MATRIX-A8

DIGITAL AUDIO PLATFORM

USER MANUAL

En V1.1

Safety Instructions

READ CAREFULLY THE FOLLOWING INSTRUCTIONS

This symbol indicates the presence of a dangerous voltage.

This made symbol refers to information in the instructions manual.

POWER SUPPLY
Connect the appliance only on a current corresponding to the characteristics listed in the back of the device. Failure to observe this precaution could result in fire or electric shock, or a failure not covered by the warranty.

POWER CORD
Before using the appliance for the first time, check that the supply voltage is consistent with that of the sector. Before connection to the mains check that the power cord is properly plugged. Route the power cord so that it cannot be squashed or bent and keep it away from moisture and significant heat sources. In case of deterioration or failure please contact dealer to replace it with an identical cord. A damaged cord may result in fire or electric shock.

PROTECTIVE GROUND
The appliance must be connected to the ground, don't remove the ground wiring of the power cord connector.

HUMIDITY
Do not expose the unit to rain or moisture and do not place container containing a liquid that might tip over. Do not handle any connector with wet hands. In case of thunderstorm, turn the unit off and disconnect it from any power outlet.

HEAT
Do not install the unit in a place subject to excessive heat or direct radiation from the Sun. Operating ambient temperature must not be below 5 ° C (41 ° F) or above 35 ° C (95 ° F).

DAMAGE
Unplug immediately in the event of introduction of liquids or objects in the device as well as in the event of damage to the power cable. Also unplug the unit if it emits smoke, an odor, or unusual noise.

DISPOSAL

This symbol indicates that the disposal of this product is submitted to local regulations. Please contact your local dealer.

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A Introduction

Thank you for having purchased MATRIX-A8. This device is dedicated music, paging, discussion and zone management solutions for Commercial Audio applications.
Easy to use and to implement, MATRIX-8 offers state-of-the-art signal processing in a cost effective package.

B Main Features

1- 20 x 20 Digital Matrix

Projects using DSP platforms usually require a minimum number of I/O. It determines the choice of a dedicated matrix system. MATRIX-A8 offers a large choice of I/O options in order to cover most of applications:

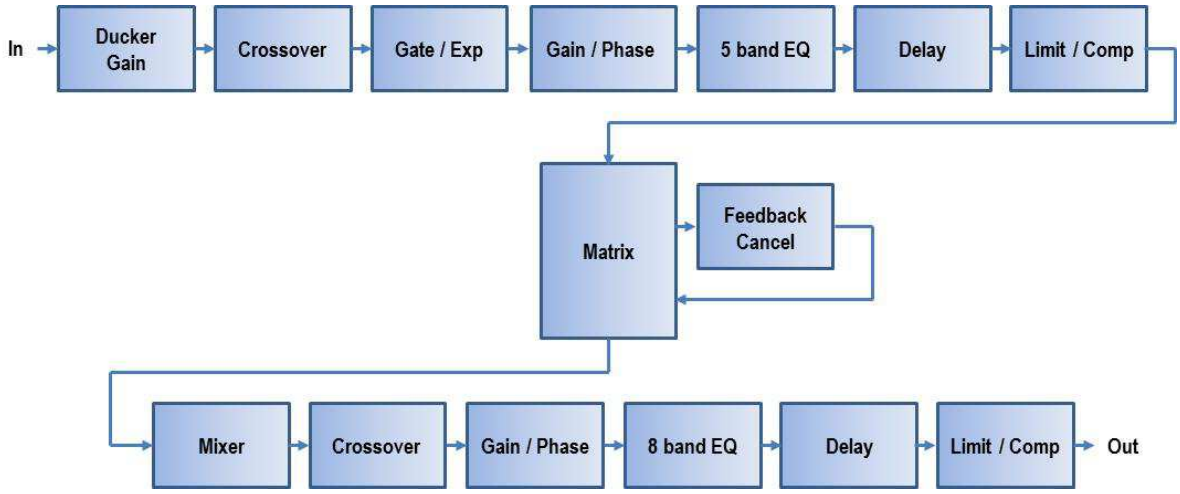
I/O:

- 8 analogue IN / 8 analogue OUT on rear panel ports
- 4 digital IN / 4 digital OUT via remote panels analog I/O
- 8 digital IN / 8 digital OUT via DANTE optional card

The basic system offers a total of 12 IN x 12 OUT without the DANTE option.
I/O expansion is possible with 16 pcs devices linked together for a maximum of 192 x IN and 192 x OUT.

2. DSP functions

MATRIX-A8 is intended for non-experts. The system used fix architecture for quick and easy operation. The intuitive GUI utilizes a familiar hardware-like layout to enable a short programming timeline and rapid hardware implementation.



All functions can be configured with the PC software via LAN. All settings can be memorized for easy duplication or modification:

3. Networks

MATRIX-A8 uses four types of network connections:

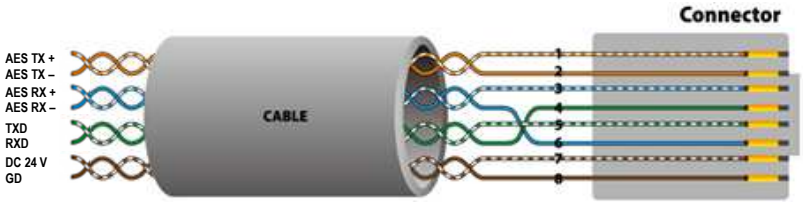
- **RCNET**, based on RS-485 for MATRIX-A8 daisy chain control.
- **RD**, based on RS-485 for panel control and AES3 for digital audio transport.
- **DANTE** for multi-channel digital audio transport.
- **TCP/IP** for LAN control.

Cable connections for Remote Controllers (RD ports)

Use shielded CAT 5e (or better) cable to connect the remote controllers to the RD ports. The maximum transmission distance is **100 meters**. If the wall-mounted controllers can be connected to the ground (except the Paging Station), the distance can be increased up to 150 meters.

Never connect a RD port to the router, otherwise the router will be damaged.

The port can transmit and receive AES3 plus control signal, the following graphic illustrates the termination and also shows function of each wire pair on the network:



The green pair is reserved for data communications between Matrix A8 and remote device. Data communication is needed to send configuration information, software update and status information from Matrix A8 to remote device.

Note: Configuration information of remote devices (such LED illuminate status, microphone sensitivity, channel name, etc) is stored in Matrix A8, not in remote devices. This makes easy to swap for a new remote device without losing of configured information.

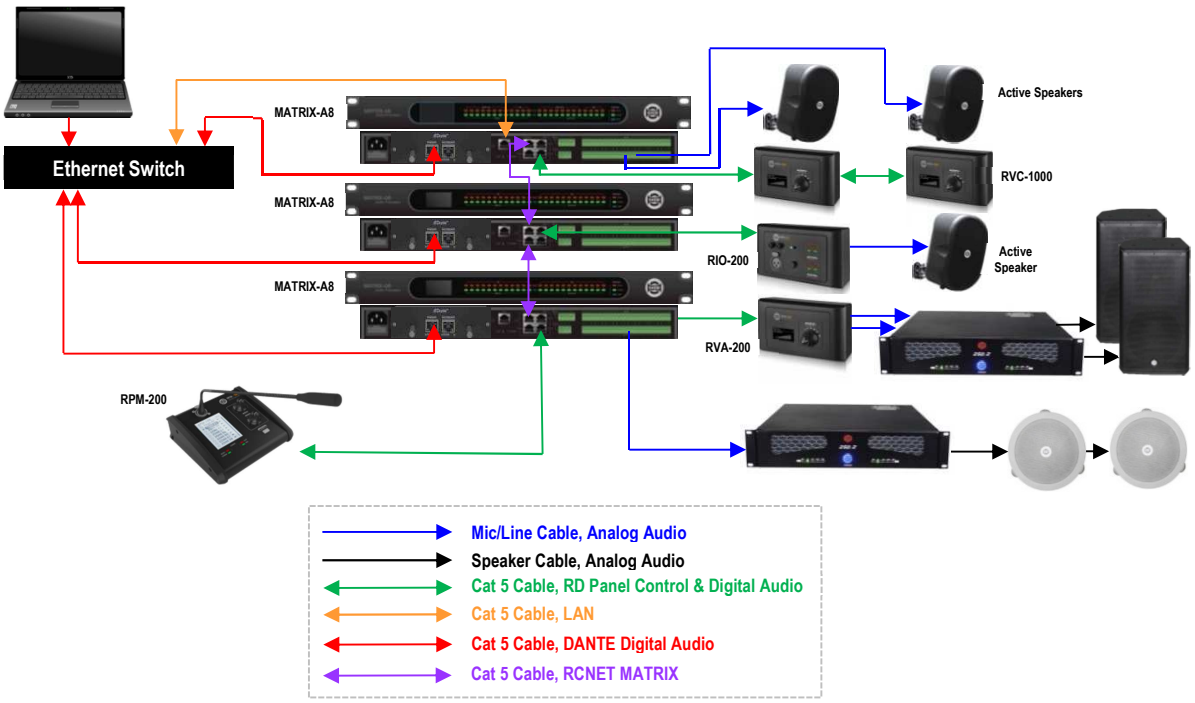
The orange and blue pairs carry two channels each of balanced, differential, AES3 digital audio. **TX** refers to audio that the remote device sends to Matrix A8, **RX** refers to audio that remote device receives from Matrix A8.

The brown pair provides 24VDC power and ground for remote devices.

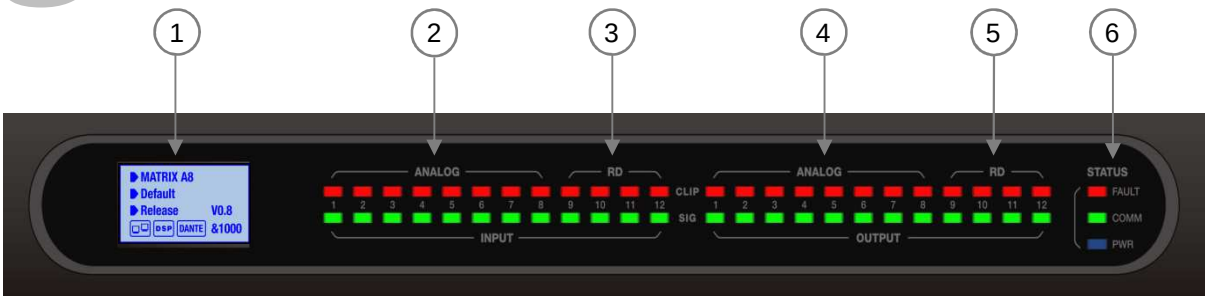
Pins meaning of RD port：

1 -	AES TX+	5 -	RS485 RX
2 -	AES TX-	6 -	AES RX-
3 -	AES RX+	7 -	DC24V
4 -	RS485 TX	8 -	GND

Example of connection:

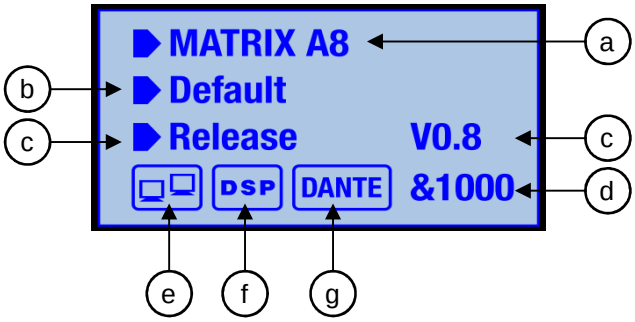


C Front Panel Description



1. LCD Display

It displays device information, such as name, firmware, ID and communication status.



- **a.** Device name.
- **b.** Current preset.
- **c.** Current release software version.
- **d.** Current ID. The ID is automatically obtained when the device in correctly connected.
- **e.** Connection indicator between the PC and the device. If the connection is okay, both icons in the box will flash alternately.
- **f.** DSP connection indicator. In case of problem " **DSP !** " will be displayed.
- **g.** Optional DANTE card indicator. The icon appears when the car is available in the rear slot.

2. ANALOG

Analog input indicators. The Green LED indicates presence of signal, the Red LED indicates signal clipping of the corresponding input.

3. RD

RD digital input indicators. The Green LED indicates presence of signal, the Red LED indicates signal clipping of the corresponding input.

4. ANALOG

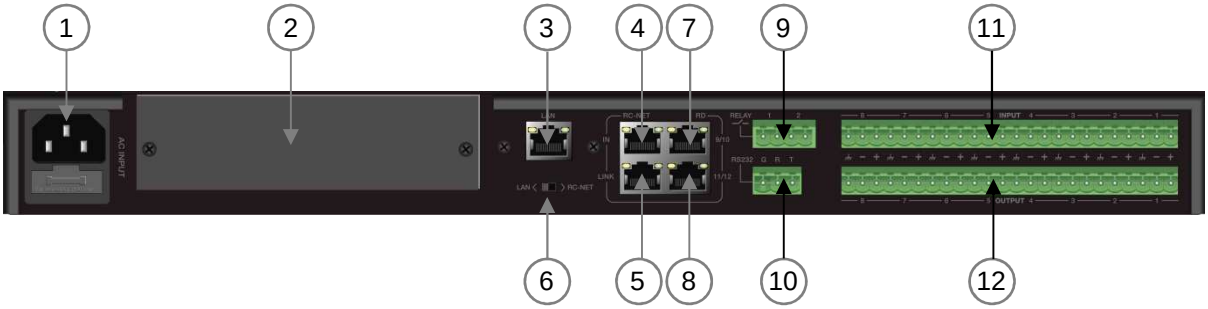
Analog output indicators. The Green LED indicates presence of signal, the Red LED indicates signal clipping of the corresponding output.

5. RD

RD digital output indicators. The Green LED indicates presence of signal, the Red LED indicates signal clipping of the corresponding output.

6. **STATUS**
    - **FAULT**
      Red LED indicating a malfunction of the DSP. The information is relayed on the LCD screen.
    - **COMM**
      Green LED indicating the communication status between the PC and the device. The LED blinks during data transfer. It remains off in case of problems.
    - **PWR**
      Blue LED indicating that the unit is powered.

D Rear Panel Description



1. **Power Socket**
   The power socket must be used with a quality cord. In case of failure the cord must be replaced. Do not try to fix it. The supply voltage is between 100 V and 240 VAC, 50-60 Hz, depending on countries.
   The socket includes the fuse compartment. When changing it, make sure to replace it with a model of the same characteristics.

2. **Optional Module Compartment**
   This location is reserved for the optional DANTE card. However, it can be used by other expansion modules.

.

3. **LAN**
   Port for the Ethernet connection. The plug includes two LEDs, a green one indicating the good connection to the network and a yellow one indicating the good data transmission.
    - If the yellow LED turns Off, there is a transmission problem. If On, with Green LED Off, the device has detected the network, but there is no connection.
    - If the Green LED is on, the network connection is correct.

4. **RC-NET / IN**
   This port transports control and command data based on RS-485 format. It is used to link several MATRIX-A8.

5. **RC-NET / LINK**
   RC-NET output port to connect to RC-NET input port (4) of another MATRIX-A8.
   .
6. **LAN / RC-NET**
   Switch to assign either Ethernet or RC-NET format to the LAN port (3).

7. **RD 9/10**
   RD Port to connect remote controllers such as **RIO-200**, **RVA-200**, **RPM-200** and **RVC-1000** (refer to page 23).
   This port transmits and receives AES3 digital audio plus control data (refer to pages 5 & 6). RIO-200 for instance, includes A/D and D/A converters for two I/O assigned to channels 9 and 10.

8. **RD 11/12**
   Similar to port RD 9/10 **(7)** but assigned to channels 11 and 12.

9. **RELAY**
   Dry contacts where ON/OFF status can be individually controlled in the **System** menu (Please refer to page 22).
   They are generally used as switches to control relays for electrical equipment.

10. **RS232**
    This interface is used to remotely control MATRIX-A8 parameters, such as a Preset change or a modification of the gain for one channel. Please refer to Appendix page 30 to consult the code table.

11. **INPUT**
    Euroblock connector including 8 balanced analog inputs.

12. **OUTPUT**
    Euroblock connector including 8 balanced analog outputs.

E MATRIX-A8 Connection

The MATRIX-A8 can be programmed by using the software editor available with the device. It works with Windows 7 and above.

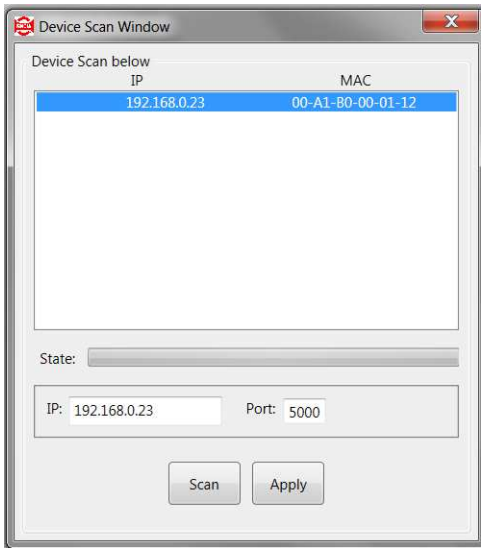
In order to use the software, MATRIX-A8 and the PC must be in a LAN environment. So, both must be connected to a network router, using a CAT5 cable.
Once the connection is done, open the **Matrix System Editor** application. The initial page shows a list of devices like below.

1. Configuration of IP Address

First, it is necessary to set the IP address of the MATRIX-A8 before opening the editor software.

- Click on **Connect**, the **Device Scan Window** opens.
- Click **Scan**, the system automatically finds and displays the IP address and MAC address of the device.
- Select the line with both addresses and click **Apply** to confirm.

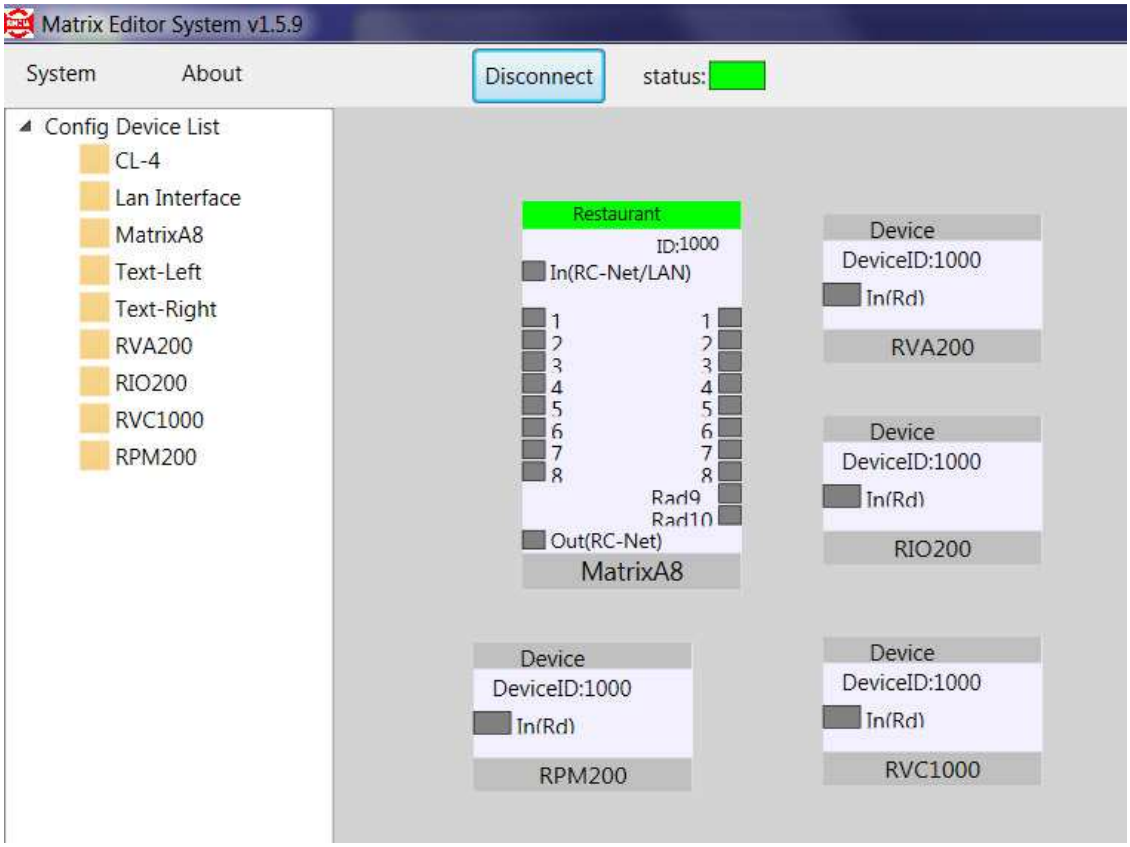
The IP address can also be set manually using the box on the bottom left.



The Device Scan Window disappears and the **Status** box becomes green when the connection is successfully established.

2. System configuration with one or several devices

In **Config Device List** on the left window bar, click on **MatrixA8** holding the mouse button pressed. Drag the mouse in the grey area on the right. Release the mouse button to bring up the MATRIX-A8 icon, as shown in the image below.



The procedure is the same for adding other devices.

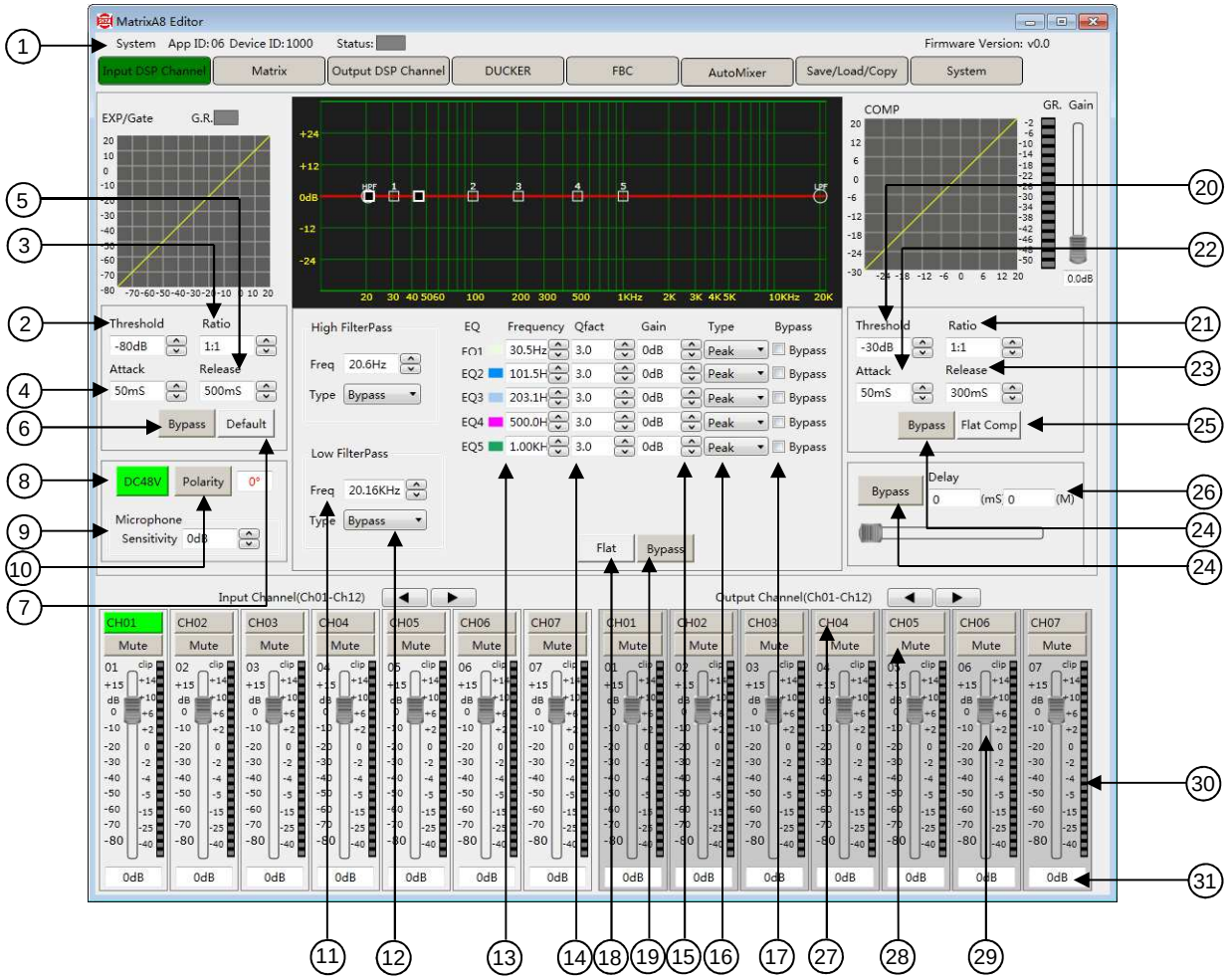
To remove a module, click right on the device box and validate **Delete Module** instruction that appears.

At the top of the module box, one can see the name and the ID number of the MATRIX-A8. It must be identical to the indication on the LCD screen of the unit.
It can be changed by clicking right on the box and validate **Change Device ID** instruction that appears. Enter the new ID number and validate.

Finally, Double click on the MATRIX-A8 box to open the first page of the **Editor**.

The remote controllers get also some editing functions. Like MATRIX-8, double click on the device box to open their editor window (refer to pages 23 to 26)

1 - Input DSP Channel



The **Input DSP Channel** is the first page appearing when the Editor Software is opened. Before editing, it is necessary to unlock the system software by clicking on **System (1)** in the left corner of the upper menu bar. The initial code is **8888**. It can be changed by following the instructions.

Expander/Gate

An Expander is used to add dynamics to a signal. When the signal is below a certain threshold the Expander boosts the input signal with a determined ratio. When the signal is beyond the threshold, the output signal remains identical to the input signal. By adjusting the value of the ratio to its maximum, the Expander is transformed into a Noise Gate.

2. **Threshold**: -80 dB to 20 dB.

3. **Ratio**: gain ratio between the input signal and the amplified signal, from 1:1 to 10:1.

4. **Attack**: reaction time when the signal is below the specified threshold, from 10 to 150 ms.

5. **Release**: reaction time of the Expander when the signal passes beyond the specified threshold from 0.01 to 1 second.

6. **Bypass**: the signal is not processed and skips to the next processing module.

7. **Default**: all parameters are reset to the default settings.

8. **DC 48V:** 48 V Phantom power for electret microphone.

9. **Polarity:** inverts the phase of the signal by 180 °.

10. **Microphone Sensitivity:** Input sensitivity for a microphone, from -48 dB to 0 dB.

EQ

High Pass and Low Pass Filters
Those filters are used to eliminate non necessary frequencies above and below the signal spectrum, in order to avoid any background noise generation due to multi-processing. For instance, a voice microphone will be set to 100 Hz for the High Pass and 4 kHz for the Low Pass.

11. **Freq**: Cut-off frequency

12. **Type**: Filter type
    Bessel 6,12, 24, 36 dB, Linkwitz 6,12, 24, 36 dB, Butterworth 6,12, 24, 36 dB.

Parametric EQ
The equalizer is used to compensate or alter the spectral characteristics of the signal in order to obtain the flattest possible frequency response. The module here is a parametric 5 bands EQ.

13. **Freq**: central frequency of the filter between 20 Hz and 20,000 Hz.

14. **Qfact**: selectivity of the filter (Q). Greater is the value, thinner is the processed part of the spectrum. Can be adjusted from 0.4 to 128.

15. **Gain**: gain or attenuation of the center frequency, from -18 dB to +18 dB.

16. **Type** : Filter type, Peak / Low / High.

17. **Bypass 1~5**: temporarily cancels the individual processing of filters 1 ~ 5 without having to use the general "Bypass".

18. **Flat**: all parameters are reset to the factory settings.

19. **Bypass**: the signal is not processed and skips to the next processing module.

Filters can be set manually by entering alphanumeric values, or graphically by clicking directly on the frequency response diagram and moving the mouse while holding the button pressed.

Compressor

A compressor can limit the dynamics of a signal beyond a certain level. When the signal exceeds the **Threshold** it is compressed in a **ratio** greater than 1. Below the Threshold, input and output signals remain the same. By adjusting the ratio to its maximum value, the compressor is transformed into a limiter.

20. **Threshold**: threshold from which the signal is compressed, from -30 dB to +20 dB

21. **Ratio**: compression ratio. For instance, a 4:1 ratio means that the input level is 4 dB above the threshold, the output signal will be 1 dB above this threshold. The ratio value can be set form 10:1 to 1:1.

22. **Attack**: reaction time of the compressor when the signal is beyond the specified threshold, from 10 to 150 ms.

23. **Release**: reaction time of the Compressor when the signal is below the specified threshold, from 10 ms to 1 s.

24. **Bypass**: the signal is not processed and skips to the next processing module.

25. **Flat Comp** : all parameters are reset to the default settings.

Delay

26. A delay can be set for each input up to 1361 ms. It can be used for sound/video synchro applications or phase adjustment.

Input Selection (CH01-CH12)

27. To select the input to set up or edit, click on the corresponding channel number. For channels that do not appear on the screen use the arrows.

Mute

28. The **MUTE** button allows instant cut of the selected input. This allows to listen to one or more sources separately without having to touch the level controls.

Level Setting

29. The input and output level for each channel can be set with a linear fader. With the mouse button, drag the cursor upwards or downwards.
    One can directly input the value by double clicking on box **(31)**.

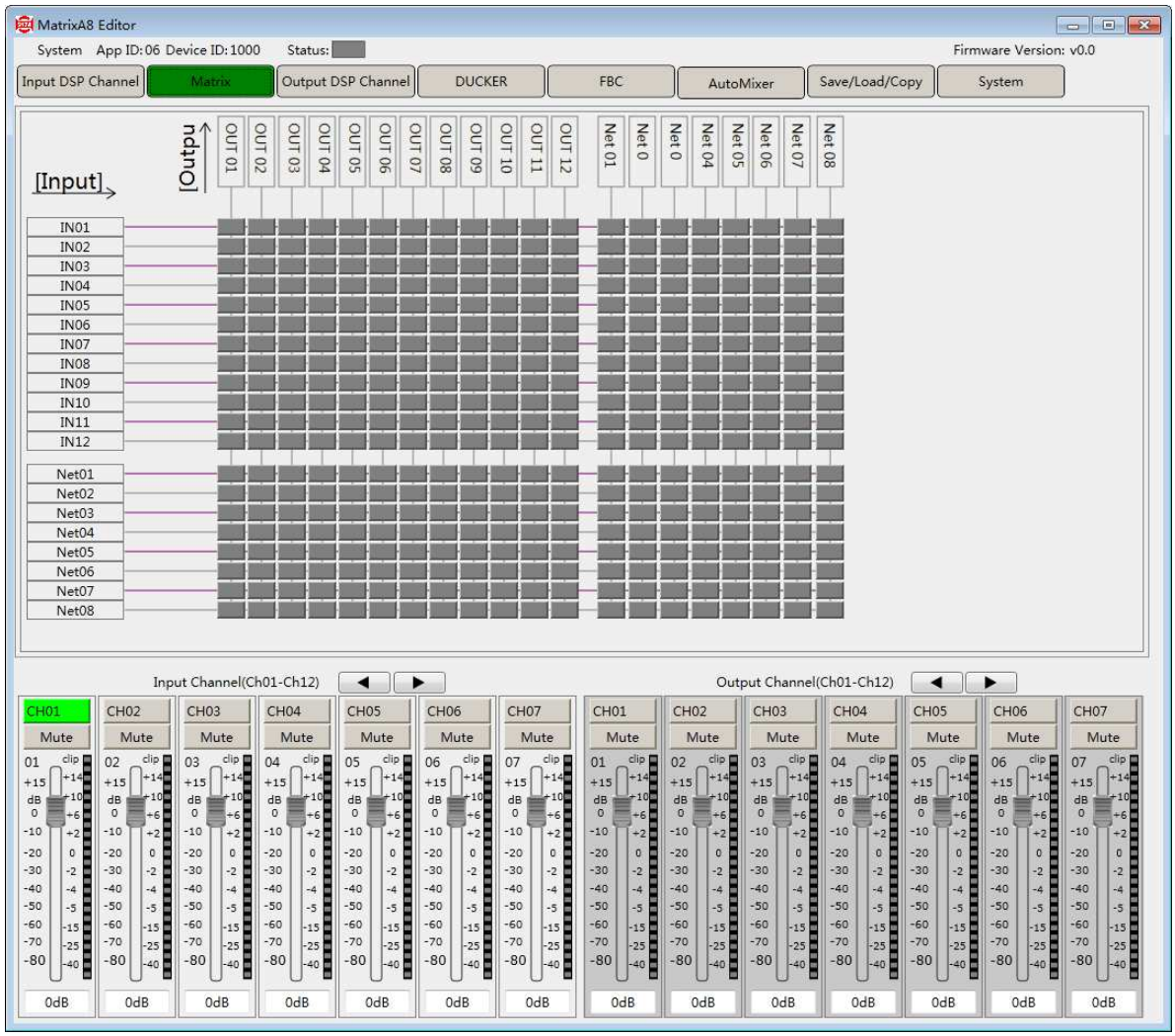
Dynamic Level Control

30. A LED meter is assigned to each channel to view the variation range of the input signal.

Gain value

31. Display and input the value of the gain.

2 - Matrix

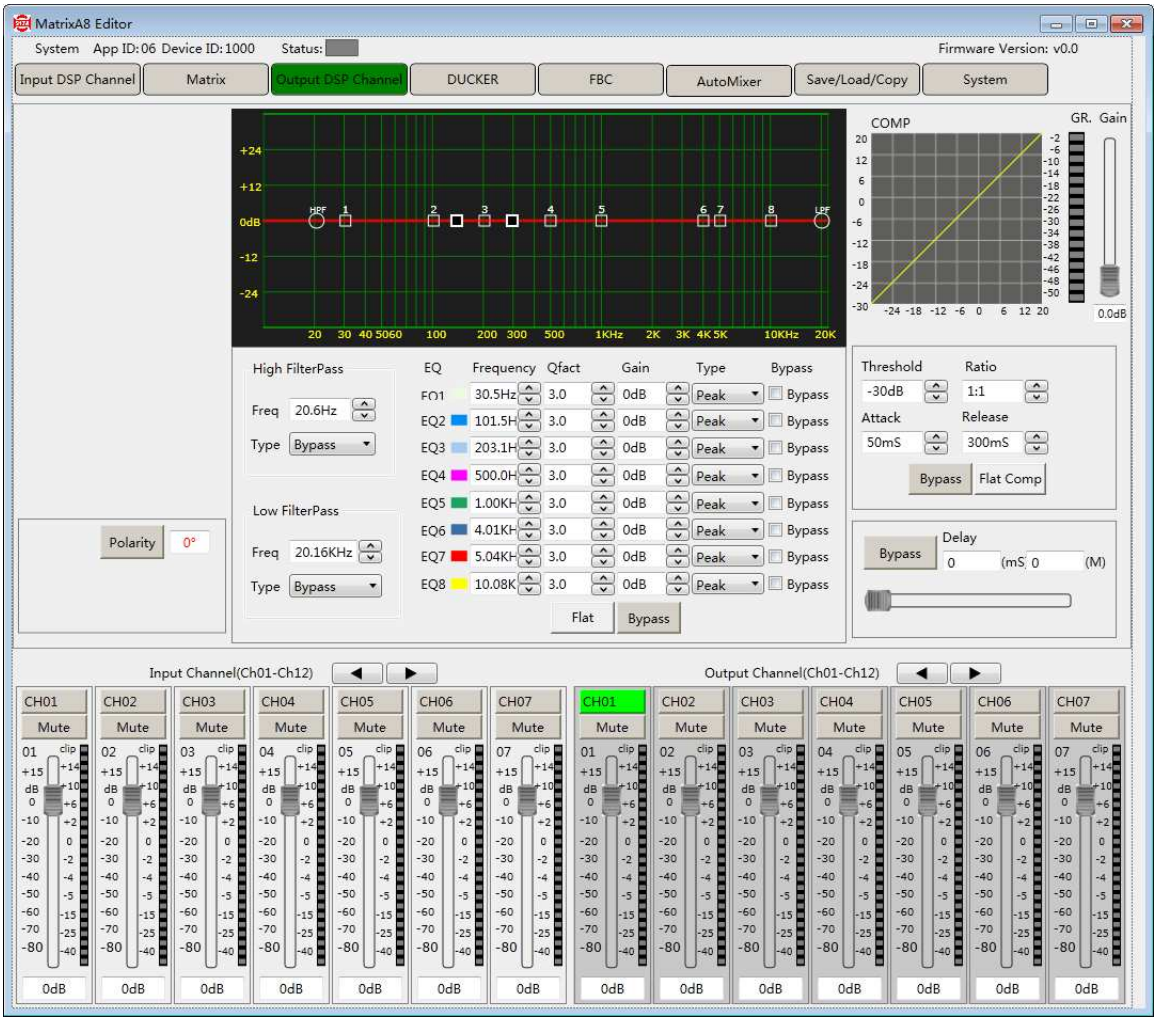


This part of the software is used to route inputs to outputs through a graphical representation as a matrix. By clicking on the gray boxes several inputs can be assigned to several outputs. If the connection is active the box turns green, otherwise it remains gray.
The matrix can route 20 input signals to 20 separate outputs. One talks about a 20 x 20 matrix.

IN (OUT) 01 to **IN (OUT) 08** are analog I/O available on the rear panel.
IN (OUT) 09 to **IN (OUT) 12** are digital I/O **(RD ports)** and are converted to analog signals in the controls panels **RIO-200** or **RVA-200** (Please refer to page 25-26).

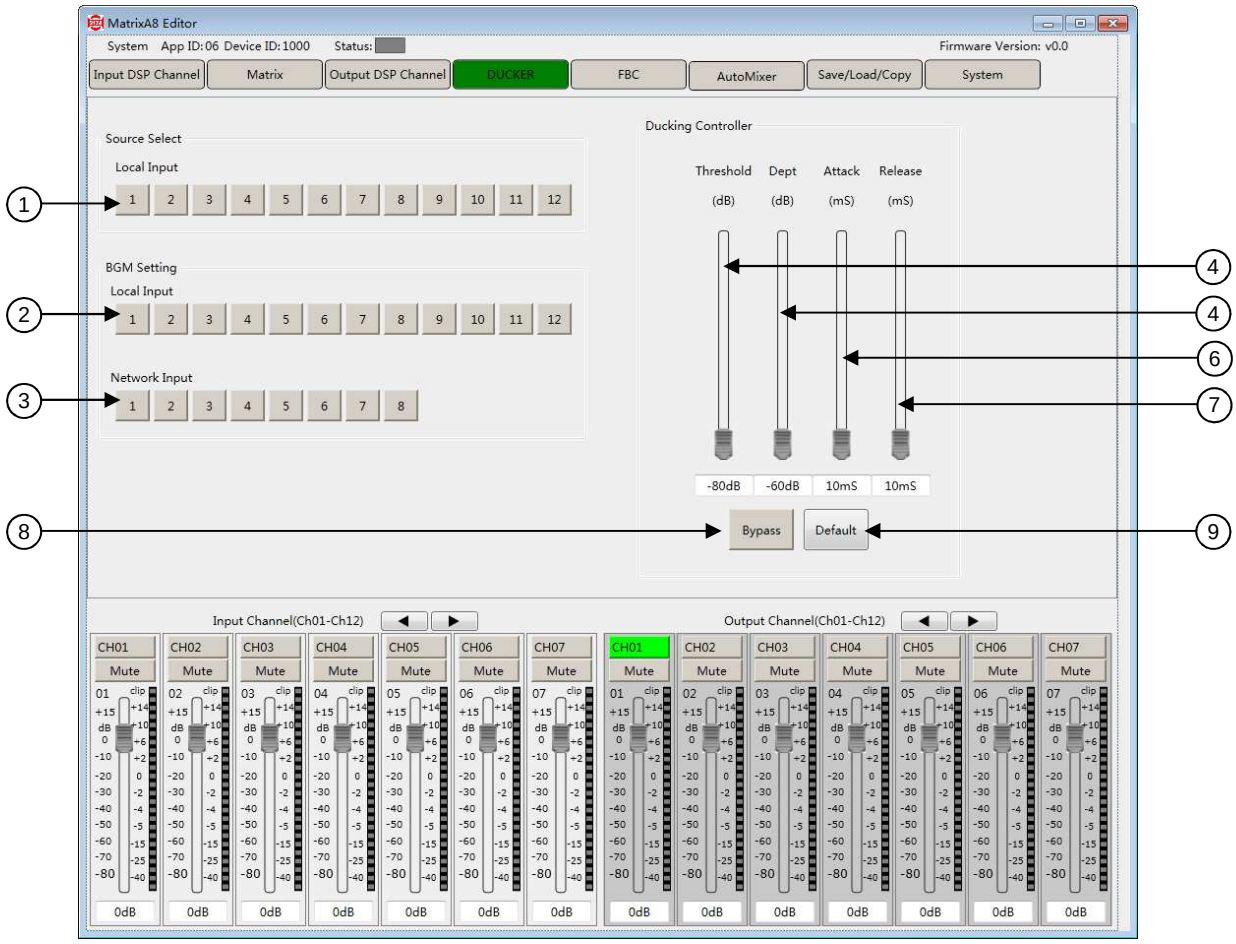
Net 01 to **Net 08** are **DANTE** digital I/O. They are selectable when using the optional DANTE card only.

3 - Output DSP Channel



Same menu as the Input DSP Channel , without the Expander/Gate section.
The Parametric EQ features 8 bands here, instead of 5 bands for the Inputs.
Please refer to page 12.

4 - Ducker



The principle of the **Ducker** is to attenuate one or several channels when priority signals are activated. The main applications are automatic speech for conference or priority messages.

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Source Select

1. **Local Input** : selection of the priority channels.

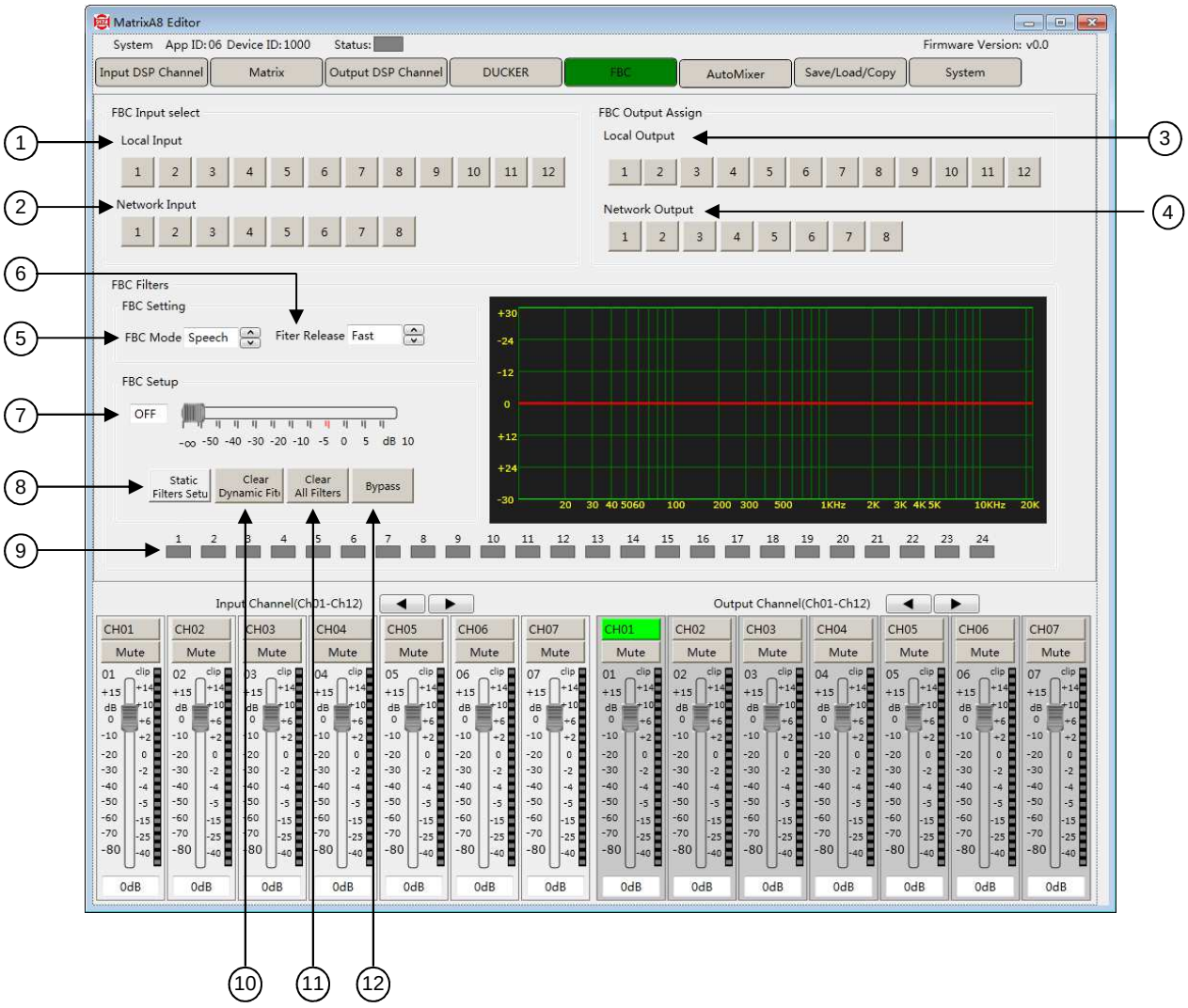
BGM Setting

2. **Local Input** : selection of channels from 1 to12 being affected by the attenuation.
3. **Network Input** : selection of DANTE channels from 1 to 8 being affected by the attenuation.

Ducking Controller

4. **Threshold**: threshold of attenuation.
5. **Depth:** depth of attenuation.
6. **Attack**: transition time between the normal and the attenuated level.
7. **Release**: transition time between the attenuated level and return to the normal level.
8. **Bypass**: transition time between the attenuated level and return to the normal level.
9. **Flatten Duck**: all parameters are reset to the factory settings.

5 - Feedback Canceller FBC



FBC or **Feedback Canceller** is a function which eliminates feedback automatically. Feedback occurs unexpectedly in a system where there are microphones and speakers nearby one of the other. This loop effect is an electro-acoustic resonance which generates an unpleasant frequency noise.

The FBC automatically detects the frequencies involved and attenuates them almost instantly using a series of selective filters.

FBC Input select

1. **Local Input** : selection of input channels (1 to 12) to be processed.
2. **Network Input** : selection of the DANTE input channels (1 to 8) to be processed.

FBC Output Assign

3. **Local Output** : selection of output channels (1 to 12) where the FBC processed input is routed.
4. **Network Output** : selection of the DANTE output channels (1 to 8) where the FBC processed input is routed.

FBC Filters
The FBC uses up to 24 notch filters which can be static or dynamic,

The FBC setup is done manually. It consists of finding the resonance frequencies to be eliminated. So, a feedback effect is generated in the room where the sound system is used. Once the frequencies found, the system automatically defines the number of filters to be used, and shows the response curve with the filter attenuations.

Among the 24 filters, those which are not static become dynamic automatically. They will instantly act when an unpredictable event may occur like an accidental increase of the volume or a presenter walking around too close from speakers, etc.

FBC Setting

5. **FBC Mode :** application type, Speech or Music
6. **Filter Release :** time release of the dynamic filters after processing, Fast, Mid, Slow

FBC Setup
This function is used to setup the static filters:

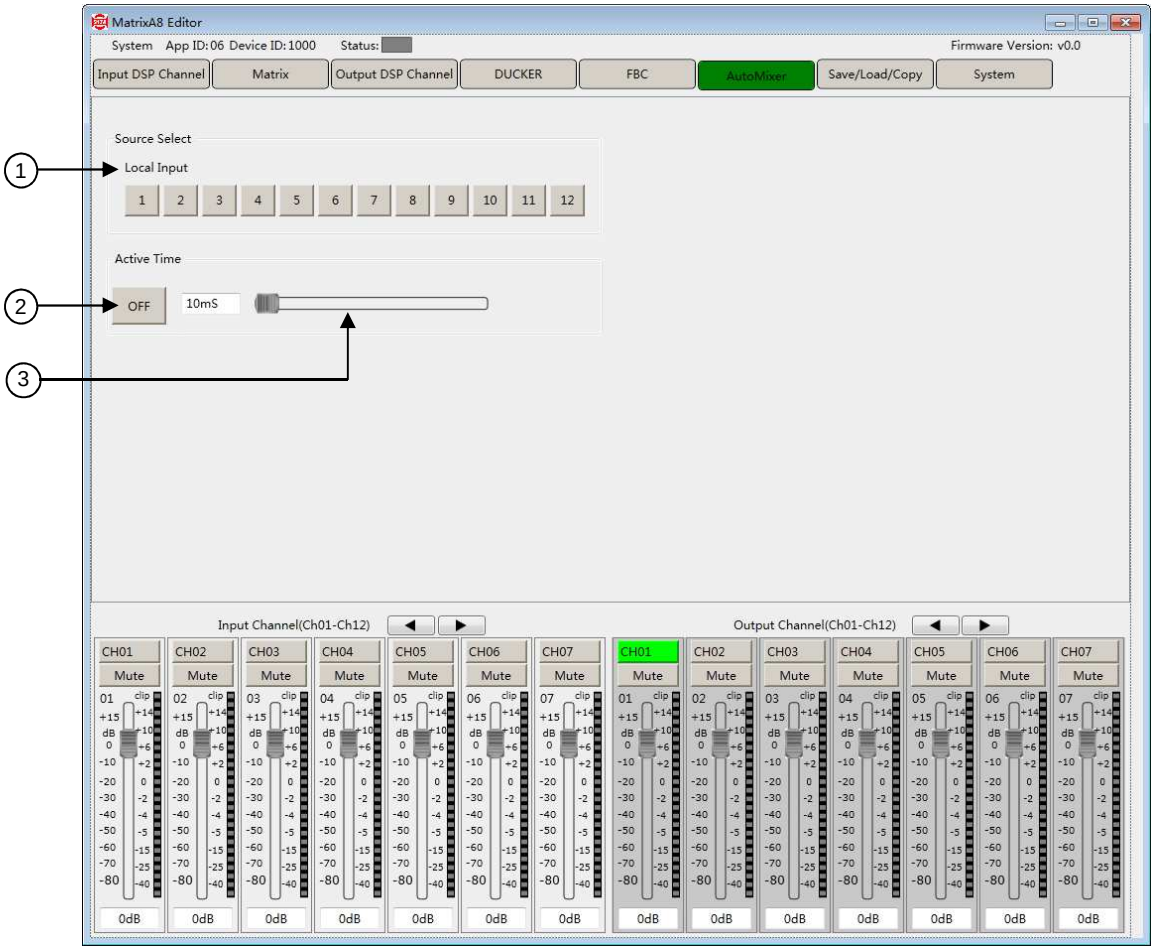
- Click **Static Filters Setup (8)**.
- Adjust the level of dedicated channels at nominal value and open microphones.
- Increase the level of the FBC using the horizontal fader **(7)** until the feedback effect appears

As soon as the system has detected the frequencies to process, the indicator boxes **(9)** 1 to 24 turns red and the filtering effect is materialized on the diagram.

For dynamic filters the attenuation also appears on the diagram and indicator boxes light up in green.

10. **Clear Dynamic Filters**: used to initialize all the dynamic filters
11. **Clear All Filters**: used to initialize all the dynamic and all static filters.
12. **Bypass**: the signal is not processed and goes directly to the next treatment module.

6 - AutoMixer



The **Automixer** automatically reduces the level of a microphone when it is not being used. Consequently it lowers the rumble, reverberation and other extraneous noise that occur when several microphones operate simultaneously.

It is typically used to mix panel discussions on television talk shows and at conferences and seminars. It can also be used to mix actors' wireless microphones in theater productions and musicals.
It is frequently employed in settings where it is expected that a live sound operator will be not present, such as courtrooms and city council chambers.

This function is often used in conjunction with the microphone priority of the **Ducker**.

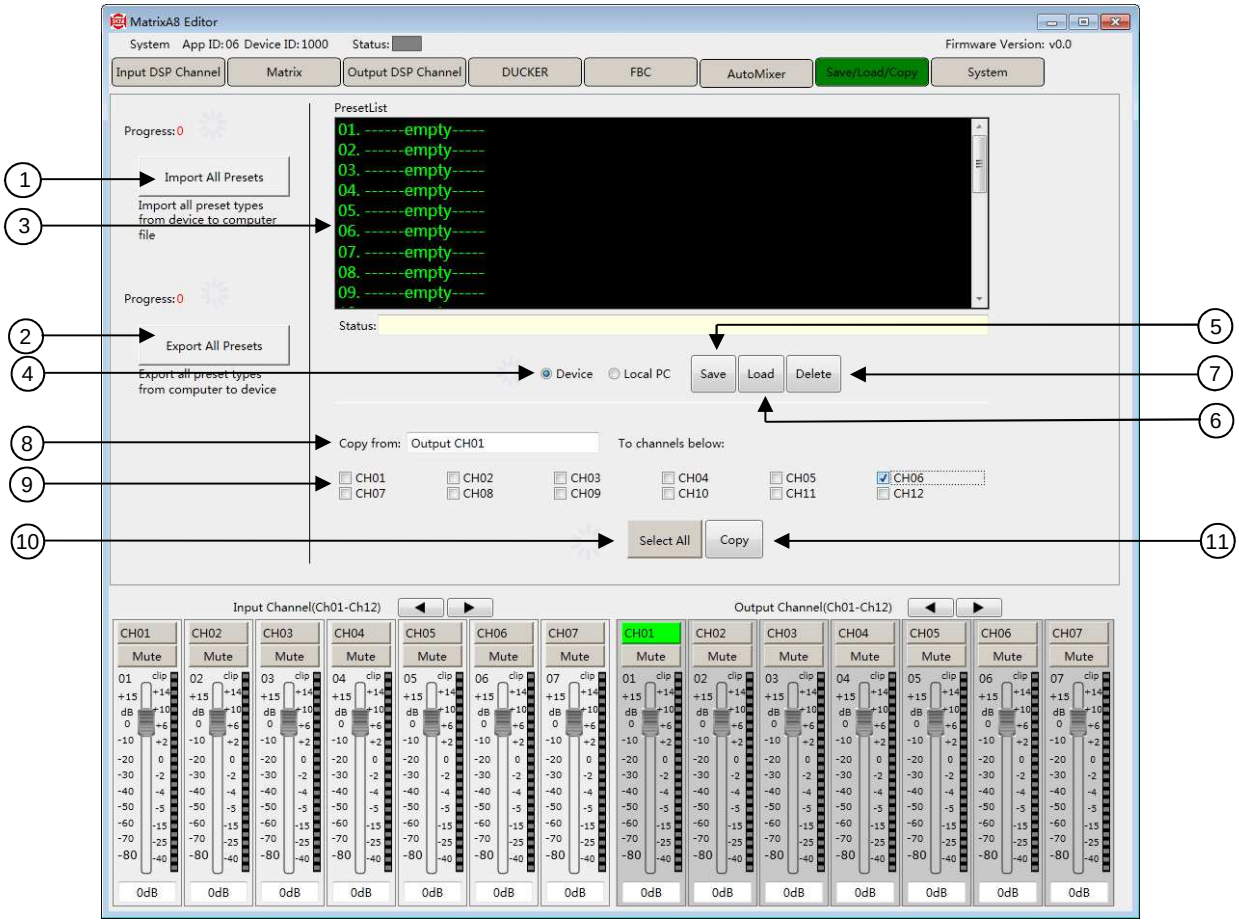
Source select

1. **Local Input**: selection of the local input to be processed.

Active time

Velocity of the gain change to attenuate inputs.
Push On **(2)** to activate the time setting, and use the horizontal fader **(3)** to set the time value.

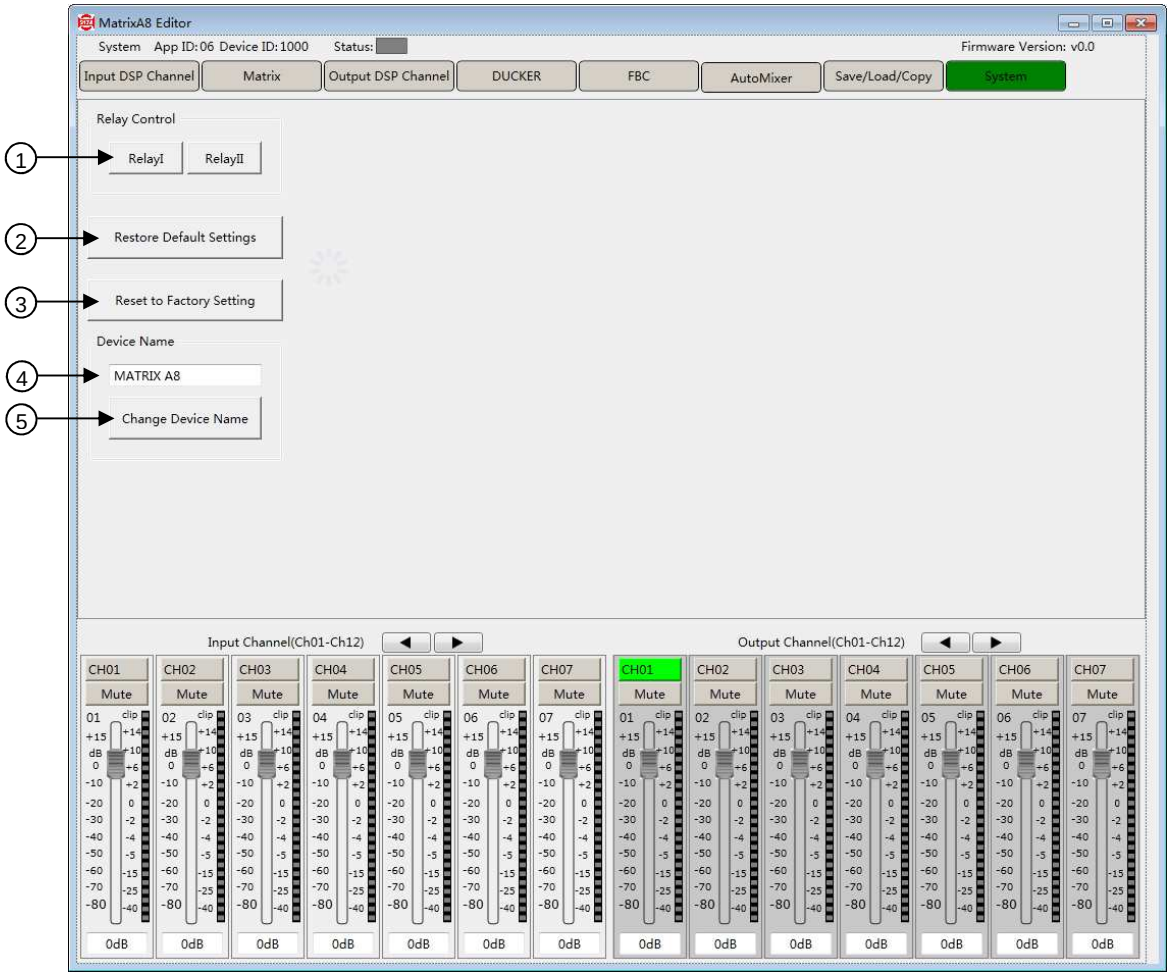
7- Save Load



This menu is used to manage the backup parameters of the MATRIX-A8. These data can be stored in the internal memory of the MATRIX-A8 either directly in the PC as presets. The MATRIX-A8 memory contains a total of 16 presets.

1. **Import All Presets:** Import all presets from device to computer file.
2. **Export All Presets:** Export all presets from computer to device.
3. **Preset List:** The screen show the preset name and number
4. **Device / Local PC** : click to select.
5. **Save :** save the MATRIX-A8 current data as a preset in the PC (Local PC mode).
6. **Load :** load a preset parameters from the PC into the MATRIX-A8 (Local PC mode).
5. **Save :** save in the MATRIX-A8 memory the current data as a preset (Device mode).
6. **Load :** load a preset from the MATRIX-A8 memory as a current program (Device mode).
7. **Delete**: delete a preset from the MATRIX-A8 memory (Device mode only).
8. **Copy from:** copy the settings of the inputs and outputs from one channel to another. Select e.g. Input CH01 then check the CH08 box **(9)**. Click Copy **(11)** and parameters of input 1 will be automatically copied to input 8. The procedure is identical for the outputs.
10. **Select All:** to select all channels without having to check them one by one.

8 - System



Relay Control

1. **Relay I - Relay II**: Controls of the dry contact that can be activated on the Euroblock connectors on the rear panel. Please refer to page 8 and 9.
   Check the boxes to close the contacts. Uncheck to open the contacts.

2. **Restore Default Settings:** restore all setting to default settings.

3. **Restore Factory Settings:** clear all settings, include default settings.

Device Name

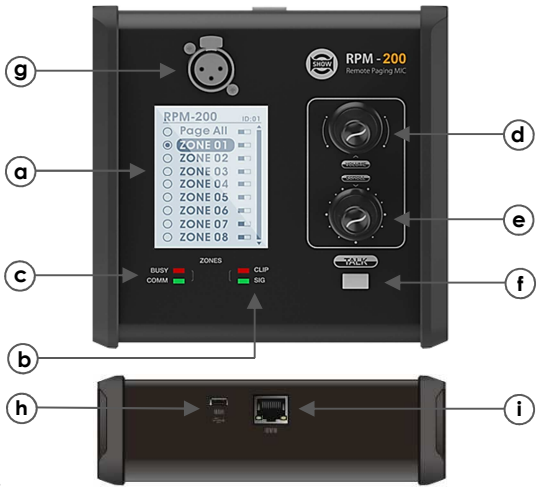
4. **Current Name :** display the device name.

5. **Change Device Name :** click to rename the device.

G Remote Control Panels

1. RPM-200 Paging Station

The RPM-200 can address 1 to 32 different zones (outputs). The number of zones depends on the number of MATRIX-A8 linked together. Moreover, a total of 32 x RPM-200 can be used in a system, which makes a lot of possibilities for message paging.



a. LCD screen
It displays the selected zones, the volume and ID number.

b. Signal status indicators
The green LED indicates the presence of signal when the microphone is ON. The red LED indicates the limit of clipping.

c. Communication status indicators
When the communication with the MATRIX-A8 is correct, the green LED blinks. In case of problem, the BUSY red LED lights up.

d. Volume control and all zone selector
It controls the volume of the microphone for each selected zones.
By pushing on the button, it selects all zones.

e. Zone selector
It selects one or several zones by turning the button left or right and pushing on it to validate.

f. Push-to-talk switch
When the button is pushed, the chimes sounds and the red ring on the microphone lights up indicating that one can talk.

g. XLR connector

Female 3 pin XLR connector for the gooseneck electret microphone. It uses a phantom power controlled by software.

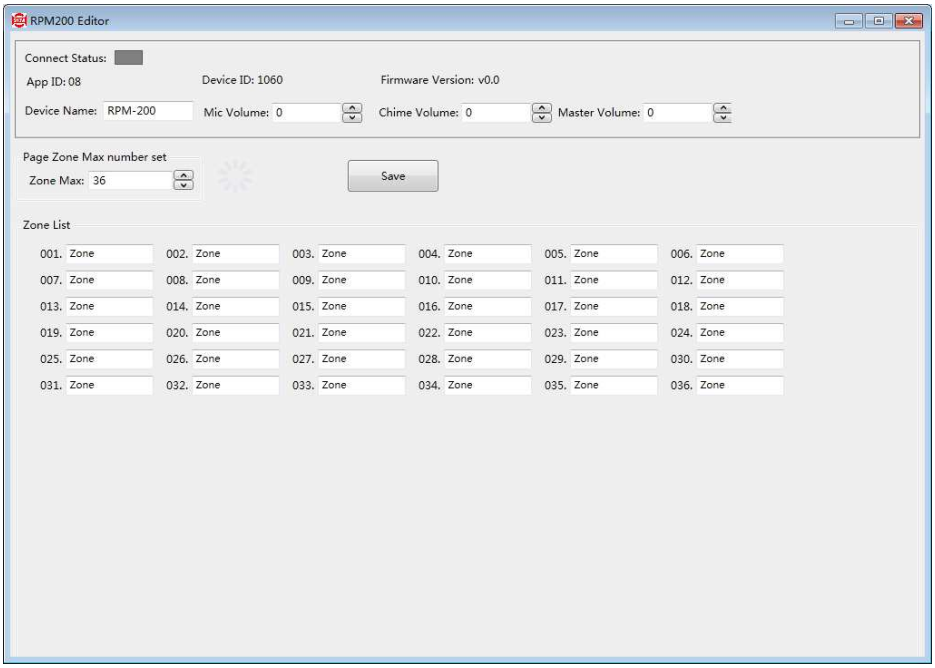
h. USB port

This port is used to load MP3 files for chimes sound. The maximum time for the chimes is 4 seconds.

i. RD port

Connection to the MATRIX-A8. The maximum CAT 5e cable length is **100 meters**.

By using the RPM-200 Editor (refer to page 11) it is possible to name any zone available in a system including one or several MATRIX-A8.
Device Name, Mic Volume, Chimes Volume and Master Volume can be edited as well.



2. RVC-1000 Volume Control

This volume controller can be assigned to any output of the MATRIX-A8. It can also route any input to any output like in the Matrix menu of the Editor Software.

a. LCD screen
It displays the volume level and the signal level for a dedicated output.

b. Volume control
Turn the button left or right to adjust the volume.
Push the button to access to the inputs and outputs routing menu.

c. RD port IN
Connection to MATRIX-A8. The maximum CAT 5e cable length is **100 meters**.

d. RD port LINK
Daisy connection for additional remote controller.

The name of the device can be changed by using the RVC-1000 Editor (Refer to page 11)

3. RVA-200 Volume Control with Audio Out

The RVA-200 has the same functionality as the RVC-1000 volume control, but it includes 2 additional analog outputs. The device includes a build in D/A converter processing digital audio AES3 signals from MATRIX-A8.

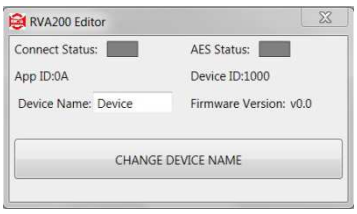
a. LCD screen
It displays the volume level and the signal level for a dedicated output.

b. Volume control
Turn the button left or right to adjust the volume.
Push the button to access to the inputs and outputs routing function.

c. RD port
Connection to MATRIX-A8. The maximum CAT 5e cable length is **100 meters**.

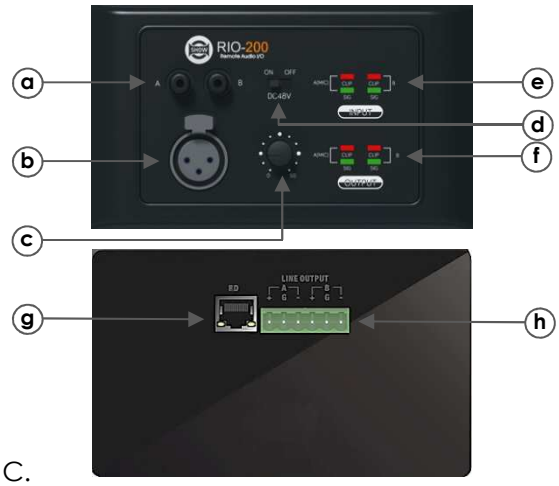
d. Analog OUT
2 channel analog line Outputs assigned to RD port 9/10 or 11/12 of MATRIX-A8.

The name of the device can be changed by using the RVA-200 Editor (Refer to page 11)



4. RIO-200 I/O Remote Module

The **RIO-200** is a remote input and output module providing 2 x analog channels IN and 2 x analog channels OUT. The device includes build in A/D and D/A converters processing digital audio AES3 signals from and to the MATRIX-A8.



a. 2 Channel Inputs
A & B analog line Inputs assigned to channels 9/10 or 11/12 of MATRIX-A8.

b. Microphone Input
XLR connector for MIC. If connected, it replaces the A channel input.

c. Microphone volume
Button to adjust le MIC input level.

d. Phantom power
48V switchable phantom power for electret MIC.

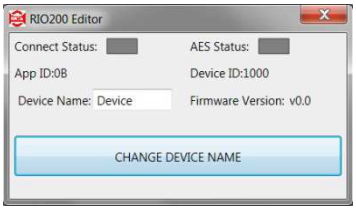
e. Signal indicators for the Inputs
Chanel A (MIC) and B input signal status indicators for signal presence and clip.

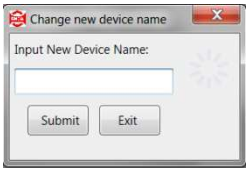
f. Signal indicators for the Outputs
Channel A and B input signal status indicators.

g. RD Port
Connection to MATRIX-A8. The maximum CAT 5e cable length is **100 meters**.

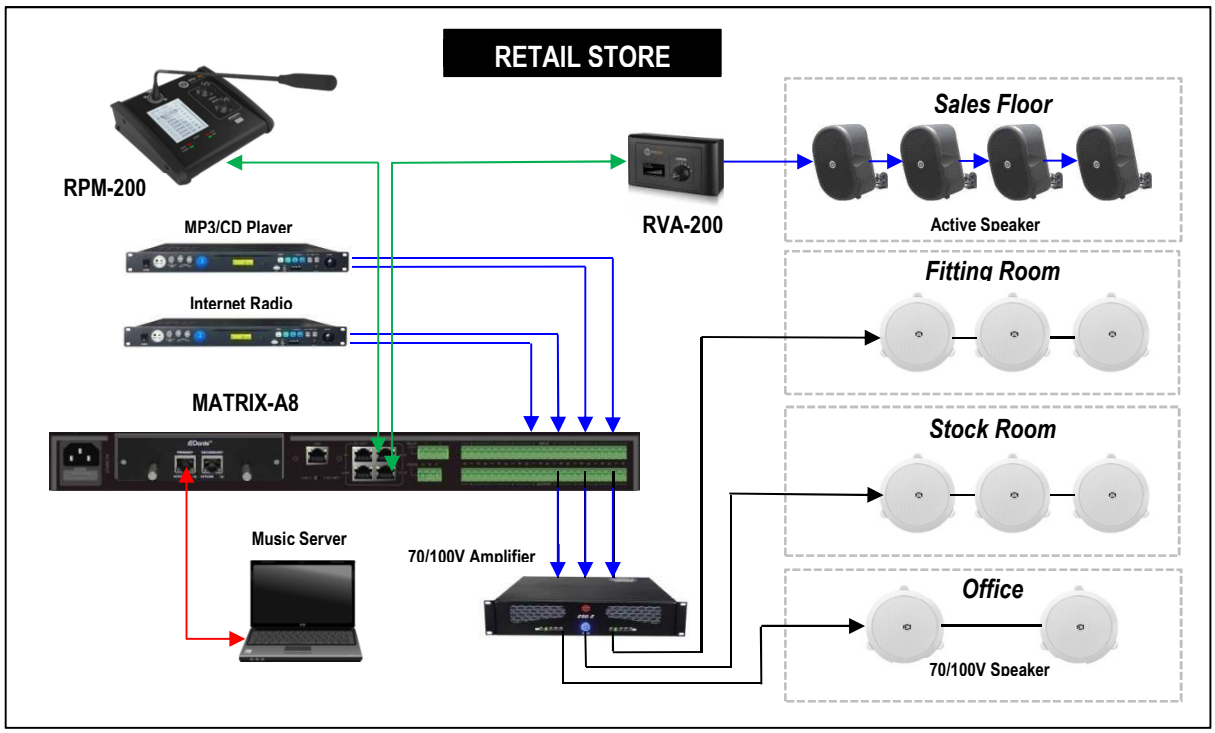
h. 2 Channel Outputs
2 channel analog line Outputs assigned to RD port 9/10 or 11/12 of MATRIX-A8.

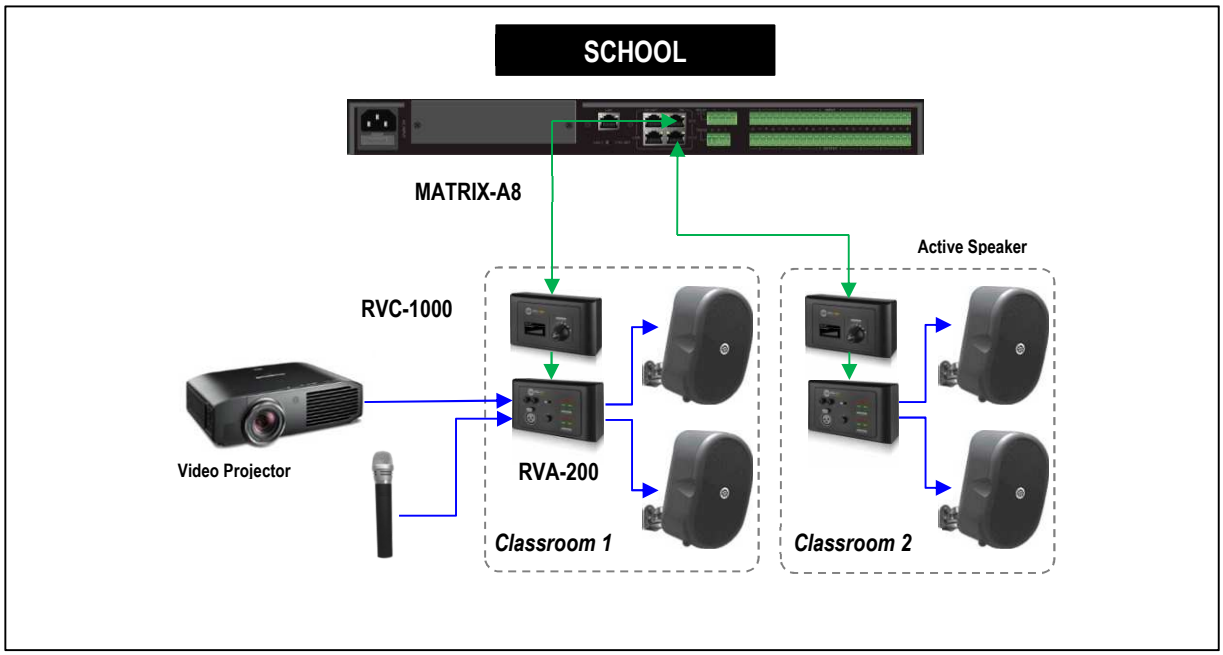
The name of the device can be changed by using the RIO-200 Editor (Refer to page 11)

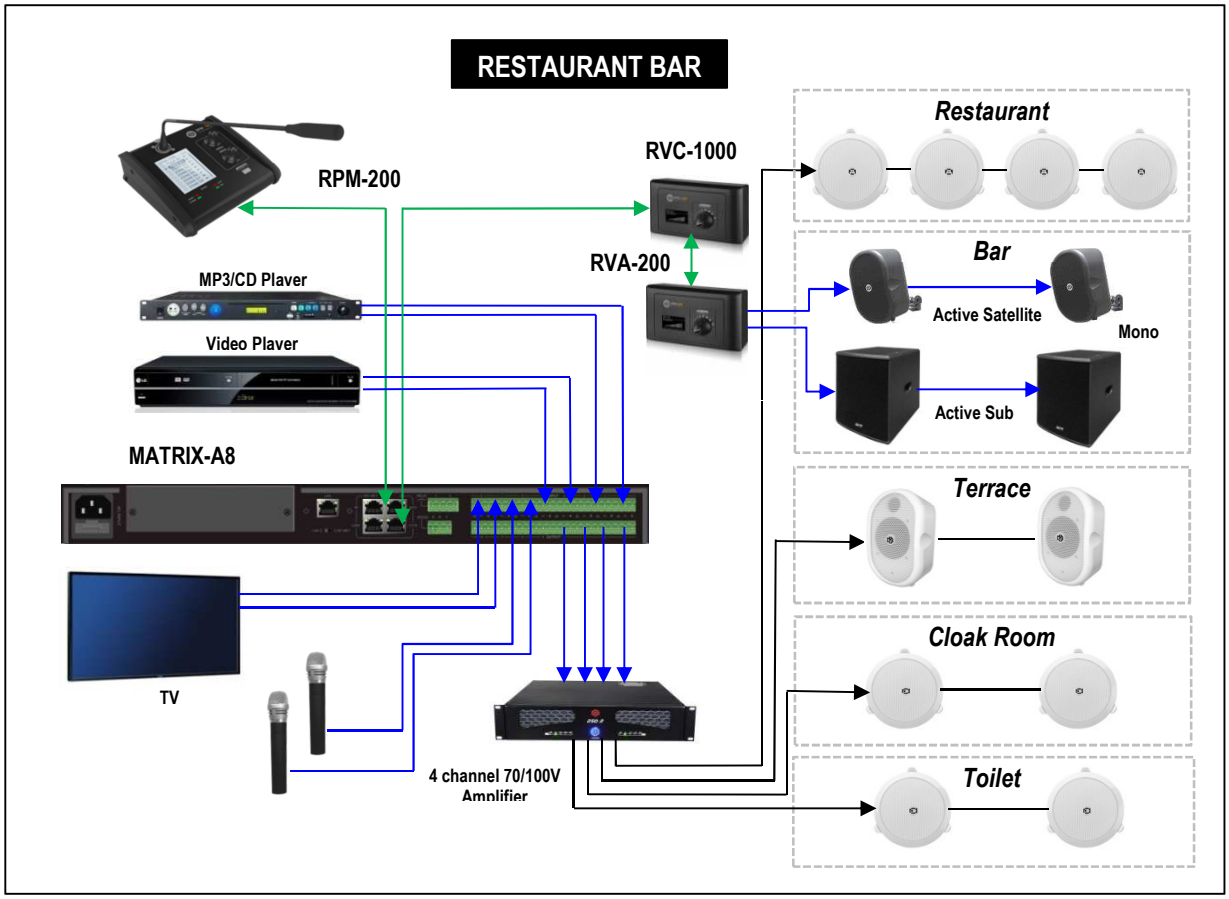


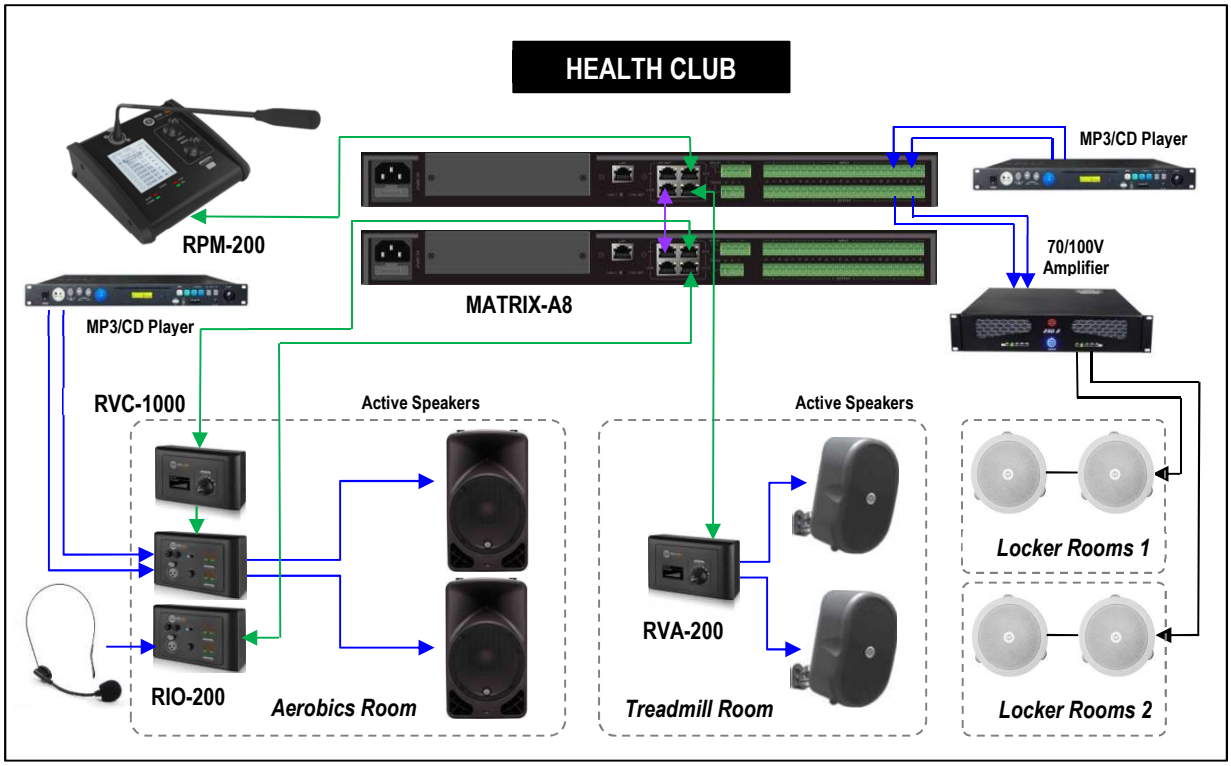


H Applications Examples






RESTAURANT BAR
RPM-200
RVC-1000
RVA-200
MP3/CD Player
Video Player
MATRIX-A8
TV
4 channel 70/100V
Amplifier
Restaurant
Bar
Active Satellite
Mono
Active Sub
Terrace
Cloak Room
Toilet


HEALTH CLUB
RPM-200
MP3/CD Player
MATRIX-A8
MP3/CD Player
70/100V
Amplifier
RVC-1000
Active Speakers
Active Speakers
RVA-200
RIO-200
Aerobics Room
Treadmill Room
Locker Rooms 1
Locker Rooms 2

RS232 Codes

N0.	Start Byte0 (1Byte)	Start Byte1 (1Byte)	Start Byte2 (1Byte)	Length	Command (1 Byte)	Channel (1Byte)	Value (N Bytes))	End Byte2 (1Byte)	Function
1	0x01	0x20	0x03	8	0x01	(1...8)	(0---80)	0x40	Change Input channel Gain
2	0x01	0x20	0x03	8	0x02	(1...8)	(0---1)	0x40	Change Input channel Phase
3	0x01	0x20	0x03	8	0x03	(1...8)	(0---1)	0x40	Change Input channel Mute
4	0x01	0x20	0x03	8	0x04	(1...8)	0x00	0x40	Get Input channel Status
5	0x01	0x20	0x03	10	0x04	(1...8)	Byte 0: Gain value Byte 1: Phase value Byte 2: Mute value	0x40	Device output the input channel status
6	0x01	0x20	0x03	8	0x05	(1...8)	(0---80)	0x40	Change Output channel Gain
7	0x01	0x20	0x03	8	0x06	(1...8)	(0---1)	0x40	Change Output channel Phase
8	0x01	0x20	0x03	8	0x07	(1...8)	(0---1)	0x40	Change Output channel Mute
9	0x01	0x20	0x03	8	0x08	(1...8)	0x00	0x40	Get Output channel Status
10	0x01	0x20	0x03	10	0x08	(1...8)	Byte 0: Gain value Byte 1: Phase value Byte 2: Mute value	0x40	Device output the Output channel status
11	0x01	0x20	0x03	23	0x09	(1...8)	Byte 0:Mixer Input channel 1 Byte 1:Mixer Input channel 2 Byte 2:Mixer Input channel 3 ... Byte 8:Mixer Input channel 8 Byte 9:Mixer Digital Input 1 Byte 10:Mixer Digital Input 2 ... Byte 15:Mixer Digital Input 8	0x40	Set Output channel Mixer From the input
12	0x01	0x20	0x03	8	0x0A	(1...8)	0x00	0x40	Set Output channel Mixer Status
13	0x01	0x20	0x03	23	0x0A	(1...8)	Byte 0:Mixer Input channel 1 Byte 1:Mixer Input channel 2 Byte 2:Mixer Input channel 3 ... Byte 8:Mixer Input channel 8 Byte 9:Mixer Digital Input 1 Byte 10:Mixer Digital Input 2 ... Byte 15:Mixer Digital Input 8	0x40	Device output the Output Mixer status
14	0x01	0x20	0x03	23	0x0D	16Bytes ASCILL code		0x40	Set device name
15	0x01	0x20	0x03	8	0x0E	0x00		0x40	Get Device information
16	0x01	0x20	0x03	29	0x0E	Byte 0-15 : Device name, ASCII Byte 16 : Firmware Version Byte 17-21 : Device Serial Number		0x40	Device output Device information
17	0x01	0x20	0x03	8	0x0F	Preset Number 0-32		0x40	Recall Preset

J Specifications

MATRIX-A8

Analog I/O 8 x 8
- Connectors : Euroblock 4 x 6-pin, 5 mm pitch,
- CODEC : CS4272, 24-bit, 48 kHz

MIC Inputs
- Active balanced
- Gain Settings: +10 to +60 dB ,1 dB steps
- Input Impedance: 2.6 kΩ 1%,1 kHz, each leg to ground
- Phantom Power: +48 VDC, 10 mA max per input
- THD+N: < 0.01 % ,typ 20-20k Hz, +4 dBu
- Maximum Input: 3 dBV (1.4 Vrms)

Line Inputs
- Active balanced
- Gain Settings: +10 to +20 dB ,1 dB steps from +10 to +20
- Input Impedance : 5.1 kΩ
- THD+N: < 0.01 % typ 20-20k Hz, +4 dBu
- Maximum Input: 20.0 dBu
- Frequency Response: 20-20k Hz, +0, -0.5 dB
- Dynamic Range: 105 dB max, A weighted
- Crosstalk: 104 dBu , 20-20k Hz, +20 dBu, ch to ch

Outputs
- Active balanced
- Impedance: 200 Ω 1%
- Maximum Output: +20.0 dBu
- Frequency Response: 20-20k Hz
- Dynamic Range: 105 dBu
- Crosstalk: 110 dB

Indicators
- Signal : -50 dBu Green LED, peak-reading
- Overload : -0.5 dBu Red LED, peak-reading

DSP
- Processor : SHARC ADSP-21489, 450 MHz
- Word Length: 32 / 64-bit Floating Point

Dimensions
- L x H x D: 483 x 44 x 256 mm

RVC-200 Remote Volume Control With Audio Out

Analog Outputs x 2
- Active Balanced
- Connectors : Euroblock 1 x 6-pin, 5 mm pitch
- Impedance: 200 Ω 1%
- Maximum Output: +20.0 dBu
- Frequency Response: 20-20 kHz
- Dynamic Range: 105 dBu
- Crosstalk: 104 dB

LCD Display
- Volume range: -120dB - 0dB

Ports
- RD net to Matrix:: RJ45, 100 m CAT 5e cable (150 m with ground connection)

Dimensions
- L x H x D: 147 x 86 x 47 mm

RPM-200 Paging Station

MIC Input
- Active balanced
- Connector: 3-pin female XLR
- Phantom Power: +24 VDC @ 100 mA On/off in software

Indicators and switch
- LCD Display: Zone activation
- LEDs: Signal Status
- Switch: Push to Talk

Ports
- RD net to Matrix: RJ45, 100 m CAT 5e cable
- USB: For MP3 Chimes Sound file (4 seconds)

Dimensions
- L x H x D: 166 x 53 x 162 mm

RIO-200 Remote Audio I/O

Inputs
- Active Balanced
- Connectors : 3-pin female XLR, RCA
- Input Impedance : 5.1 kΩ
- THD+N: < 0.01 % typ 20-20k Hz, +4 dBu
- Maximum Input: 20.0 dBu
- Frequency Response: 20-20k Hz, +0, -.05 Db
- Dynamic Range: 105 dB max, A weighted
- Crosstalk: 104 dBu , 20-20k Hz, +20 dBu, ch to ch

Outputs
- Active Balanced
- Connectors : Euroblock 1 x 6-pin, 5 mm pitch
- Impedance: 200 Ω 1%
- Maximum Output: +20.0 dBu
- Frequency Response: 20-20k Hz
- Dynamic Range: 105 dBu
- Crosstalk: 104 dB

Indicators
- Signal : -50 dBu Green LED, peak-reading
- Overload : -0.5 dBu Red LED, peak-reading

Ports
- RD net to Matrix: RJ45, 100 m CAT 5e cable (150 m with ground connection)

Dimensions
- L x H x D: 147 x 86 x 47 mm

RVC-1000 Remote Volume Control

LCD Display
- Adjustable volume range: -120dB - 0dB

Ports
- RD net to Matrix: RJ45, 100 m CAT 5e cable (150 m with ground connection)
- RD net LINK: RJ45, 100 m CAT 5e cable (150 m with ground connection)

Dimensions
- L x H x D: 147 x 86 x 47 mm

Notes