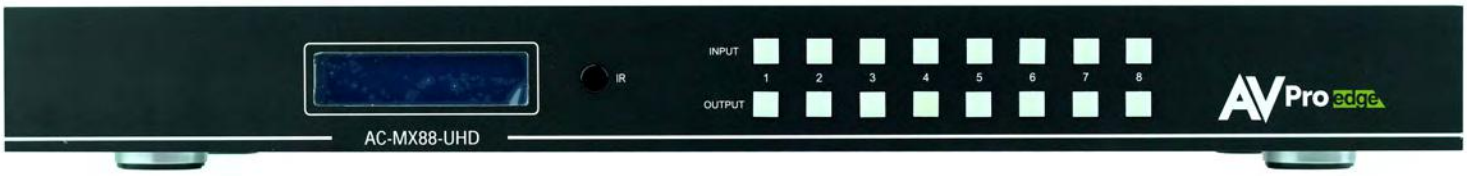
User Manual

AC-MX88-UHD

8x8 HDMI Matrix w/ Audio De-Embedding 4K 60Hz, HDMI 2.0 and HDCP 2.2 Compatible



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The AC-MX88-UHD is a true 8x8 HDMI matrix switch. Supporting HDMI 2.0, HDCP 2.2, up to 4K video resolution, and up to 10.2 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.

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 todays 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!

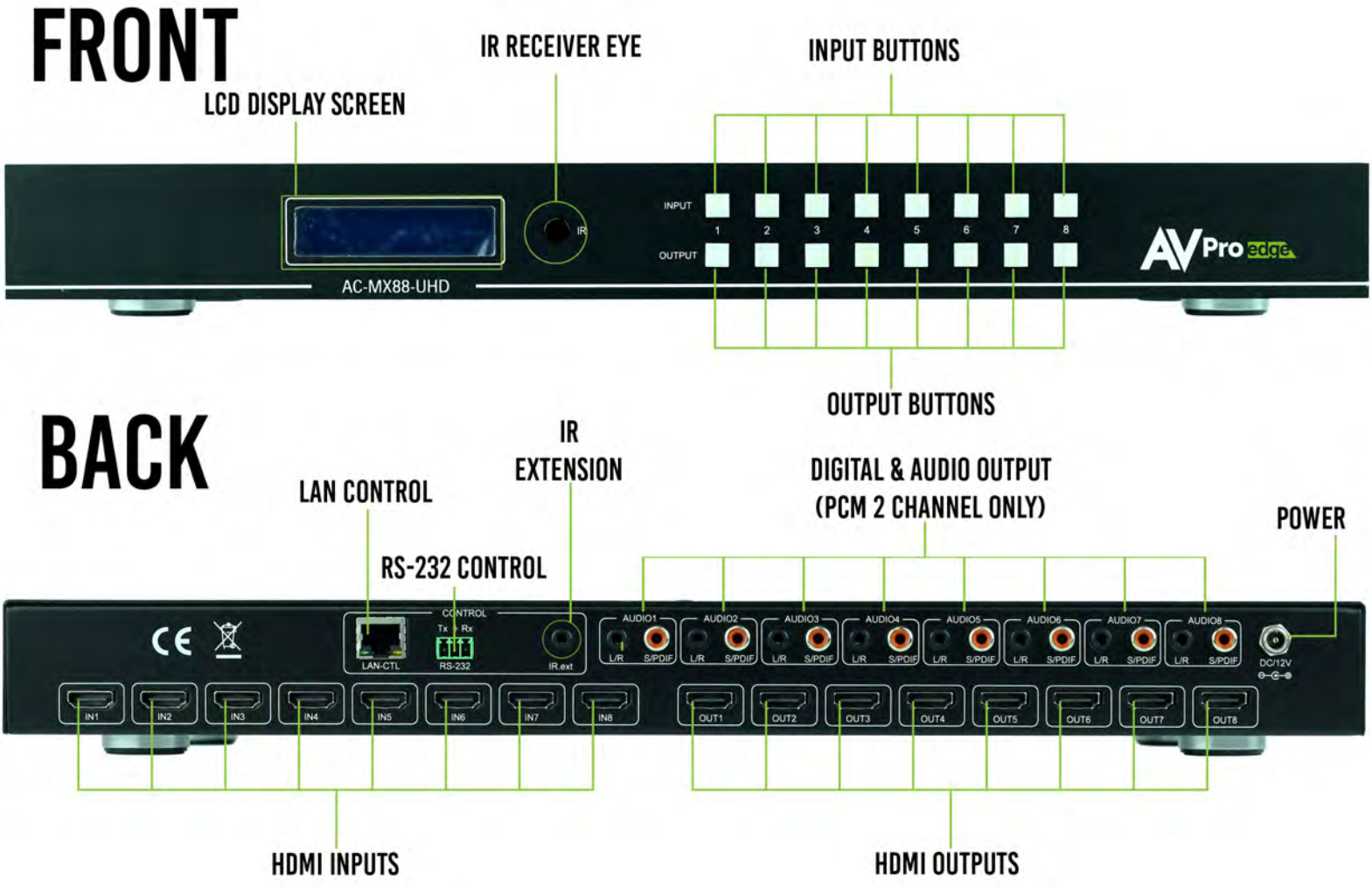
Features:

- HDMI 2.0 (10.2 Gbps)
- HDCP 2.2 compliant
- De-embed SPDIF audio on each output
- Independent source/display switching
- Up to 4K Resolution (4K60 4:2:0)
- HDR Supported
- IR & RS-232 Control

Easy to use:

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

Device Overview:



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In The Box:

- AC-MX88-UHD Matrix Switch
- IR Remote Control
- IR Extension Cable
- 12V/3A Locking Power Supply
- Instruction Manual

Quick Installation:

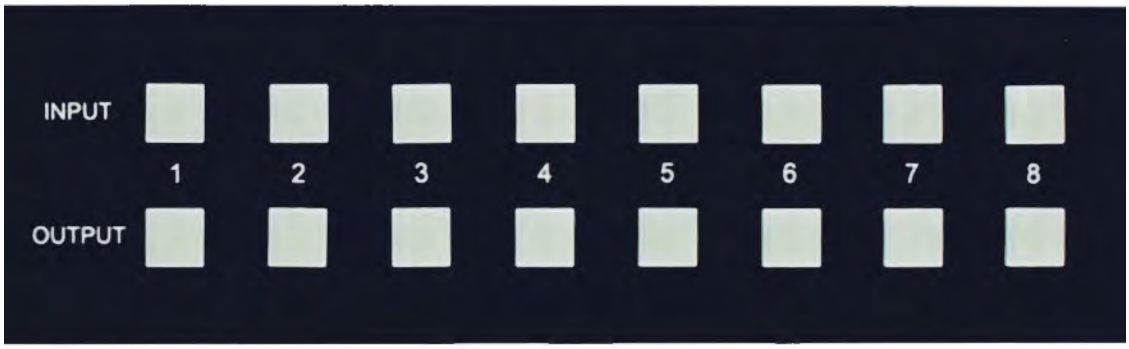
1. Connect the HDMI input sources (Blu-ray, Set Top Box, etc...) to the AC-MX88-UHD
2. Connect the HDMI output devices (AVR, Display, Distribution Amplifier, Extender) to the AC-MX88-UHD
3. Power on the sources
4. Connect the power supply into the AC-MX88-UHD
5. Turn on output devices/displays
6. You 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 on page 7

Front Panel Control:

The AC-MX-88-UHD front panel controls allow for the selection of the inputs to the various outputs. First press a button on the OUTPUT row to choose the output port, then press a button on the INPUT row to select the input signal for the selected output. (Output, then Input)

Select Your Output First



Then Select Your Input

Figure 1 ~ AC-MX88-UHD Panel Controls

NOTE: There is an application diagram on page 11 of this manual.

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IR Remote Control:

The HDMI routing of the matrix can also be controlled

by using the IR remote supplied with the product.

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

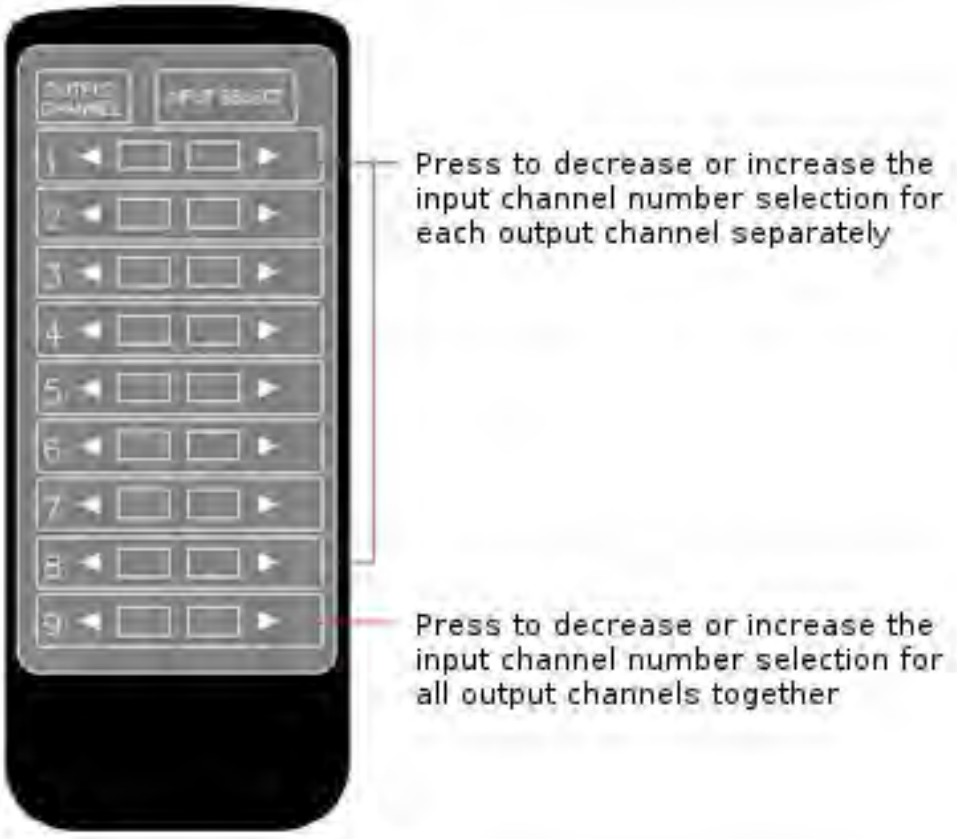

Figure 2 ~ AC-MX88-UHD IR Remote

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.

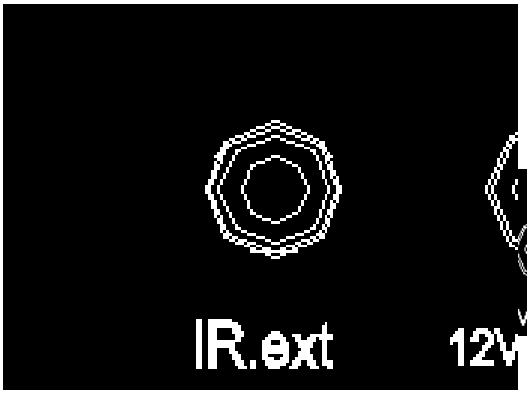

Figure 3 ~ AC-MX88-UHD IR Controls

Figure 4 ~ IR Extension Cable

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EDID Management:

This matrix has 12 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". We recommend uploading custom EDID settings to memory 2 or 3.

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. Now "click" desired INPUT to toggle through the available EDID options
3. Once you are on the EDID you want to select, press and hold for 3 seconds again.

This will set the EDID for the desired input. Please see the example below for detailed instructions.

These are the pre-defined EDID settings that you can toggle through:
1 - 1080P 2CH (PCM)
2 - 1080P 6CH (5.1 Channel)
3 - 1080P 8CH (7.1 Channel)
4 - 1080p 3D 2CH (PCM)
5 - 1080P 3D 6CH (5.1 Channel)
6 - 1080P 3D 8CH (7.1 Channel)
7 - 4K30Hz 3D 2CH (PCM)
8 - 4K30Hz 3D 6CH (5.1 Channel)
9 - 4K30Hz 3D 8CH (7.1 Channel)
10 - 4K60Hz (Y420) 3D 2CH (PCM)
11 - 4K60Hz (Y420) 3D 6CH (5.1 Channel) 12 - 4K60Hz (Y420) 3D 8CH (7.1 Channel)
USER EDID 1
USER EDID 2
USER EDID 3
EDID from output 1
EDID from output 2
EDID from output 3
EDID from output 4
EDID from output 5
EDID from output 6
EDID from output 7
EDID from output 8

Bonus Feature!

Pressing and holding the any OUTPUT button will automatically read, store and apply the EDID from the display device to the current INPUT assigned. It will be stored in USER EDID 1.

The following is an example of how to change the EDID setting for input 3:

User Action	LCD Text after User Action
Press and hold INPUT button 3 for 3 seconds	[3] EDID | 1080P 6CH
Continue to "click" INPUT 3 to toggle through the EDID settings. (Keep "clicking" to toggle through all of the EDID settings listed above.)	[3] EDID | 1080P 8CH
Press and hold INPUT 3 for 3 more seconds to save the EDID as shown on the display	[3] EDID | SETTING SUCCESS

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EDID Management Cont:

The first 12 EDID settings cannot be altered. The three USER EDID settings are programmed using RS-232 or the free PC Software. However, you can read an EDID from any output and it will automatically store in USER EDID 1. Remember, each INPUT has an independent EDID setting and you may need to program each one.

To read and set an EDID to a specified input the steps are the same as on PAGE 5. The only difference is that when you see a screen similar to FIGURE 5, you press and hold the INPUT button again for 3 seconds and this AUTOMATICALLY reads, stores and sets the EDID for that INPUT.

Figure 5 ~ Read EDID Screen

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)

You can enable/disable DHCP mode directly from the front panel. When DHCP is enabled it will automatically gather an IP address from the network and it will be discoverable on said network. You can now view the assigned IP address by following the steps above. To toggle DHCP, press and hold INPUT 1 **and INPUT 4 at the same time for three seconds. You will see one of the two options shown below**

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RS-232 Commands:

The AC-MX88-UHD can also be controlled using RS232 commands, and some configuration settings can only be performed using RS232 commands.

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

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

In each of the following RS232 commands the ↵ symbol represents the carriage-return character (0x0d). Where shown for a particular command, the square brackets [ ] are required for that command.

The commands normally reply with the same command that was sent, but with the first character pointing left: e.g. the command: >@WWVSO[1] I [2] ↵ gives the command response >@WVSO[1] I [2] ↵

Switching Commands:

Change the input and output signal routing: Where x is the input number and y is the output number.	>@WVSO[y]I[x]↵
Set input x to all outputs	>@WVSOA[x]↵
Turn output y off	>@WVSO[y]OFF↵
Turn output y on	>@WVSO[y]ON↵

External Audio Commands:

Enable external (de-embedded) audio for output y	>@WASO[y]E EN↵
Disable external (de-embedded) audio for output y	>@WASO[y]E DIS↵
Enable All external (de-embedded) audio outputs	>@WASOAEON↵
Disable All external (de-embedded) audio for outputs	>@WASOAEOFF↵

EDID Commands:

Read the current EDID information from input x [3]	>@R8010[x]↵
Read the current EDID information from output y [3]	>@R8011[y]↵
Set input x to EDID from output y	>@WECO[y]I[x]↵
Set All inputs to EDID from output y	>@WECO[y]A↵
Set input x to Default EDID n – (n = 1 to 12)	>@WECD[n]I[x]↵
Set All inputs to Default EDID n – (n = 1 to 12)	>@WECD[n]A↵
Set input x to User EDID n – (n = 1 to 3)	>@WECU[n]I[x]↵
Set All inputs to Default EDID n – (n = 1 to 3)	>@WECU[n]A↵
Read EDID from output y and write to User EDID n of input x – (n = 1 to 3)	>@WEWI[x]U[n]O[y]↵
Read EDID from output y and write to User EDID n of All inputs – (n = 1 to 3)	>@WEWIAU[n]O[y]↵

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.

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IP Set-Up Commands:

Set the Host IP address of the matrix switcher (Default: 192.168.001.239)	>@WIPH xxx.xxx.xxx.xxx↵
Set the subnet mask (Default: 255.255.255.000)	>@WIPN xxx.xxx.xxx.xxx↵
Set the Router IP address (Default: 192.168.001.001)	>@WIPR xxx.xxx.xxx.xxx↵
Set the TCP/IP port number (Default: 23)	>@WIPH zzzzz↵
Set DHCP on	>@WIPDP ON↵
Set DHCP off	>@WIPDP OFF↵

Get Status Commands:

Output a report giving the current status of the matrix switcher (2)	>@RSTA↵
Read the input connection status (4)	>@R8001↵
Read the output connection status (4)	>@R8002↵
Read input HDCP status (4)	>@R8003↵
Read output HDCP status (4)	>@R8004↵
Read output channel settings (4)	>@R8006↵
Read output On/Off states (4)	>@R8007↵
Read External (de-embedded) audio status (4)	>@R8008↵
Read input EDID setting (4)	>@R8009↵
Read all network settings (5)	>@R8012↵

Other Commands:

Power off the matrix switcher (enter standby mode)	>@WSPF↵
Power off the matrix switcher (exit standby mode)	>@WSPN↵
Help, list all available commands (2)	>@RH↵
Reset to factory defaults	>@WSDF↵

Notes:(1) This command generate a large report giving detailed information about the current status of the matrix switcher.

(2) This command lists all the commands that the matrix switcher supports.

(3) These EDID commands output an ASCII data block that lists the values of the requested EDID data values in hexadecimal notation.

(4) These commands respond with a short message, usually one line, giving the requested information.

(5) The IP status command will respond with all the current IP settings: Host IP address, Subnet mask, Router IP address, TCP/IP port number and the DHCP setting.

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Specifications:

Parameter	AC-MX88-UHD
HDMI Inputs	8
HDMI Outputs	8
SPDIF audio Outputs	8
Weight (Main Unit)	5.3lbs
HDCP Versions	HDCP 2.2 and earlier
Input Video Signal	0.5-1.0 volts p-p
Input DDC Signal	5 volts p-p (TTL)
Signalling Rate	10.2 Gbps
Video Format Supported	DTV/HDTV: 4K60/4k30/1080P/1080i/720P/576P/480P/576i/480i
Output Video	HDMI2.0 and HDMI 1.4
Audio Format Supported (HDMI)	DTS-HD, Dolby trueHD
Maximum Transmission Distance	Less than 15m
Communication Ports	RS232, IR, Ethernet
RS232 Settings	Baud rate: 57600 Data bits: 8 Parity: None Stop bits: 1 Handshaking: None
Supply voltage	12V DC
Power Consumption	15W (Max.)
Operating Temperature Range	0 to +35°C (32 to +95°F)
Operating Humidity Range	15 to 90 %RH (non-condensing)
Dimensions	L440 x W256 x H42 mm L17.3”xW10”xH1.65” 19” Rack height: 1U

NOTE: HDR (High Dynamic Range) is supported on these matrix switchers. you mus read EDID from and HDR capable display and store it to to the input where the HDR source resides.

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Safety Instructions:

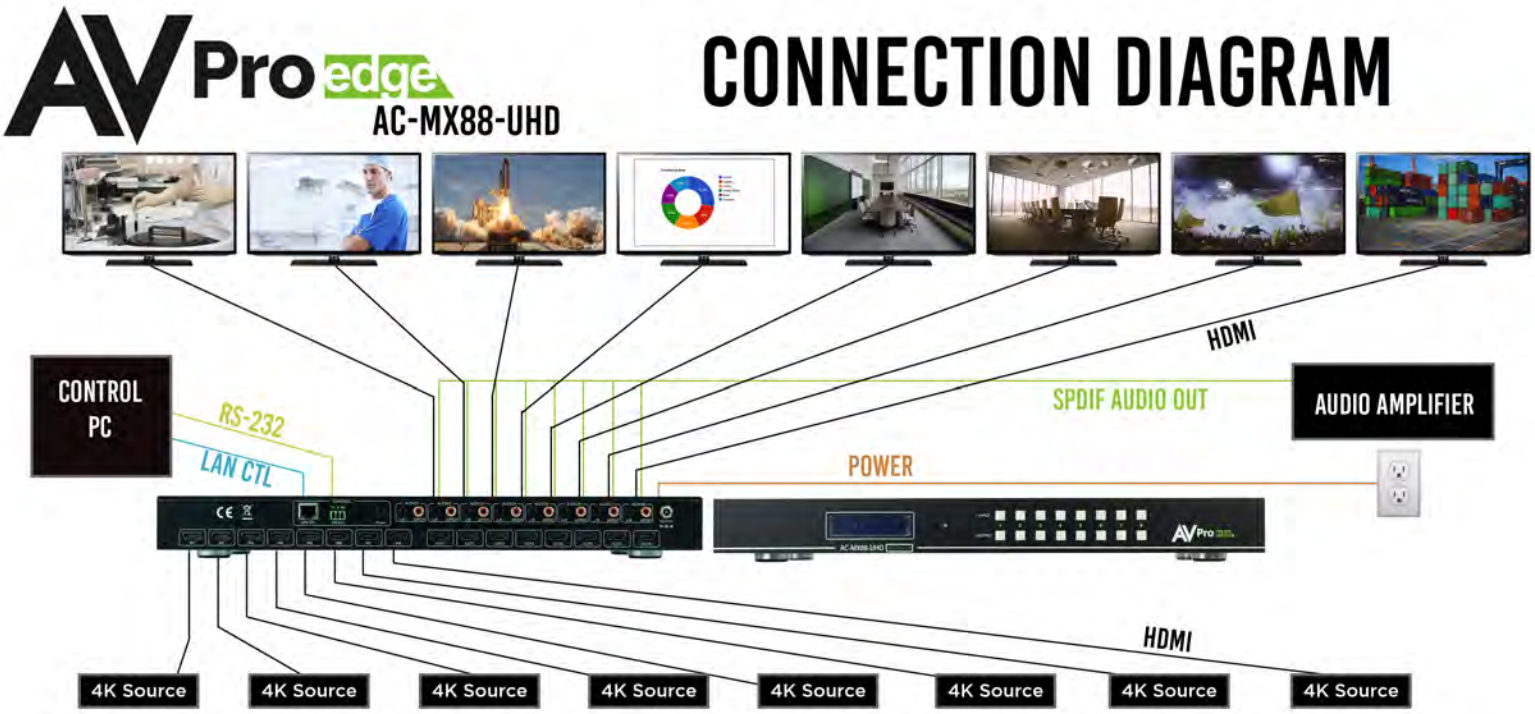
To ensure reliable operation of these products as well as protecting the safety of any person using or handling these devices while powered, please observer the following instructions.

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 these products 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 some of these matrix switchers, correct Manual Handling and Lifting procedures should be observed at all times while handling these products in order to minimize the risk of injury.

After Sale Service:

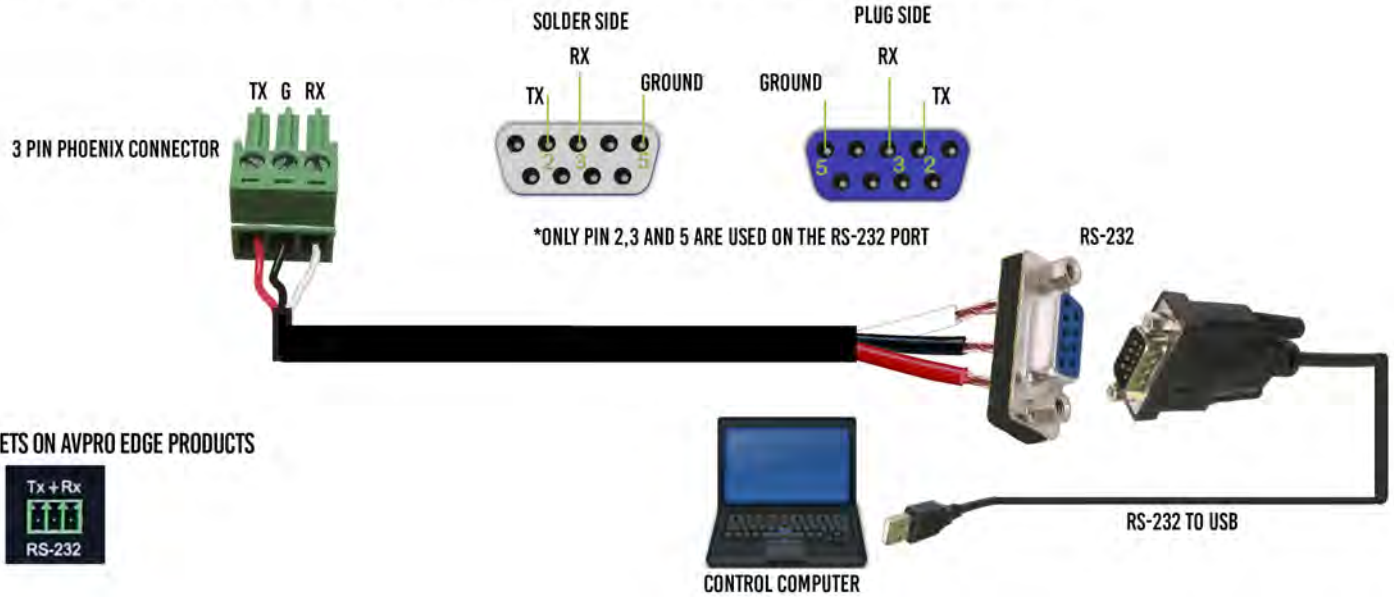
1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting Technical Support.
2. When calling Technical Support, the following information should be provided:
    - Product name and model number
    - Product serial number
    - 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 registrtation 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 unauthorised repairs
    - Damage caused by mistreatment of the product
5. Please direct any questions or problems you may have to your local dealer before contacting AVProEdge

Application Diagram:



RS-232 CABLE FOR AVPRO EDGE

IN ORDER TO CONNECT YOUR COMPTER 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. 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 De-Embedding Diagram

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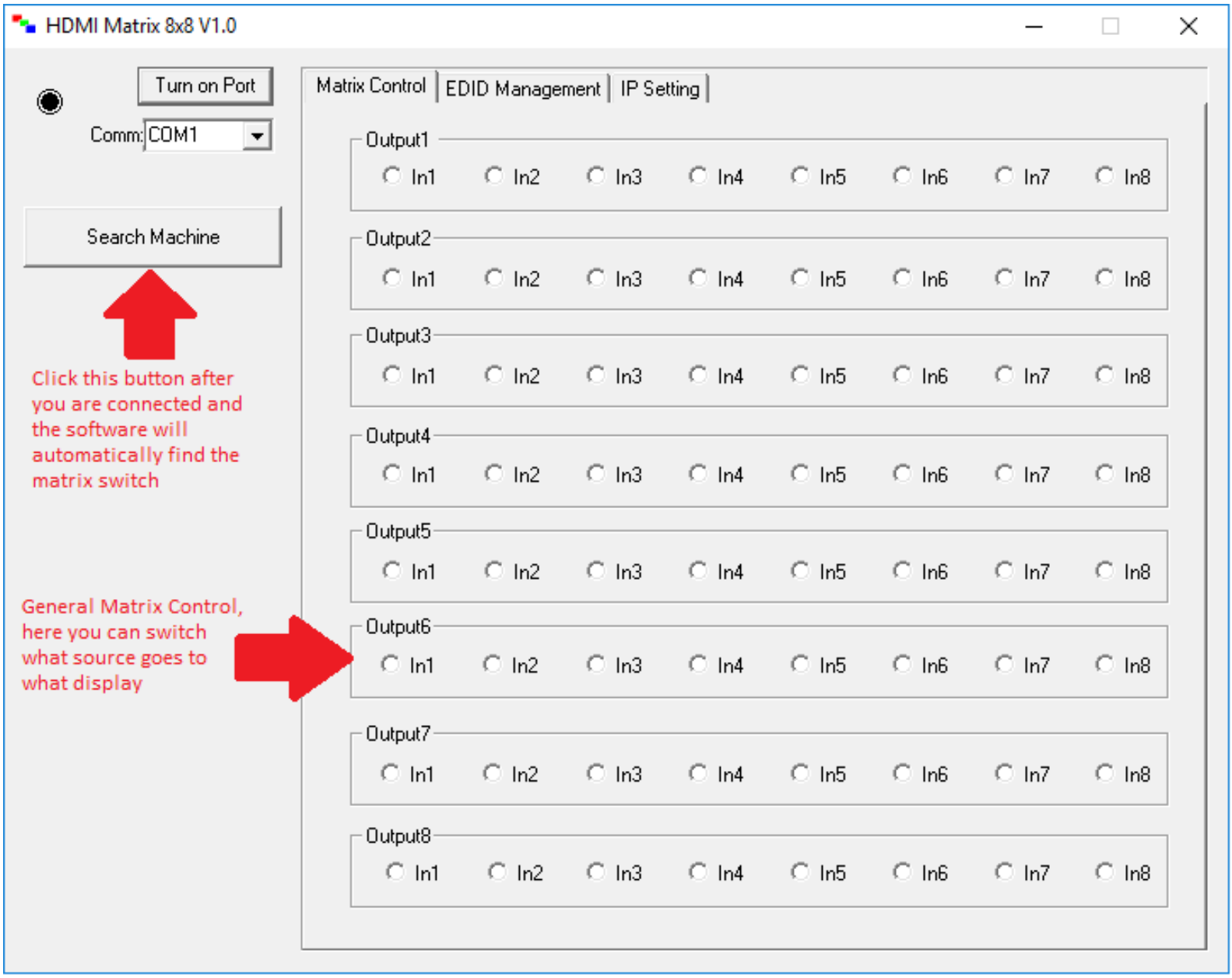
Using the Free PC Software: General Matrix Control



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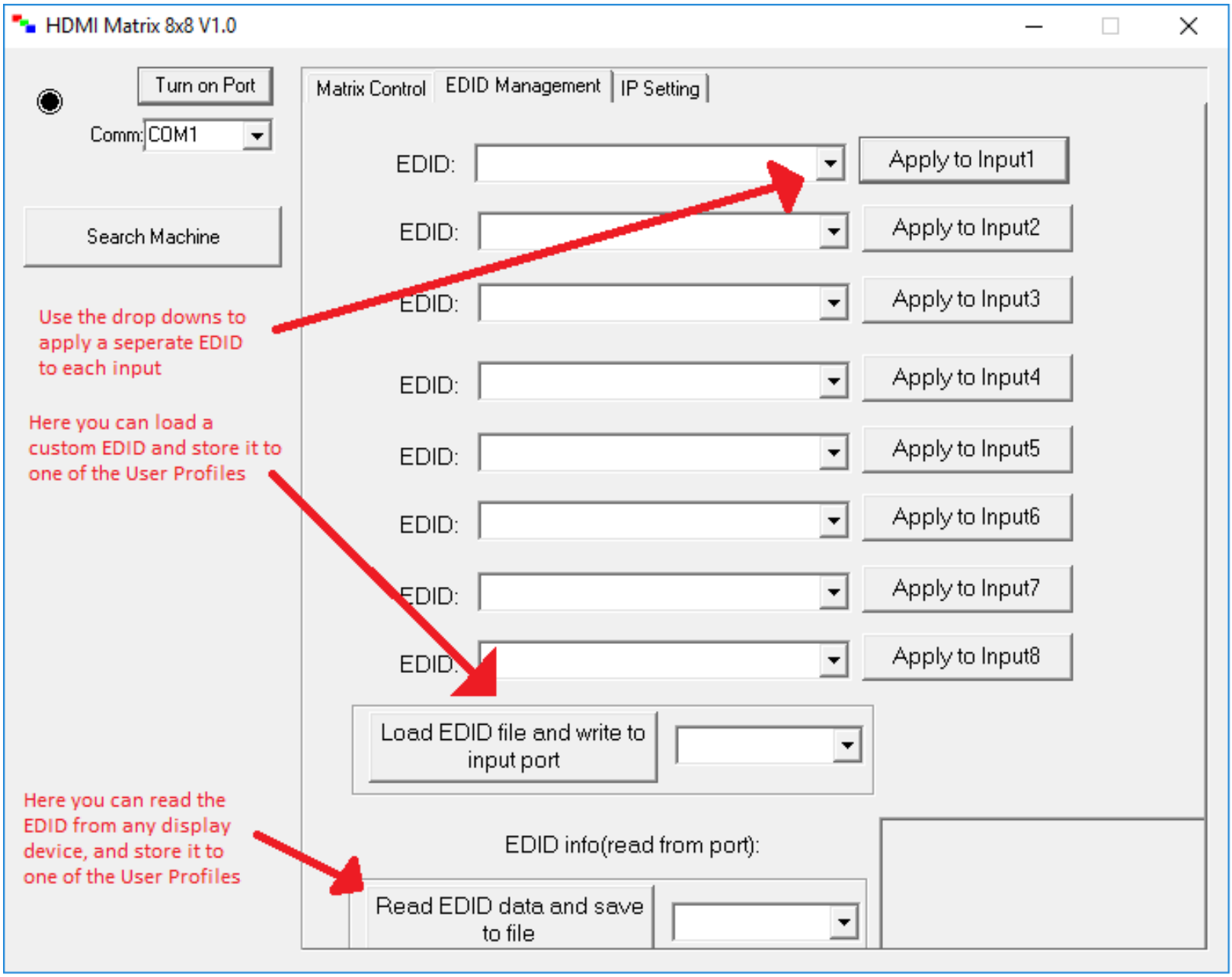
Using the Free PC Software: EDID Management



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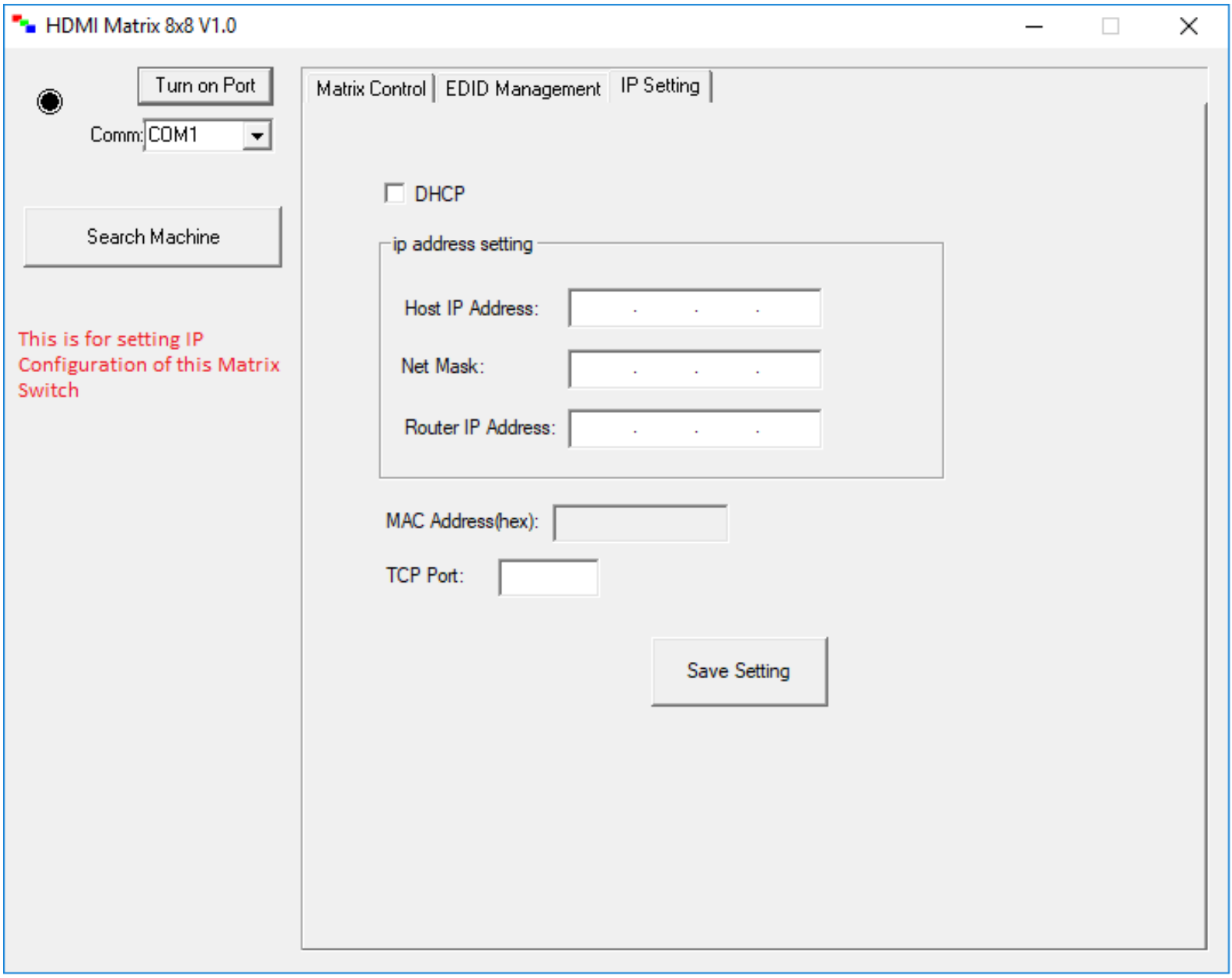
Using the Free PC Software: IP Settings



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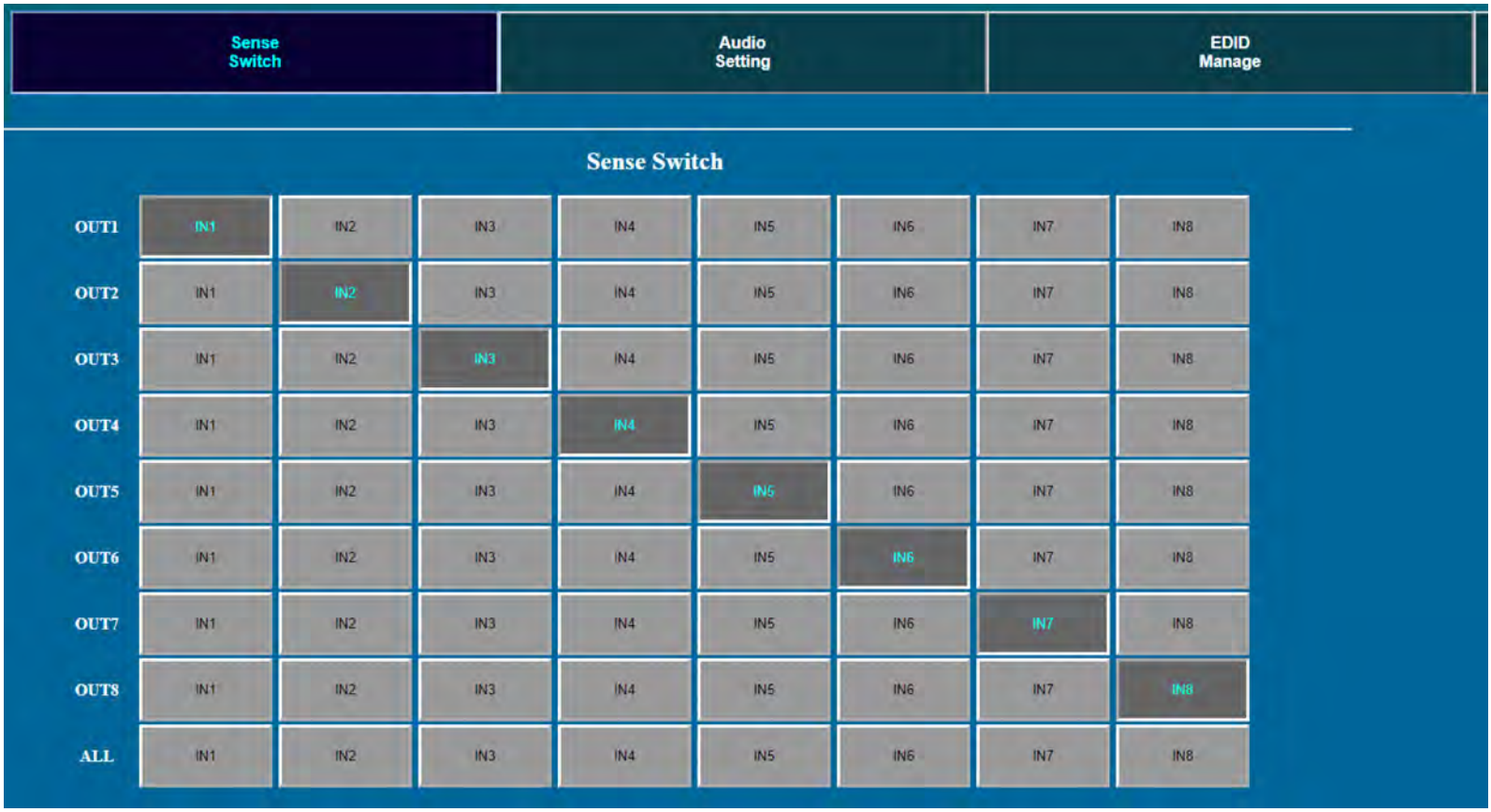
Web Interface: Switching

Use this page to switch between inputs and outputs from the web interface.



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Web Interface:Audio Settings

Audio Status:

This allows the user to turn ON and OFF the extracted audio output. When this is set to OFF the audio is muted from the extracted port.

Audio Matrix:

This allows the user to route the audio in a matrix fashion for the extracted audio ports.
NOTE: The Audio Matrix Function only works if "MATRIX" is selected on the right (See next explanation).

Ex-Audio Matrix Mode:

This allows the user to set a binded audio setting or set the extracted audio to Matrix. The options are:

- **Bind to Input** - The extracted audio port is always fixed to a specific input. For example, when a source is plugged into INPUT 1, OUTPUT 1 will always have the audio signal from INPUT 1. This will happen regardless of which input is selected for OUTPUT 1
- **Bind to Output (Default)** - The extracted audio always follows the corresponding HDMI output. For example, in this mode AUDIO OUT 1 and HDMI OUT 1 are the same (Switched Together).exa
- **Matrix** - You can set to "Matrix" and it will allow routing of the audio as a separate, stand-alone "Matrix". This allows use of the "Audio Matrix" buttons pictured above.

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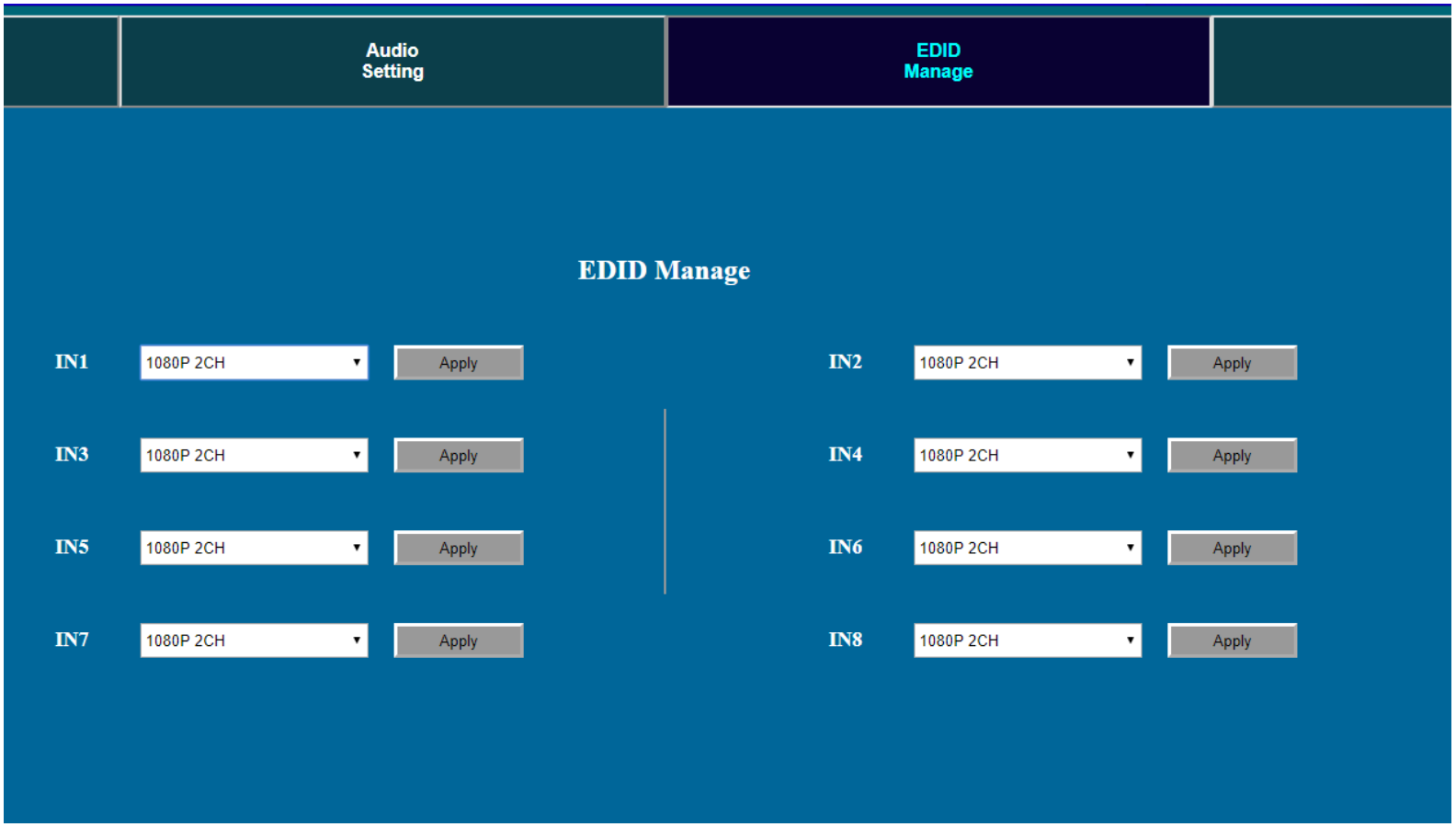
Web Interface: EDID Manage



EDID Manage:

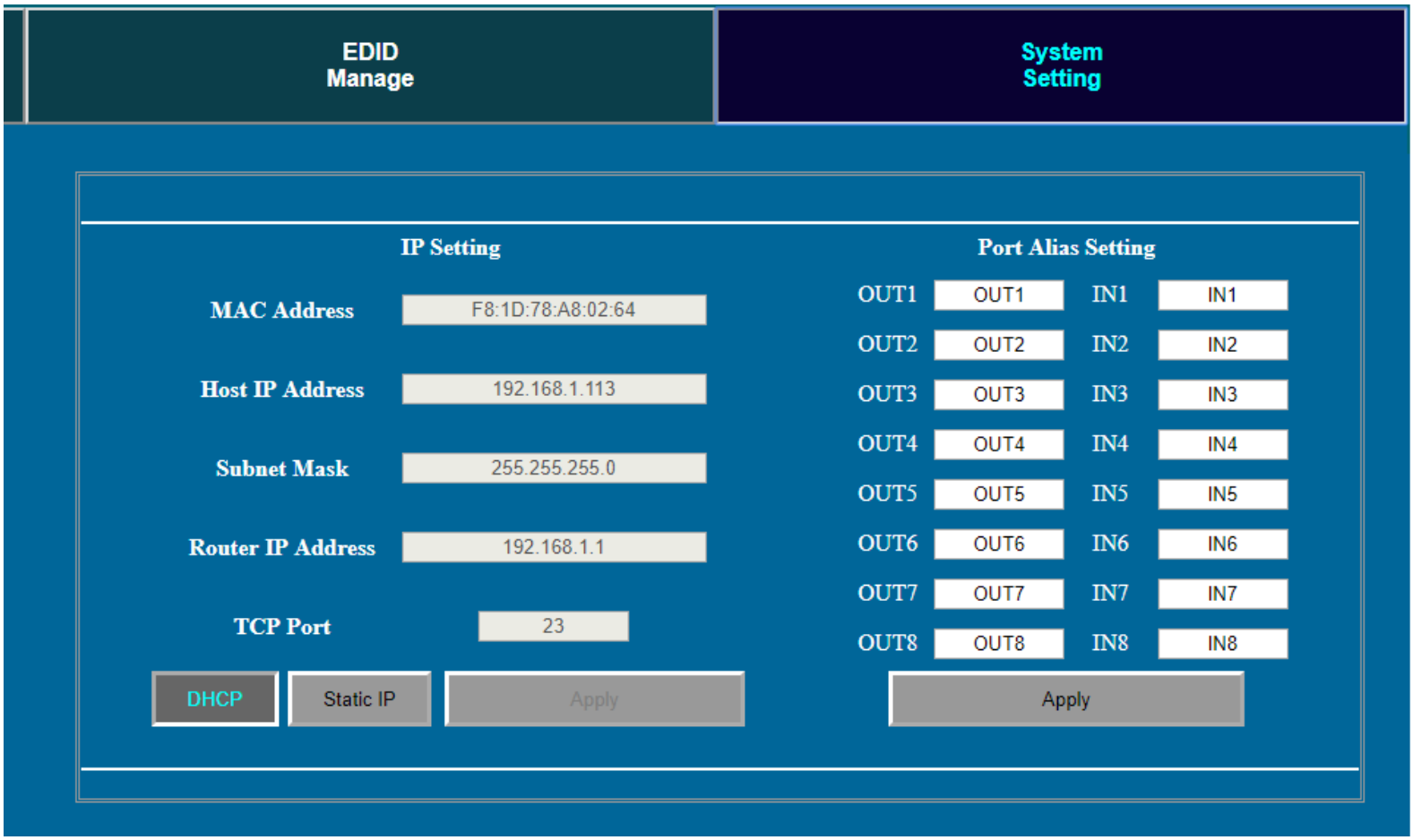
Using the built-in EDID manager, a multitude of EDID's can be set for each input, and each input can be assigned a different EDID. This should be used to optimize sources or to manage infrastructure.

The EDID options are:

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

*You can copy the EDID from any output and apply it to any input. Select "Copy EDID from Output x" (x=1-8). This will copy the EDID from the display and apply it to the selected input. This new EDID will be stored as "USER EDID 1" once the "Apply" button is pressed.

Web Interface: System Settings



IP Settings:

Set network settings such as:

- Static IP
- Subnet Mask
- Router IP
- TCP Port
- Enable DHCP

Port Alias Settings:

Rename inputs and outputs for easy management. Each custom name is limited to eight (8) characters.

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▪ Troubleshooting

- Verify Power - The LCD screen on the front of the matrix should be lit up when power is applied. Check that both power supplies are connected to the matrix and powered
- Verify Connections - Check that all cables are properly connected
- Issues with one INPUT/OUTPUT - Swap ports/cables/etc to help narrow down if the issue stays with the input/output/etc
    - Follows the device, then it may be an EDID issue. Default out of the box is a 1080p 2ch. Try another canned EDID or use the COPY FROM OUTx command to copy the connected displays EDID - Pg. 5, 6, 7, and 14

- Issues with 4k but 1080p or less is working
    - Verify all connected devices are capable of the signal you are sending

Note: This switch is limited to 10.2Gbps, this limits the 4k signals it is capable of passing see chart below for reference

TYPE	RESOLUTION	FRAME RATE (FPS)	COLOUR COMPRESSION	DEEP COLOUR BIT DEPTH	HDR	WIDE COLOR GAMUT (BT2020)	HDMI VERSION	DATA RATE	AUHD SERIES	444 SERIES	UHD SERIES
HD	1920x1080	24	4:2:2	8 BIT	NO	NO	1.4	0.75 Gbps	YES	YES	YES
HD	1920x1080	60	4:2:2	8 BIT	NO	NO	1.4	4.45 Gbps	YES	YES	YES
HD	1920x1080	60	4:4:4	16 BIT	NO	NO	1.4	5.91 Gbps	YES	YES	YES
UHD	3840x2160	24	4:2:0	8 BIT	NO	NO	1.4	8.91 Gbps	YES	YES	YES
UHD	3840x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 Gbps	YES	YES	YES
4K	4096x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 Gbps	YES	YES	YES
UHD OR 4K	3840x2160	60	4:2:0	8 BIT	NO	NO	1.4/2.0	8.91 Gbps	YES	YES	YES
LINE OF INNOVATION											
UHD OR 4K	3840x2160	24	4:2:0	10 BIT	YES	YES	2.0(A/B)	8.91 Gbps	YES	YES	YES
UHD OR 4K	3840x2160	24	4:2:2	12 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	24	4:4:4	10 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	24	4:4:4	12 BIT	YES	YES	2.0(A/B)	13.37 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	60	4:2:0	10 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	60	4:2:0	12 BIT	YES	YES	2.0(A/B)	13.37 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	60	4:2:2	12 BIT	YES	YES	2.0(A/B)	17.82 Gbps	YES	YES	NO
UHD OR 4K	3840x2160	60	4:4:4	8 BIT	YES	YES	2.0(A/B)	17.82 Gbps	YES	YES	NO

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Thank you for choosing AVProEdge!

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

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