

ZIGEN

User Manual



Audio Matrix Switcher

8x8

AX-88

V.2012AX-88.00

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Before You Begin

- Follow all instructions marked on the device during using.
- Do not attempt to maintain the device by yourself, any faults, please contact your vendor.
- Provide proper ventilation and air circulation and do not use near water.
- It is better to keep it in a dry environment.
- The system should be installed indoor only. Install either on a sturdy rack or desk in a well-ventilated place.
- Only use the power Adaptor supported with the device.
- Do not use liquid or aerosol cleaners to clean the device.
- Always unplug the power to the device before cleaning.
- Unplug the power cord during lightning or after a prolonged period of non-use to avoid damage to the equipment.

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1.0 Matrix System Overview

1.0.1 Introduction

ZIGEN AX-88 Audio Matrix Switcher is high performance switcher designed for applications where routing of audio signals are required. AX-88 Matrix switch is capable of switching balanced or unbalanced mono or stereo audio signals. AX-88 also ensures simultaneous distribution of any input source signal to one or more receivers / amplifiers in (one-to-one / one-to-many combination)

AX-88 matrix switchers are ideal for use in bars, restaurants, hotels, commercial, medical, military, government, and residential environments where distribution of high quality, audio signals are needed and audio output volume, treble, bass, lip-sync and muting is essential.

One of the key features of the AX-88 is the ability to integrate with a fire alarm / life safety systems. When integrated with fire alarm / life safety, AX-88 will detect and enter in all mute standby modes until fire alarm / life safety system is reset. This is a great feature when used in hotels, banquet halls and etc.












In addition, AX-88 comes with independent line-level sub-woofer outputs for each zone offering the ability to control sub levels independently.

AX-88 also offers you the ability to save 8 frequently used I/O configurations as presets. AX-88 can be operated via the front panel, RS-232 / RS-485, IR and Ethernet control.



Figure 1-1 AX-88 Matrix Switcher

1.0.2 Packing

	<p>Audio Matrix Device</p>
	<p>RS-232 Communication Connecting Cable</p>
	<p>Power Cord</p>
	<p>IR BOX</p>
	<p>LAN Line</p>
	<p>Female 1x5 Pole Captive Screw Socket * 2</p>
	<p>Female 1x2 Pole Captive Screw Socket *1</p>
	<p>Remote Controller</p>
	<p>AAA battery * 2</p>
	<p>Audio Matrix Software CD</p>
	<p>User Manual</p>

2.0 Features

- Support up to 8 Out/In ports
- Support subwoofer output
- Volume/Subwoofer/Bass/Treble Adjustment features
- Support maximum allowable audio delay 1000ms.
- Support mute function when the fire alarm is active
- Centralized control upon 32 series connections
- Memory control up to 8 sets
- RS-232 control
- RS-485 control
- Ethernet control
- IR control
- Internal universal power supply
- 2U rack

3.0 Specifications

General	
Power	100VAC~240VAC, 50/60Hz, Automatic Switch
Housing	Black Aluminum
Mounting	Rack mountable (2U-rack-mount kits)
Weight	3135 g
Dimensions (LxWxH)	300x482x90mm (2U high, full rack wide)
Frequency Response	20Hz to 20kHz
Volume	0dB to -78.75dB
Subwoofer	0dB to -37.5dB (150Hz Low pass filter)
Bass and Treble	-14dB to +14dB
Lip-sync (Delay)	5ms for a unit (0ms, 5ms, 10ms,....1sec)
Impedance	Input: 10k ohm, unbalanced
Output Volume Range	0 to -64 (0 to -78.75 dB, mute) in -1.25 dB increments from steps 0 to -64 mute; default is 0 dB
Audio Signal	
Input Ports	RCA Female Ports (L / R)
Output Ports	RCA Female Ports (L / R Subwoofer)
Signal Type	Stereo, Unbalanced Connection
Impedance	Input:10kΩ
Control Information	
Baud rate	9600 bps; 8 data bits, 1 stop bit, no parity
Ethernet protocol	HTTP, DHCP, TCP/IP, ICMP (ping)
Program control	Web Server, AVM Application
Serial Control Port	RS-232, 9Pin Female D Type Connector RS-485, 1X5 Pole Captive Screw
Control Sequence	Matrix
Remote Control	Remote Controller, IR Receiver
Web Server	LAN, RJ-45
Fire Alarm	1 X 2 Pole Captive Screw

4.0 Device Installation

The Matrix Switching device has a black metallic housing. It can be placed on a sturdy desk directly or installed on a 19-in bracket. See Figure 4-1 below:

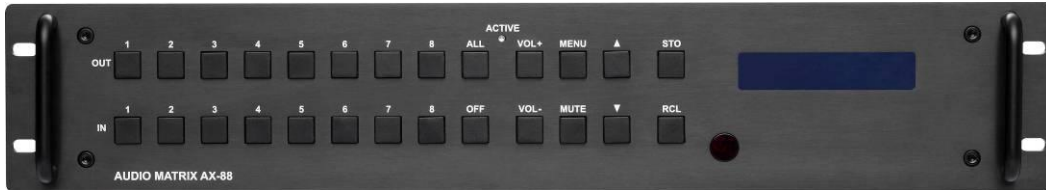


Figure 4-1 mounts the Device on a Standard Bracket with 2U Rack-mount

5.0 Front/Rear Panels

5.0.1 Front Panel



Figure 5-1 AX-88 Front Panel

The AX-88 Matrix Switching System supports up to 8 Output/Input switching keys on the Front Panel allowing you to switch signals quickly.

There are four kinds of button combinations as below:

Operation method No. 1: “Output Channel” + “Input Channel”

Press the Output key then select the Input key to set the combinations.

Operation method No. 2: “STO” + “Output/Input Channel”

Press the STO key then select the Output/Input key. Refer to [8.0 Operation Examples](#)

Operation method No. 3: “RCL” + “Output/Input Channel”

Press the RCL key then select the Output/Input key to retrieve the combinations.

Refer to [8.0 Operation Examples](#)

Operation method No. 4: Single Operation

This example is for audio configuration keys, click the VOL+, VOL-, MENU, MUTE,

▲ Or ▼ key directly.

- **OUT1~8 keys** (output channel): Specify the Channel 1~Channel 8 for audio signal output to broadcast peripherals. These keys configure the status/access the settings.
- **IN1~8 keys** (input channel): Specify the Channel 1~Channel 8 for audio signal input. Use these keys to switch to the connected input signal source channels.

- **ALL:** This key allows user to set single input channel to all output channels.
 - Press the “**ALL**” key.
 - Select one of the IN 1~8 keys.
 - The selected **IN x** key will transfer the input signal to all output channels.
 - You can also press the “**ALL**” key and then the “**OFF**” key to disable all the displayed switching settings.
- **OFF:** Disable the entire output channels. Select one of the **OUT x** keys that you would like to disable, then press the **OFF** key. Likewise, press the “**ALL**” button and then the “**OFF**” key to disable all the displayed switching settings. In addition to switching port menu, pressing “**OFF**” key can return to the main screen during implementing in other menu.
- **VOL+, VOL-, and MUTE:** Audio output volume adjustment. Each individual output audio signal has volume control adjustment via the front panel, remote controller, RS-232 or Ethernet control.
- **MENU:** Press this key to enter audio configure mode. In the audio configure mode, you can switch among Subwoofer, Bass, Treble and Lip-sync audio controls.
- **▲, ▼:** Adjust the values of selected audio feature.
- **STO:** The “**Store Key**” saves all current output/input corresponding relations and audio settings up to 8 sets for a memory control. Refer to [8.0 Operation Examples](#).
 - Press the “**STO**” key first.
 - Arrange memory location. (Support up to 8 sets of memories, user can select the memory location through OUT1~OUT8/IN1~IN8.)
 - The relation among all settings will be saved in the memory permanently.
- **RCL:** The “**Retriever Key**” retrieves all the settings that are saved in the memory. Refer to [8.0 Operation Examples](#).
 - Press the “**RCL**” key first.
 - Then select one of the output/input channel key 1~8.
- The system will retrieve your personal I/O combination settings and implement changes.
- **Active LED:** A clear LED reactor designed for pressing keys on the front panel and remote controller. Refer to [Appendix A Remote Controller](#).
- **IR:** Infrared receiver.
- **LCD:** LCD display shows current audio matrix and operation status.

5.0.2 Rear Panel



Figure 5-2 AX-88 Rear Panel

The AX-88 supports up to 8 input / output zone / source Audio, RS-232 and RJ-45 on the rear panel, each female terminal forms the signal input / output connectors. The AX-88 signal input / output terminal channels are numbered from left to right as INPUT1~8 / OUTPUT1~8 channels.

Power Port: The Power Port is applicable for 100~240VAC, 50~60Hz connected to the outlet of power source. Refer to [6.0.4 Power connection](#).

- **Power Switch:** To switch power ON or OFF the audio matrix device.
- **RS-232:** Use a 9-pin **RS-232** cable to connect both computer serial port (COM1 or COM2) and audio matrix device **RS-232** communication port, refer to [6.0.5.1 RS-232](#). The computer can then be deployed to control the audio matrix after installing of application software. Refer to [7.0.1 Software Introduction](#) for a software control or [Appendix C RS-232 Communication Protocol](#) for an individual configuration.
- **IR2:** Connect to the IR BOX. Refer to [6.0.3 IR2 Connection](#).
- **Switcher:** AX-88 supports 8 pins DIP switcher and 2 pins DIP switcher for connection configurations. For more information, refer to [6.0.5 Connection ports and Switchers](#).
 - Pin 1~Pin5: ID
 - Pin 6: Master/Slave
 - Pin 7: RS-232/LAN
 - Pin 8: IP RESET
- **RS-485:** A connection port allows you to connect/control more than one Matrix product, refer to [6.0.5.2 RS-485](#).
- **Fire Alarm:** A connector used for the connection of fire alarm system in a building. For more information, refer to [6.0.5.7 Fire Alarm](#)
- **LAN Port:** Use the RJ-45 connection cable to connect the Internet and the audio matrix device. The entire PC at the same network can control the audio matrix device through the LAN port. Refer to [6.0.5.3 LAN Port](#).

6.0 Audio Matrix and Peripherals Connection

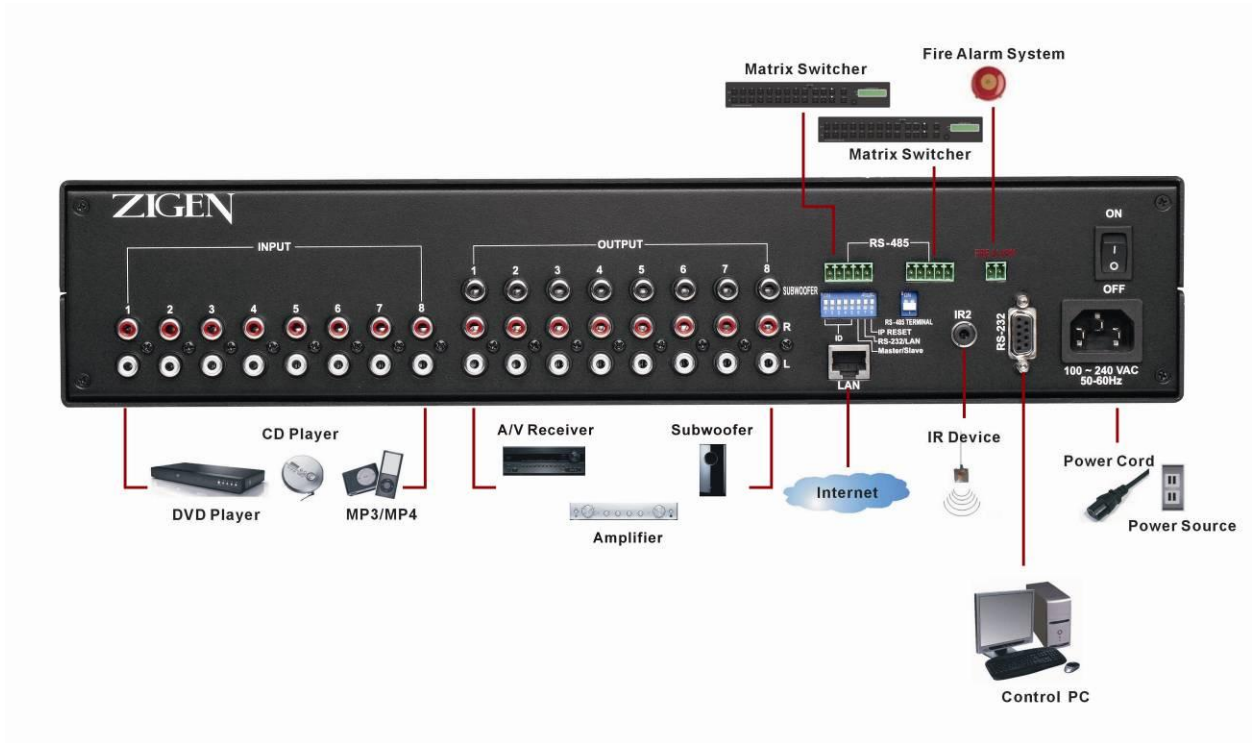


Figure 6-1 Audio Matrix System Connections

6.0.1 Input/Output Connections

Use the audio connecting cable to connect the Input serial port (No.1 ~ No.8) to the audio port of the DVD Player/CD Player/MP3/MP4 and output serial port (No.1 ~ No.8) to the audio in port of the A/V Receiver, Amplifier, Subwoofer etc.

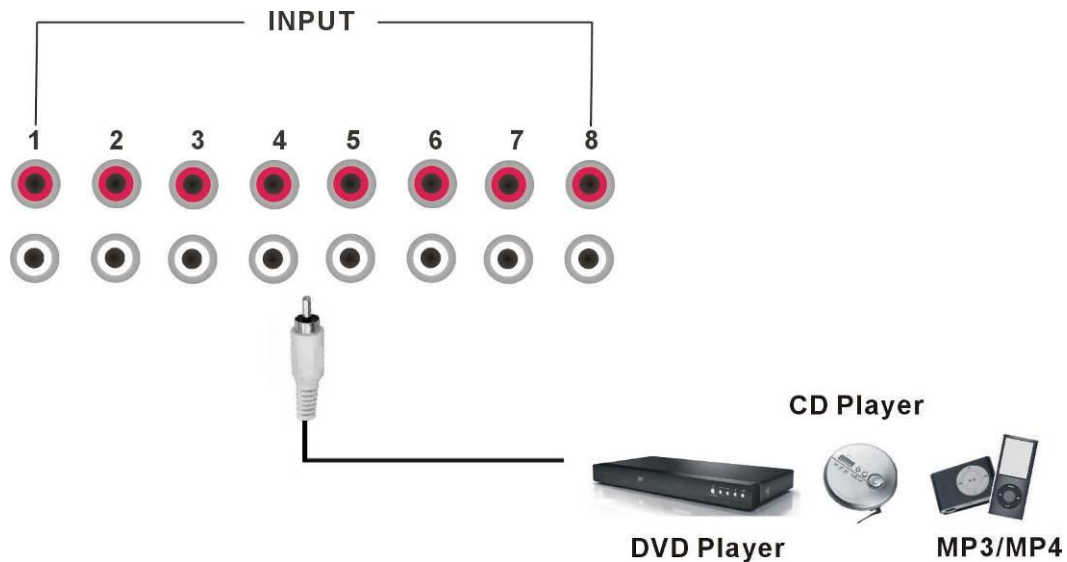


Figure 6-2 Input Connections

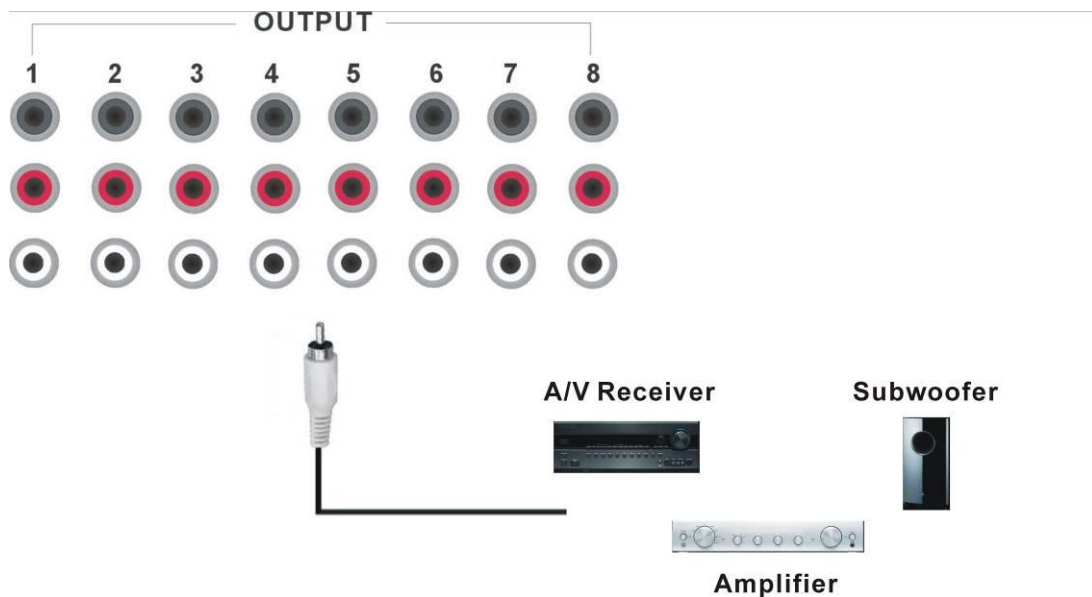


Figure 6-3 Output Connections

6.0.2 Audio Matrix System Remote Control

Use the RS-232 connecting cable to connect the computer serial communication port (COM1 or COM2) to the RS-232 communication port of the audio matrix device. The computer can then be used to control the audio matrix after installing of application software. Aside from using the front panel keys for switching operation, you are also permitted to use the RS-232 connection port for remote operation.

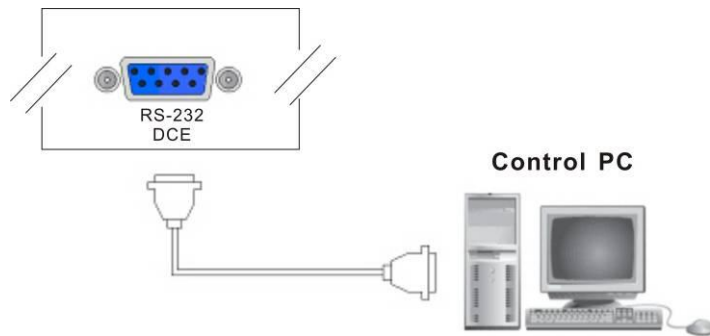


Figure 6-4 (a) RS-232 and Control PC connection

AX-88 also supports a LAN port allows you to control all the series connection devices through PC Browser.

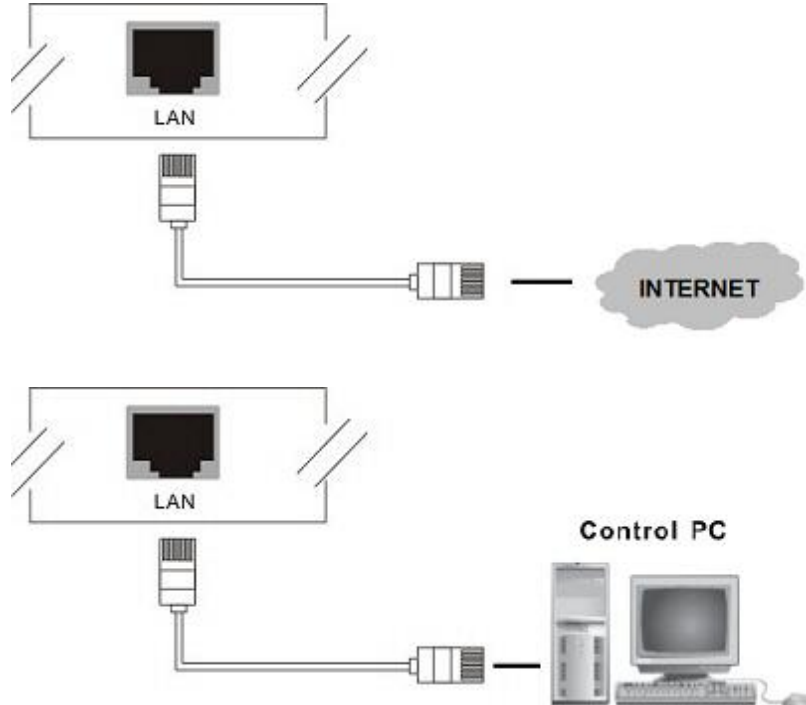


Figure 6-4 (b) LAN port and Control PC Connection

☞ AX-88 supports RS-232 and RS-485 on the rear panel for a remote control and allows you to operate settings via the keys located on the front panel.

6.0.3 IR2 Connection

The audio matrix provides you an IR BOX for more convenient to react to the controller. If it is difficult for you to aim at IR receiver on the front panel due to the location of matrix switching device, please connect the IR receiver BOX to the IR2 port located on the rear panel for optional position.

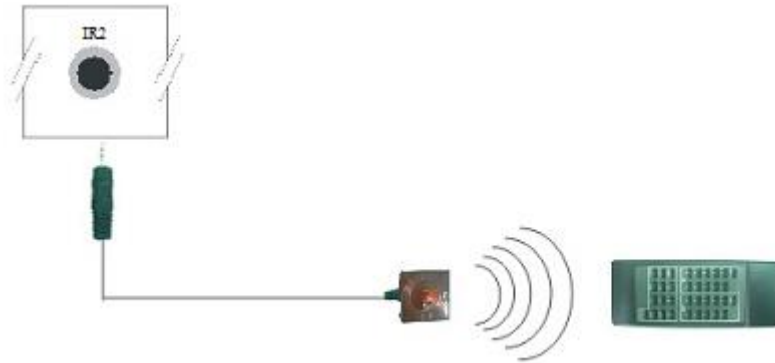


Figure 6-5 IR Connection

6.0.4 Power connection

Use the included power cord to connect from the power port on the rear panel of audio matrix device to the outlet.

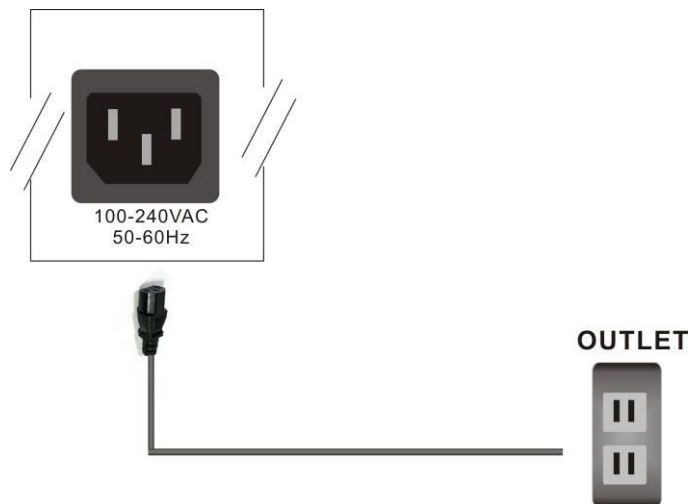


Figure 6-6 Power Connection

6.0.5 Connection ports and Switchers

The audio matrix provides standard RS-232 and RS-485 serial communication ports. Beside the front panel for key switching operation, you can also use the RS-232 or RS-485 serial communication port to carry out remote operation.

6.0.5.1 RS-232

The RS-232 Pin functions are described as below:

Pin No.	Abbreviation	Description
1	N/u	Null
2	TXD	Send
3	RXD	Receive
4	N/u	Null
5	GND	Ground
6	N/u	Null
7	N/u	Null
8	N/u	Null
9	N/u	Null

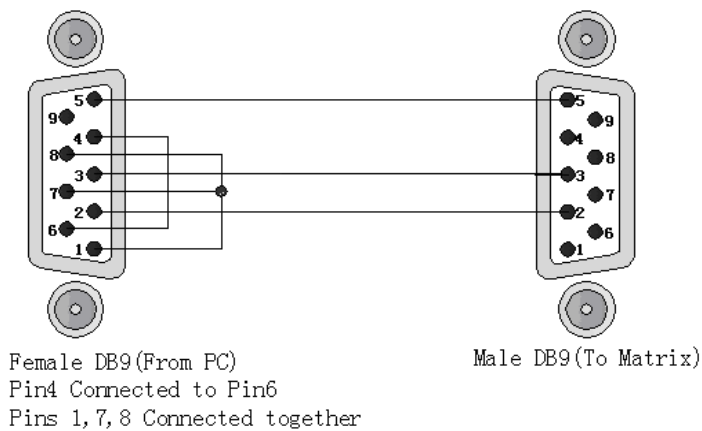


Figure 6-7 (a)

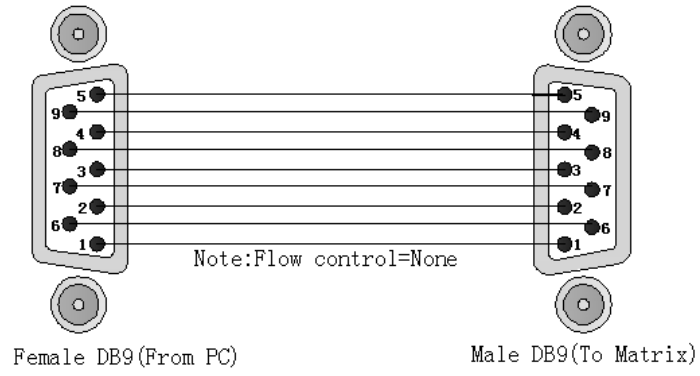


Figure 6-7 (b)

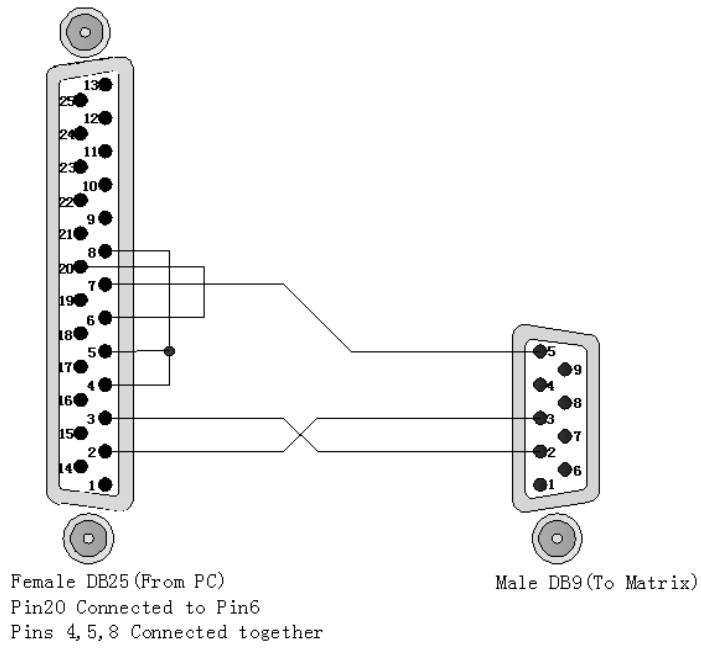


Figure 6-8

☞ The Matrix RS-232 port is defined by DCE.

6.0.5.2 RS-485

RS-485 is a standard defining the electrical characteristics of drivers and receivers for use in balanced digital multipoint systems. Digital communications networks implementing the RS-485 standard can be used effectively over long distances and in electrically noisy environments. AX-88 supports up to two RS-485 ports allows you to control more than one Matrix Device. If the master device is specified for IPM, it allows you to control all the series devices with web browser. When connecting in parallel, Matrix device ID must be unique.

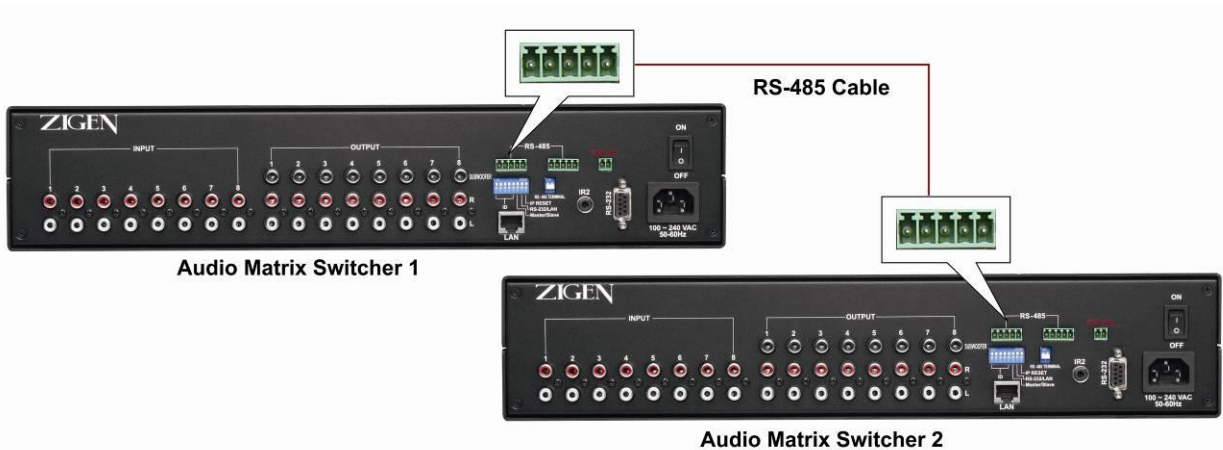


Figure 6-9 RS-485 Connection

See Pin definitions as below:

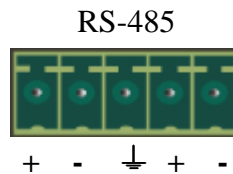


Figure 6-10 RS-485 Port

Serial connection between Matrix RS-485:

- Pin1 TX (+) ← TX (+) --- Transmitted Data +
- Pin2 TX (-) ← TX (-) --- Transmitted Data -
- Pin3 Gnd ← (Ground)
- Pin4 RX (+) ← RX (+) --- Received Data +
- Pin5 RX (-) ← RX (-) --- Received Data -

☞ RS-232 and RS-485 baud rates: 9600bps, no odd or even calibration address, 8bit data transmission address, 1bit stop address (96, N, 8, 1).

6.0.5.3 LAN Port

AX-88 supports a network RJ45 registered jack using 8P8C modular connector, which specifies the physical male and female connectors as well as the pin assignments of the wires in a telephone cable. (A common LAN cable is available.)

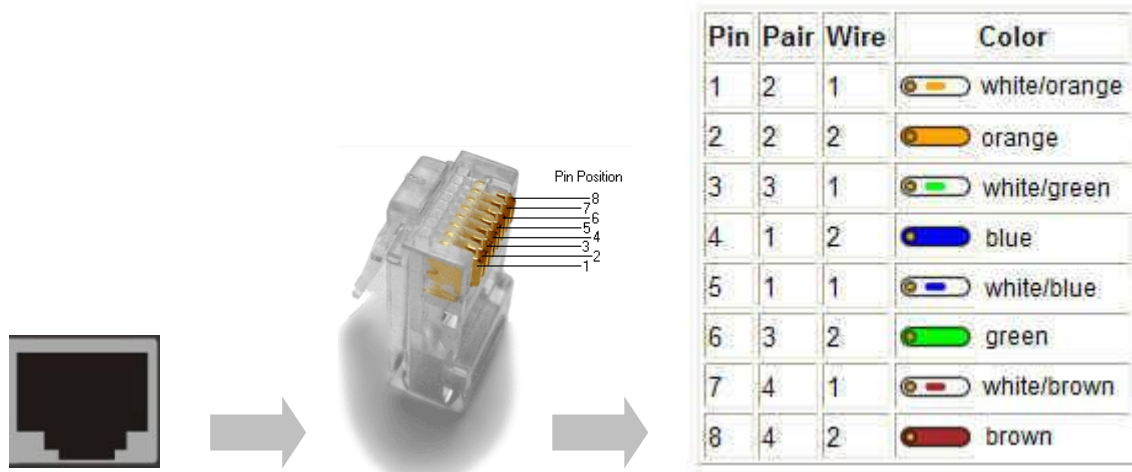


Figure 6-11 LAN Port

6.0.5.4 DIP Switcher 8 Pins

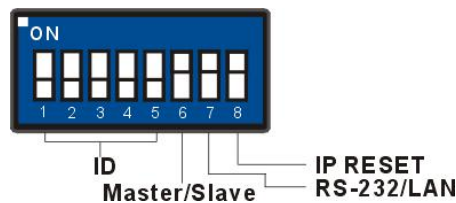


Figure 6-12 DIP Switchers

A. DIP Switcher Pin 1 to 5: Switch to up (ON) is specified for “0”, on the other hand to down (OFF) is specified for “1”. For Device ID settings refer to [6.0.5.6 Device ID Settings](#).

B. DIP Switcher Pin 6: RS-232/LAN Communication Port Enable/Disable. Only one matrix device can be connected to other device via RS-232/LAN that is specified as Master, others are specified as Slave.

ON: RS-485 Serial Master and RS-232 / LAN Enable.

OFF: RS-485 Serial Slave and RS-232 / LAN Disable.

C. DIP Switcher Pin 7: Switch between RS-232 port and LAN port connection.

ON: RS-232

OFF: LAN

D. DIP Switcher Pin 8: Reset the web server IP address to **192.168.0.3**

The steps are as below:

1. Please adjust the pin8 to OFF and re-start AX-88.
2. After the AX-88 re-starts about 10sec, shut down your equipment.
3. For a normal operation, please adjust the pin8 to ON, then power on AX-88 again. The IP address will be restored to the default value: **192.168.0.3**

6.0.5.5 DIP Switcher 2 Pins



Figure 6-13 RS-485 Terminal Switcher

DIP Switch RS-485 Terminator: RS-485 Terminator for ON/OFF

ON: RS-485 Terminator ON.

OFF: RS-485 Terminator OFF.

Proceed multi-matrix switching device connections, the RS-485 Terminator for both of the first Device (the Master) and the last Device must be set to ON. Others must be set to OFF.

6.0.5.6 Device ID Settings

Device ID Settings

The Device ID determines the position of a Matrix system. When multiple Matrix products are connected to one PC or when the Matrix products are serially connected, the Device ID decides which Matrix product is to be controlled. Device ID must not set to same number. Use the ON/OFF switches 1, 2, 3, 4, 5 on the rear panel to set the ID number as below:

Number Setting Table

ID Address (Decimal)	ID Address (Hexadecimal)	ID Address (Binary)	ON/OFF Switching Positions				
			SW5	SW4	SW3	SW2	SW1
0	00	00000	ON	ON	ON	ON	ON
1	01	00001	ON	ON	ON	ON	OFF
2	02	00010	ON	ON	ON	OFF	ON
3	03	00011	ON	ON	ON	OFF	OFF
4	04	00100	ON	ON	OFF	ON	ON
5	05	00101	ON	ON	OFF	ON	OFF
6	06	00110	ON	ON	OFF	OFF	ON
7	07	00111	ON	ON	OFF	OFF	OFF
8	08	01000	ON	OFF	ON	ON	ON
9	09	01001	ON	OFF	ON	ON	OFF
10	0A	01010	ON	OFF	ON	OFF	ON
11	0B	01011	ON	OFF	ON	OFF	OFF
12	0C	01100	ON	OFF	OFF	ON	ON
13	0D	01101	ON	OFF	OFF	ON	OFF
14	0E	01110	ON	OFF	OFF	OFF	ON

15	0F	01111	ON	OFF	OFF	OFF	OFF
16	10	10000	OFF	ON	ON	ON	ON
17	11	10001	OFF	ON	ON	ON	OFF
18	12	10010	OFF	ON	ON	OFF	ON
19	13	10011	OFF	ON	ON	OFF	OFF
20	14	10100	OFF	ON	OFF	ON	ON
21	15	10101	OFF	ON	OFF	ON	OFF
22	16	10110	OFF	ON	OFF	OFF	ON
23	17	10111	OFF	ON	OFF	OFF	OFF
24	18	11000	OFF	OFF	ON	ON	ON
25	19	11001	OFF	OFF	ON	ON	OFF
26	1A	11010	OFF	OFF	ON	OFF	ON
27	1B	11011	OFF	OFF	ON	OFF	OFF
28	1C	11100	OFF	OFF	OFF	ON	ON
29	1D	11101	OFF	OFF	OFF	ON	OFF
30	1E	11110	OFF	OFF	OFF	OFF	ON
31	1F	11111	OFF	OFF	OFF	OFF	OFF

6.0.5.7 Fire Alarm

A Fire Alarm port for fire alarm cable connected to fire alarm systems serve as life lines to safe and secure buildings. Once the matrix senses fire alarm contact closure, all zones will be muted, and restored to the original volume and settings after relieving the fire alarm. When the pins of fire alarm port (closed), it will actuate the fire alarm system.



Figure 6-14 Fire Alarm Port

7.0 Matrix Application Software

7.0.1 Software Introduction

The «AV Matrix» Matrix control software applies to different input/output matrixes.

7.0.1.1 Software Description

The «AV Matrix» matrix testing software is an application tool developed for matrix testing and application. The software operation environment is as below:

Window98/2000/NT/XP/ operating systems

32M internal memory or above

10M hard disk space or above

CD-ROM

At least one serial communication port

7.0.1.2 Software Activation

Power on the computer: Implement the **AV Matrix.msi** in the bundled CD-ROM to activate installation screen as below, click “**Next**”. And follow the instructions on screen to finish the installation.

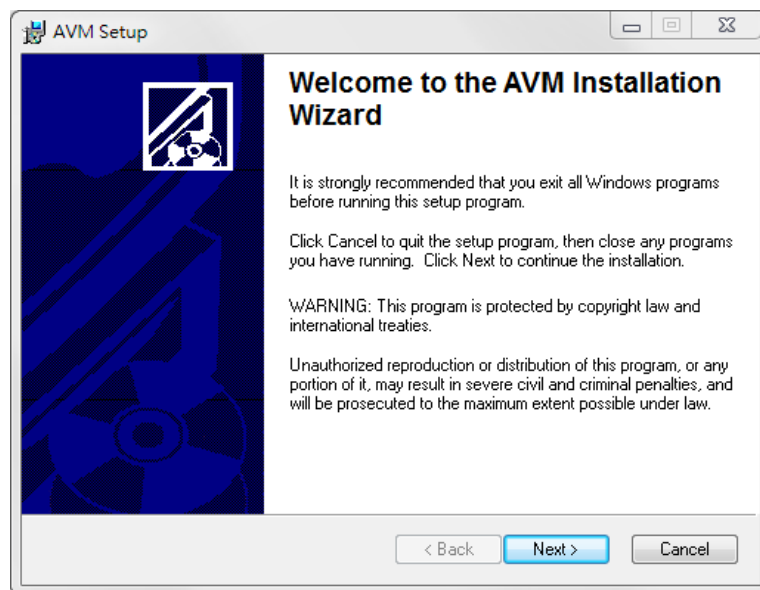
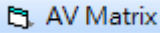


Figure 7-1 AV Matrix Installation Screen

7.0.1.3 Connect AX-88 and PC

You must power off the AX-88 matrix switching device. Then, connect the matrix RS-232 port to the PC RS-232 port with the bundled communication cable. And make sure the DIPs on the rear panel are set to Master and RS-232. (Refer to the previous section [6.0.2 Audio Matrix System Remote Control](#).)

7.0.2 Matrix Configuration

After finishing installation, click  **AV Matrix** to active AV Matrix Application. In the **“Options”** screen, select the connected PC Port number and Baud rate, and then click **“OK”**.

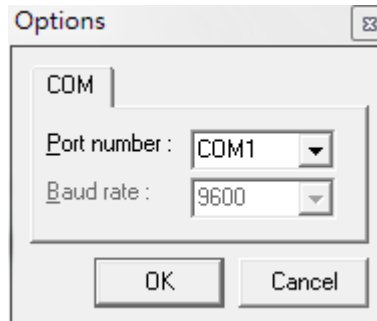


Figure 7-2 AV Matrix Options Screen

The software controls audio signal connection between the corresponding input port and output port as required. The AV Matrix software application main screen is as below:

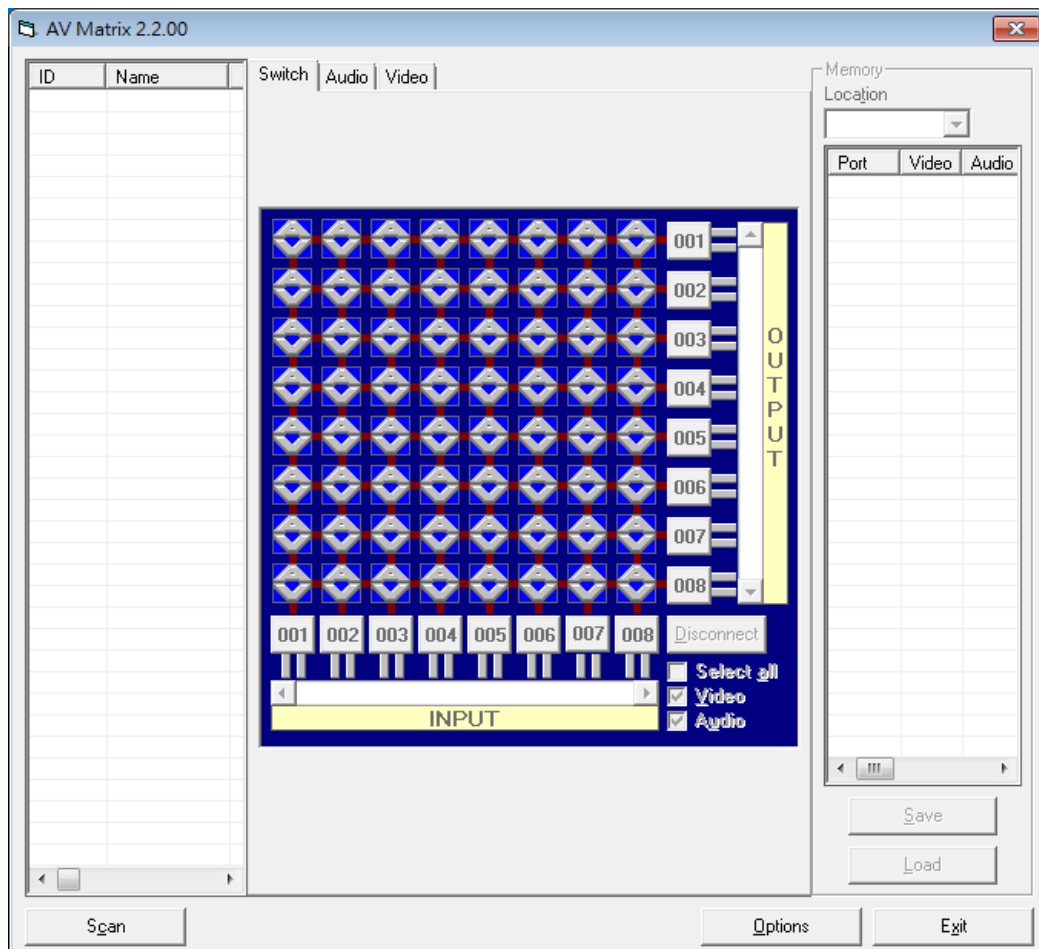


Figure 7-3 《AV Matrix》 Software Application Main Screen

☞ The Device ID is based on the DIP of switcher located on the rear panel.

Slide the scrollbar on the lower left area of main screen to view all contents (including ID, Name, A/V, I/O (only for VO/AO reference), Memory, VI Plug, AI Plug, VO Plug, AO Plug, EDID Type, Volume, Bass, Treble, Subwoofer, Delay, Delay Unit, Max Delay and Version) as described below:

ID: Specify the ID address of matrix switching device.

Name: The name of matrix switching device.

A/V: Specify the character of audio or video. Or both of audio and video are supported will show “**Both**”.

I/O: Ports quantities of Input and Output.

Memory: Show the quantities of memory sets.

AI/VI Plug: Enable to detect the status of all input ports for audio/video.

AO/VO Plug: Enable to detect the status of all output ports for audio/video.

EDID Type: EDID function is not supported on the AX-88

Volume/Bass/Treble/Subwoofer: Show the Volume/Bass/Treble/Subwoofer function is Enable or Disable.

Delay: Show whether enable or disable the audio output delay time function.

Delay Unit: Show the delay time of audio output. The unit for delay time is “**ms**”.

Max Delay: Show the maximum permissive delay time. The unit for maximum delay time is “**ms**”.

Version: Show the version information of device.



AO Plug	EDID Type	Vo
Disable	Disable	En

7.0.2.1 Main Operation Interface

Refer to the main screen as above, the marked blue area shows crossing matrix of output ports 001-008 and input ports 001-008. For the basic operation is described as below:

Examples for Selecting Matrix Switching Functions:

Example: Now there is an AX-88 matrix having all the input/output ports properly connected to the equipments. If you want to set channel 1 input to channel 2, 3 and 4 output; channel 3 inputs to channel 1 output. There are 2 ways to implement the switching. Please follow the ways and steps to finish the switching functions:

First way: Directly click on the corresponding icons on the matrix  to transform them into  to complete the switching operation.

Second way:

Step 1: First select the “**Output**” number keys 002, then select 003 and final select 004 to the right of the blue configuration area, and select the “**Input**” number key 001 to the bottom. Then, press consecutively the previously selected “**Output**” number keys 002, 003 and 004. This way, you have selected “**Input**” 001 and “**Output**” 002, 003 and 004 switching.

Step 2: First select the “**Output**” number key 001 to the right of the blue configuration area, and select the “**Input**” number key 003 to the bottom. Then, press the previously selected “**Output**” number key 001. This way, you have selected Input 03 and Output 001 switching.

Upon completion of the above steps, you have actually completed the switching operation of having channel 1 input to channel 2, 3 and 4 outputs while at the same time successfully switched from channel 3 inputs to channel 1 output.

The main configuration screen also shows you some function buttons for easy operation:

Switch Tab: Click “**Switch**” tab to show the main configuration screen.

Audio Tab: Click the “**Audio**” tab to show the audio related configuration screen. For more information, refer to [7.0.2.3 Audio Configuration Function](#).

Video Tab: Click the “**Video**” tab to show the video related configuration screen. This function is NOT supported for AX-88.

Disconnect: To disable the connections. After you had configured the connection between input and output ports, you can click this button to disable the connections.

Select all output: Click this button to select all output ports including output 001~008.

Video check box: Used for video configurations. This function is NOT supported for AX-88.

Audio check box: Used for audio configurations.

Scan: To search the device controlled by the AV Matrix Application configuration. When the device name located on the left of main configuration screen is empty, you can click the **Scan** to research and update the device **ID** and **Name** and other related information. End the **Scan** function by pressing the Scan again during scanning process. And the left of main configuration screen will show you the detected information presently.

Options: Allows you to configure the **Port number** and **Baud rate**.

Exit: Click this button to exit the configuration screen.

Save: Click this button to save the connected combinations both output ports and input ports into the memory set.

Load: Click this button to retrieve the previously saved settings.

For more information and operations, please refer to next chapters.

7.0.2.2 Disconnect Function Key

Disable all the unused output ports.

A specific example of operation is described as below:

The present input and output relations are shown in Figure 7-4 (a) below:

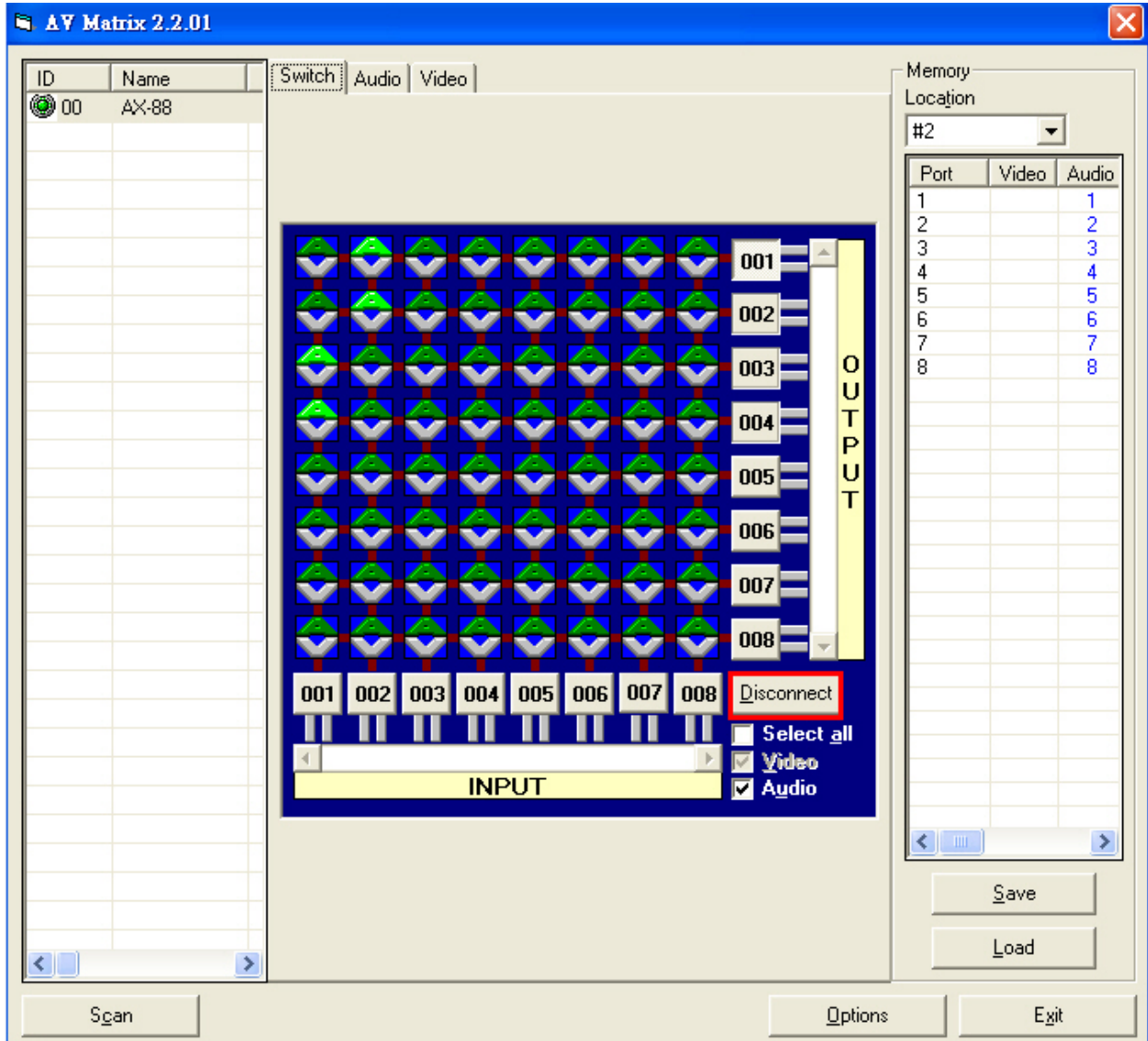


Figure 7-4 Disconnect Function Key (a)

Follow the steps as below to disable the output ports including port 003、002、and 001.

- Step 1:** First press down the output number keys 003, then 002 and final 001 to the right of the blue configuration area.
- Step 2:** Press the “**Disconnect**” key;
- Step 3:** Press the previously pressed output number keys 003, then 002 and final 001 to complete the operation.

The final results will be as shown in Figure 7-4 (b) below:

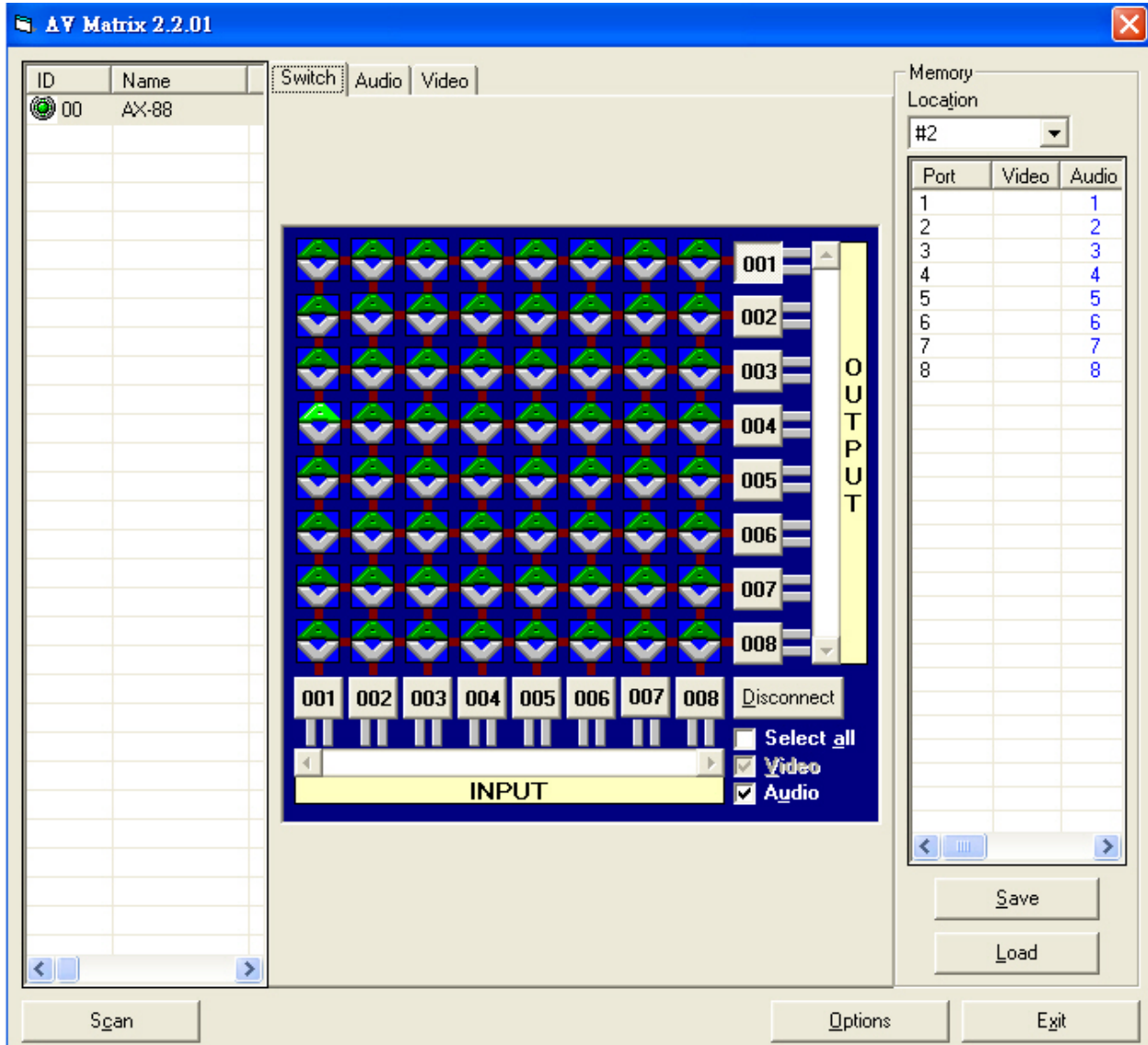


Figure 7-4 Disconnect Function Key (b)

7.0.2.3 Audio Configuration Function

Click “**Audio**” tab to enter the audio configuration screen. The audio configuration screen allows you to adjust **Volume**, **Bass**, **Treble**, **Subwoofer** and **Delay** by sliding the scrollbar. You can also enable/disable the “**Mute**” function here.

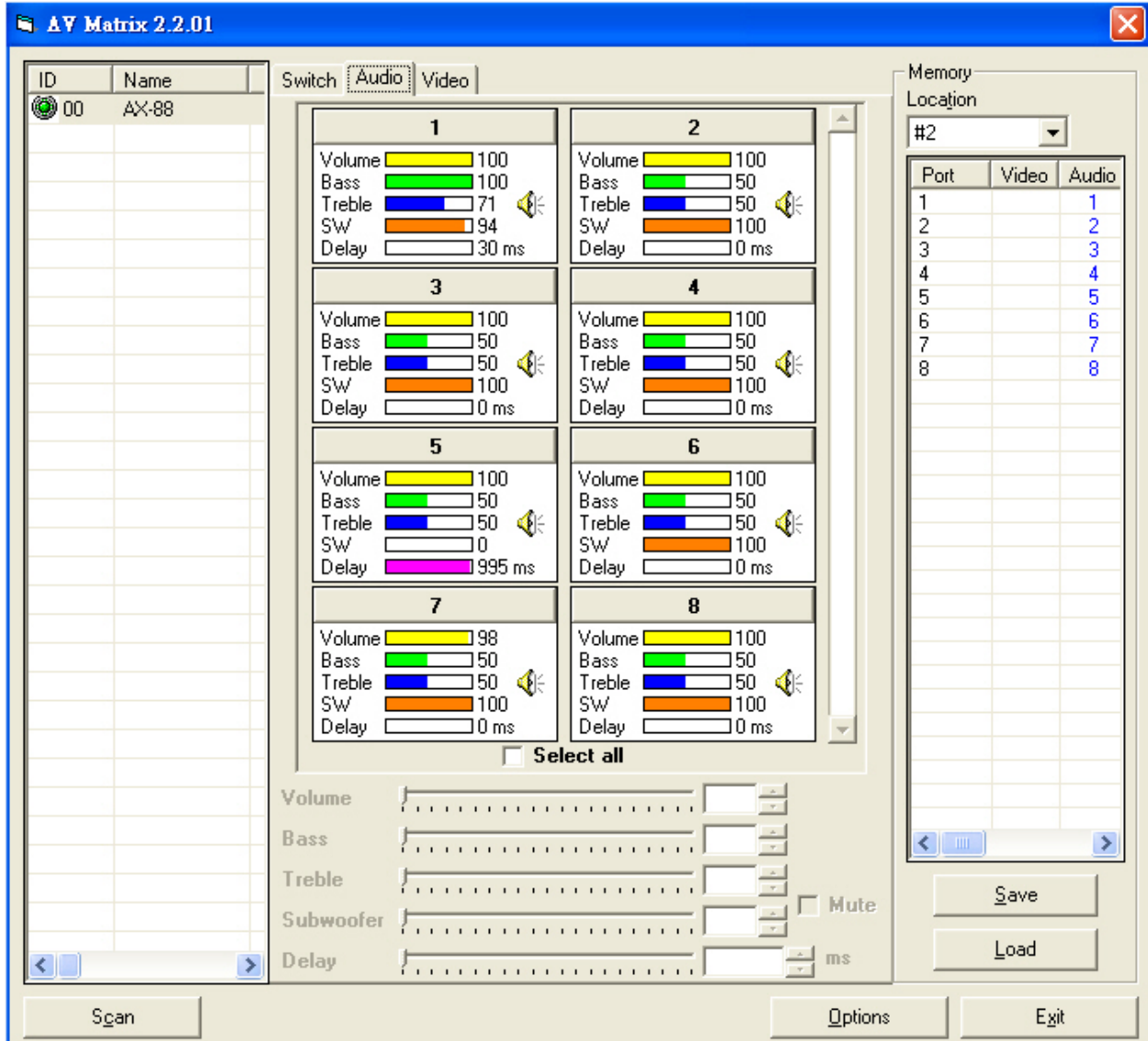


Figure 7-5 Audio Configuration Screen

Mute Function Description: To mute the volume.

A specific example of the Mute One Function is described below:

Select one port configuration section as light blue block, then click “**Mute**” check box to

mute blocked section. The  icon will become .

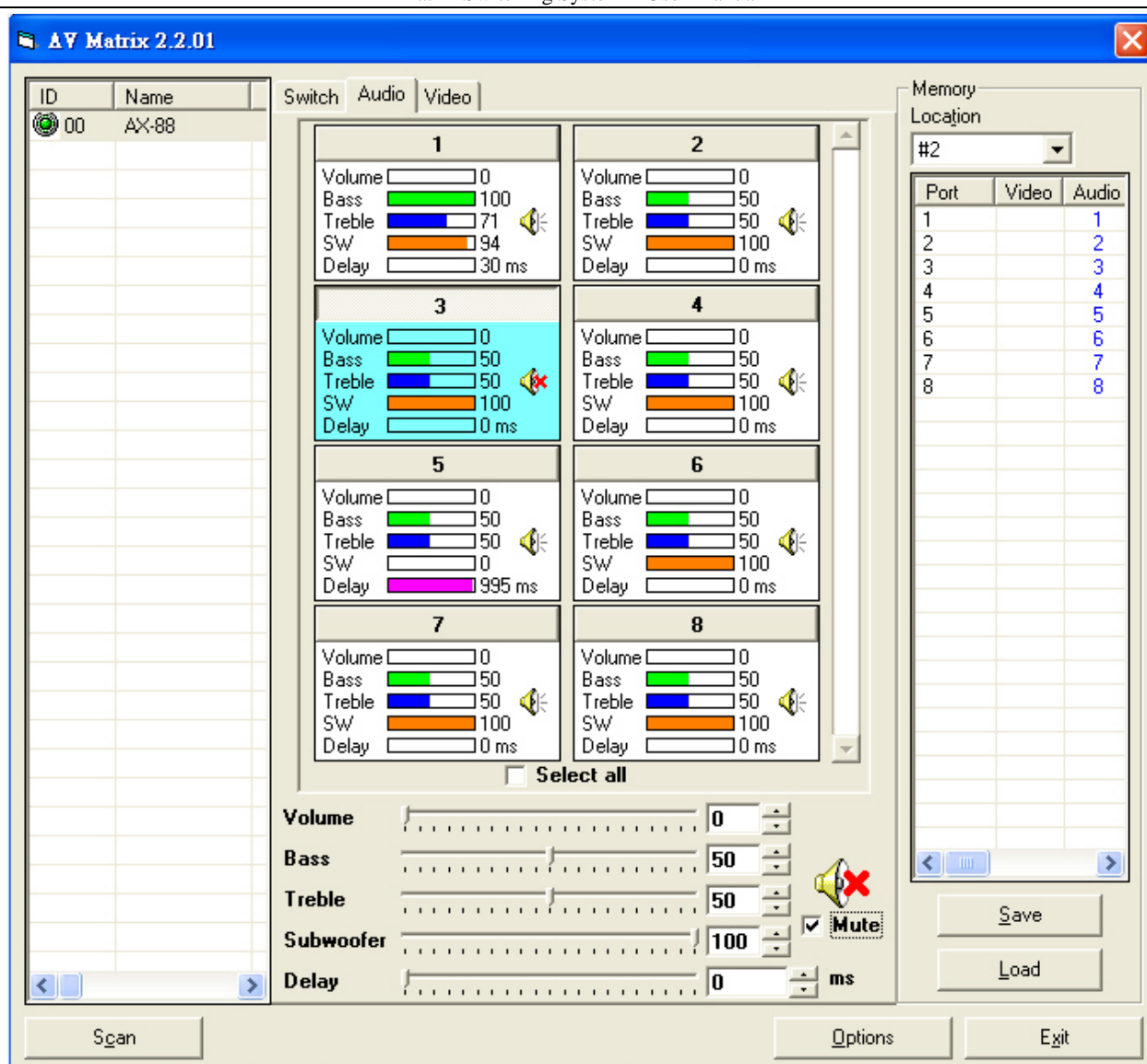


Figure 7-6 Mute One Port Configuration

A specific example of Mute all function is described below:

Click **“Select all”** check box, all of configuration sections will become as light blue block,

then click **“Mute”** check box to mute all blocked sections. All of the  icon will become



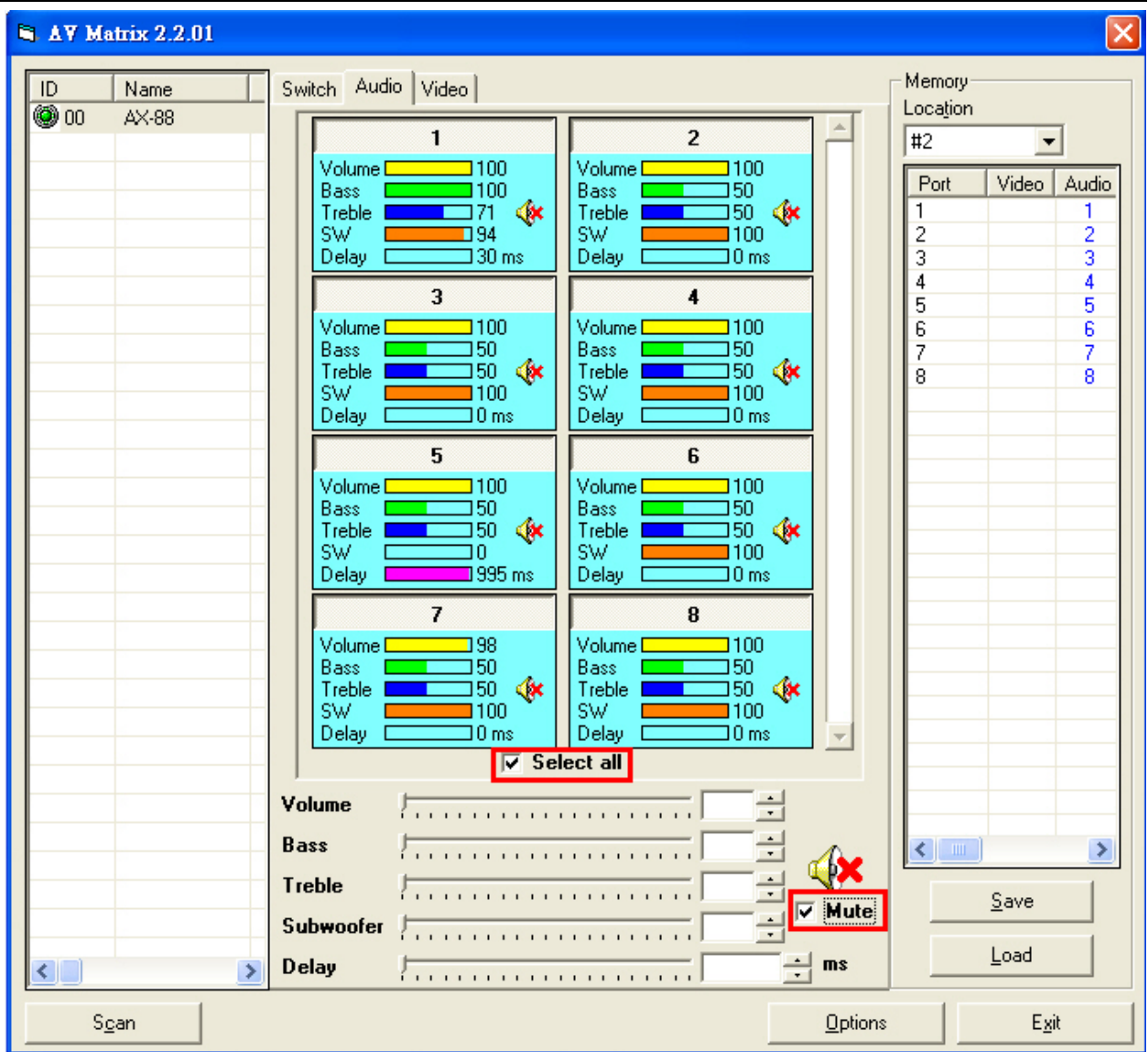


Figure 7-7 Mute All Ports Configuration

7.0.2.4 Video Configuration Function

Click “**Video**” tab to enter the video configuration screen. In the video configuration screen allows you to configure the **EDID** type of channel as **FIX** or **Output1**.

- **FIX mode:** The matrix switching device will supply a set of fixed **EDID** values to support up to only 1080P high performance TV.
- **TV1 mode:** The matrix switching device will access the **EDID** values of high performance TV that is connected to the first output channel, and copy the **EDID** value to all the input channels.

☞ AX-88 is an audio matrix switching device; therefore, it does not support the video configuration function.

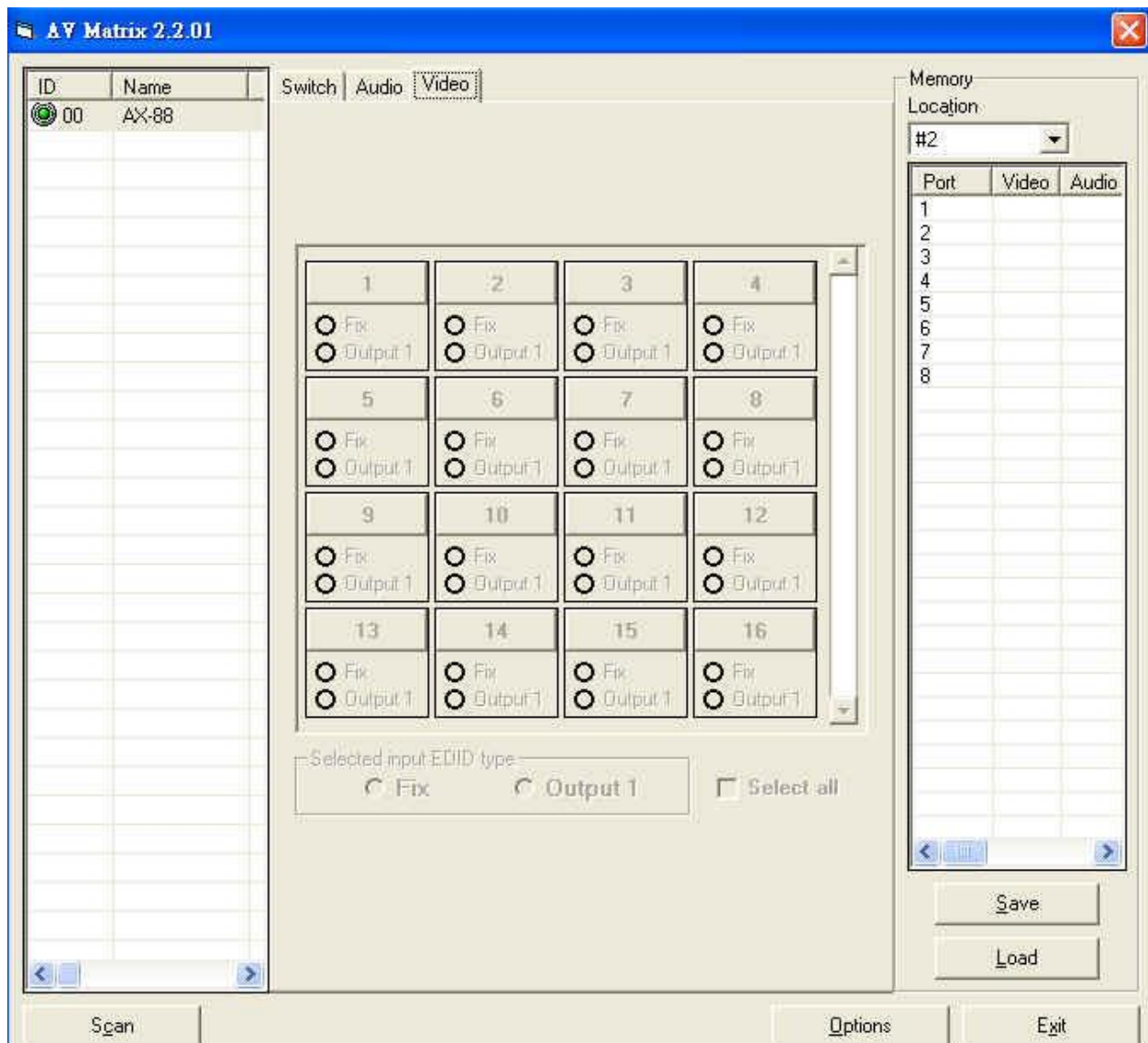


Figure 7-8 Video Configuration screen

7.0.2.5 RS-232 Memory Function

Function Description: To store and retrieve the settings.

Memory Save Function Description: The function saves all the present input/output switching relations and all settings to any Locations from #1 to #8 you desired.

A specific example of the Store Function is described below:

Store all the present input/output switching relations to Location #1. First, select Location #1, as shown below. Then click the **Save** key to save all the present input/output switching relations and all settings to Location #1.

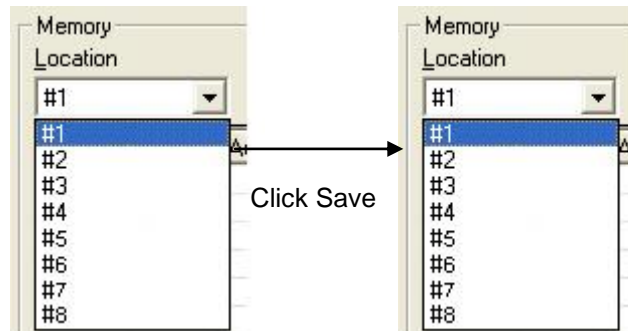


Figure 7-9

Retrieve Function Description: To retrieve the saved input/output switching relations.

A specific example of the Retrieve Function is described below:

To retrieve all settings saved in Location #1. First, select Location #1 as shown in the figure below. Then click the **Load** key to retrieve all the settings stored in Location #1.

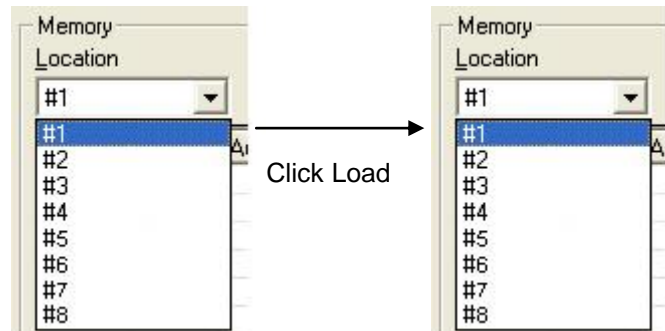


Figure 7-10

7.0.2.6 Options Function

Activation Function:

In the main configuration menu, select **Options** to prop-up the **Options Window** as shown in Figure 7-11 (a)

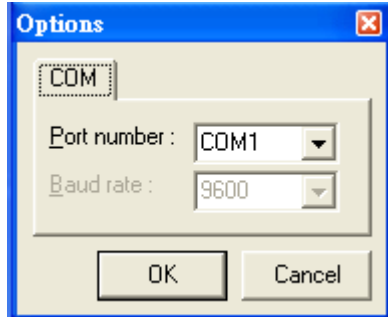


Figure 7-11 Options (a)

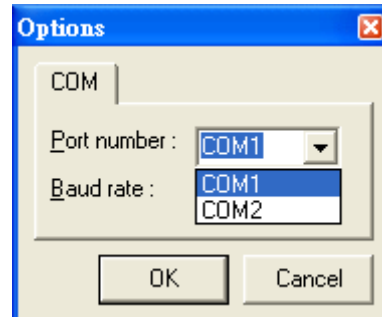


Figure 7-11 Options (b)

Function Description:

Linking Methods: In “Port number” select one of the COM ports as shown in Figure 7-11 (b) for a example; in “Baud rate” select 9600 for signal transmission as shown in Figure 7-11 (a)

7.0.2.7 Other Application

In the right main screen displays the presently saved switching status as shown in Figure 7-12 below:

Memory		
Location		
#1		
Port	Video	Audio
1		None
2		1
3		None
4		None
5		None
6		None
7		None
8		None

Figure 7-12 Memory Configuration Status

When input corresponding to Output is enabling, it shows the Output ports correspond to the Input ports; when they are disabled it will show red “**None**” in the relative field.

7.0.2.8 Communication Protocol/Control Command Code

Communication Protocol: Baud rate 9600bps, no odd or even calibration bit address, 8bit transmission address, 1bit stop address. Please refer to the “**Command list.pdf**” in the CD-ROM for more relative **Command Code** information. Also see [Appendix C RS-232 Communication Protocol](#).

7.0.3 LAN Web Configuration

Open the **Browser** on your PC, key in the default IP address: <http://192.168.0.3> to login the **AV MATRIX Control** configuration screen. Once the default IP address is changed, please use the changed IP to login.

The software controls signal connection between the corresponding input port and output port as required. The LAN main configuration screen is as below:

The screenshot shows the AV MATRIX Control web interface. At the top center is the title "AV MATRIX Control". Below it, there's a "Console List" section with "Previous" and "Next" buttons and a table with "ID" and "Name" columns. To the right of this is a "Console:" dropdown set to "0", followed by tabs for "Audio" (selected), "Video", and "Status", and navigation buttons: "<", "<<", ">>", and ">". The main configuration area is an 8x3 grid. The first row is labeled "Output" and has 8 colored buttons (1-8). The second row is labeled "Video" and has 8 white buttons. The third row is labeled "Audio" and has 8 white buttons. Below the grid are several control buttons: "All Output" (checkbox), "AV Link" (checkbox), "Set", "OFF", "Refresh", "Load", "Scan", "Upgrade", "Options", and "Save". There are also "Key In:" radio buttons for channels 0-9 and an "Enable:" radio button for channels 0-9. On the far right is a "Memory Information" section with a "Location:" dropdown set to "#1" and a table with columns "Output", "Video", and "Audio" and rows 1-8.

Figure 7-13 LAN Web Configuration Screen

☞ AX-88 is integrated Audio switching equipment. You can only key in the Output Channel No. into the **Audio** field for configuration.

☞ AX-88 Device ID is based on the DIP of switcher located on the rear panel. Note, please adjust the DIPs to LAN and Master for the web control device.

Set: Click this button to set the connected combinations both output and input ports.

OFF: Disable the entire output channels.

Refresh: To refresh the values of the configuration screen. Any changed settings directly on the AX-88 equipment will not respond to the AV Matrix operating interface, you have to click the **Refresh** button to refresh the configuration screen so that it may reflect the changed values.

Load: Click this button to retrieve the previously saved settings.

Scan: To search the device controlled by the LAN Web Configuration. When the **Console List** content is empty, you can click the **Scan** to search and update the Console List, If the connections of your matrix switching device is over 8 devices, you can click **“Previous”** or **“Next”** to view console list by page.

Upgrade: Use for firmware upgrade. For more information, refer to [Appendix B Firmware Upgrade](#).

Options: Allows you to configure the **IP** address.

Save: Click this button to save the connected combinations output ports and input ports. It also includes the present input/output switching relations and all audio settings.

☞ For more relative information, refer to [5.0.1 Front Panel](#) as “**STO**” key function.

All Output: A Hot Key for you to set the same value to all output channels. Select the **All Output** check box, then key in example “5” value in the channel 1 output. Click anywhere on the screen, the all channels output will become “5” value.



Figure 7-14 All Output Check Box Function

A / V Link: Link between audio and video, video function is not supported on AX-88.

Key In: A Hot key for keying in the value 0~99 quickly. After setting the value, click “**Enable**” to save changes.

Previous and Next: If the connections of your matrix switching devices are over 8 devices, you can click “**Previous**” or “**Next**” to view the console list by page.

7.0.3.1 Audio Operation

For audio configuration, click **Audio** button to drop down “**Audio Settings**” screen. For Video button, AX-88 is not supported.

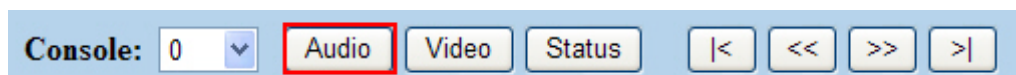


Figure 7-15 Audio Operation

In “**Audio Settings**” screen, you can select output port 1~8 from the drop-down list. If you want to mute the volume, please select the **Mute** check box. You can also adjust the **Subwoofer**, **Bass**, **Treble** or **Lip-sync** value here.

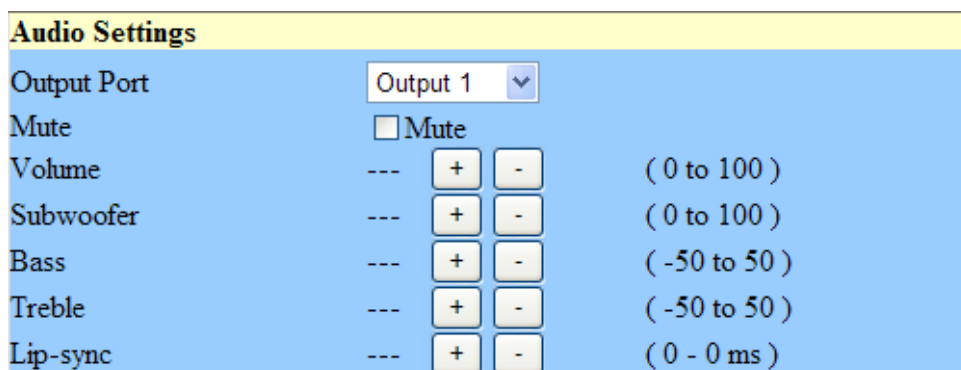


Figure 7-16 Audio Settings

7.0.3.2 Device Status Information

Click **Status** button pop-up “**Device Status Information**” screen as below.

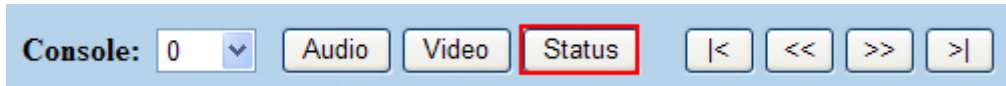


Figure 7-17 Device Status

The “**Device Status Information**” screen will show you **Device Name**, **Device ID**, **Firmware Version**, **Total Memory**, **Total Output** and **Total Input** information. Click “**Refresh**” button to renew related information in real time.

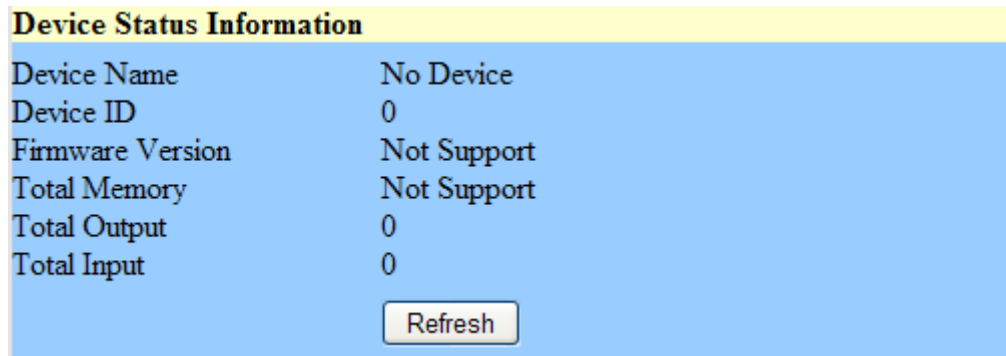


Figure 7-18 Device Status Information

7.0.3.3 Device Output View

When your matrix switching device supports more than 8 output ports, the output configuration view of browser application will be over one page. Click to go to the first page of output configurations, to go to last page, to go to previous page and to go to next page as below:

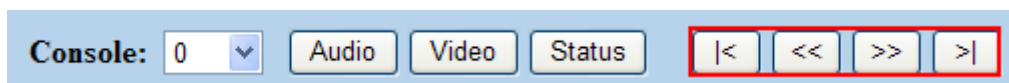


Figure 7-19 Audio Output View

☞ AX-88 only supports up to 8 output ports (one page viewing). Therefore, turn page viewing function for AX-88 is not supported.

7.0.3.4 LAN Main Operation

Refer to the main configuration screen as above; the basic operation is described as below:

Example: Now there is an AX-88 matrix having all the input/output ports properly connected to the equipment. If you want to set channel 1 input to channel 2, 3 and 4 output; channel 3 inputs to channel 1 output.

AV MATRIX Control

Console List

Previous Next

ID	Name
0	AX-88

Console: 0

Output	1	2	3	4	5	6	7	8
Video								
Audio	3	1	1	1	5	6	7	8

All Output
 AV Link

Key In: 0 10 20 30 40 50 60 70 80 90

Enable 0 1 2 3 4 5 6 7 8 9

Memory Information

Location: #1

Output	Video	Audio
1		1
2		2
3		3
4		4
5		5
6		6
7		7
8		8

Figure 7-20 AV Matrix Control

Step 1: For channel 2, 3, 4 Output, please key in the value “1” in the **Audio** fields.

Step 2: For channel 1 Output, please key in the value “3” in the **Audio** fields.

Step 3: Click “Set” button.

Upon completion of the above 3 steps, you have actually completed the switching operation of having channel 1 input to channel 2, 3 and 4 output while at the same time successfully switched from channel 3 input to channel 1 output.

7.0.3.5 LAN Memory Function

Function Description: To store and retrieve the settings.

Store Function Description (STO/Save): The **Store Function** saves all the present input/output switching relations and all audio settings to any Locations from #1 to #8 you desired.

A specific example of the Store Function is described below:

Store the present input/output switching relations to Location #2. First, select Location #2, as shown in the figure below. Then click the **Save** button to save the present input/output switching relations to Location #2.

Retrieve Function Description (RCL/Load): To retrieve the saved input/output switching relations and all audio settings.

A specific example of the Retrieve Function is described below:

To retrieve the input/output corresponding relations saved in Location #1. Select the Location #1 as shown in the figure below. The input/output corresponding relations and audio settings stored in Location #1 will be shown directly.

The figure shows two screenshots of the 'Memory Information' interface. The left screenshot shows a dropdown menu for 'Location' with '#2' selected, and a table with 'Output' and 'Audio' columns. The right screenshot shows the 'Location' dropdown with '#1' selected, and a table with 'Output', 'Video', and 'Audio' columns.

Memory Information		
Location: #1		
Output	Audio	
1		
2		
3		
4		
5		
6		
7		
8		

Memory Information		
Location: #1		
Output	Video	Audio
1		1
2		2
3		3
4		4
5		5
6		6
7		7
8		8

Figure 7-21 Memory Information

7.0.3.6 LAN IP Function

In the main configuration menu, select **Options** button to pull-up the **Browser** ex. “**Windows Internet Explorer**” dialog box, click “**OK**” to show the IP configuration screen as shown in Figure 7-22

Network Settings	
	<input type="checkbox"/> Enable DHCP
Static IP Address	192.168.0.3
Static Subnet Mask	255.255.255.0
Static Default Gateway	192.168.0.1
Static DNS Server	192.168.0.1
Physical Address	e4-46-bd-03-02-04
	<input type="button" value="Apply"/> <input type="button" value="Default"/> <input type="button" value="Reboot"/>

Figure 7-22 Network Settings

In the “**Network Settings**” screen, you can set the IP information by yourself (Fix IP) or click the **Enable DHCP** check box to get the IP from the DHCP (Float IP).

☞ Click the **Default** button to restore to default IP address. After changing the IP, you have to restart (power off then power on) the Device to make the changed values take effect.

☞ You can also use the blue **Dip-Switch** on the rear panel of the Device to reset the IP.

7.0.3.7 Other Application

The software utility will show you at least 32 units Device ID and Name. You can click the **Console** down list to select which device that you want to configure output /input values. The entire connected Device name will be shown on the **Console List** as Figure 7-23. For this model, the software utility will show at least 1 up to 32 devices. The example as below shows you an ID: 0 for the Name: AX-88 presently.

☞ When the **Console List** is empty, please pay attention to the location of switcher pin on the rear panel of Device is correct. Then, click **Scan** to search the configured.

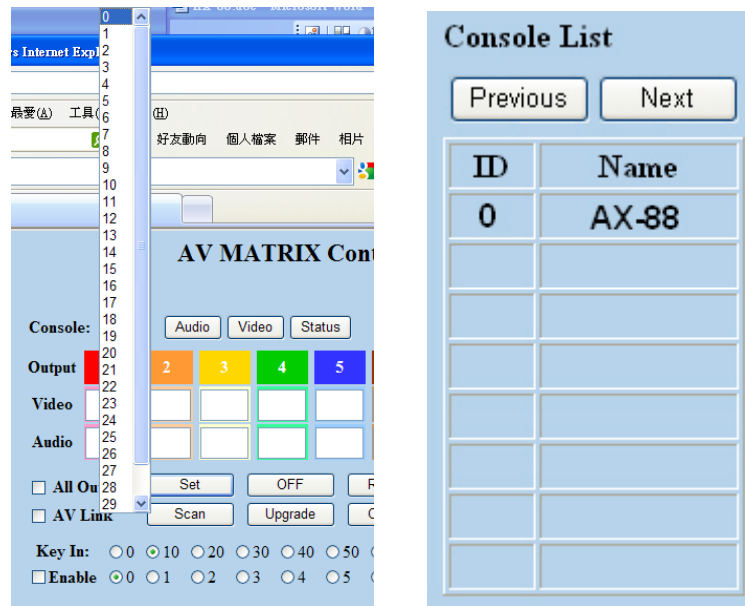
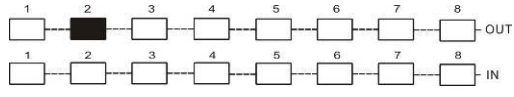

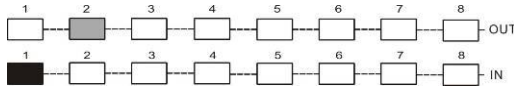



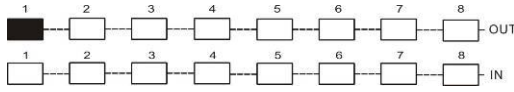

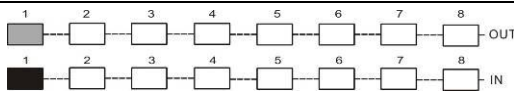

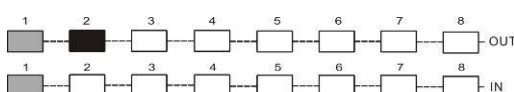

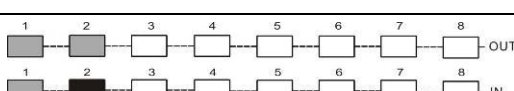

Figure 7-23 Other Application

8.0 Operation Examples

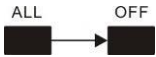

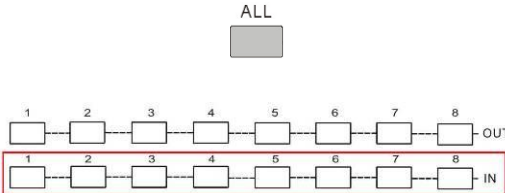


Example 1: Switch the NO.1 input signal to the NO.2 output channel.

Key	LCD Display	Operation
		1. Press the NO.2 key of the output channel, then the input channel will begin to flicker.
		2. Press the NO.1 key of the Input channel.



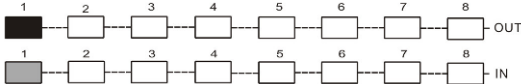



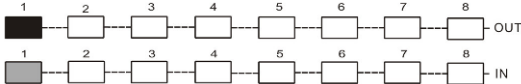

Example 2: Switch the NO.1 and NO.2 input signals to NO.1 and NO.2 output channels.

Key	LCD Display	Operation
		1. Press the NO.1 key of the output channel, then the input channel will begin to flicker.
		2. Press the NO.1 key of the Input channel.
		3. Press the NO.2 key of the output channel, then the input channel will begin to flicker.
		4. Press the NO.2 key of the Input channel.

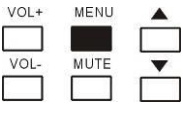













Example 3: “All” settings.

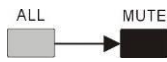




Key	LCD Display	Operation
		1. Press the ALL key on the front panel, and then press the OFF key to cancel all the settings.
	 	2. Press ALL key then select input 1~8 that indicate all outputs will switch to selected inputs. “#” is specified for 1~8.

Example 4: “STO” and “RCL” functions.

Key	LCD Display	Operation
<p style="text-align: center;">STO</p> 		<p>1. Press the STO key on the front panel. The Store Memory begins to flicker about 8 seconds.</p>
		<p>4. Press the IN1 key or OUT1 key to save the setting in the NO.1 memory location.</p>
<p style="text-align: center;">RCL</p> 		<p>6. Press the RCL key on the front panel, The Recall Memory begins to flicker about 8 seconds.</p>
		<p>7. Press the IN1 key or OUT1 key to Load the previously saving.</p>

Example 5: “Audio” functions.

Key	LCD Display	Operation
		<p>1. Press the MENU key to enter audio configuration mode.</p>
		<p>2. During the audio configurations, you can:</p> <ul style="list-style-type: none"> a. Press OUT or ALL to select output. b. Press VOL+/VOL- to adjust the volume. c. Press MUTE to mute zone. d. Press MENU select the audio features among SUBWOOFER, BASS, TREBLE and LIP-SYNC. e. Press ▲/▼ key to increase/decrease the values of selected audio feature. f. Press OFF to exit audio configure mode.
		
		
		
		
		
		
		
		
		
		<p>3. Press the ALL key for all output. Because the values of all output are different, it will be specified as “- -”.</p>

	<p>OUT VOLUME LIP-SYNC ALL MUTE --</p> <p>OUT VOLUME LIP-SYNC ALL UNMUTE --</p>	<p>4. Press the MUTE key to enable or disable the volume to all ports.</p> <p>5. Press the MUTE again to release mute function.</p>
 	<p>OUT VOLUME LIP-SYNC ALL UP --</p> <p>OUT VOLUME LIP-SYNC ALL DOWN --</p>	<p>6. Press the VOL+/VOL- key to increase/decrease the volume of all ports.</p> <p>☞ Once you press the other key, the volume field will show you as “- -”.</p>
 	<p>OUT VOLUME LIP-SYNC ALL -- UP</p> <p>OUT VOLUME LIP-SYNC ALL -- DOWN</p>	<p>7. Press ▲/▼ key to increase/decrease the values of selected audio feature to all ports.</p> <p>☞ Once you press the other key, the audio feature field will show you as “- -”.</p>

9.0 Troubleshooting

1. What to do if LCD fails to display?

Answer: Check the connection of power cord. Make sure the power cord is plugged and does not have any damage. Check to make sure the power source is normal.

2. What to do if the audio matrix front panel keys do not respond?

Answer: The Audio matrix front panel keys employ scanning testing and require longer response time. Press and hold the keys for 2 seconds and then release.

3. What to do if the serial port (usually refer to the computer serial port) fails to control the audio matrix?

Answer: Check that the communication port set by the control software is correctly connected to the corresponding serial port of the equipment. Also, check if the computer communication port is in good order. Check ID address and DIP Switcher are configured correctly. Refer to [6.0.5.6 Device ID Settings](#) and [6.0.5.5 DIP Switcher 2 Pins](#).

4. What to do if the corresponding audio signal fails to output during audio matrix switching?

Answer:

- (1) Be sure there is signal on the input end. If there is no input signal, it could be that the input connection cable is broken or the connector got loose. You are advised to replace the connection cable.
- (2) Check if there is signal on the output end. If there is no output signal, it could be that the cable is broken or the connector gets loose. You are advised to replace the connection cable.
- (3) Check if the output port number is the same as the controlled port number.
- (4) Check the connections of input and output ports are correct.
- (5) It could be internal failure of the product itself. You must send for repair by qualified technical engineers.

5. What to do if you sense the power leakage during plugging or unplugging of the input/output ports?

Answer: It could be that the equipment power is not properly grounded. You must properly ground your equipment; otherwise product life can easily be shortened.

6. What to do if the audio matrix panel keys and communication ports are out of order?

Answer: Check the power and the computer communication ports are in good order. If yes, it could be internal failure of the product, please send for repair by qualified technical engineer.

7. What to do if operation and function failure occurred?

Answer: Check if the equipment and the matrix system are properly connected. If the problem persists, send the product to the maintenance center for repair.

8. How to avoid the equipment failure due to the high temperature?

Answer: Place the equipment in a well ventilated location.

9. What to do if IR function failure occurred?

Answer: Check the remote control battery and be sure the IR connector is not loose. Check whether the remote controller is aiming at the IR receiver accurately.

10. What to do if fire alarm function failure occurred?

Answer: Check and be sure the connection is not loose. Check whether the signal is present, refer to [6.0.5.7 Fire Alarm](#).

Appendix A Remote Controller

AX-88 supports a remote control interface, allowing you to control the channels, audio features and matrix switching through remote controller.



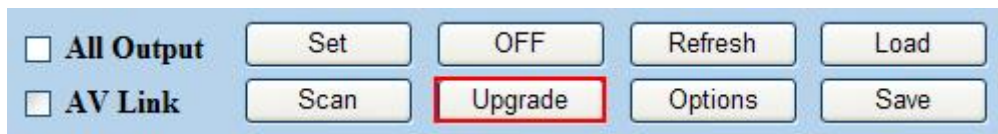
☞ For AX-88, the **IN 9, +10** and **OUT 0, 9, +10** keys are not being used. These keys are only supported on units over 8 ports. **IN 0** key is same as “**OFF**” function on the front panel of AX-88. **SW+** and **SW-** are the hot keys for speed controlling subwoofer functions. Pressing **INFO** key will show you the device ID, Master/Slave and IP information via LCD. The functions of others are as same as the keys on the front panel.

Appendix B Firmware Upgrade

This Chapter will introduce you on how to upgrade firmware on your web browser. For firmware upgrade, you have to upload the firmware file to your web server and then upload it to your device from web server.

Follow the steps as below to upgrade the firmware:

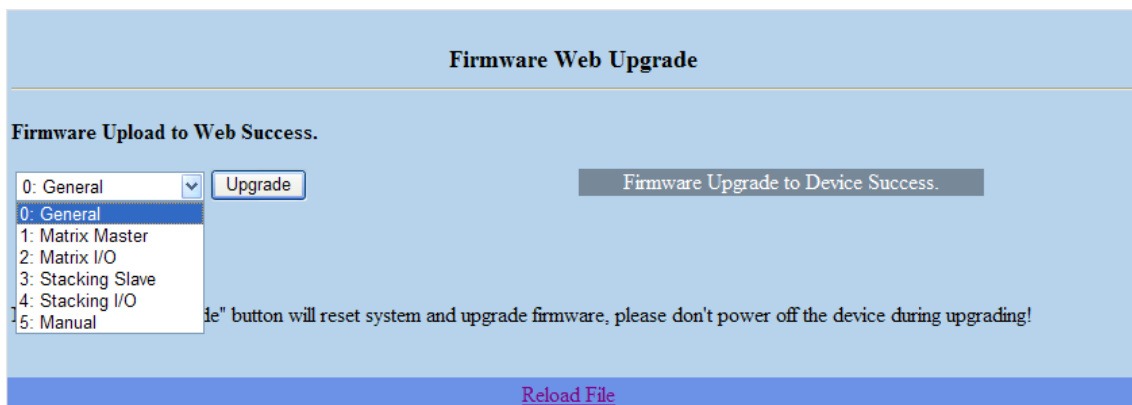
1. Open the **Browser** on your PC, key in the default IP address: <http://192.168.0.3> to login the AV MATRIX Control configuration. Click **“Upgrade”** to begin firmware upgrade.



2. Click **“Browser”** to select upgraded firmware, then click **“Upload”** to upload the firmware to web server.

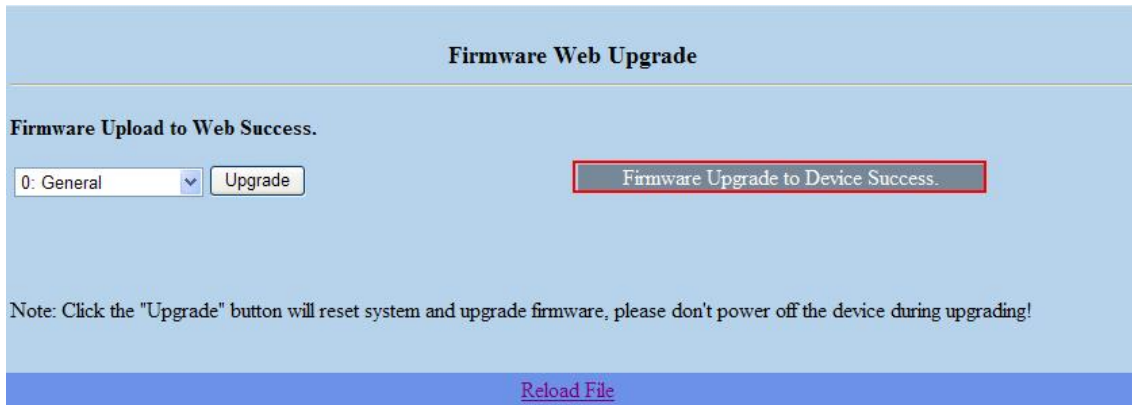


3. Select **“0: General”** form the drop-down list and click **“Upgrade”** to upload the firmware to your device.



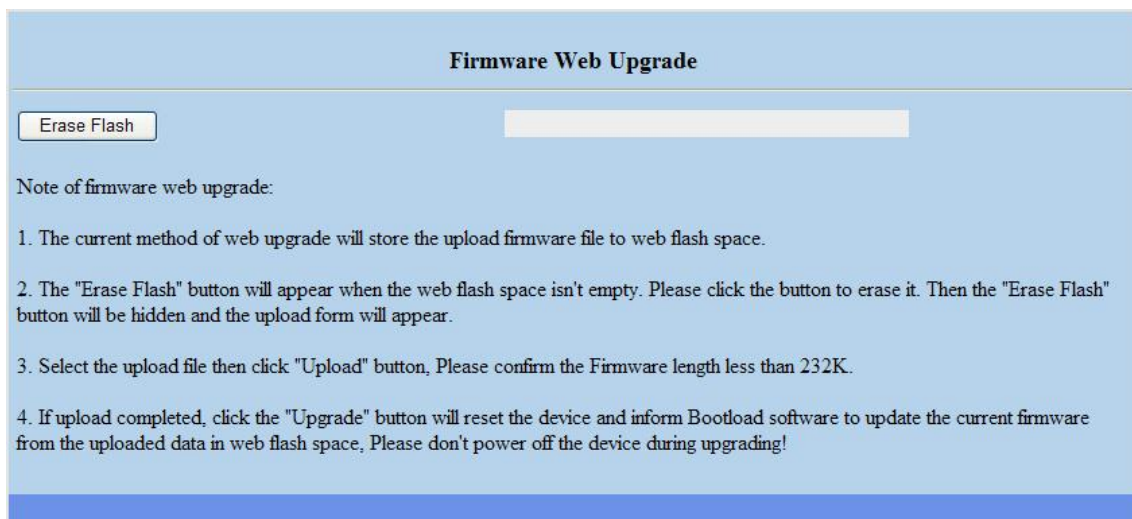
☞ For **0: General** selecting, you have to adjust the switcher ID on the rear panel to “0” that means the device with ID “0” will be upgraded. For **1: Matrix Master** selecting will allow you to select target device based on ID 0 to 31 for firmware upgrading.

4. After finishing firmware upgrade successfully, “**Firmware Upgrade to Device Success**” information will appear as below.



The firmware upgrade will not stop even though the web connection suddenly failed. Check with the LCD screen to confirm the firmware upgrade has been finished successfully or wait at least 2 minutes then power off to restart your PC.

5. If a firmware already exists on the web server during firmware upgrade. The “**Erase Flash**” information screen will appear to notify you to remove the existing firmware before upgrading the new one.



Appendix C RS-232 Communication Protocol

This AV Matrix RS-232 communication protocol uses variable length bytes of information as define below. The default baud rate is 9600 bps, no parity, 8 data bit and 1 stop bit. Command timeout is 300 ms, and byte to byte timeout is 30ms.

Use the RS-232 connecting cable to connect the computer serial port to the RS-232 communication port of the matrix device. The computer can control the matrix device via RS-232. Aside from using the front panel keys for operation, you are also permitted to use the RS-232 connection port for remote operation.

Protocol Command

A. Standard Command

Standard command is 5 bytes command.

Device + Request + Index + Value + CRC

Byte 1: Device Byte (DB)

Byte 2: Request Byte (RB)

Byte 3: Index Byte (IB)

Byte 4: Value Byte (VB)

Byte 5: CRC Byte (CB)

B. Variable Length Command

Variable length command is $2n+4$ bytes command.

Device + Request + Length + Index 1 + Value 1 + ... + Index n + Value n + CRC

Byte 1: Device Byte (DB)

Byte 2: Request Byte (RB)

Byte 3: Length Byte (LB)

Byte 4: Index 1 Byte (IB_1)

Byte 5: Value 1 Byte (VB_1)

Byte 6: Index 2 Byte (IB_2)

Byte 7: Value 2 Byte (VB_2)

... ..

Byte $2n + 2$: Index n Byte (IB_n)

Byte $2n + 3$: Value n Byte (VB_n)

Byte $2n + 4$: CRC Byte (CB)

☞ Host must send CRC code to follow the last byte.

Protocol Byte

Host (PC) command: 1st byte and 2nd byte are fixed.

Byte 1: Device Byte (DB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DB	BT	0	1	Device ID (0 - 31)				

BT: Broadcast Command Flag.

0 - Instruction for Device ID only

1 - Instruction for all devices. (Device ID must be written 0)

☞ Devices will not respond, when receiving the broadcast command.

0: Reserve, Always 0.

1: Identifier, Always 1.

Device ID: Device id ranges from 0 to 31. (Please refer to device's user manual)

Byte 2: Request Byte (RB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RB	VAR	0	Request Type (0 - 63)					

VAR: Variable Length Command Flag.

0 - Standard Command (Recommended)

1 - Variable Length Command. (Only support the command Ack Type A)

Request Type: Please refer to "Table - Host Request List".

A. Standard Command

Byte 3: Index Byte (IB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IB	Index							

Index: Please refer to "Table - Host Request List" and "Table - Command Index List".

Byte 4: Value Byte (VB)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VB	Value							

Value: Please refer to "Table - Host Request List" and "Table - Command Value List".

Byte 5: CRC Byte (CB)

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
CB	CRC (cyclic redundancy check)							

CRC: Host must send CRC code to follow the last byte.

B. Variable Length Command**Byte 3: Length Byte (LB)**

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
LB	Length for the total data bytes (Index + Value)							

LB: LB value is equal to the total data bytes (Index + Value), not include the CRC byte.

The maximum LB decided by the LBMAX flag of the extended information from device. If the extended information does not exist, the default maximum LB is 64 bytes.

Other Bytes: The other bytes are the same as the standard command.

Request Byte

Table - Host Request List

Request	Description	Index	Value	ACK	Note
0x00	Dummy call	-	-	A	1, 2, 3
Switch Tools					
0x01	Switch Video Output Channel	Output	Input	A	2, 3
0x02	Switch Audio Output Channel	Output	Input	A	2, 3
0x03	Store Video Status	Setting	Memory	A	2, 4
0x04	Store Audio Status	Setting	Memory	A	2, 4
0x05	Recall Video Status	Setting	Memory	A	2, 3
0x06	Recall Audio Status	Setting	Memory	A	2, 3
0x07	Request Video Output Channel	Output	Memory	B	
0x08	Request Audio Output Channel	Output	Memory	B	
Plug Detect					
0x09	Request Video Input Plug Status	Input	0	B	
0x0A	Request Audio Input Plug Status	Input	0	B	
0x0B	Request Video Output Plug Status	Output	0	B	
0x0C	Request Audio Output Plug Status	Output	0	B	
Audio Control					
0x10	Control Audio Output Mute	Output	Enable	A	2, 3
0x11	Request Audio Output Mute Status	Output	Memory	B	
0x12	Control Audio Output Volume	Output	Level	A	2, 3
0x13	Request Audio Output Volume	Output	Memory	B	
0x14	Control Audio Output Bass	Output	Level	A	2, 3
0x15	Request Audio Output Bass	Output	Memory	B	
0x16	Control Audio Output Treble	Output	Level	A	2, 3
0x17	Request Audio Output Treble	Output	Memory	B	
0x18	Control Audio Output Subwoofer	Output	Level	A	2, 3
0x19	Request Audio Output Subwoofer	Output	Memory	B	

0x1C	Control Audio Output Delay Low	Output	Delay1	A	2, 3
0X1D	Request Audio Output Delay Low	Output	Memory	B	
0X1E	Control Audio Output Delay High	Output	Delay2	A	2, 3
0X1F	Request Audio Output Delay High	Output	Memory	B	
Video Control					
0x20	Select Input EDID Type	Input	EDID	A	2, 3
0x21	Request Input EDID Type	Input	0	B	
Device Information					
0x30	Request Protocol Version	0	0	C	1
0x31	Request Firmware Version	0	0	C	
0x3F	Request Device Information	0	0	D	1
0x3F	Request Extend Information	1	0	E	

Command Note:

1. All devices support the command.
2. Support broadcast commands.
3. Support variable length commands.
4. Memory # 0 is the current status, it can't be stored. Memory #1 – x is allowed to be stored.

Index Byte**Table – Command Index List**

Index	Description
Output	The output that will be selected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: All outputs
Input	The input that will be selected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: All inputs
Setting	The setting type that will be selected. 0: All Settings 1: Switch Settings only 2: Video/Audio Settings only
-	Don't care

Value Byte

Table – Command Value List

Value	Description
Input	The input that will be connected. (Port 1 = 1, Port 2 = 2... Port n = n) 0: Disconnect
Memory	Select Memory Location 0 : Current Status (Can't be stored)
Enable	1: Enable Status (example: Mute, Plug) 0: Disable Status (example: Un-mute, Unplug)
Level	Level Range (0 – 100) 0x81: Increase a step 0x82: Decrease a step
Delay	Audio delay time is 16-bit data. (Unit: 5 ms or 10 ms) Delay1 - The audio delay time low byte. (Bit0 – Bit7) Delay2 - The audio delay time high byte. (Bit8 – Bit15) The audio delay time unit decided by the DTUF flag of the extend information. The maximum Delay decided by the DTMAX flag of the extended information.
EDID	EDID Type 0: Fixed (Device default EDID) 1: Output 1 (Copy the EDID from the output 1)
-	Don't care

CRC Byte

Example: switch output 6 to the input 3.

Byte 1 (DB) is 0x20 – Device: Identifier + Device ID = 0x20 + 0 = 0x20

Byte 2 (RB) is 0x01 – Request: Switch Video Output Channel = 0x01

Byte 3 (IB) is 0x06 – Index: Output 6 = 6

Byte 4 (VB) is 0x03 – Value: Input 3 = 3

Byte 5 (CB) is 0x93 – CRC code from Byte 1 to Byte 4.

CRC Calculation

CRC 0 = 0 (initial value)

CRC 1 = CRC_ TABLE [CRC 0 ^ **Byte 1**] = CRC_ TABLE [0x00 ^ 0x20] = 0x23

CRC 2 = CRC_ TABLE [CRC 1 ^ **Byte 2**] = CRC_ TABLE [0x23 ^ 0x01] = 0x9F

CRC 3 = CRC_ TABLE [CRC 2 ^ **Byte 3**] = CRC_ TABLE [0x9F ^ 0x06] = 0x8D

CRC 4 = CRC_ TABLE [CRC 3 ^ **Byte 4**] = CRC_ TABLE [0x8D ^ 0x03] = 0x93

Byte 5 = CRC 4 = 0x93

CRC_ TABLE: Please refer to “Table – CRC Table”.

Table – CRC Table

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	5E	BC	E2	61	3F	DD	83	C2	9C	7E	20	A3	FD	1F	41
10	9D	C3	21	7F	FC	A2	40	1E	5F	01	E3	BD	3E	60	82	DC
20	23	7D	9F	C1	42	1C	FE	A0	E1	BF	5D	03	80	DE	3C	62
30	BE	E0	02	5C	DF	81	63	3D	7C	22	C0	9E	1D	43	A1	FF
40	46	18	FA	A4	27	79	9B	C5	84	DA	38	66	E5	BB	59	07
50	DB	85	67	39	BA	E4	06	58	19	47	A5	FB	78	26	C4	9A
60	65	3B	D9	87	04	5A	B8	E6	A7	F9	1B	45	C6	98	7A	24
70	F8	A6	44	1A	99	C7	25	7B	3A	64	86	D8	5B	05	E7	B9
80	8C	D2	30	6E	ED	B3	51	0F	4E	10	F2	AC	2F	71	93	CD
90	11	4F	AD	F3	70	2E	CC	92	D3	8D	6F	31	B2	EC	0E	50
A0	AF	F1	13	4D	CE	90	72	2C	6D	33	D1	8F	0C	52	B0	EE
B0	32	6C	8E	D0	53	0D	EF	B1	F0	AE	4C	12	91	CF	2D	73
C0	CA	94	76	28	AB	F5	17	49	08	56	B4	EA	69	37	D5	8B
D0	57	09	EB	B5	36	68	8A	D4	95	CB	29	77	F4	AA	48	16
E0	E9	B7	55	0B	88	D6	34	6A	2B	75	97	C9	4A	14	F6	A8
F0	74	2A	C8	96	15	4B	A9	F7	B6	E8	0A	54	D7	89	6B	35

Device ACK Type

Table – ACK Type List

Ack Type	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	...	Last Byte
Type A	AB							CB
Type B	AB	LB	Index 1	Value 1	Index 2	Value 2	...	CB
Type C	AB	LB	Data 1	Data 2				CB
Type D	AB	LB	INF	OP	IP	Name 1	...	CB
Type E	AB	LB	EXINF	VEINF	AEINF	PLUG	...	CB

ACK Type A

ACK Byte + CRC Byte (Total 2 Bytes)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 – 31)				
CB	CRC							

ACC: The devices acknowledge status. Accept or Reject.

1: device accepts this request. (ACK; acknowledge)

0: device rejects this request. (NAK; negative acknowledge)

☞ The device sends the Nak packet. This is always 2 bytes. (NAK + CRC)

0: Reserve, Always 0.

1: Identifier, Always 1.

Device ID: Device id ranges from 0 to 31. (Please refer to device's user manual)

CRC: Device always sends the CRC code to follow the last byte.

ACK Type B

ACK Byte + LB + Index1 + Value1 + Index2 + Value2 +.....+ CRC Byte

<i>Name</i>	<i>Bit 7</i>	<i>Bit 6</i>	<i>Bit 5</i>	<i>Bit 4</i>	<i>Bit 3</i>	<i>Bit 2</i>	<i>Bit 1</i>	<i>Bit 0</i>
AB	ACC	0	0	Device ID (0 – 31)				
LB	Length for the total data bytes (Index + Value)							
IB n	Index							
VB n	Value							
...	...							
CB	CRC							

AB & CB: These are the same as the ACK Type A.

LB: LB value is equal to the total data bytes (Index + Value), not include the CRC byte.

The maximum LB value of the ACK Type B is twice the total number of output or input.

IB: Often means that the input or output port number. (Port 1 = 1, Port 2 = 2... Port n = n)

VB: Response the status refers to the table.

Request	Description	Index	Value
0x07	Request Video Output Channel	Output	Input
0x08	Request Audio Output Channel		
0x09	Request Video Input Plug Status	Input	Enable 1: Plug 0: Unplug
0x0A	Request Audio Input Plug Status		
0x0B	Request Video Output Plug Status	Output	
0x0C	Request Audio Output Plug Status		
0x11	Request Audio Output Mute Status	Output	0: Unmute, 1: Mute
0x13	Request Audio Output Volume		Level Range (0 – 100)
0x15	Request Audio Output Bass		
0x17	Request Audio Output Treble		
0x19	Request Audio Output Subwoofer		
0x1D	Request Audio Output Delay Low		
0x1F	Request Audio Output Delay High		Delay2
0x21	Request Input EDID Type	Input	EDID Type

Please refer to “Table – Command Index List” and “Table – Command Value List”.

ACK Type C

ACK Byte + LB + Data 1 + Data 2 + CRC Byte (Total 5 Bytes)

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 – 31)				
LB	Length for the total data bytes (This byte is always 2)							
DB 1	Data 1							
DB 2	Data 2							
CB	CRC							

AB & CB: These are the same as the ACK Type A.

LB: LB value is always 2 (Data 1 + Data 2). Not include the CRC byte.

DB: Data Bytes as define below.

Request	Description	Data 1		Data 2
0x30	Request Protocol Version	VER1		VER2
0x31	Request Firmware Version	VERA	VERB	VERC

Version Type A:

RS-232 Protocol Version contains the VER1 and VER2 (ex: VER1.VER2)

VER1: Data 1, Bit 7 - Bit 0 (Range 0 - 99)

VER2: Data 2, Bit 7 - Bit 0 (Range 0 - 99)

If the Data 1 is 0x01 and Data 2 is 0x07; VER1 = 1 and VER2 = 7; RS-232 protocol version is v1.07

If the Data 1 = 0x23 and Data 2 = 0x45; VER1 = 0x23 = 35 and VER2 = 0x45 = 69;

RS-232 protocol version is v35.69

Version Type B:

Firmware Version contains the VERA, VERB and VERC (ex: VERA.VERB.VERC)

VERA: Data 1, Bit 7 - Bit 4 (Range 0 - 9)

VERB: Data 1, Bit 3 - Bit 0 (Range 0 - 9)

VERC: Data 2, Bit 7 - Bit 0 (Range 0 - 99)

If the Data 1 is 0x10 and Data 2 is 0x07; VERA = 1, VERB = 0 and VERC = 7; Firmware version is v1.0.07

If the Data 1 = 0x23 and Data 2 = 0x45; VERA = 2, VERB = 3 and VERC = 69; Firmware version is v2.3.69

ACK Type D

ACK Byte + LB + INF + OP + IP + Name 1 + Name 2 + Name 3 +.....+ CRC Byte

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 - 31)				
LB	Length for the total data bytes (INFO +.....+ Name n)							
INFO	Audio	Video	Extend	0	Total Memory Location (0 - 15)			
OP	Total Output Port							
IP	Total Input Port							
NB 1	Device Name (ASCII code)							
...	...							
NB n	Device Name (ASCII code)							
CB	CRC							

AB & CB: These are the same as the ACK Type A.

LB: LB value is the total length of the data bytes, not include the AB, LB and CB.

The maximum LB value of the ACK Type D is 19.

INFO: Device information

Bit 7: 1 - Support Audio switch tools request. (Request 0x02, 0x04, 0x06 and 0x08)

0 - Not support Audio switch tools request.

Bit 6: 1 - Support Video switch tools request. (Request 0x01, 0x03, 0x05 and 0x07)

0 - Not support Video switch tools request.

Bit 5: 1 - Extended information exists. (Request 0x3F [0x01])

0 - Extended information does not exist.

Bit 4: Reserve, always 0.

Bit 3~0: Total Memory location ranges from 0 to 15.

☞ Request [Index], if 0x3F [0x01] => Request = 0x3F and Index = 0x01

OP: The total number of output.

IP: The total number of input.

NB: Device Name (ASCII code). (The maximum length is 16)

ACK Type E

ACK Byte + LB + EXTI + VID1 + AUDI + PLUG +.....+ CRC Byte

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
AB	ACC	0	0	Device ID (0 - 31)				
LB	Length for the total data bytes (EXINF +.....+ DTMAX)							
EXINF	LBMAX		0	0	0	0	0	FWVER
VEINF	EDID	0	0	0	0	0	0	0
AEINF	DTUF	DELAY	0	0	SW	TRE	BASS	VOL
PLUG	0	0	0	0	AOPD	VOPD	AIPD	VIPD
DTMAX	Delay Time Maximum (unit: 100 ms)							
CB	CRC							

AB & CB: These are the same as the ACK Type A.

LB: LB value is the total length of the data bytes, not include the AB, LB and CB.

EXINF: Device extended information

LBMAX - defines the maximum LB value of the variable length command

- 0 - The maximum LB is 64 Bytes (default)
- 1 - The maximum LB is 128 Bytes
- 2 - The maximum LB is 254 Bytes (255 is reserved)
- 3 - Reserved

The LB value of the Ack packet is not limited by LBMAX.

If the extended information does not exist, the default maximum length is 128.

FWVER - Firmware version command flag. (Request 0x31)

- 1 - Support Firmware version command.
- 0 - Not support Firmware version command.

VEINF: Video Extend Information

EDID - Input EDID type select command flag. (Request 0x20 and 0x21)

- 1 - Support Input EDID type select command.
- 0 - Not support Input EDID type select command.

AEINF: Audio Extend Information

VOL - Volume and Mute command flag. (Request from 0x10 to 0x13)

- 1 - Support Volume and Mute command.
- 0 - Not support Volume command.

BASS - Bass command flag. (Request 0x14 and 0x15)

- 1 - Support Bass command.

0 - Not support Bass command.

TRE - Treble command flag. (Request 0x16 and 0x17)

1 - Support Treble command.

0 - Not support Treble command.

SW - Subwoofer command flag. (Request 0x18 and 0x19)

1 - Support Subwoofer command.

0 - Not support Subwoofer command.

DELAY – Audio delay command flag. (Request from 0x1C to 0x1F)

1 - Support audio delay command.

0 - Not support audio delay command.

DTUF - defines the audio delay time scale units.

1 - Audio delay time scale unit is 10ms

0 - Audio delay time scale unit is 5ms (default)

☞ If the AEINF is not equal to 0, the device support Request 0x04[0x02] and 0x06[0x02].

PLUG: Plug Detect Support Information.

VIPD - Video input plug detection command flag. (Request 0x09)

1 - Support Video input plug detection.

0 - Not support Video input plug detection.

AIPD - Audio input plug detection command flag. (Request 0x0A)

1 - Support Audio input plug detection.

0 - Not support Audio input plug detection.

VOPD - Video output plug detection command flag. (Request 0x0B)

1 - Support Video output plug detection.

0 - Not support Video output plug detection.

AOPD - Audio output plug detection command flag. (Request 0x0C)

1 - Support Audio output plug detection.

0 - Not support Audio output plug detection.

Others - Bit 7~4 are reserve, always 0

DTMAX: defines audio maximum delay time. (Unit: 100 ms)

WARRANTY

LIMITED WARRANTY – with the exceptions noted in the next paragraph, ZIGEN warrants the original purchaser that the equipment it manufactures or sells will be free from defects in materials and workmanship for a period of one year from the date of purchase. The proof of sale is required in order to claim warranty. Should this product, in ZIGEN's opinion, prove defective within this warranty period, ZIGEN, at its option, will repair or replace this product without charge. Customers outside of US are responsible for shipping charges to and from ZIGEN. Any defective parts replaced become the property of ZIGEN. This warranty does not apply to those products which have been damaged due to accident, unauthorized alterations, improper repair, modifications, inadequate maintenance and care, or use in any manner for which the product was not originally intended for. Items integrated into ZIGEN products that are made by other manufacturers, notably computer hard drives and liquid crystal display panels, are limited to the term of the warranty offered by the respective manufacturers. Such specific warranties are available upon request to ZIGEN.

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