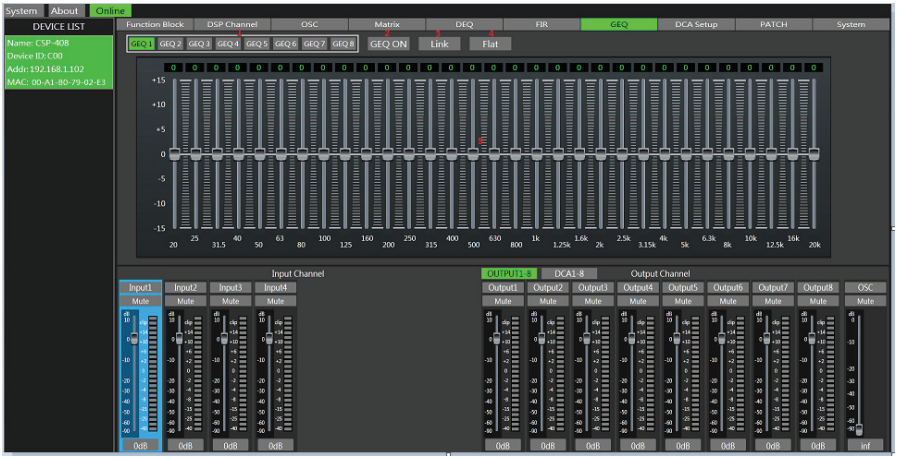
FIR Filter(Finite-length unit impulse response filter):It enables high-precision signal processing and strict linear phase characteristics, thereby effectively improving sound quality and the performance of audio systems.

1) Used to activate or close the FIR1-8 function,The background lights green when the function activates.
2) Used to load FIR1-8 parameters,The tips will appear once parameters loaded successfully.
3) Up to 512 points of FIR datas can be viewed through FIR1-8, It is default to show "0" if no data applied.
4) FIR1-8 corresponde to channel 1-8 by default, Assignment switches into input1-4 by clicking FIR1-4.

Remark: There are only 2 FIR based on 96K sampling ratio,That which channel(input or output channel) FIR function will be applied on can be set.

Software Editor

12. GEQ



Using GEQ constant Q technology to keep the fixed band width for each frequency.31 bands (1/3 octave),Dedicated for fine frequency response adjustment.

1) GEQ1-8:48K sampling rate： GEQ1-8 corresponds to Output1-8,96K sampling rate:GEQ1-2 can correspond to Output1-2 or Output3-4 or Output5-6 or Output7-8 by modulating.

-Select any button of "GEQ1-GEQ8" by clicking with green backgound lighting and thenit will be current output channel to setup corresponding parameters.

2) GEQ ON: Click it to activate or close the GEQ function,The background lights up green when GEQ activates.

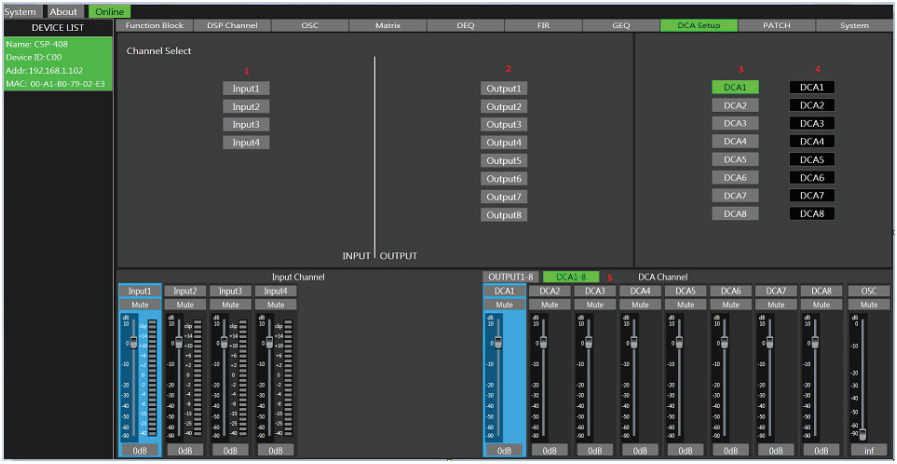
3) LINK: Once it activates,the GEQ fader parameters of two channels will be linked and enabled based on current channel.

4) FLAT: Click it to reset the gate parameters into the default value.

5) Graphics:User can intuitively ajust or setup the gain of 31 band by sliding corresponding faders.

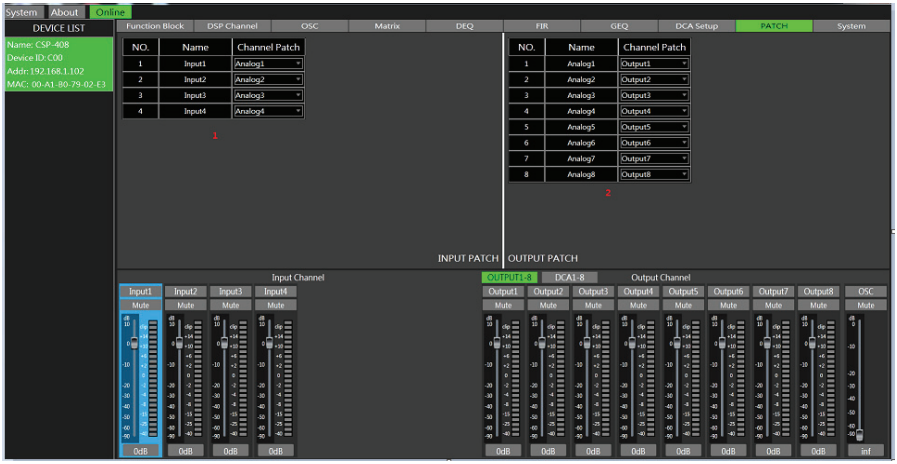
Software Editor

13. DCA Setup



1) Group(input1-input4)selection,Green background shows if selected and gray background shows if unselected,Support three options(single/multiple/all selection).
2) Group(output1-output8)selection,Green background shows if selected and gray background shows if unselected,Support three options(single/multiple/all selection).
3) DCA button 1-8,Green background shows if selected and gray background shows if unselected,
4) DCA button 1-8,The name can be customized with the maximum 8 bytes.
5) DCA button1-8 can be used to adjust volume or mute control for corresponding I/O channels selected for one group.

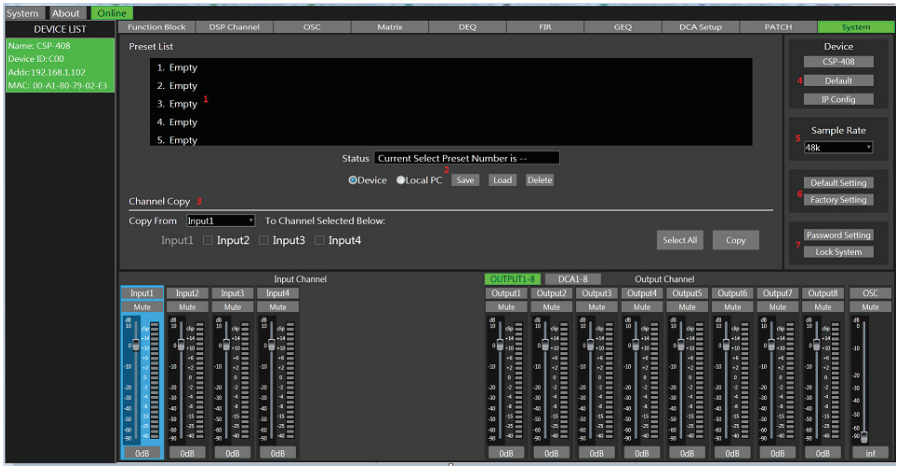
14. PATCH Interface



Software Editor

1) Input Setting: Available to select different input sources for each channel.
   1.Available to select Analog 1-4 as input sources.
   2.Select "No Assign" if none input sources needed.
2) Output Setting:Available to select different output sources for each channel.
   1.Available to select Output 1-8 as output sources.
   2.Select "No Assign" if none input sources needed.

15. System Interface



It is used to manage backup parameters.These parameters can be stored directly in the host's internal memory as preset,Total 24 presets contained in its memory.

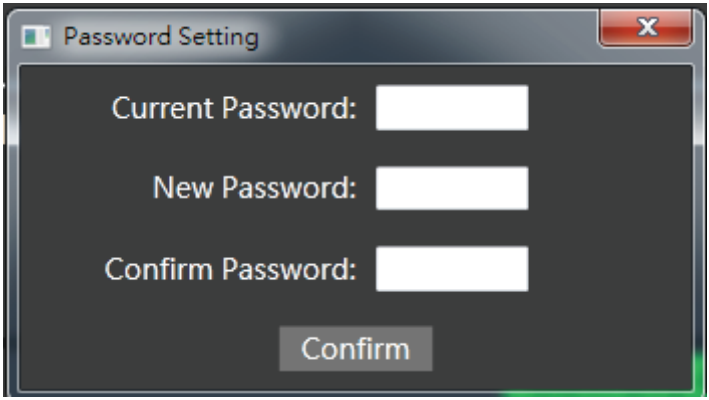
1) Preset List: All saved presets will show in this list (total 24 presets).
2) Device/PC
   - Save: Select relevant presets user want to save and then select the device or PC where presets will be saved in, Finally click "save" button to save them.
   - Load: Available for user to load relevant parameters from device or PC.
   - Delete: Click the "delete" button to delete all selected parameters in software list.
3) Channel Copy
   - Available to select any channel from Input1-4 or Output 1-8 and copy it to other any channel based on settings of DSP,Gain and mute.
   - Select All: Click the button to select all corresponding I/O channels.
   - Copy: After selecting channels,Click the button to copy relevant parameters applied on these selected channels.
4) Device Name: Used to customize the device's name,Default value: Click it to restore factory device name.
   IP Config: Used to modify dynamic/stastic IP settings of device.

Software Editor

5) System Sampling Ratio: 48K /96K,If 96K sampling ratio selected for the system, only 2 FIR and 2 GEQ applied.

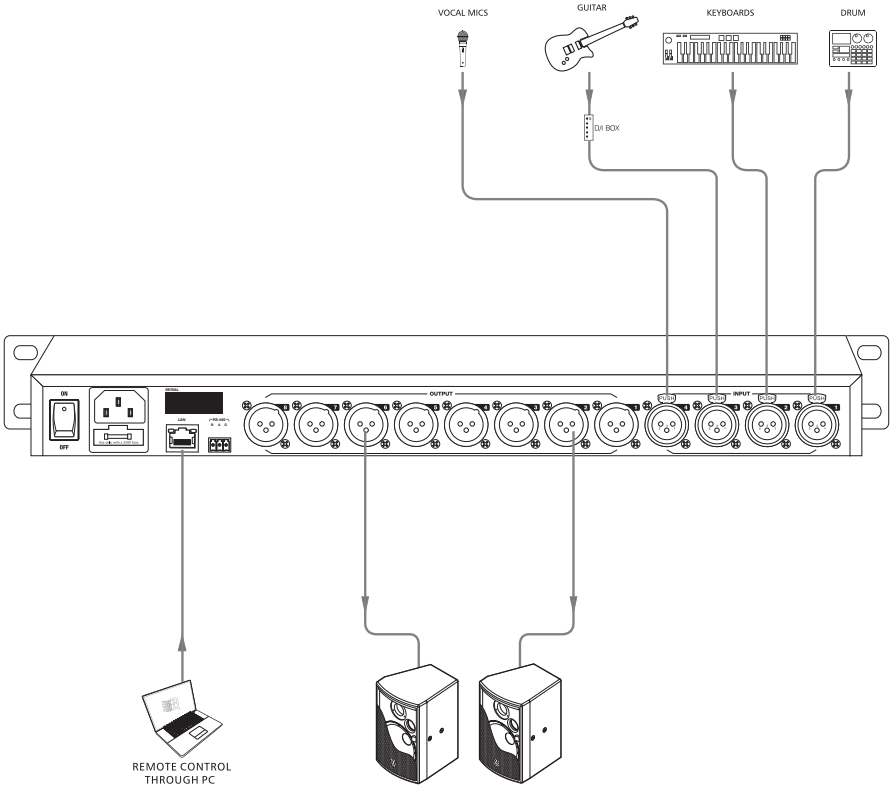
6) Default Setting: Except "Device name"/"channel name"/"Device passwords",Other items can be restored into the default value by clicking the button.
Factory setting: Click it to clear all settings as well as default setting involved.

7) Password Setting: Press the button to modify passwords,If it is the first time. Please key in "0000" initial password as current password.
If user forget the current password, Please key in "8888" super password to customize the new password.



Lock System: Click it to lock the system.
Remark: please key in the super password "8888" to unlock the system in case user forget the locking password.

Hookup Diagram



Technical information

Input	Electronically balanced
Frequency Response to Main Output	20Hz~20KHz at 0dBu +1/-3dBu
Distortion(THD&N) to Main Output	<0.01% at +1.5/-1.5dBu 1KHz
Maximum Input Level	+20dBu

Outputs	
Maximum Output Level	+20dBu
SNR(Signal to Noise Ratio)	107dBu

System Crosstalk	
Input to Output	-88dBu
Adjacent Channels	-88dBu

Noise Gate	
Threshold Range	-80dBu~ + 20dBu
Attack time	0mS ~ 250mS
Relesae time	5mS~2S

Compressor	
Threshold Range	-80dBu~+20dBu
Attack time	0mS ~ 250mS
Relesae time	5mS~2S
Ratio	1:1 to 40:1
Gain	0dB~ +12dBu

EQ	
Low (LowPass or LowShelf)	20Hz~20KHz +/- 15dBu
Low Mid	20Hz~20KHz +/- 15dBu
High Mid	20Hz~20KHz +/- 15dBu
High(HighPass or HighShelf)	20Hz~20KHz +/- 15dBu

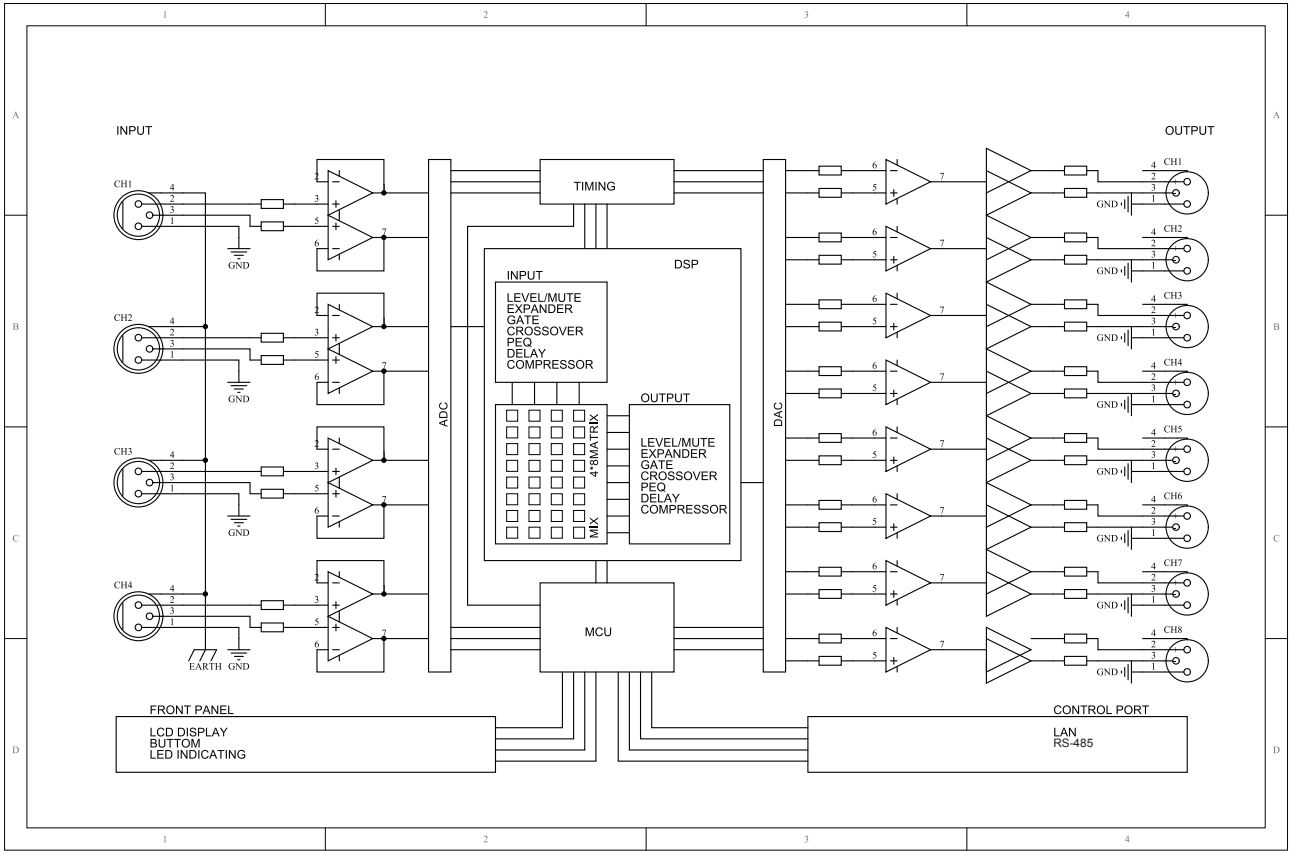
Impedances	10Kohm
operating free-air temperature range	0~45℃

Power Supply	100-240VAC~ 50/60Hz Fuse T1.6AL
Power consumption	40W

Appendix

NO.	"Start Byte0 (1Byte)"	"Start Byte1 (1Byte)"	Start Byte2 (1Byte)	Length (2 Byte)	Device (2 Byte)	ID Adress (High Byte)	ID Adress (Low Byte)	Type (2 Byte)	Command (2 Byte)	Channel Local Channel : 0x 01 - 0x04 (n Byte) Network Channel : 0x0D - 0x14	Value (n Byte)	"End Byte (1Byte)"	function
1	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x01	Channel 1-8 : 0x01–0x08 (1 Byte)	Volume: 0x00 -0x6B(1 Byte)	0x40	Input Gain
2	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x02	Channel 1-8 : 0x01–0x08 (1 Byte)	Phase: 0x00 - Norma l , 0x01–Invert(1 Byte)	0x40	Input Phase
3	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x03	Channel 1-8 : 0x01–0x08 (1 Byte)	Mute: 0x00–Off, 0x01–On(1 Byte)	0x40	Input Mute
4	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x04	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid: 0x00(1 Byte)	0x40	Get Input Status
5	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x04	Channel 1-8 : 0x01–0x08 (1 Byte)	"Volume: 0x00 -0x6B(1 Byte) Phase: 0x00 - Norma l , 0x01–Invert (1 Byte) Mute: 0x00–Off , 0x01–On(1 Byte)"	0x40	Receive Input Status
6	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x05	Channel 1-8 : 0x01–0x08 (1 Byte)	Volume: 0x00-0x6B (1 Byte)	0x40	Output Gain
7	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x06	Channel 1-8 : 0x01–0x08 (1 Byte)	Phase: 0x00-Norma l ,0x01-Invert(1 Byte)	0x40	Output Phase
8	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x07	Channel 1-8 : 0x01–0x08 (1 Byte)	Mute: 0x00-Off,0x01-On(1 Byte)	0x40	Output Mute
9	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x08	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid : 0x00(1 Byte)	0x40	Get Output Status
10	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x08	Channel 1-8 : 0x01–0x08 (1 Byte)	"Volume: 0x00-0x6B (1 Byte) Phase: 0x00-Norma l , 0x01-Invert(1 Byte) Mute: 0x00-Off , 0x01-On (1 Byte)"	0x40	Receive Output Status
11	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x09	"Matrix Output Channel : 0x01-0x10(1 Byte) Matrix Input Channel : 0x01–0x11 (1 Byte)"	Routing: 0x00-On , 0x01-Off (1 Byte)	0x40	"Matrix Mixer Matrix Input Channel 9 = OSC"
12	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0A	Matrix Output Channel : 0x01–0x10(1 Byte)	Invalid: 0x00(1 Byte)	0x40	Get Matrix Mixer Status
13	0x01	0x20	0x03	0x00 0x14	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0A	Matrix Output Channel : 0x01–0x10(1 Byte)	Matrix Local Input 01: 0x00-On , 0x01-Off (1 Byte) Matrix Local Input 17: 0x00-On , 0x01-Off (1 Byte)	0x40	Receive Matrix Mixer Status
14	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0B	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid: 0x00 (1 Byte)	0x40	Input Gain Up
15	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0C	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid: 0x00 (1 Byte)	0x40	Input Gain Down
16	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0D	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid: 0x00 (1 Byte)	0x40	Output Gain Up
17	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0E	Channel 1-8 : 0x01–0x08 (1 Byte)	Invalid: 0x00 (1 Byte)	0x40	Output Gain Down
18	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x0F	Invalid : 0x00 (1 Byte)	Oscillator: 0x01-PINK NOISE,0x02-WHITE NOISE 0x03-SINE WAV	0x40	Oscillator
19	0x01	0x20	0x03	0x00 0x11	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x10	Channel 1-8 : 0x01–0x08 (1 Byte)	"FIR: 0x00-Off ,0x01-On(1 Byte) InsertPos: 0x00-OUTPUT ,0x01-INPUT(1 Byte)"	0x40	FIR
20	0x01	0x20	0x03	0x00 0x1F	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x11	"16 Chars Device Name -ASCII Code (16 Byte)"	Invalid: 0x00(1 Byte)	0x40	Modify Device Name
21	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x12	Invalid : 0x00 (1 Byte)	Invalid: 0x00(1 Byte)	0x40	Get Device information
22	0x01	0x20	0x03	0x00 0x1E	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x12	"16 Chars Device Name -ASCII Code (16 Byte)"	Firmware Version: 0x10-0x99	0x40	Receive Device information
23	0x01	0x20	0x03	0x00 0x10	0x00 0x77	0x01 (High Byte of ID address)	0x00 (Low Byte of ID address)	0xA5 0xE8	0x00 0x13	Preset number : 0x01 – 0x18 (1 Byte)	Invalid: 0x00(1 Byte)	0x40	Recall Preset

Block Diagram



User Manual