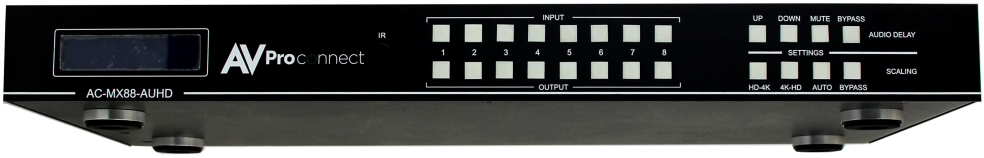
User Manual

AC-MX88-AUHD

18 GBPS True 4K60 4:4:4 8x8 HDMI Matrix w/

Dual Audio De-Embedding, Scaling & Delay.



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AC-MX88-AUHD

The AC-MX88-AUHD is a true 4K60 4:4:4 8x8 HDMI matrix switch. Supporting HDMI 2.0, HDCP 2.2, HDR and up to 18 GBPS bandwidth. This switch allows any source (Blu-ray, UHD Blu-ray, satellite receiver, game consoles, PCs, etc...) to be shown on any of the connected displays.

Audio Delay is "On-Board" so you can manage lip-sync issue before it is a problem. Also with built in Scalers you don't have to forfeit that 4K signal just because you have a couple older displays. All that with Full EDID management allows maximum flexibility with today's wide mixture of sources and displays.

This matrix equalizes and amplifies the output to ensure the HDMI signal can be transmitted through long HDMI cables without loss of quality. You can extend your distance further with the AC-EX70-UHD HDMI Extender. Full EDID management allows maximum flexibility with today's wide mixture of sources and displays.

This is an ideal solution for digital entertainment centers, HDTV retail, show sites, data centers, schools, conference and training centers and more!

Features:

- Advanced Equalization and amplification of outputs for smooth switching
- 1080p > 4K & 4K > 1080p Up /Down Scalers on each output
- Advanced EDID Management
- HDMI 2.0
- 4K60 4:4:4 Support
- Full HDR Support
- HDCP 2.2
- IR, RS-232 and LAN Control Options
- Digital Toslink Out
- Balanced Analog Out
- Audio Delay for Digital & Analog Out

Easy to use:

- Install in seconds
- Feature rich
- Powerful EDID management
- Front Panel Control
- IR Remote
- IR & RS-232 Control
- LAN Control

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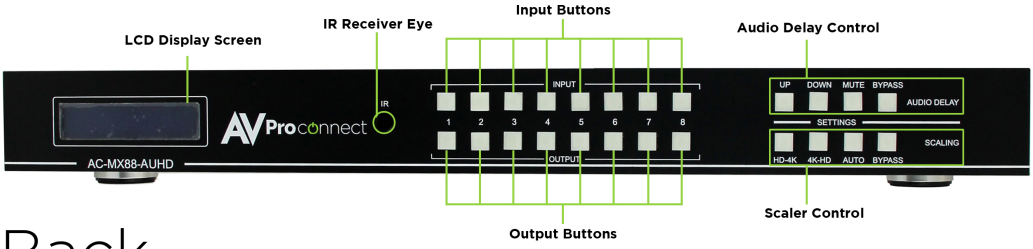
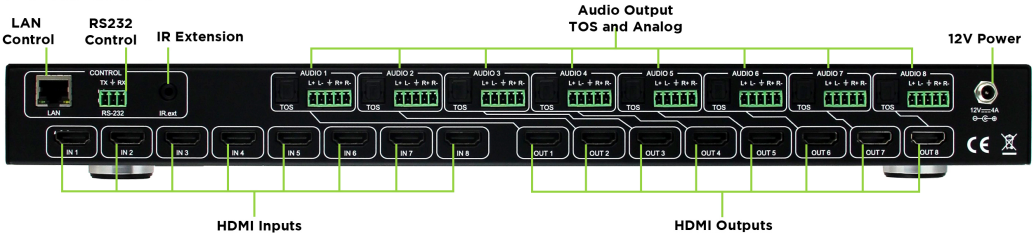
Device Overview:

- Definition - Matrix switchers provide the ability to route any input to any output or to multiple outputs at any time. Depending on the model, a matrix switcher can route HD, UHD or AUHD content in this manner. Additionally, since most venues have audio zones and video zones the requirement to breakout or strip off the audio in often necessary and has become almost a standard feature on matrix switches.
- Control – Matrix switches are generally controlled via 3rd party controller like Control 4, RTI, Crestron and others. Many integrators want ready-made drivers for their control system to make programming and deployment easier.
- Who uses them? - At the heart of almost every custom install is a matrix switch to ease routing and distribution of signals throughout the install including Audio, Video and Control – so, you have a product that can compete on price, performance, compatibility, and control.
- Matrix Switches are used widely in both Commercial and Residential Applications

Front



Back



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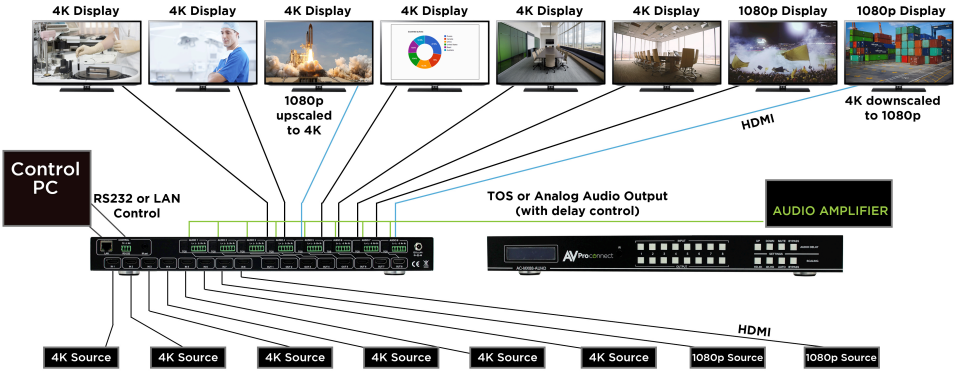
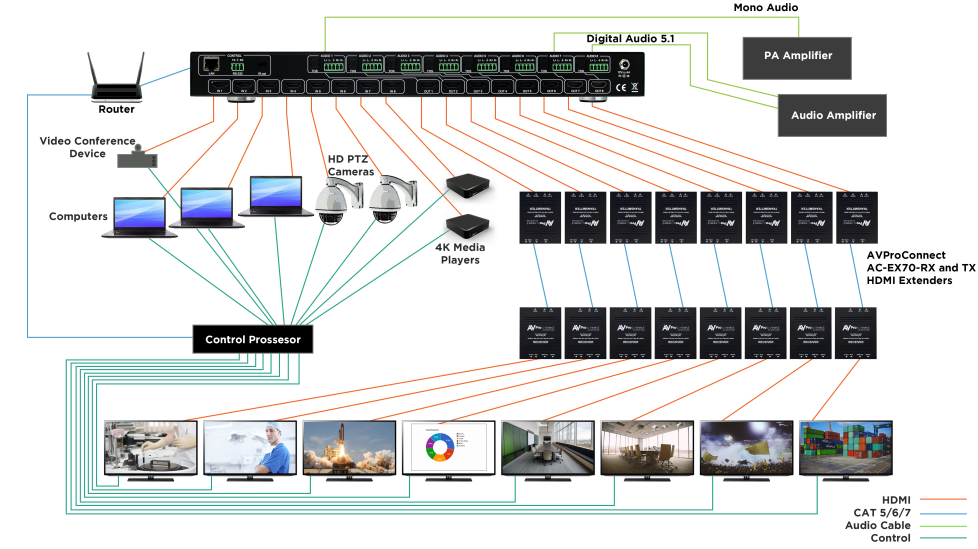
AVProconnect AC-MX88-AUHD CONNECTION DIAGRAM



AVProconnect AC-MX88-AUHD 18GBPS 8x8 Matrix System Application



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In The Box:

- AC-MX88-AUHD Matrix Switch
- IR Remote Control
- IR Extension Cable
- 12V/4A Locking Power Supply
- RS-232 Control Cable
- Instruction Manual

Quick Installation:

1. Connect the HDMI input sources (Blu-ray, Set Top Box, etc…) to the AC-MX88-AUHD
2. Connect the HDMI output devices (AVR, Display, Distribution Amplifier, Extender) to the AC-MX88-AUHD
3. Power on the sources
4. Connect the power supply into the AC-MX88-AUHD
5. Turn on output devices/displays
6. You may now use the front panel controls, supplied IR remote or free PC software to control the switch.

* For advanced programming please see the RS-232 commands

Front Panel Control

Switching:

The AC-MX88-AUHD can be switched from the front panel by selecting the OUTPUT first then selecting the INPUT:

1. Press the button (1 through 8) on the bottom row that corresponds with the OUTPUT (Display, or Sink Device) you would like to send a source.
2. Once pressed, the switch will illuminate the OUTPUT button you have pressed along with the INPUT row (as pictured) indicating it is ready for you select the INPUT.
3. Now select the desired INPUT

Figure 1 – Switching with the front panel controls. NOTE: Select the OUTPUT and then the INPUT

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Audio Delay Control:

The AC-MX88-AUHD has and Audio Delay feature built in. Audio Delay is set on the extracted audio OUTPUT (Digital and Analog) of the switch and each can have separate settings. The Audio Delay has 4 controls:

- UP (Increase Delay)
- Down (Decrease Delay)
- MUTE (The audio will be muted)
- BYPASS (means there will be no delay set)

*Delay setting are in increments of 90 milliseconds. Settings are; 90MS, 180MS, 270MS, 360MS, 450MS, 540MS, 630MS.

You can control this feature from the front panel:

1. Press and hold the OUTPUT number for which you want to delay the audio.
2. The available options will light up (as pictured)
3. Press UP, DOWN, MUTE or BYPASS to control the delay
4. The current setting will be indicated on the LCD screen.

Scaler Control:

The AC-MX88-AUHD has scalers built into every output. The Scalers are set on the OUTPUT side of the switch and each can have separate settings. The Scaler Control has 4 controls:

- HD-4K (Scales 1080P to 2160P)
- 4K-HD (Scales 2160P to 1080P)
- HDBaseT-C (Reduces the 9G+ content to be under 9G by reducing 4:4:4 to 4:2:0 or 10BIT to 8BIT while maintaining HDR, ideal for HDBaseT runs)
- BYPASS (means there will be no scaling set)

*Delay setting are in increments of 90 milliseconds. Settings are; 90MS, 180MS, 270MS, 360MS, 450MS, 540MS, 630MS.

You can control this feature from the front panel:

5. Press and hold the OUTPUT number for which you want to delay the audio.
6. The available options will light up (as pictured)
7. Press UP, DOWN, MUTE or BYPASS to control the delay
8. The current setting will be indicated on the LCD screen.

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EDID Management:

This matrix has 29 factory defined EDID settings. It also has 3 user defined EDID memories. The user EDID memories are independent to each input and can be set differently. The user defined EDID can be uploaded using the free PC Control software or RS-232. In addition, you can choose to read the EDID from the desired output and that read EDID will automatically store and overwrite the EDID in "USER EDID 1" and apply it to the selected source.

By default, the matrix is set to a 1080P EDID, this is to maximize plug and play capability. When using 4K sources, you will want to define a 4K EDID on that input (or read from the display).

To Change the EDID setting:

1. Press and hold the INPUT you want to change for 3 seconds
2. The “UP” and “DOWN” Button’s will illuminate (As pictured), and the LCD will show the active EDID
3. Toggle through the EDID options by pressing up and down repeatedly
4. Press the “INPUT” you had selected once more to apply the EDID (This should still be illuminated).

These are the pre-defined EDID settings that you can toggle through:

0. 1080P_2CH
1. 1080P_6CH
2. 1080P_8CH
3. 1080P_3D_2CH
4. 1080P_3D_6CH
5. 1080P_3D_8CH
6. 4K30HZ_3D_2CH
7. 4K30HZ_3D_6CH
8. 4K30HZ_3D_8CH
9. 4K60HzY420_3D_2CH
10. 4K60HzY420_3D_6CH
11. 4K60HzY420_3D_8CH
12. 4K60HZ_3D_2CH
13. 4K60HZ_3D_6CH
14. 4K60HZ_3D_8CH
15. 1080P_2CH_HDR
16. 1080P_6CH_HDR
17. 1080P_8CH_HDR
18. 1080P_3D_2CH_HDR
19. 1080P_3D_6CH_HDR
20. 1080P_3D_8CH_HDR
21. 4K30HZ_3D_2CH_HDR
22. 4K30HZ_3D_6CH_HDR
23. 4K30HZ_3D_8CH_HDR
24. 4K60HzY420_3D_2CH_HDR
25. 4K60HzY420_3D_6CH_HDR
26. 4K60HzY420_3D_8CH_HDR
27. 4K60HZ_3D_2CH_HDR
28. 4K60HZ_3D_6CH_HDR
29. 4K60HZ_3D_8CH_HDR
30. User EDID 1
31. User EDID 2
32. User EDID 3

*You may also copy EDID from any output and apply to any input, simply select “Copy EDID from Output x” (x=1-8). This will copy the EDID from the display attached and store it into “User EDID 1” and apply it to the input you have selected.

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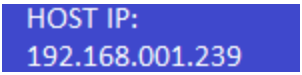
Display IP Data:

Press and hold INPUT 3 and INPUT 4 at the same time for three seconds to display the current IP settings. This screen will change every 3 seconds showing additional settings (host, net mask, router IP). NOTE: This screen always starts with the current IP address of the matrix:



In order to prevent potential IP problems, most IP settings have to be managed in the Free PC Software or using RS-232 commands.

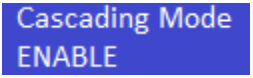
NOTE: The default IP address is 192.168.001.239 (As pictured above)

Cascade Mode:

When Cascade Mode is turned on, the signal is passed from the switch without reading EDID or Hot Plug. Many issues can be resolved in the field with this mode, including:

- Invalid/incorrect EDID coming from display (It happens more than you think)
- When you want to manage EDID in a device further down the chain (AVR or Distribution Amp)
- When running one or more outputs into additional peripherals before the display

We recommend you ONLY use cascade mode if you have exhausted all other troubleshooting options. To toggle Cascade Mode press and hold INPUT 1 and INPUT 2 at the same time for three seconds. When Cascade Mode is enabled you will see this:



IR Remote Control:

The HDMI routing of the matrix can also be controlled by using the IR remote supplied with the product.

The labels on the left are the OUTPUT numbers

The left arrow button decrements to the next lower input port, and the right arrow increments to the next input port.

Figure 2 ~ AC-MX88-AUHD IR Remote

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IR Control:

For IR Control there is an IR Window on the front face of the device. Additionally, the supplied IR Extension Cable can provide a different receiver position. Just plug into the IR Extension Socket on the back of the matrix and place the receiver in a more convenient location.

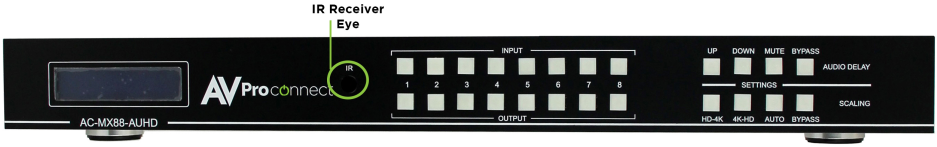

Figure 3 ~ AC-MX88-AUHD IR Controls

Figure 4 ~ IR Extension Cable

IR Setup Commands:

AC-MX88-AUHD	IR Code Setup Command
Command	**Action**
SET IR SYS xx.yy	Set IR Custom Code{xx=[00-FFH],yy=[00-FFH]}
SET IR OUTx INy CODE zz	Set IR Data Code{x=[1~8],y=[1~8],zz=[00-FFH]}

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RS-232 Commands:

The AC-MX88-AUHD can be controlled with RS-232 commands. Some configurations can only be done using these commands. We recommend using MyUART software (free) as it is very easy to use to send commands to the machine.

The same commands can be sent to the matrix using Ethernet as IP commands

The serial port settings should be se to: 57600,n,8,1 (baud: 57600, no parity, 8 data bits and 1 stop bit) with no handshaking

Please add a return (Enter) after each command when using direct commands

Here is the unified command list (ASCII):

General Commands:

AC-MX88-AUHD Commands	
Command	**Action**
H	Help
STA	Show Global System Status
SET RST	Reset to Factory Defaults
SET ADDR xx	Set System Address to xx [xx=[99~99](00=Single)}
SET CAS EN/DIS	Set Cascade Mode Enable/Disable
GET ADDR	Get System Address
GET STA	Get System Status

Switching and Output Commands:

AC-MX88-AUHD	Output Setup Commands
Command	**Action**
SET OUTx VS INy	Set Output x To Input y{x=[0~8](0=ALL), y=[1~8]}
SET OUTx HDCPy	Set Output HDCP Mode{x=[0~8](0=ALL), y=[0~4](0=AUTO,1=BYPASS,2=Dis,3=H14,4=H22)}
SET OUTx VIDEOy	Set Output VIDEO Mode{x=[0~8](0=ALL), y=[0~4](0=AUTO,1=BYPASS,2=4K->2K,3=2K->4K,4=HDBT C Mode)}
SET OUTx IMAGE ENH y	Set Output Image Enhancement{x=[0~8](0=ALL), y=[0~3](0=OFF,1=WEAK,2=MEDIUM,3=STRONG)}
SET OUTx EXA EN/DIS	Set Ex-Audio Output Enable/Disable{x=[0~8](0=ALL)}
SET OUTx EXADL PHy	Set Ex-Audio Delay{x=[0~8](0=ALL), y=[0~7](0=Bypass,1~7=90,180,270,360,450,540,630MS)}
GET OUTx VS	Get Output x Video Route{x=[0~8](0=ALL)}
GET OUTx HDCP	Get Output x HDCP Mode{x=[0~8](0=ALL)}
GET OUTx VIDEO	Get Output x Video Mode{x=[0~8](0=ALL)}
GET OUTx IMAGE ENH	Get Output Image Enhancement Mode{x=[0~8](0=ALL)}
GET OUTx EDID DATA	Get Output x EDID DATA{x=[1~8]}
GET OUTx EXA	Get Ex-Audio Output Enable/Disable Status{x=[0~8](0=ALL)}
GET OUTx EXADL PH	Get Ex-Audio Output Delay Status{x=[0~8](0=ALL)}

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Input & EDID Commands:

AC-MX88-AUHD	Input Setup Commands
Command	**Action**
SET INx EDID y	Set Input x EDID{x=[0~8](0=ALL), y=[0~32]} 0. 1080P_2CH 1. 1080P_6CH 2. 1080P_8CH 3. 1080P_3D_2CH 4. 1080P_3D_6CH 5. 1080P_3D_8CH 6. 4K30HZ_3D_2CH 7. 4K30HZ_3D_6CH 8. 4K30HZ_3D_8CH 9. 4K60HzY420_3D_2CH 10. 4K60HzY420_3D_6CH 11. 4K60HzY420_3D_8CH 12. 4K60HZ_3D_2CH 13. 4K60HZ_3D_6CH 14. 4K60HZ_3D_8CH 15. 1080P_2CH_HDR 16. 1080P_6CH_HDR 17. 1080P_8CH_HDR 18. 1080P_3D_2CH_HDR 19. 1080P_3D_6CH_HDR 20. 1080P_3D_8CH_HDR 21. 4K30HZ_3D_2CH_HDR 22. 4K30HZ_3D_6CH_HDR 23. 4K30HZ_3D_8CH_HDR 24. 4K60HzY420_3D_2CH_HDR 25. 4K60HzY420_3D_6CH_HDR 26. 4K60HzY420_3D_8CH_HDR 27. 4K60HZ_3D_2CH_HDR 28. 4K60HZ_3D_6CH_HDR 29. 4K60HZ_3D_8CH_HDR 30. User EDID 1 31. User EDID 2 32. User EDID 3
SET INx EDID CY OUTy	Copy Output y EDID To Input x(USER1 BUF){x=[0~8](0=ALL), y=[1~8]}
SET INx EDID Uy DATAz	Write EDID To User y Buffer of Input x{x=[0~8](0=ALL), y=[1~3],z=[EDID Data]}
GET INx EDID	Get Input x EDID Index{x=[0~8](0=ALL)}
GET INx EDID Y DATA	Get Input x EDID y Data{x=[1~8],y=[0~32]}

NOTE: To see a connection diagram of how connect to the matrix using RS-232, see the connection diagram at the end of the manual.

IP Set-Up Commands:

AC-MX88-AUHD	Network Setup Commands
	Network Setup Command: (xxx=[000-255], zzzz=[0001~9999]
Command	**Action**
SET RIP xxx.xxx.xxx.xxx	Set Route IP Address to xxx.xxx.xxx.xxx
SET HIP xxx.xxx.xxx.xxx	Set Host IP Address to xxx.xxx.xxx.xxx
SET NMK xxx.xxx.xxx.xxx	Set Net Mask to xxx.xxx.xxx.xxx
SET TIP zzzz	Set TCP/IP Port to zzzz
SET DHCP y	Set DHCP {y=[0~1](0=Dis,1=Enable)}
GET RIP	Get Route IP Address
GET HIP	Get Host IP Address
GET NMK	Get Net Mask
GET TIP	Get TCP/IP Port
GET DHCP	Get DHCP Status
GET MAC	Get MAC Address

IR Code Setup Commands:

AC-MX88-AUHD	IR Code Setup Command
Command	**Action**
SET IR SYS xx.yy	Set IR Custom Code{xx=[00-FFH],yy=[00-FFH]}
SET IR OUTx INy CODE zz	Set IR Data Code{x=[1~8],y=[1~8],zz=[00-FFH]}

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Specifications:

AC-MX88-AUHD Specifications	
Parameter	Description
Video	
HDMI Inputs	8
HDMI Outputs	8
HDMI Output format	1.4 and 2.0(a)
Video Formats supported	4K60 (all up to 4:4:4), 4K30, 1080P, 1080I, 720P, 576P, 480P, 576I, 480I
Video Scaling Modes (Per Output)	Bypass, HDBT Compatiability (9G), 4K->2K, 2K->4K
HDCP Versions	2.2 And earlier
Signal Rate	18 GBPS
HDR Suppoerted	HDR 10, Dolby Vision
Audio	
Audio Formats Supported (HDMI)	Up to DTS-HD, Dolby trueHD
SPDIF Audio Outputs	8
Audio Formats Supported (SPDIF)	Up to Dolby 5.1 PCM
Balanced Audio Outputs	8
Balanced Audio Output Level	Line
Audio Delay (Per output Balanced/SPDIF)	Up to 630MS
Other	
EDID Management	SDR & HDR Presets up to 18G (4K 4:4:4), Custom EDIDs, EDID Copy/Emulate
Input Video Signal	0.5-1.0 volts p-p
Input DDC Signal	5 volts p-p
Transmission Distance Over HDMI	45 Feet (15 Meters)
Control	RS-232, IR, Ethernet
RS-232 Settings	Baud rate: 57600 Data bits: 8 Parity: None Stop Bits: 1 Handshaking: None
Power Supply	12V 4A
Power Consumption	15W (Max)
Operating Temprature	32-95°F (0-35°C)
Operating Humidity	15-90% RH
Weight	5.3LBS
Dimensions	L440 x W256 x H42 mm 17.3 x 10 x 1.65 in 19 inch RU's: 1

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Safety Instructions:

To ensure reliable operation of this product as well as protecting the safety of any person using or handling this device while powered, please observe the following instructions.

1. Use the power supplies provided. If an alternate supply is required, check voltage, polarity and that it has sufficient power to supply the device it is connected to.
2. Do not operate these products outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation to allow this product to operate efficiently.
4. Repair of the equipment should only be carried out by qualified professionals as these products contain sensitive devices that may be damaged by any mistreatment.
5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.
6. Due to the weight and physical size of this matrix switcher, correct manual handling and lifting procedures should be observied at all times while handling these products in order to minimise the risk of injury

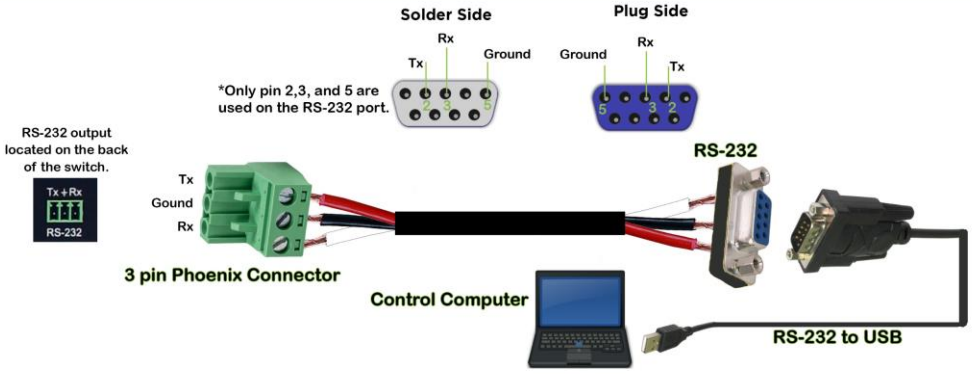
After Sale Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting Technical Support.
2. When Calling Technical Support, the following information should be provided:
    - Product name an model number
    - Product serial number
    - Details of the fault and any conditions under which the fault occurs.
3. This Product has a two year standard warranty, beginning from the date of purchase as stated on the sales invoice. Online registration of this product is required to activate the full three year extended warranty. For full details please refer to our terms and conditions.
4. Product warranty is automatically void under any of the following conditions:
    - The product is already outside of its warranty period
    - Damage to the product due to incorrect usage or storage
    - Damage caused by unauthorized repairs
    - Damage caused by mistreatment of the product
5. Please Direct any question or problems you may have to your local dealer before contacting AVProConnect

RS-232 Wiring Diagram:

RS-232 Connection

In order to connect your computer to the switch by RS-232 you need to make your own cable with one end a phoenix connector and the other end a RS-232 port. If your computer doesn't have a RS-232 input, get a usb converter (as shown below), and plug the usb end to any computer.



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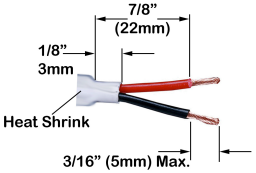
Audio Wiring Diagram:

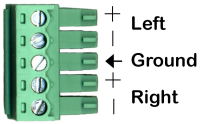
Cable Preparation for Audio Connecitons

To get the job done correctly the first time here are some things to remember; The ideal length when stripping your exposed wires is 3/16" (5mm). If it's shorter you risk having it easily pulled out, if longer you can cause a short circuit between them. Don't tin wires, it won't hold it's shape and can become loose over time if you do.



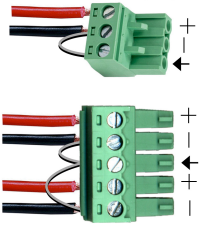
3 Pin Phoenix Connector

5 Pin Phoenix Connector



Unbalanced Audio Wiring

(Unbalanced Input)

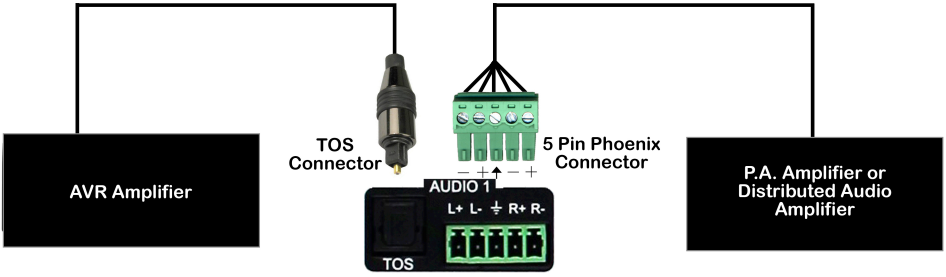


*make sure ground is always connected

(Unbalanced Output)

When using a RCA or TRS Connetion:
Tip (T) +
Ring (R) -
Sleeve (S) G

AUDIO DIAGRAM



Audio Output on the AC-MX88-AUHD

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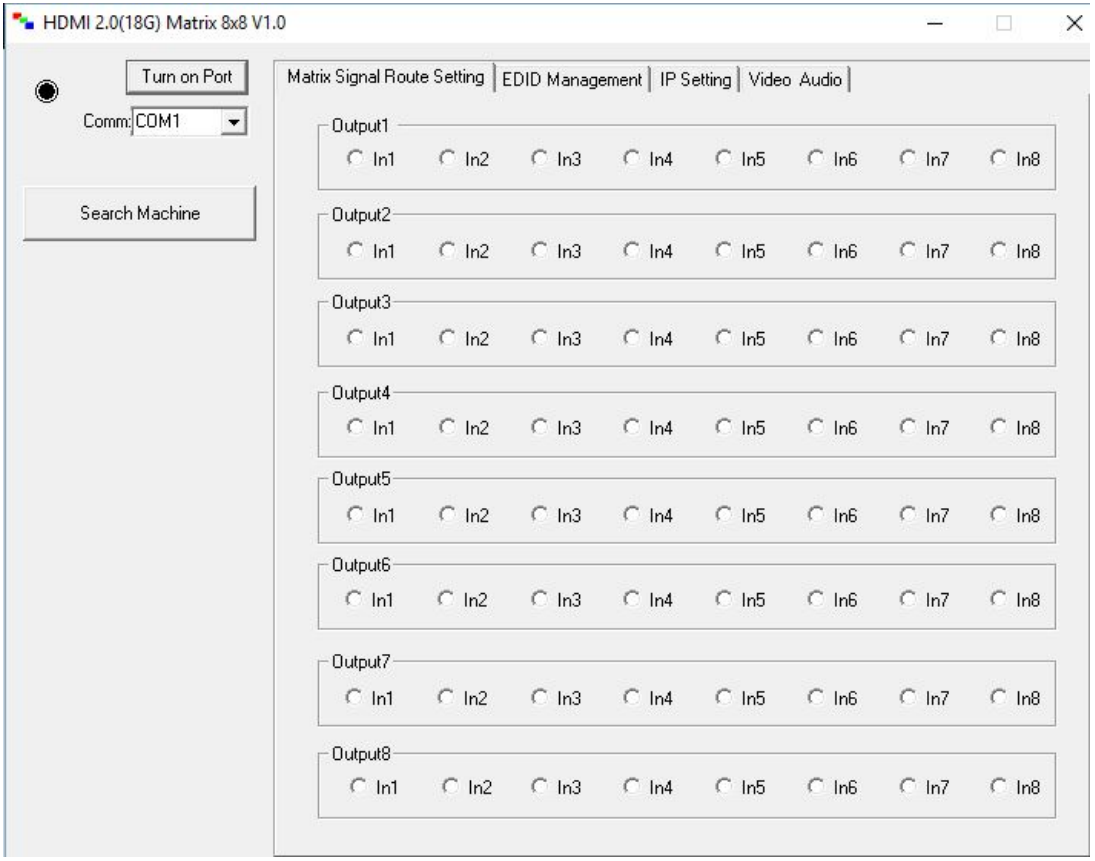
Using the Free PC Software: General Matrix Control



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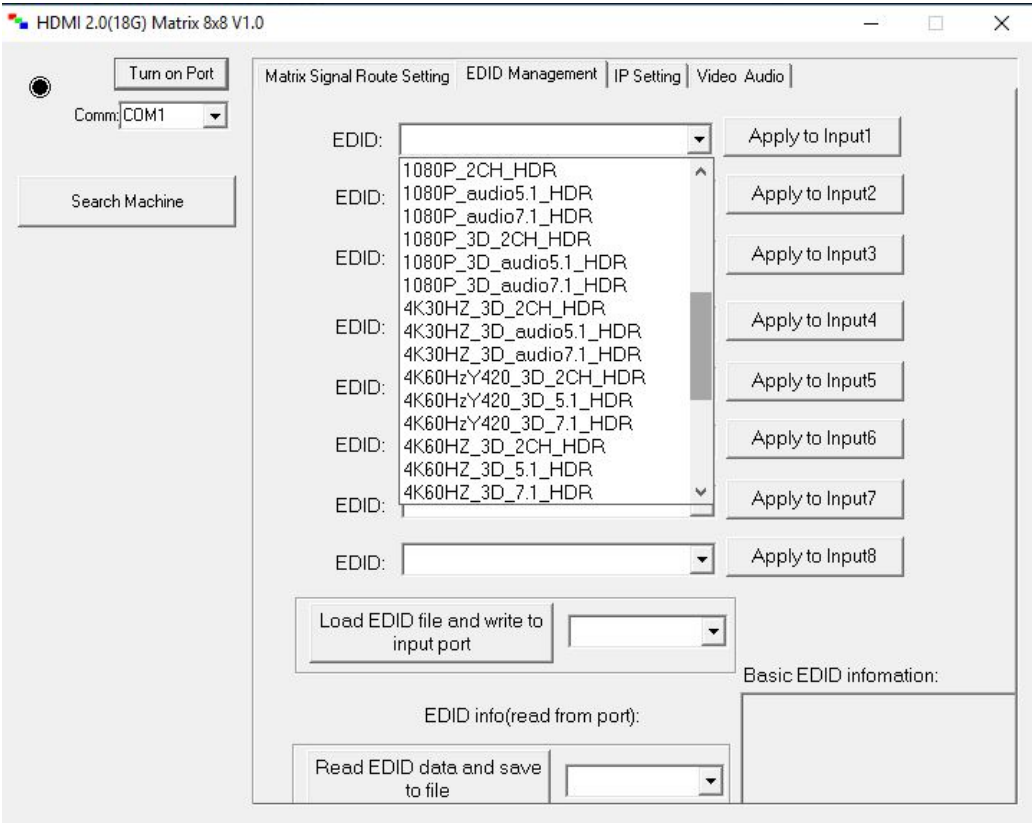
Using the Free PC Software: EDID Management



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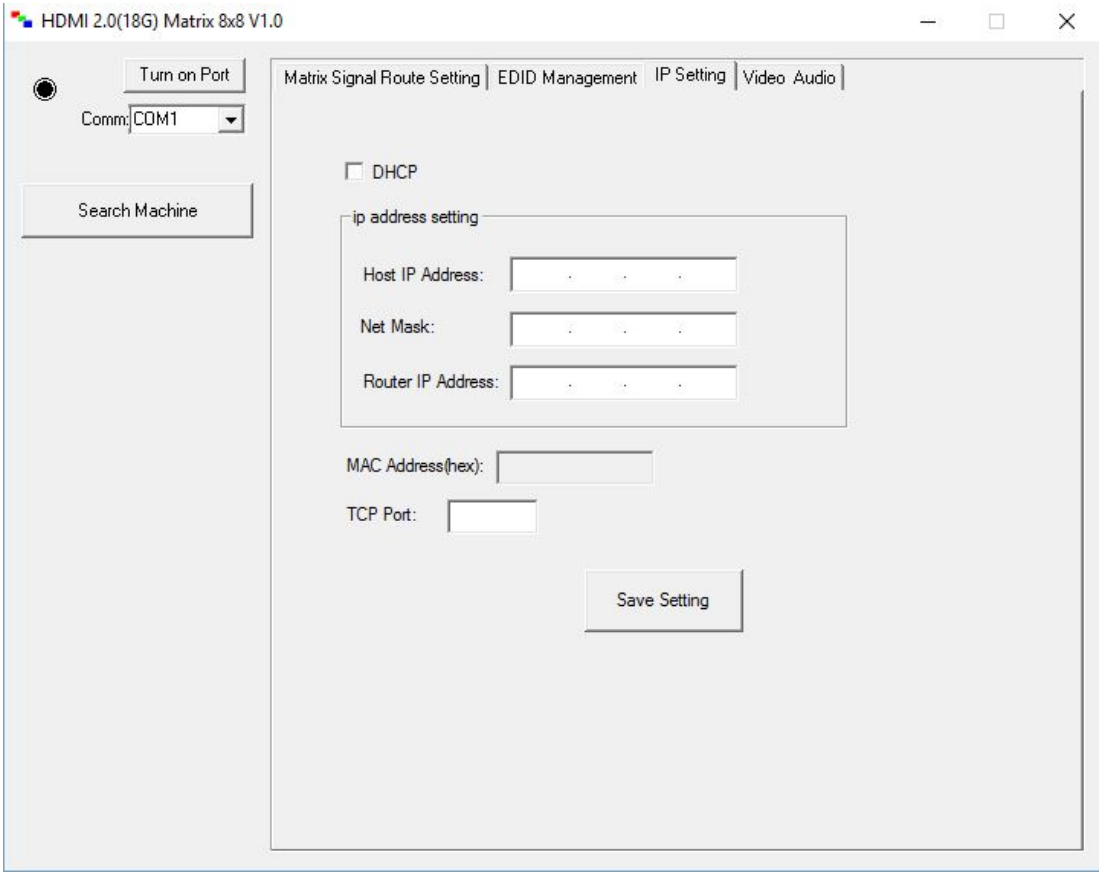
Using the Free PC Software: IP Settings



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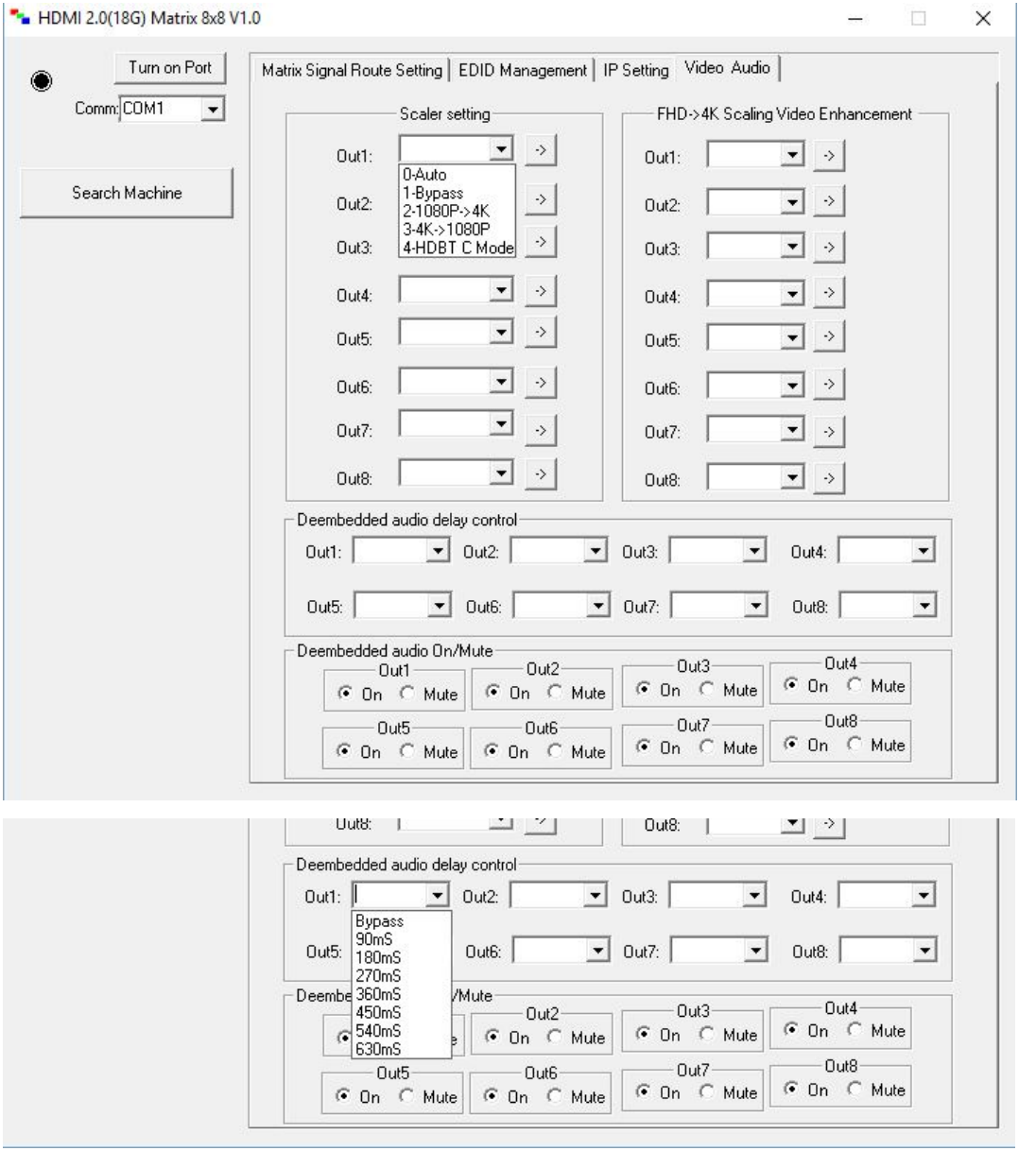
Using the Free PC Software: Scaling & Audio Delay



Thank you for choosing AVProConnect!

Please contact us with any questions, we are happily at your service!

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