TOPP PRO MUSIC GEAR

www.topppro.com

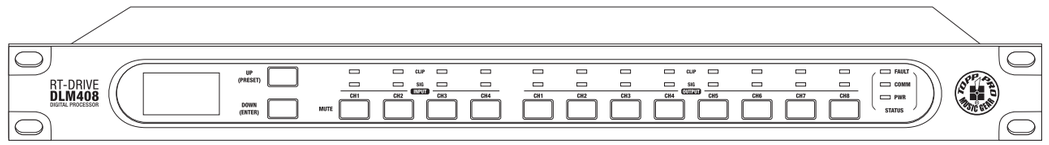
RT-DRIVE
DLM408
DIGITAL PROCESSOR

NF05021-1.0

RT-DRIVE DLM408

User's Manual

DIGITAL PROCESSOR
AUDIO MATRIX PROCESSOR



Important Safety Instructions

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

TO REDUCE THE RISK OF ELECTRIC SHOCK PLEASE DO NOT REMOVE THE COVER OR THE BACK PANEL OF THIS EQUIPMENT.
THERE ARE NO PARTS NEEDED BY USER INSIDE THE EQUIPMENT. FOR SERVICE, PLEASE CONTACT QUALIFIED SERVICE CENTERS.

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.

1. Read this Manual carefully before operation.
2. Keep this Manual in a safe place.
3. Be aware of all wamings reported with this symbol.
4. Keep this Equipment away from water and moisture.
5. Clean it only with dry doth. Do not use solvent or other chemicals.
6. Do not damp or cover any cooling opening. Install the equipment only in accordance with the Manufactu-rer's instructions.
7. Power Cords are designed for your safety. Do not remove Ground connections! If the plug does not fit your AC outlet, seek advice from a qualified electri-cian. Protect the power cord and plug from any physical stress to avoid risk of electric shock. Do ot place heavy objects on the power. This could cause electric shodk or fire.
8. Unplug this equipment when unused for long periods of time or during a storm.
9. Refer all service to qualified service personnel only. Do not perform any servicing other than those instruc-tions contained within the User's Manual.
10. To prevent fire and damage to the product, use only the recommended fuse type as indicated in this manual. Do not short-circuit the fuse holder.

WARNING
To reduce the risk of electric shock and fire, do not expose this equipment to moisture or rain.

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

Before replacing the fuse, make sure that the product is OFF and disconnected from the AC outlet.

11. Move this Equipment only with a cart, stand, tripod, or bracket, specified by the manufacturer, or sold with the Equipment. When a cart is used, use caution when moving the cart / equipment combination to avoid possible injury from tip-over.

12. Permanent hearing loss may be caused by exposure to extremely high noise levels.
The US. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible exposure to noise level.
These are shown in the following chart:

Hours x day	SPL	Example
8	90	Small gig
6	92	Train
4	95	Subway train
3	97	High level desktop monitors
2	100	Classic music concert
1.5	102	
1	105	
0.5	110	
0.25 or less	115	Rock Concert

According to OSHA, an exposure to high SPL in excess of these limits may result in the loss of heat. To avoid the potential damage of heat, it is recommended that Personnel exposed to equipment capable of generating high SPL use hearing protection while such equipment is under operation.

The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

The mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

Notes

11 Guarantee

Topp Pro guarantees the normal operation of the product against any defect of manufacture and / or vice of material, by the term of (12) months, counted as of the date of purchase on the part of the user, committing itself to repair or to change, to its election, without position some, any piece or component that will fail in normal conditions of use within the mentioned period.

This guarantee is valid if the original buyer will have to present/display this certificate properly sealed and signed by the selling house, accompanied by the corresponding invoice of purchase where it consisted the model and serial number of the acquired equipment.

The guarantee does not cover:

- Damages caused by the illegal use of the product, repair and/or nonauthorized modification conducted by people by **Topp Pro**.
- Damages caused by the connection of the equipment to other equipment different from the specified ones in the manual of use, or by bad connection to these last ones.
- Damages caused by electrical storms, blows and/or incorrect transport.
- Damages caused by excesses or falls of tension in the network or by connection to networks with a tension different from the required one by the unit.
- Damages caused by the presence of sand, acid of batteries, water, or any strange element inside the equipment.
- Deteriorations produced by the course of the time, use and/or normal wear of the unit.
- Alteration or absence of the serial number of factory of the equipment.

The repairs could only be carried out the authorized technical service by **Topp Pro**, that will inform about the term and other details into the repairs to take place according to this guarantee.

Topp Pro, will repair this unit in counted a term nongreater to 30 days as of the date of entrance of the unit to the Technical Service. In those cases in that due to the particularitity of the spare part, outside necessary their import, the repair time and the viability of the same one will be subject to the effective norms for the import of parts, in which case one will inquire to the user about the term and possibility into repair.

With the object of its correct operation, and of the validity of this one guarantee, this product will have to be installed and to be used according to the instructions that are detailed in the manual associate or the package of the product.

This unit will be able to appear for its repair, next to the invoice of purchase (or any other proof where the date of purchase consists), to its authorized distributer Topp Pro or an authorized technical center on watch by **Topp Pro**.

Exclusion of damages:
THE RESPONSABILITY OF TOPP PRO BY ANY DEFECTIVE PRODUCT IS LIMITED THE REPAIR OR THE REPLACEMENT OF HE HIMSELF, TO TOPP OPTION PRO. IF WE CHOSE TO REPLACE THE PRODUCT, THE REPLACEMENT CAN BE A RECONDITIONATED UNIT. TOPP PRO WILL NOT BE RESPONSIBLE BY THE DAMAGES BASED ON THE LOST, INCONVENIENCE, LOSS OF USE, BENEFITS, LOST SAVINGS, BY THE DAMAGE TO OTHER EQUIPMENT OR OTHER ARTICLES IN THE USE SITE, OR BY ANY OTHER DAMAGE IF HE IS FORTUITOUS, CONSEQUENT OR OF ANOTHER TYPE, ALTHOUGH TOPP PRO HAS BEEN NOTICED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow to the exclusion or the limitation to the fortuitous or consequent damages, so the aforesaid limitation can not be applied to you.
This guarantee gives specific legal rights him, you you can also have other right that varies of state to state.

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DIGITAL PROCESSOR

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Don't forget to visit our website at **www.topppro.com**
for more information about this and other **Topp Pro** products.

1 Introduction

Thank you for choosing **TOPP PRO**. The new **TOPP PRO MUSIC GEAR RT-DRIVE DLM408** 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.

Our Professional Audio Products are designed and tested by a highly qualified engineering team with more than 20 years of experience. Great pride & care is placed in delivering products with excellent performance, specifications and dependa ble reliability. Also great emphasis is placed in creating and bringing to market products that can fill multiple applications and also offer customers exceptional values.

Every **TOPP PRO** audio product is strictly tested and complied to very strict standards.
Please carefully read this manual before starting operation! Thank you again for choosing **TOPP PRO MUSIC GEAR RT-DRIVE DLM408**.

2 Features

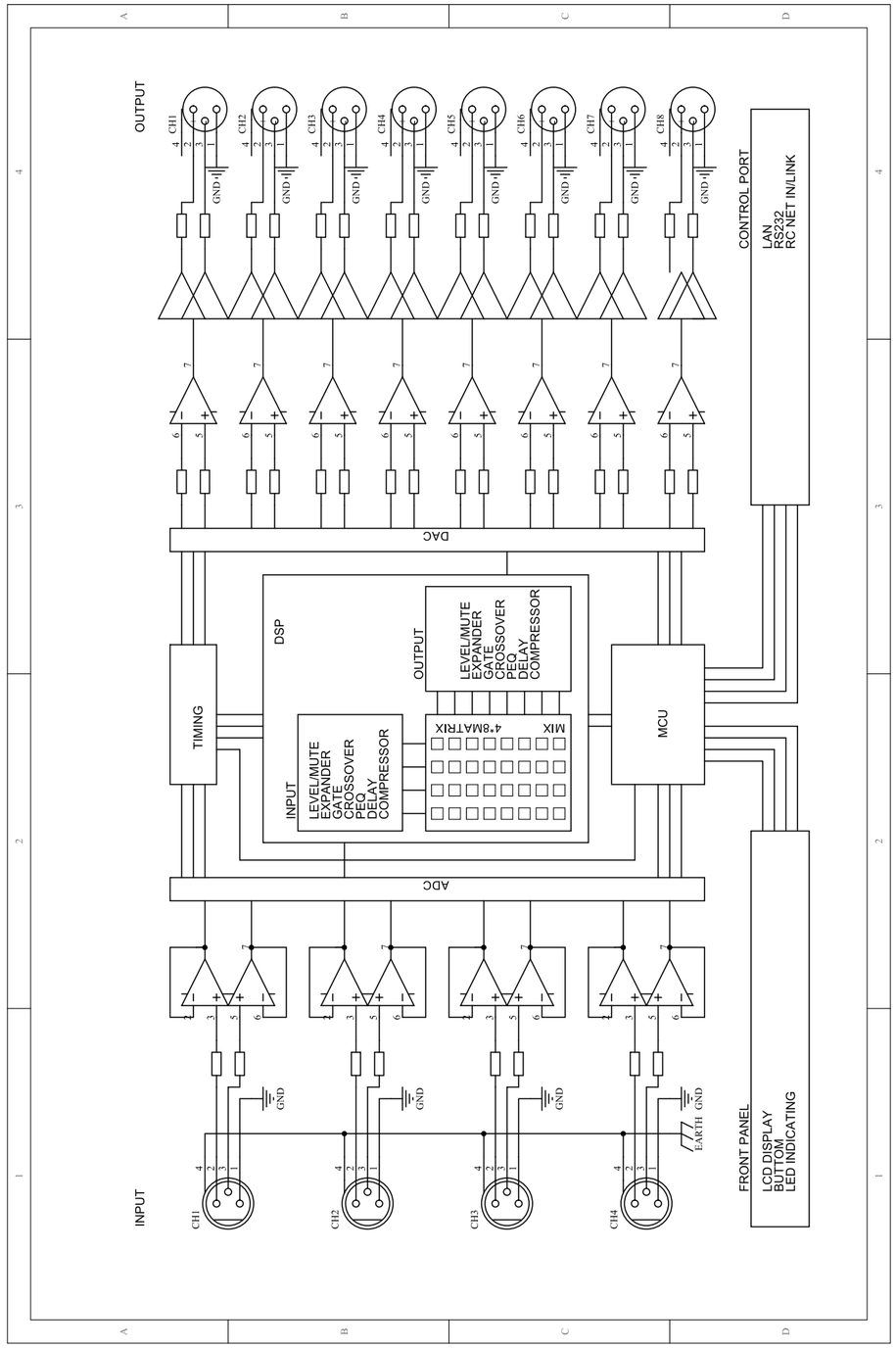
- All input channels are equipped with GATE/EXP/CROSSOVER/PEQ/DELAY/COMPRESSOR function.
- All input channels are equipped with Gain/Crossover/PHASE/PEQ/DELAY/COMPRESSOR function.
- 4 in / 8 out audio matrix processor.
- Input and output channels support 4 * 8 matrix combination settings.
- Match with PC and App operation software, which is convenient for user.
- User can on-line update DSP and MCU Firmware via internet.

3 Usefull Data

Please write your serial number here for future reference.

Serial Number:
Date of Purchase:
Purchased at:

10 Block Diagram



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Technical information

Input	Electronically balanced
Frequency Response to Main Output	20Hz~20KHz at 0dBu +1/-3dB
Distortion(THD&N) to Main Output	<0.01% at 0dBu 1KHz
Maximum Input Level	+20dBu
Outputs	
Maximum Output Level	+20dBu
SNR(Signal to Noise Ratio)	108dB
System Crosstalk	
Input to Output	-90dBu
Adjacent Channels	-90dBu
Noise Gate	
Threshold Range	-84dBu - 0dB
Attack time	0.5mS ~ 200mS
Releae time	5mS~2S
Compressor	
Threshold Range	-30dBu -+20dB
Attack time	10mS ~ 150mS
Releae time	10mS~1S
Ratio	1:1 to 24:1
Gain	0dBu - +24dB
EQ	
Low (LowPass or LowShelf)	21Hz~19.2KHz +/- 24dB
Low Mid	21Hz~19.2KHz +/- 24dB
High Mid	21Hz~19.2KHz +/- 24dB
High(HighPass or HighShelf)	21Hz~19.2KHz +/- 24dB
Impedances	10Kohm
operating free-air temperature range	0~40℃
Power Supply	100-240V~ 50/60Hz
	T1.6AL
	30Wmax

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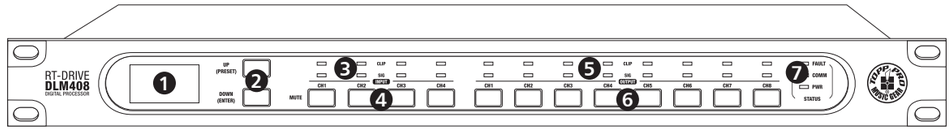
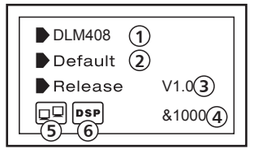
Function Buttons and LED Indicators

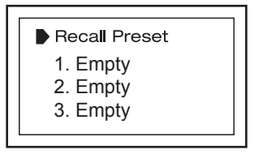


1. LCD Screen
Display device information, such as device name, port number, preset etc.
a. Initial page



(1) Device name
(2) Current preset
(3) Current release version
(4) Current ID, when connecting with device, the ID can be obtained automatically.
(5) This image means the PC isn't connecting with DLM408; if connecting well, the two devices inside box will flash alternately.
(6) This image means DSP communication well, if faulty, it will show DSP!.

b. Preset list



2. UP and DOWN buttons (PRESET and ENTER)
The two buttons can meet operation demands of LCD screen.

-UP: Click to list up.

-DOWN: Click to list down.

-PRESET: Function as following
1) Enter Preset List
Press this button for about 3 seconds to enter "Recall Preset" page, you can see totally 32 presets, every preset can be set at PC, after finishing the setting, then save the preset, it can be synchronously saved to DLM408.
2) Exit from Current Page
In"Recall Preset"page, press PRESET button again for 3~4 seconds. exit from current page to initial page.
3) Indicate System Information
In initial page, press PRESET button for 3~4 seconds, you can see system information showed on LCD screen, such as system version(System V1.0), firmware version(Firmware V1.0).

Function Buttons and LED Indicators

- ENTER. Function as following
1) Load Preset
Click UP/DOWN button to select preset, then press the “ENTER” button for about 3 seconds to recall the selected preset. After recalling successfully, the screen will display “Load OK”.
2) Exit from Preset List Page
When the selected preset is empty, press ENTER for 3 seconds, no preset to load, the system will exit from current page and return back to initial page.
3) Default setting
press both PRESET and ENTER buttons for 8 seconds to erase all memory settings, for default setting.

Note that whichever page it is, if hang it without any operation, the system will go back to initial page about 5 seconds later.

3. Input Signal LED indicating
Indicate input connection status. When you connect this device to other host, the LEDs indicate corresponding Channel port connection status at back panel.

LEDs indicate as below:
-CLIP(RED). It means current CH input signal overload, the led lights up when the signal >15dB.
-SIG(GREEN). It means some signal input from current CH port, the led lights up when the signal >-30dB.

4. Input Channel MUTE Button
Press CH1-4 buttons, the corresponding background LED light, which means to mute signal from selected channels.

5. Output Signal Indicating LED
Indicate output connection status. When you connect this device to other hosts, LEDs here indicate corresponding XLR port connection status at back panel.

LEDs indicate as below:
- CLIP(RED). It means current XLR output signal overload, the led lights up when the signal >15dB.
- SIG(GREEN). It means some signal output from current XLR port, the led lights up when the signal >-30dB.

6. Output Channel Select Button
Press CH1-8 buttons, the corresponding background LED light, which means to mute signal can output from selected channels.

7. Status LED Indication
LED indicating as below:
- COMM.(GREEN). Power on DLM408 and connect it with PC by router, then open DLM408’s software control page on PC, it lights if communication is common; while it turns off if communication is fault.

- FAULT(RED). It lights when DSP runs fault, you can see fault information on LCD screen, see details in section 1 about LCD Screen. At this time please check your device configuration.

- PWR(BLUE). It means the power on.

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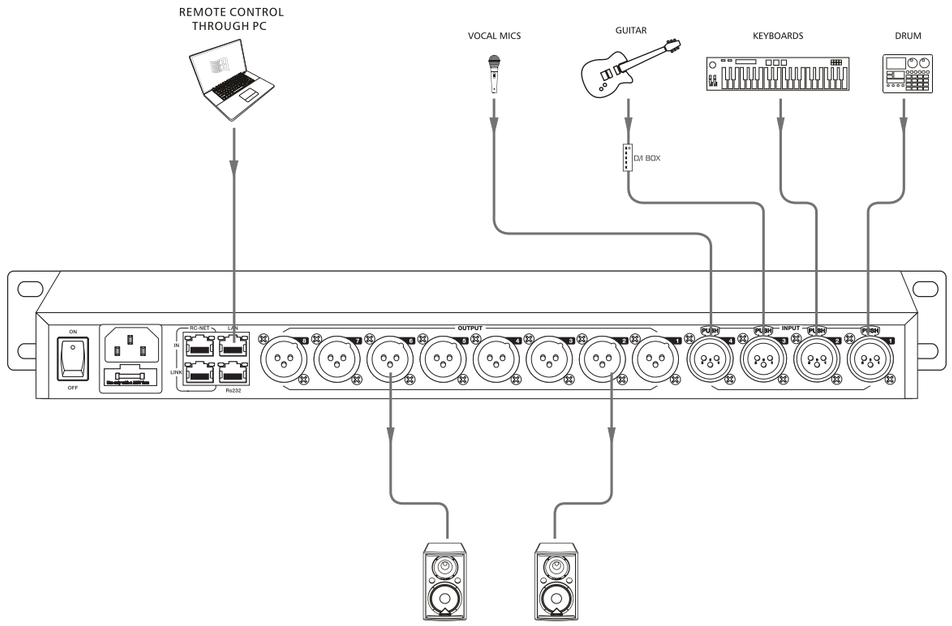
Hookup Diagram



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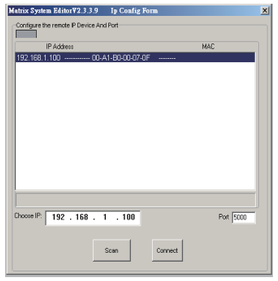
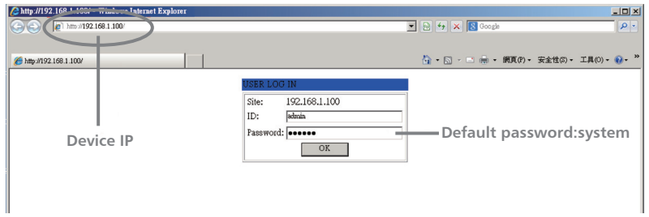
Web Configuration of LAN Module

Web Configuration of LAN Module

1. Search IP address of LAN Port by PC software.

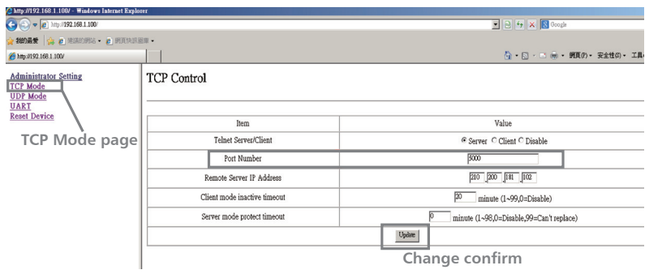


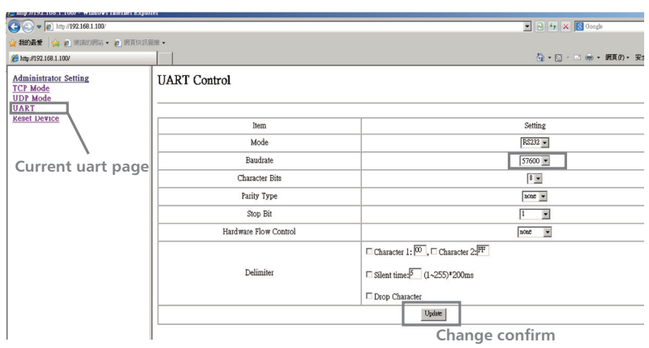
2. Open the browser on PC , input IP that searched in above step to enter the configuration web site.



Below pictures show the configuration and review for port number and Baud rate.

3. Please DO NOT change the Baud rate and TCP PORT, while you can change any other parameters. Then click “Update” and restart device.





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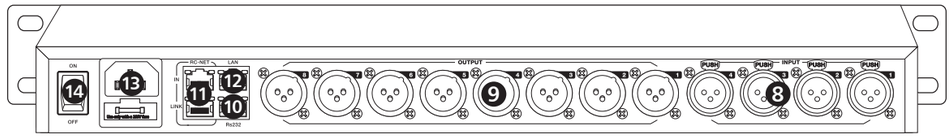
Rear Panel

Rear Panel



8. CH Input Port1~4
3 poles XLR input. These ports are used for connecting input device of analog microphone or line input devices.

9. XLR Output Port 1~8
These ports are used for connecting analog line output device, such as Amplifier and Speaker.

10. RS-232 Input Port
It can connect other device via RS232 data line, DLM408 can be controlled by this device’s action. Such as selecting two audio channel or mute whole system by device connected to this port.
The used baud rate is 57600.
Below table lists the whole command of RS-232:

Volume Control:

N0.	Start Byte0 (1Byte)	Start Byte1 (1Byte)	Start Byte2 (1Byte)	Length (1 Byte)	Command (1 Byte)	Channel (1Byte)	Value (N Bytes))	End Byte2 (1Byte)	function
1	0x01	0x20	0x03	0x08	0x04	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	0x00	0x40	Get Input channel Status Command
2	0x01	0x20	0x03	0x0a	0x04	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	Byte1: Volume Value 0~160 Byte2: Phase Value 0 - Normal, 1 - Invert Byte2: Mute Value 0 - OFF， 1 - ON	0x40	Input channel Status (output from device)
3	0x01	0x20	0x03	0x08	0x08	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	0x00	0x40	Get Output channel Status Command
4	0x01	0x20	0x03	0x0a	0x08	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	Byte1: Volume Value 0~160 Byte2: Phase Value 0 - Normal, 1 - Invert Byte2: Mute Value 0 - OFF， 1 - ON	0x40	Output channel Status (output from device)
6	0x01	0x20	0x03	0x08	0x15	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	0x00	0x40	Change Input channel Volume UP
7	0x01	0x20	0x03	0x08	0x16	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	0x00	0x40	Change Input channel Volume Down
8	0x01	0x20	0x03	0x08	0x17	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	0x00	0x40	Change Output channel Volume UP
9	0x01	0x20	0x03	0x08	0x18	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	0x00	0x40	Change Output channel Volume Down
10	0x01	0x20	0x03	0x08	0x03	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	Mute: 0x01 Mute Cancel :0x00	0x40	Change Input channel Mute
11	0x01	0x20	0x03	0x08	0x07	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	Mute: 0x01 Mute Cancel :0x00	0x40	Change Output channel Mute
12	0x01	0x20	0x03	0x08	0x01	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04	Value Range: 0~190	0x40	Change Input channel Volume
13	0x01	0x20	0x03	0x08	0x05	CH1: 0x01 / CH2: 0x02 CH3: 0x03 / CH4: 0x04 CH5: 0x05 / CH6: 0x06 CH7: 0x07 / CH8: 0x08	Value Range: 0~190	0x40	Change Output channel Volume
BuadRate: 9600,n,1									

Rear Panel

System Setting:

N0.	Start Byte0 (1Byte)	Start Byte1 (1Byte)	Start Byte2 (1Byte)	Length (1 Byte)	Command (1 Byte)	Value (N Byte)	End Byte (1Byte)	function
1	0x01	0x20	0x03	0x17	0x0D	Byte 1-16: 16 Chars Device Name (ASCILL Code)	0x40	Write device name
2	0x01	0x20	0x03	0x08	0x0E	0x00	0x40	Get Device information Command
3	0x01	0x20	0x03	0x17	0x0E	Byte 1-16: 16 Chars Device Name (ASCILL Code) Byte 17: Firmware Version	0x40	Get Device information (Output from device)
4	0x01	0x20	0x03	0x08	0x0F	Preset Number: Byte 1: 0-24	0x40	Recall Preset
BuadRate: 9600,n,1								

Routing:

N0.	Start Byte0 (1Byte)	Start Byte1 (1Byte)	Start Byte2 (1Byte)	Length (1 Byte)	Command (1 Byte)	Select Output Bus Channel (1Byte)	Select Routing Input Channel (1 Byte)	Value (1 Byte)	End Byte (1Byte)	function
1	0x01	0x20	0x03	0x09	0x09	Analog Output1 Mixer:0x01 Analog Output2 Mixer:0x02 Analog Output3 Mixer:0x03 Analog Output4 Mixer:0x04 Analog Output5 Mixer:0x05 Analog Output6 Mixer:0x06 Analog Output7 Mixer:0x07 Analog Output8 Mixer:0x08	Analog Input1:0x01 Analog Input2:0x02 Analog Input3:0x03 Analog Input4:0x04	ON : 0x01 OFF: 0x00	0x40	Routing Input to Outputs
BuadRate: 9600,n,1										

Get Output Channel Mixer Status:

N0.	Start Byte0 (1Byte)	Start Byte1 (1Byte)	Start Byte2 (1Byte)	Length (1 Byte)	Command (1 Byte)	Output Bus Channel (1Byte)	Input Channel to Output Bus Status (16 Bytes)	End Byte (1Byte)	function
1	0x01	0x20	0x03	0x1c	0x09	Analog Output1 Mixer:0x01 Analog Output2 Mixer:0x02 Analog Output3 Mixer:0x03 Analog Output4 Mixer:0x04 Analog Output5 Mixer:0x05 Analog Output6 Mixer:0x06 Analog Output7 Mixer:0x07 Analog Output8 Mixer:0x08	Byte1: Analog Input1 To Output Bus Status Byte2: Analog Input2 To Output Bus Status Byte3: Analog Input3 To Output Bus Status Byte4: Analog Input4 To Output Bus Status Byte5: NC. Byte6: NC. Byte7: NC. Byte8: NC. Byte9: NC. Byte10: NC. Byte11: NC. Byte12: NC. Byte13: NC. Byte14: NC. Byte15: NC. Byte16: NC. Status : 0 ==OFF , 1==ON	0x40	Get output channel Mixer Status
BuadRate: 9600,n,1									

11. RC-NET Input/Link Port
Control signal can transmit through this network port.
RC-Net is based on RS-485 transport protocol, which owns function of RS485 data exchange, to realize large-scale real data transmit.

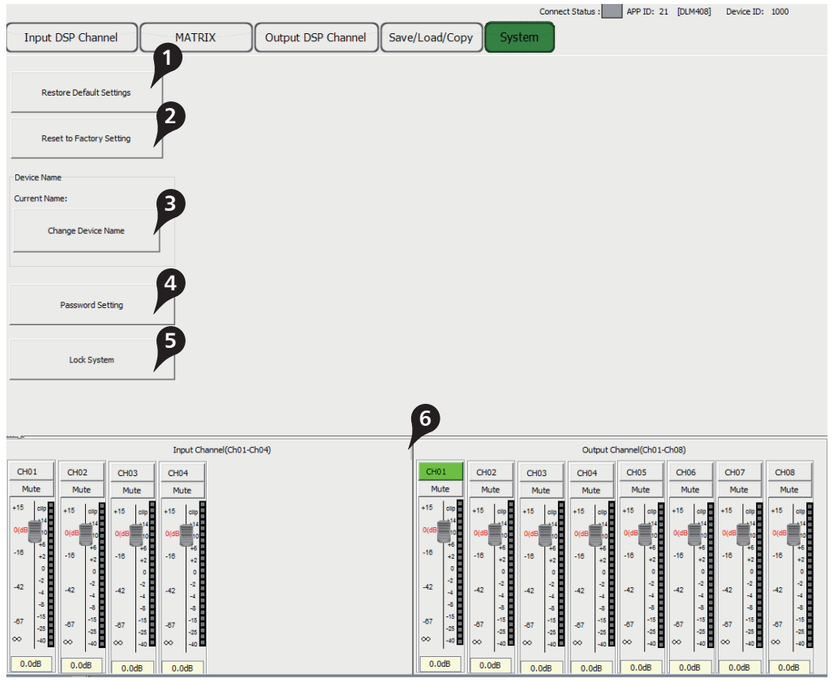
12. LAN Network Control Port
DLM408 can connect with Ethernet switch via this port. On LAN network control port, you can see two LEDs, they are connection status indicator (green) and signal transmit indicator(yellow).
-- If the yellow LED goes out, means no signal transmits; while if yellow LED is on, but green one goes out, means the device detects network, but no connection.
-- If green LED is on ,means network connects well.

13. Power Inlet
Connect AC voltage, 100-240VAC, 50-60Hz.

14. Power Switch
Press it to turn on/off the device.

DSP Control

7. System



1).Restore default settings
Click this button to restore all settings.

2).Reset to factory settings
Click this button to reset all setting parameters to default.

3).Change device name
Click this button to change current device name in the dialog that pops-up.

4).Password setting
Click this button to set password.

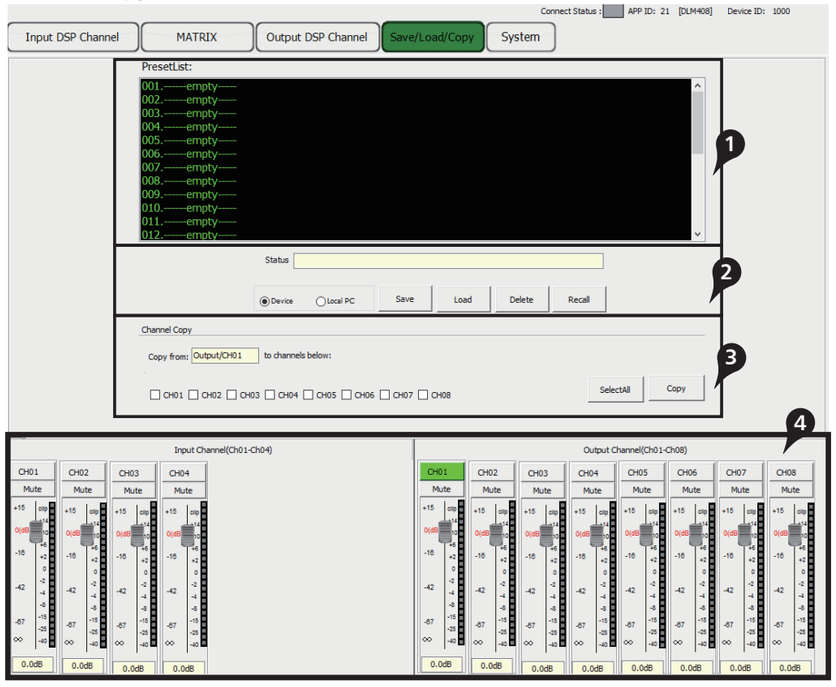
5).Lock system
Click this button to lock system.

6).Input/Output Channel Parameter Control
Please refer to section 3 Input DSP Channel for details about this area.

6

DSP Control

6. Save/Load/Copy



1). Preset List
The text area shows preset list that have been saved, select a preset, then click Load button to load the selected preset to corresponding control.

2). Save/Load/Delete/Recall
When use this function, please pay attention the switch of Device and Local PC first. If Device is selected, Save and Load buttons are not enabled, which means you can not save or load presets from Device to PC. While they are enabled if select Local PC.
-Save
In Local PC mode, select a preset in Preset List, then click Save button to save the selected preset from Local PC to DLM408.
-Load
In Local PC mode, select a preset in Preset List, then click Load button to load the selected preset from Local PC to DLM408.
-Delete
In Device mode, select a preset in Preset List, then click Delete button to delete the selected preset from DLM408.
-Recall
In Device mode, click Recall button to recall all the presets in Preset List.

3). Copy
Select a channel that you want to copy to other channels from item menu, such as CH01, then select Input Channel or Output channel, select the channels that you want to be copied or click SelectAll button to copy CH01 to these channels.

4). Input/Output Channel Parameter Control
Please refer to section 3 Input DSP Channel for details about this area.

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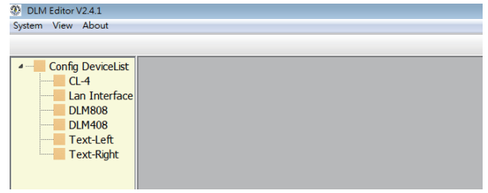
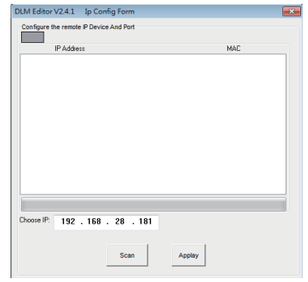
DSP Control

DLM408 can connect with PC by internet port on router. After successfully connected, please click the file named MatrixPro.exe on PC, you can see initial page as below picture shows, which can set connection of each device.



1. Configuration of IP Address
When connect DLM408 with PC by internet port on router:
Before connect devices on software control page, please set IP address of DLM408 and router first, below gives steps(pay attention that the toggle switch on DLM408 rear panel should be at LAN side):

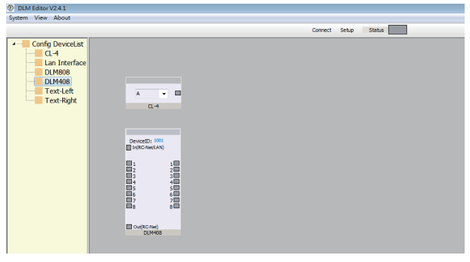


1). Click "Setup" control on top right corner, a search dialog will jump up, click "Scan" button, it will automatically search IP and MAC address in the system, as below picture shows. Then click "Apply" button to build communication. The "Status" control in top right corner indicates the communication status, which will light green if connect right, while off means fail to connect.

2). If fail to connect following above step, then please key the IP address in "Choose IP" text field, then click "Apply" button. After connecting successfully, you can see device information in the lower-left corner.

2. Configuration of Device Connection on Initial Page
Below picture shows you the connected status between CL-4 and DLM408.

How to connect?
1). Add Device
Click CL-4(or Lan Interface) under "Config DeviceList" and drag it to the middle area, then release mouse, the CL-4 will be added to this area, use the same way to add other devices.

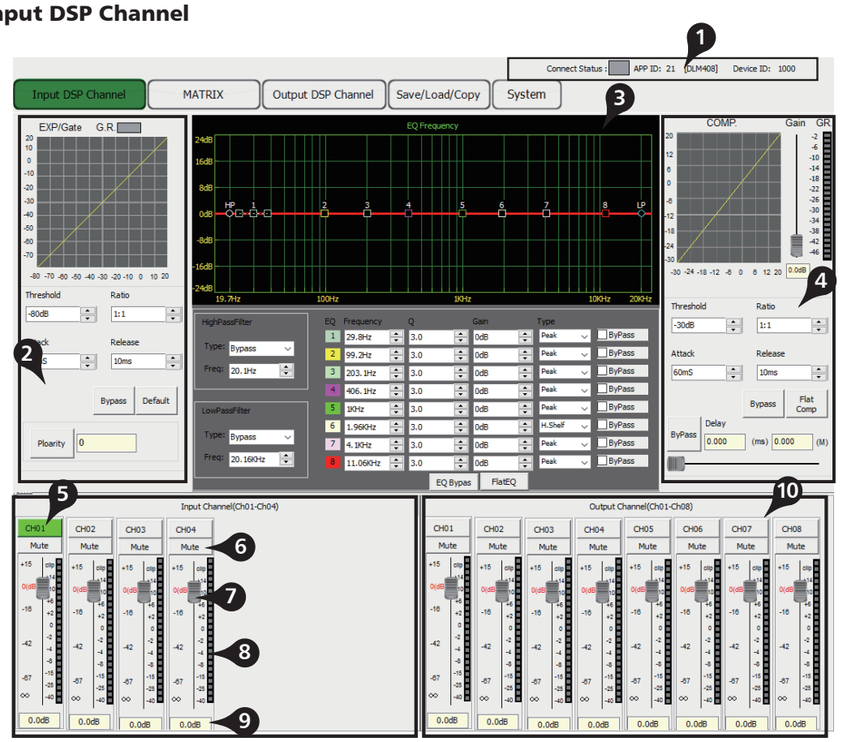


2). Delete Device
Right-click the device, select "Delete Module" to delete it.
Note: Before delete the device, please make sure that all the lines that connected to the selected device have been removed, or you may fail to delete it.

3). Configuration of Device ID
Right-click the device, select "Change DeviceID" , a dialog appears as below picture shows,input a new Device ID in the text field, then click "OK" button to change it.
Note: The new ID you key in must be the same as it is showing on DLM408's LCD screen.

After successfully connected devices, double click DLM408 on this initial page to enter DSP control page, which will be introduced later.

3. Input DSP Channel



1). Device Data
After connecting PC with DLM408 and communication right, here you can see information about current channel, device name, ID number etc. If Connect Status icon is green, means communication is right; While off means communication is fault.

2). Expander/Gate
In this area, you can adjust parameter of EXP/Gate , the curve in coordinate will change with parameter's change.
The Expander is used for adding input dynamic range according to user's demand.

- Threshold
Click the control to set Gate threshold of selected channel. This threshold value determines the open level of Gate. Actually, all input audio signal that higher than threshold value can go through, the range of threshold value is -80dB to 20dB.
If input signal is lower than threshold, the Expander can enlarge it with setting ratio, then output the signal.
If input signal is larger than threshold, output signal will be the same with input signal, which means ratio is 1:1.
If adjusting the ratio to max(∞), Expander will change to noise Gate.

- Ratio
Click the control to set ratio of input signal to output signal. That is the dynamic change value of Expander's input signal/dynamic change value of Expander's output signal.

5. Output DSP Channel

As you can see, compared with input DSP channel, this page only remove the Gate/EXP function, please refer to section 3 Input DSP Channel for details about its function.

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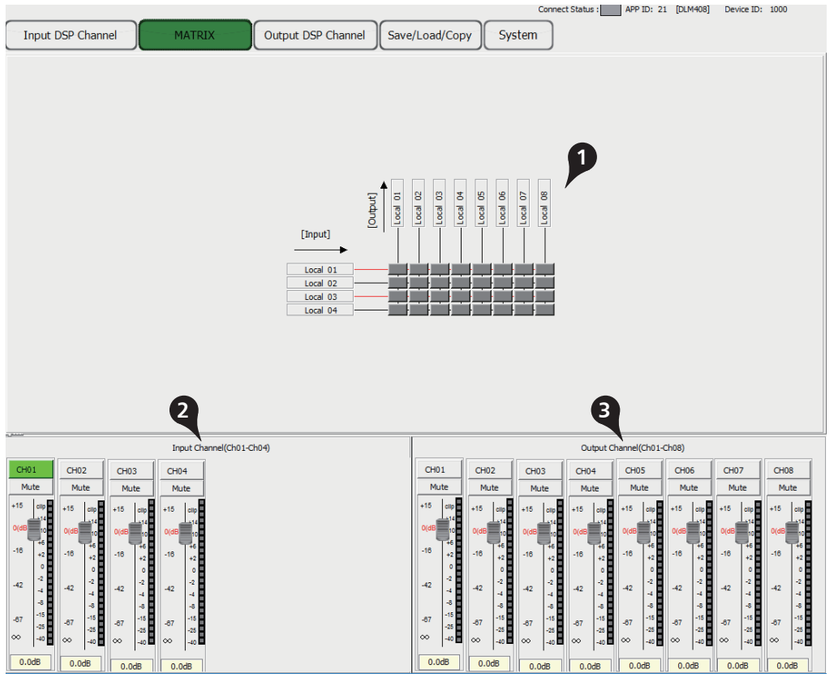
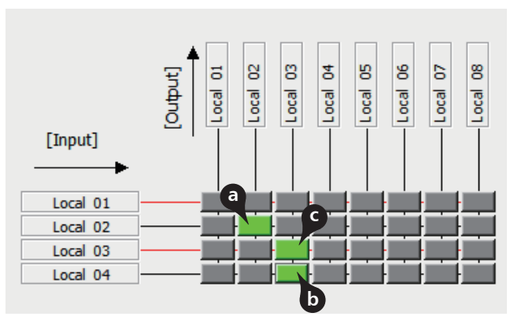
DSP Control

4. MATRIX



1). Assign of input and output channels
In this area, there are many small blocks, click one block, its background turns green, audio signal flow from left input channel to top output channel; while the signal won't go through any channel if it is not active. Below figure gives an example:

a. Click the block as a marked, its background turns green, means that signal input from channel Local 02 will be assigned to output channel Local 02. But the input channel Local 02 wouldn't be assigned to other output channels because there is no other block activates.
b&c. Click the block as b&c marked, their background turn green, means that signal input from channel Local 03 and Local 04 will be assigned to output channel Local 03. Other channels that inactive won't be assigned to any other output channel.
And so on...



2). Input Channel Parameter Control
Please refer to section 3 Input DSP Channel for details about this area.

3). Output Channel Parameter Control
Please refer to section 3 Input DSP Channel for details about this area.

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- Attack
Click the control to set the interval time from selected channel's signal beyond threshold to open noise Gate, the time can be set from 10 to 150ms.
Signals that increase slowly need lower attack, because if set the attack value too high, it may cause "click" noise. Actually, all Gate may cause "click" noise when operation, but it can be avoid if set properly.

- Release
Click the control to set the amount of time for the gate to go from open to fully close. It can be set from 0.01 to 1 second.
Note: A fast release abruptly cuts off the sound once it has fallen below the threshold, A slower release smoothly changes from open to closed, much like a slow fade out. If the release time is too short, a click can be heard when re-open the gate .

- Bypass
Click Bypass, it will illuminate red, all input signals will bypass control of Threshold, Ratio, Attack and Release to flow to next block, these parameters can not be adjusted.

- Default
Click this button to flat all set parameters to be default.

- Polarity
Click this button to invert the phase of the selected channel's signal (to alter the phase by 180°). If the phase reverse is active the button will illuminate. The Polarity control can be used to correct audio signals which are out of phase as well as to cancel/reinforce each other.

3). Equalizer
In this area, you can adjust parameter of Equalizer(EQ) , the curve in coordinate will change with parameter's change. EQ can compensate and correct frequency characteristic, through which to make its frequency response characteristic curve to be more smooth and straight. On DLM408, you can adjust 8 band EQ.

- High Pass Filter
This is a high-pass filter. It can pass higher frequencies. When set to its lowest position, the filter is off.
Type indicates the filter's type that you selected, different type means different shape and different filter frequency range.

- Low Pass Filter
This is a low-pass filter. It can pass lower frequencies. When set to its highest position, the filter is off.
Type indicates the filter's type that you selected, different type means different shape and different filter frequency range.

- EQ Frequency
Click the control to set the center frequency of the equalizer's
Low/Low-mid/High-mid/ High band separately. The center frequency is the middle of the pass-band between the lower and upper cutoff frequencies which define the limits of the band. The center frequency can be set from 19.7Hz to 20KHz.

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DSP Control

- Q
Click the control to set the Q for the Low/Low-mid/High-mid/High band separately. The Q is the ratio of the center frequency to the bandwidth. If the center frequency is constant, the bandwidth is inversely proportional to the Q, which means that if you raise the Q, the bandwidth will be narrowed. It can be adjusted from 0.4 to 128.

- Gain
Click the control to set the gain attenuation or boost at the center frequency for the Low/Low-mid/High-mid/High band separately. It can be set from -18 to +18 dB. When Gain is 0dB, center frequency and Q are all invalid.

- Type
To select current filter type of current EQ, option is Peak/L.Shelf/H.Shelf.

- EQ Bypass
Click this button to bypass all signal to next block, if EQ bypass function is active the button will illuminate. If it is not active,signal will be processed at this block and then flow to next block.

- Flat EQ
To flat all setting parameters to default.

4). Compressor
In this area, you can adjust parameter of compressor. Compressor will compress signal that higher than threshold with specified ratio, then output it. The curve in coordinate will change with parameter's change.

-Threshold
Click the control to set the compressor threshold for selected channel.
If amplitude of an audio signal exceeds a certain threshold, the compressor will reduce the level of this signal with specified ratio;
If amplitude of an audio signal is lower than this given threshold, compressor won't work, signal will flow to next block directly.
If setting ratio to "+∞", compressor will be limited.
Threshold can be set from -30dB to 20dB.

- Ratio
Click the control to set the compression ratio for selected channel. The ratio determines the amount of gain reduction. For example, a ratio of 4:1 means that if input level is 4 dB over the threshold, the output signal level will be 1 dB over the threshold. The ratio can be set from 10:1 to 1:1 until limit.

- Attack
Click the control to set the compressor's attack setting for selected channel. The attack setting is the period when the compressor is decreasing gain to reach the level that is determined by the ratio. You can set the attack from 10 to 150 milliseconds.

- Release
Click the control to set the compressor for selected channel. Release sets the length of time the compressor takes to return to its normal gain once the signal level drops below the threshold. Release can be set from 10 to 1,000 milliseconds.

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- Bypass
Click this button to bypass all signal to next block, if compressor bypass function is active the button will illuminate. If it is not active,signal will be processed at this block and then flow to next block.

- Flat COM
To flat all setting parameters to default.

- Delay
Delay here can engage and disengage the delay function for selected Channel. Move the slide below it to set delay time. Only if delay function is active can set the delay time. If Bypass beside it is enable, the parameter can not be adjusted.

5). Current input channel selection
Click channel button 1-4, corresponding background LED will light, which means current channel is selected, you can set parameters on this channel.

6). Input channel mute control
Click it, the background LED will light, which means it enable mute function on current channel.

7). Input channel Meter control
Select the block and slide it to adjust current channel's volume.

8). Input channel Meter dynamically indication
Dynamically indicate current channel's input level meter.

9). Input channel Meter value display
The value will vary with slide moving.

10). Output channel control
Function in this area is similar to that to input channel. Please read carefully about input channel introduction.