User Manual

AC-MX44/88-AUHD-HDBT

18 Gbps True 4K60 4:4:4 4x4/8x8 HDMI Matrix w/ Mirrored 18Gbps (Using ICT) HDBaseT Outputs. 70 Meters 4K 60 4:4:4 & HDR / 100 Meters 1080P. Dual Audio De-Embedding, Scaling & Delay.

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AC-MX44/88-AUHD-HDBT

The AC-MX44/88-AUHD-HDBT is a true 4x4/8x8 HDMI/HDBaseT matrix switch. This unit includes 4/8 HDMI inputs, and 4/8 HDMI/HDBaseT output blocks. These output blocks include a HDBaseT and HDMI port, these ports are mirrored, and both are active. This Matrix supports HDMI 2.0(a/b), HDCP 2.2, up to 4K video resolution, and up to 18 Gbps bandwidth. We are able to pass 18Gbps through category cable by using the new HDBaseT technology we have developed called "ICT", learn more about ICT below. 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.

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 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(a/b)
- 18Gbps Uncompressed Bandwidth Support on HDMI
- 18 Gbps wit ICT on HDBaseT outputs
- 4K60 4:4:4 Support
- Full HDR Support (HDR 10 & 12 Bit)
- Dolby Vision, HDR10+ and HLG Support
- HDCP 2.2 (and all earlier versions supported)
- 1080p > 4K Up Scaling on HDMI outputs
- 4K > 1080P Down Scaling on HDBaseT outputs
- Advanced EDID Management
- IR, RS-232 and LAN Control Options
- Digital Toslink Out (7CH PCM, DD, DD+, DTS, DTS-MA)
- Balanced Analog Out (2CH PCM)
- Audio Delay for Digital & Analog Out
- HDBaseT Compatibility mode for mixed systems! (More below)
- Driver Support for Crestron, C4, RTI, ELAN and more!!!
- Extracted Audio Now Supports DD+, DTS Master Audio on Toslink
- Extracted Audio Now Has 3 Operating Modes. Bound to Input, Bound to Output, or Independent Matrix
- Built in Test Pattern on Each Output to Verify Infrastructure

Easy to use:

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

In The Box:

- AC-MX44/88-AUHD-HDBT Matrix Switch
- IR Remote Control
- IR Extension Cable
- 48v Power Supply
- RS-232 terminal blocks
- Rack ears
- Instruction Manual

Quick Installation:

1. Connect the HDMI input sources (Blu-ray, Set Top Box, etc...) to the AC-MX44-AUHD-HDBT.
2. Connect the HDMI output devices (AVR, Display, Distribution Amplifier, Extender) to the ACQUICK-MX44-AUHD-HDBT.
3. Power on the sources.
4. Connect the power supply into the AC-MX44/88-AUHD-HDBT.
5. Turn on output devices/displays.
6. Use the front panel controls, supplied IR remote or free PC software to control the switch.

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Specifications:

Video:	
Video Resolutions	Up to 4K 60Hz 4:4:4
VESA Resolutions	Up to DCI 4K (4096x2160)
HDR Formats/Resolutions	420, 422, 444 (10 and 12 Deep Color) HDR10, HDR10+, Dolby Vision (24/30 Frames), HLG
Color Space	YUV (Component), RGB (CSC: Rec. 601, Rec. 709, BT2020, DCI, P3 D6500)
Chroma Subsampeling	4:4:4, 4:2:2, 4:2:0 Supported
Deep Color	Up to 16 bit (1080), Up to 12 bit (4K)
Scalers (HDMI) Per Output Optional	1080P to 4K (Resolution Only, Framerate stays the same)
Scalers (HDBaseT) Per Output Optional	4K to 1080P (Resolution Only, Framerate stays the same)
Audio:	
Audio Formats Supported HDMI	PCM 2.0 Ch, LPCM 5.1 & 7.1, Dolby Digtal, DTS 5.1, Dolby Digital Plus, Dolby TrueHD, DTS-HD Master Audio, DTS-X, Dolby Atmos
Audio Formats Supported Extracted (Toslink)	PCM 2 Ch, LPCM 6 Ch, LPCM 7 Ch, Dolby Digital, Dolby Digital Plus, DTS-HD Master Audio
Audio Formats Supported Extracted (2CH Port)	PCM 2 CH (No Downmix)
Audio Extraction Location	Bind to Input, Bind to Output or Matrix (Independent)
Audio Delay (Per Output, Extracted)	Up to 630MS
Distance:	
HDBaseT Out (4K60 4:4:4 & HDR) w/ **AC-EX70-444-RNE**	70 Meters / 230 Feet (Cat 6a)
HDBaseT Out (1080P) w/ **AC-EX70-444-RNE**	100 Meters / 330 Feet (Cat 6a)
HDBaseT Out (4K60 4:2:0 Max) w/ **AC-EX70-UHD-R**	40 Meters / 131 Feet (Cat 6a)
HDBaseT Out (1080P) w/ **AC-EX70-UHD-R**	70 Meters / 230 Feet (Cat 6a)
HDMI In/Out (4K60 4:4:4)	Up to 50 Feet (using Bullet Train HDMI)
HDMI In/Out (w/ AOC Cable) (4K60 4:4:4)	Up to 130 Feet (using Bullet Train AOC)
Other:	
Bandwidth HDMI	18 Gbps Uncompressed
Bandwidth HDBaseT	18 Gbps (Uses ICT above 10.2 Gbps signals)
HDCP	HDCP 2.2 and Earlier
PoH for Receivers (No need to power receivers)	Yes, all outputs
Control:	
Ports	LAN, RS232, IR, Mini USB
Drivers	C4, RTI, ELAN, Crestron, URC (for more - see Drivers Page)
PC Software	YES
LAN WebOS	YES
Ports:	
HDMI	Type A
HDBaseT	RJ45 w/ PoH for HDbaseT Receivers
LAN	RJ45 w/ Web Interface/Control
Audio (Extracted Digital)	Toslink
Audio (Extracted Analog)	5 pin terminal block (balanced)
IR Rx	3.5mm Stereo (3 Conductor)
RS232	3 pin terminal block
Environmental:	
Operating Temprature	23 to 125°F (-5 to 51°C)
Storage Temperature	-4 to 140°F (-20 to 60°C)
Humidity Range	5-90% RH (No Condensation)
Power:	
Power Consumption (Total)	38 Watts Max
Power Supply - Matrix	Input: AC 100-240V ~ 50/60Hz Output: DC 12V 4A
Dimensions:	
Dimensions (Unit Only Height/Depth/Width)	mm: 50.8 x 256 x 441.33 inch: 2 x 10.07 x 17.375
Dimensions (Packaged Height/Depth/Width)	mm: 88.9 x 393.7 x 495.3 inch: 3.5 x 15.5 x 19.5
Rack Units	1 Unit
Weight (Unit)	8 lbs/3.5 kg
Weight (Packaged)	11 lbs/5 kg
*Specifications subject to change without notice. Mass & dimensions are approximate	

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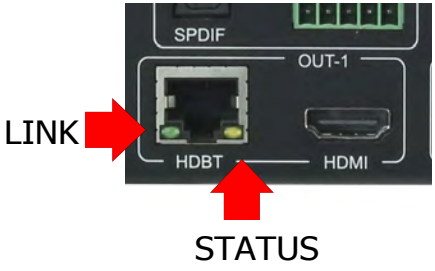
Device Overview:

- Definition - Matrix switches provide the ability to route any input to any output or to multiple outputs at any time. Depending on the model, a matrix switch can route HD, UHD or AUHD content in this manner. Additionally, since most venues have both, audio zones and video zones, the requirement to breakout or strip off the audio is often necessary and has become almost a standard feature on most matrix switches.
- Control – Matrix switches are generally controlled via a third-party controller (like Control 4, RTI, Crestron, etc...). Many integrators want ready-made drivers for their control system in order to make programming and deployment easier.
- Matrix Switches are widely used in both, Commercial and Residential Applications.

Front & Rear Panel:

HDBaseT Port Indicator lights:



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Compatible Receivers:

AC-EX70-444-RNE: (W/ICT)

- 70M 4K 60 4:4:4 & HDR
- 100M 1080P

NOTE: You MUST use this receiver to get 18Gbps ICT Video

AC-EX70-UHD-R:

- 40M 4K 60 4:2:0
- 70M 1080P

Indicator Troubleshooting Lights on the HDBaseT Port on Matrix and Receiver:

LINK - Above RJ45 (HDBT) Port & Below it on the Matrix: (Green) This indicator shows that the AV HDBT link between the Tx and Rx is in tact. This light should ALWAYS be solid.

STATUS- Above RJ45 (HDBT) Port & Below it on the Matrix: (Amber) This is an indicator showing that the power is present between the Transmitter and Receiver. This light ALWAYS BLINKS steadily indicating everything is OK.

If the lights are not as discussed above - please check the following:

1. Check the length. The maximum distances and resolution compatibilities are:
   a. AC-EX70-444-RNE ~ 70m (230ft) on 4K 60 4:4:4 & HDR and 100m (330ft) on 1080P
   b. AC-EX70-UHD-R ~ 40m (131ft) on 4K 60 4:2:0 (NO HDR) and 70m (230ft) on 1080P
2. Remove any coils of cable and make sure that there is not excess cabling.
3. Bypass all patch panels and punch-down blocks.
4. Re-terminate connectors. Sometimes, even if a cable tester indicates the run is valid, something may be slightly off.
5. Contact AVProEdge if these suggestions do not work.

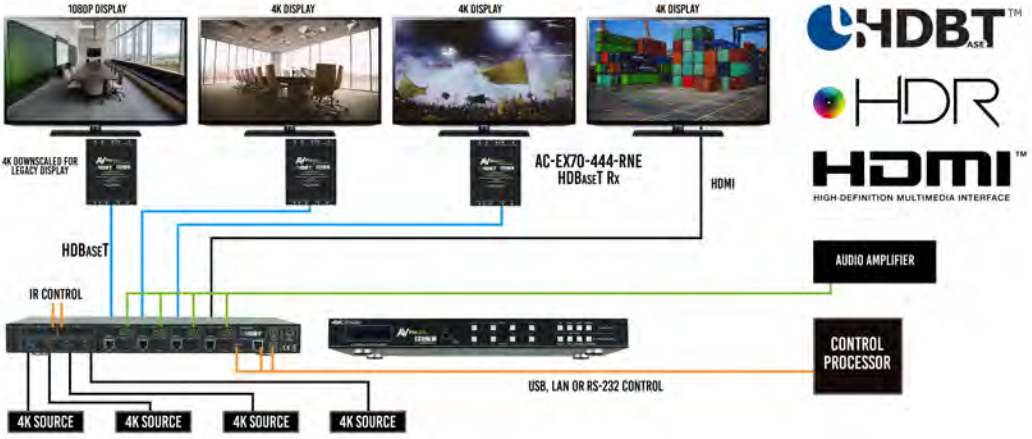
Common Application Diagram & What Is ICT:

THIS 4X4 MATRIX HAS 4 HDMI INPUTS AND FEATURES DUEL MIRRORED HDMI AND HDBASET OUTPUTS FOR A TOTAL OF 8 PORTS. THE HDBASET OUTPUT IS UTILIZING ICT (INVISIBLE COMPRESSION TECHNOLOGY), GIVING IT THE ABILITY TO DELIVER 18GBPS FULL 4K60 (4:4:4) SIGNALING OVER STANDARD CATEGORY CABLE. IT DOES THIS BY USING AVPROCONNECTS PROPRIETARY ENCODING ALGORITHM INSIDE THE MATRIX, AND DECODING ALGORITHM INSIDE THE AC-EX70-444-RNE HDBASET RECEIVERS.

ICT
INVISIBLE COMPRESSION TECHNOLOGY

AVPro edge
AC-MX44-AUHD-HDBT

CONNECTION DIAGRAM



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Full List of Quick Commands From Front Panel:

AC-MX88-AUHD-GEN2 & AC-MX44-AUHD Quick Setup Control		
Parameter	How To :	Options
Switching Control	1. Press the OUTPUT button you want to switch. 2. Press the desired INPUT button.	
EDID Setup	1. Press and hold (3 sec) the INPUT button of the source you want to set EDID for. 2. Use the "UP" & "DOWN" buttons that have lit up to navigate to your desired EDID setting. 3. Quick press the same INPUT button to lock in the selection	See PAGE 7 in the manual for a full list of available EDIDs
Scaling Control	1. Press and hold (3 sec) the OUTPUT button that you would like to scale. 2. The BOTTOM row of buttons on the righthand side of the machine light up, allowing you to make your selection.	- HD-->4K - 4K-->HD - AUTO (Detects Display) - BYPASS (No Scaling)
Audio Delay Control	1. Press and hold (3 sec) the OUTPUT button that you would like to scale. 2. The TOP row of buttons on the righthand side of the machine light up, allowing you to make your selection.	- UP - DOWN - MUTE (Turns Off Audio) - BYPASS (No Delay)
Set Extracted Audio Bindings	1. Press and hold (3 Sec) the BYPASS button on the audio settings buttons (top right set of buttons). 2. Press the "UP" & "DOWN" buttons to switch between desired settings. 3. Press BYPASS button again to set mode. NOTE: if "Matrix" is selected, you will be able to route audio. Please see "Extracted Audio Switching", Step 3. 4. Press BYPASS again to exit.	- Bind to OUTPUT - Bind to INPUT - Matrix NOTE: Send switching commands from the front panel by selecting "Matrix" when in audio mode.
Extracted Audio Switching	1. Press and hold (3 Sec) the BYPASS button on the AUDIO SETTINGS buttons (top right set of buttons) 2. The screen will say "Matrix". 3. Quick press the BYPASS button again to enter Extracted Audio Switching. Now you can switch by: -Press the OUTPUT you'd like to change Press the INPUT you'd like to route to the previously selected audio port 4. When finished, press the BYPASS button again, in order to exit.	NOTE: Audio Switching commands are ONLY available from front panel when the audio mode is set to "MATRIX". NOTE: The web interface may be easier for active, live, switching.
Initialize Test Pattern Output	1. Press and hold (3 Sec) the INPUT & OUTPUT together. 2. Repeat to turn off test pattern	Ex. Pressing and holding INPUT 1 & OUTPUT 1 (for 3 seconds) will generate test patterns out of OUTPUT 1.
Toggle DHCP Mode	1. Press and hold (3 sec) INPUT 1 & INPUT 4 together	Toggles DHCP OFF/ON NOTE: The default mode is OFF, and the default IP Address is 192.168.1.239.
View Network Settings	1. Press and hold (3 Sec) INPUT 3 & INPUT 4 together	The screen will flash the following: - Device IP - Host IP - Subnet Mask - MAC Address
View Firmware Version	1. Press and hold (3 Sec) INPUT 2 & INPUT 4 together	

NOTE: A factory reset may be performed by pressing and holding 4 buttons together for 10 seconds. Press and hold:

- HD-4K (Scaler Settings)
- BYPASS (Scaler Settings)
- MUTE (Audio Delay Settings)
- BYPASS (Audio Delay Settings)

You should see "System RST...." on the front screen of the Matrix.

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Front Panel Control

Switching:

The AC-MX44/88-AUHD-HDBT can be switched from the front panel by selecting the OUTPUT button first and then selecting the INPUT button:

1. Press the button (1 through 4) on the bottom row that corresponds with the OUTPUT (Display, or Sink Device) you would like to send to a source.
2. Once pressed, the switch will illuminate the OUTPUT button that you have selected, along with the INPUT row (as pictured), indicating that it is ready for you to select the INPUT.
3. Select the desired INPUT.

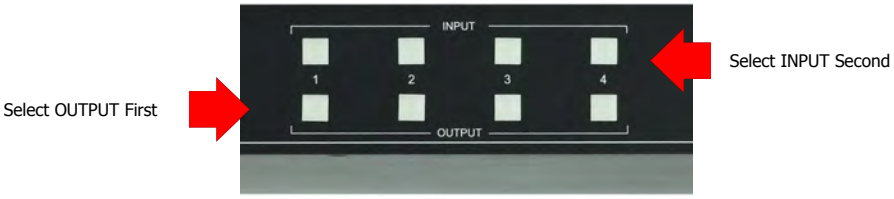

Figure 1 – Switching with the front panel controls. NOTE: Select the OUTPUT and then the INPUT.

Scaler Control:

The AC-MX44/88-AUHD-HDBT has scalers built into every output. The HDbaseT Port can be DOWNSCALED and the HDMI Port can be UPSCALED. The scalers are set on the OUTPUT side of the switch and each can have separate settings. Control the scaler:

- HD-4K (Scales 1080P to 2160P - On HDMI Port Only)
- ICT Mode (Enables ICT Compression mode on HDBT Port) - **DEFAULT**
- 4K-HD (Scales 2160P to 1080P - On HDBT Port Only)
- AUTO (Automatically detects capabilities of attached display - for HDBT Port Only)
- BYPASS (There will be no scaling set)

  NOTE: When using a non ICT receiver the unit automatically applies HDBT-C mode when ICT mode is selected, which reduces 10-18Gbps content to 9Gbps for legacy infrastructures. This mode maintains 4K resolution, but removes HDR.

The LCD Screen shows current status

STEP 1:
Press and hold the desired output you want to scale

STEP 2:
Choose the scaler mode

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Audio Binding Setup:

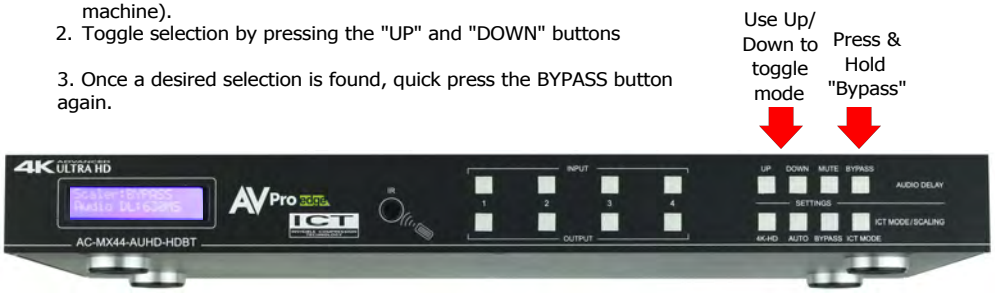
The AC-MX44/88-AUHD-HDBT can be configured to extract audio in 3 ways

- Bind to OUTPUT(Default) (See page 10)
- Bind to INPUT (See page 10)
- Matrix (See page 10)

To Set:

1. Press and hold (3 sec) BYPASS from the audio settings (top right of machine).
2. Toggle selection by pressing the "UP" and "DOWN" buttons

3. Once a desired selection is found, quick press the BYPASS button again.

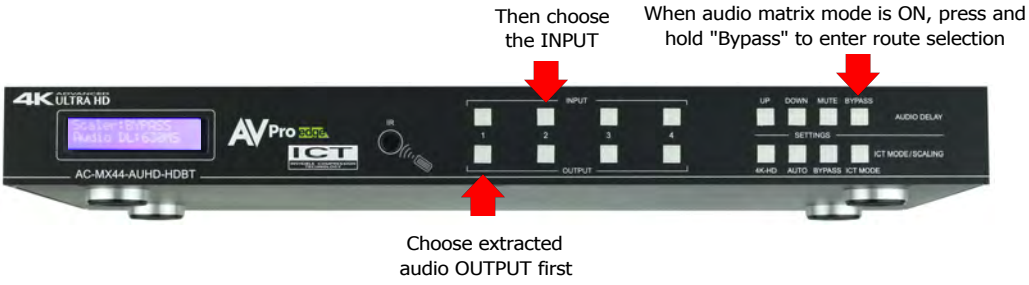


Audio Matrix Control:

Once in "Matrix" mode for audio, the extracted audio routing on the AC-MX44/88-AUHD-HDBT can be controlled from the front panel:

To Control:

1. Press and hold (3 sec) BYPASS button from the audio settings (top right of machine).
2. Make sure the screen says "Matrix" and quick press the BYPASS button again in order to enter the AUDIO MATRIX.
3. Press the desired extracted audio OUTPUT.
4. Press the INPUT for the desired audio source.
5. Quick press BYPASS button again to exit audio matrix .



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Audio Delay Control:

The AC-MX88/44-AUHD has an 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 (There will be no delay set)

*Delay settings are in increments of 90 milliseconds. Settings are: 90MS, 180MS, 270MS, 360MS, 450MS, 540MS or 630MS.

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.

STEP 2:
Choose the delay setting

The LCD Screen shows current status

STEP 1:
Press and hold the desired extracted audio output you want to delay

Audio Output Logic and Cable Prep:

You can extract audio from toslink or balance 2CH Audio. Audio outputs are an un-decoded output. This means that what goes in, is what goes out.

2CH Balanced Audio Port - Supports 2CH PCM audio only, which is ideal for 2 Channel systems and zoned audio systems. No Down-mixing see AC-ADM-AUHD or AC-ADM-COTO

Toslink Audio Port - Supports PCM, LPCM (up to 7CH), Dolby Digital, Dolby Digital Plus, DTS, DTS-HD, DTS Master Audio, which is ideal for multi-channel audio systems and older AVR's that do not support 18Gbps.

Need to down-mix for combination, uncompressed and 2CH systems? Check out the AC-ADM-AUHD and AC-ADM-COTO.

You can use balanced analog outputs in a balanced system, but you can also prep a cable as shown below to convert to a traditional 2CH unbalanced (L/R) system. You can also purchase pre-made cables (AC-CABLE-5PIN-2CH) at www.avproedge.com.

*make sure ground is always connected

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Ex-Audio Matrix Mode:

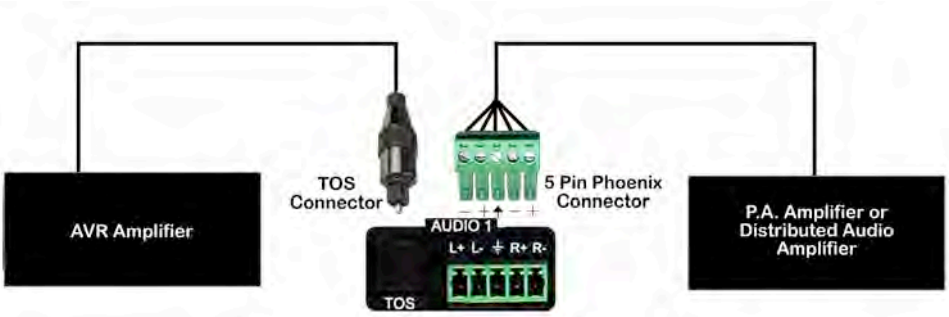
This allows the user to set a binded audio setting or set the extracted audio to Matrix. The options are:

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).

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.

Audio Wiring Diagram:



Audio Output on the AC-MX88-AUHD

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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 the captured EDID will automatically store and overwrite the EDID in "USER EDID 1" and will be applied 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 each input (or read from the display).

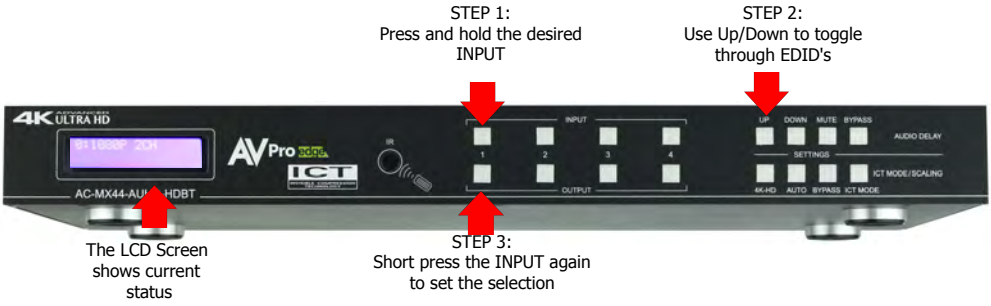
To Change the EDID setting:

1. Press and hold (for 3 seconds) the INPUT you want to change.
2. The "UP" and "DOWN" button's will illuminate (as pictured below), and the LCD will show the active EDID.
3. Toggle through the EDID options by pressing up or down repeatedly.
4. Press the "INPUT" you had selected in order to apply the EDID (this will still be illuminated).

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

1. 1080P_2CH
2. 1080P_6CH
3. 1080P_8CH
4. 1080P_3D_2CH
5. 1080P_3D_6CH
6. 1080P_3D_8CH
7. 4K30HZ_3D_2CH
8. 4K30HZ_3D_6CH
9. 4K30HZ_3D_8CH
10. 4K60HzY420_3D_2CH
11. 4K60HzY420_3D_6CH
12. 4K60HzY420_3D_8CH
13. 4K60HZ_3D_2CH
14. 4K60HZ_3D_6CH
15. 4K60HZ_3D_8CH
16. 1080P_2CH_HDR
17. 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=1-4). 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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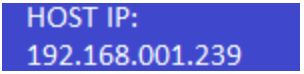
Display IP Data:

In order to see the current IP settings, press and hold (for 3 seconds) INPUT 3 and INPUT 4 buttons simultaneously. 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 toggle DHCP on and off, press and hold (for 3 seconds) the INPUT 1 and INPUT 4 buttons simultaneously.

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

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

Quick Network Connect to Web Interface:

Use the following steps to quickly and immediately connect to the matrix switch:

1. Connect the LAN port into an active router port.
2. On most networks you can simply type the Default IP address into any web browser. The Default IP Address is 192.168.1.239.

If you are on a closed network or non-standard, the following may work better when using DHCP:

1. Use an Ethernet cable to connect the LAN port on the switch to an unused, active port on the router.
2. Enable DHCP by pressing the INPUT 1 and INPUT 4 buttons simultaneously for 3 seconds.
3. Wait 5 seconds, then press and hold (for 3 seconds) the INPUT 3 and INPUT 4 buttons simultaneously. The display will show the assigned IP address.
4. Input the IP Address into any web browser.

Setting a Static IP:

- Once connected, you can use the web interface to set a static IP address.
- A static IP can also be set by using the RS-232 software or a direct command (see RS-232 below for more information).

Web Interface: Switching

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

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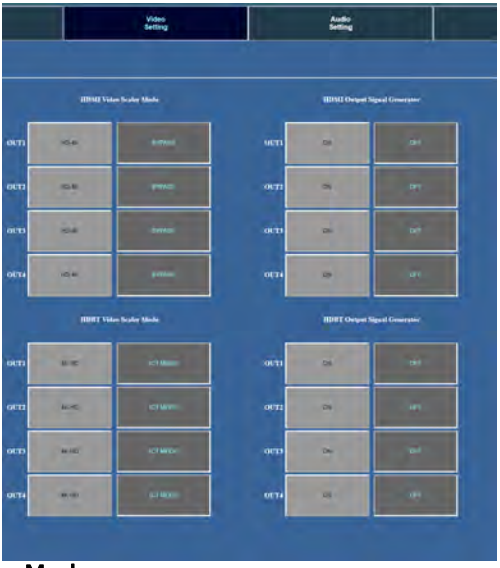
Web Interface: Video Setting



HDMI Video Scaler Modes:

With the video scaler mode, you can scale each HDMI output independently

- **BYPASS** = Bypass - Scaler is disabled (Default)
- **HD-4K** = 2K --> 4K - If the incoming signal is 1080P it will be upscaled to 4K.

HDBT Video Scaler Modes:

With the video scaler mode, you can scale each HDBaseT output independently

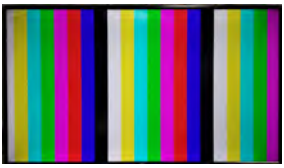
- **4K-HD** = 4K --> 2K - If incoming signal is 4K, it will be downscaled to 1080P or 1900x1200 depending on the input format.
- **ICT MODE** = ICT Mode (Enables ICT (18G) Compression mode on HDBT Port) - **DEFAULT**

Image Enhancement:

The Image Enhancement feature will add extra sharpness to edges in the image. This effect may be desirable for presentations in corporate or classroom environments. **NOTE:** Image Enhancement only works when upscaling from 2k to 4k.

- **W** = Weak - Minimum level of enhancement
- **M** = Medium - Medium level of enhancement
- **S** = Strong - Strongest setting for image enhancement
- **OFF** = None - Feature disabled

Output Signal Generator:



The Output Signal Generator will output an internally stored 1080p color bar test pattern (see the image on the right) to test infrastructure. It can be turned on and off for each output, but remember to turn it off to resume normal functionality.

Web Interface:Audio Settings

EX-Audio Delay:

This setting allows the user to change the audio delay to overcome lip-sync issues when using audio separate from HDMI. The user can choose from the above options in milliseconds. Bp = Bypass or No Delay. Delay can be different per audio output port.

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:

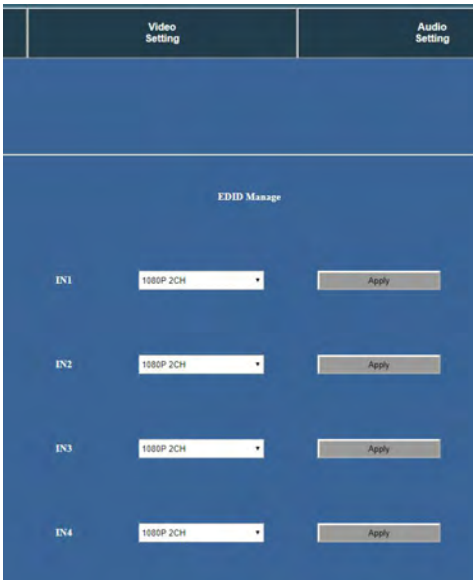
This allows the user to route the audio in a matrix fashion for the extracted audio ports.
NOTE: The Audio Matrix Function only works if "MATRIX" is selected on the right (See next explanation).

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.

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
2. 1080P_6CH
3. 1080P_8CH
4. 1080P_3D_2CH
5. 1080P_3D_6CH
6. 1080P_3D_8CH
7. 4K30HZ_3D_2CH
8. 4K30HZ_3D_6CH
9. 4K30HZ_3D_8CH
10. 4K60HzY420_3D_2CH
11. 4K60HzY420_3D_6CH
12. 4K60HzY420_3D_8CH
13. 4K60HZ_3D_2CH
14. 4K60HZ_3D_6CH
15. 4K60HZ_3D_8CH
16. 1080P_2CH_HDR
17. 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 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".

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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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Web Interface: IR Routing

IP Switch:

This allows you to route the IR Signals on the IR outputs manually if you want to fix a specific route

IR Control:

For IR Control there is an IR Window on the front face of the device.

IR Receiver Eye

IR Remote Control:

When routing HDMI, the matrix can be controlled by using the IR remote supplied with the product.

The labels on the right are the OUTPUT numbers.

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

The numbers are for selecting a desired INPUT.

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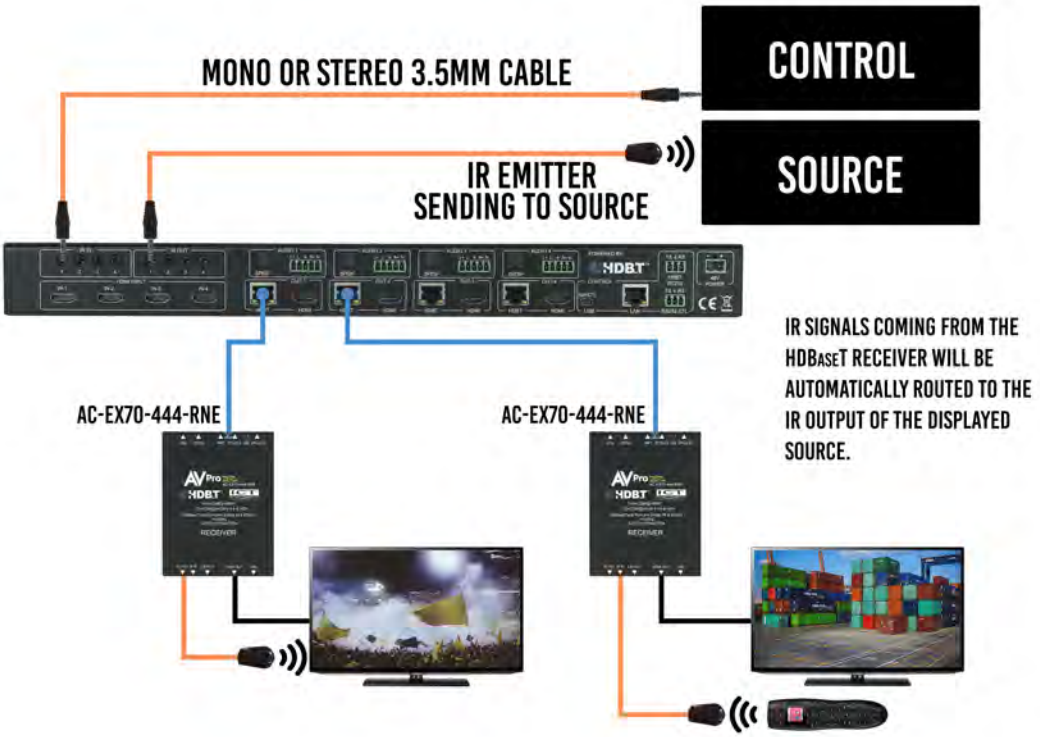
IR HDBaseT Routing:



IR NOTES (On the Matrix):

1. By default the **IR IN** is routed to the corresponding HDBaseT Output number (ie. IR IN #1 --> HDBaseT Output 1, IR IN #2 --> HDBaseT Output 2, etc...)
2. By default the **IR OUT** is automatically routed with the active source (ie. If you are watching INPUT 3 on HDBaseT OUTPUT 1, when you point a remote at an IR Receiver on the HDBaseT Rx connected the signal will be routed to IR OUT 3)
3. Each **IR IN** can be routed in any way you like (One to one or one to many) by using the command SET IRC EXT SW x1.x2.x3.x4 (See below).
4. Each **IR OUT** can be routed manually as well using the command SET IRC OUTx VS INy. This can also be controlled by the Web Interface

IR NOTES (On the HDBaseT Receiver):

1. **IR OUT** = IR Emitter for sending signals to a Display or Projector (Note - Use Provided Emitters)
2. **IR IN** = For sending IR signals back to the Matrix for switching AND to send IR signals to the IR OUT on the Matrix - by default the IR OUT on the matrix is automatically routed with the active source (ie. If you are watching INPUT 3 on HDBaseT OUTPUT 1, when you point a remote at an IR Receiver on the HDBaseT Rx connected the signal will be routed to IR OUT 3)

RS-232 Commands & Using RS232

The AC-MX44/88-AUHD-HDBT can be controlled with RS-232 commands. Some configurations can only be completed by using these commands. We recommend using MyUART software (free of charge) as it is very easy to use in order 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 set to: 57600,n,8,1 (baud: 57600, no parity, 8 data bits and 1 stop bit) with no handshaking.

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

The unified command list (ASCII) is listed below. You can get a .txt version at www.avproedge.com

To send commands to control the matrix be sure to use the "RS232-CTL" Port

8x8 has broadcast all RS232 port like the 4x4. Additionally it has one per output as well.


```
=============================================================================================================================
=**********************************************************Systems HELP*********************************************************=
=-------------------------------------------------------------------------------------------------------------------------=
=                          System Address = 00           F/W Version : 1.00                                             =
=   Azz                          :  All Commands start by Prefix System Address zz, if [01-99]                          =
=-------------------------------------------------------------------------------------------------------------------------=
=   H                            : Help                                                                                 =
=   STA                          : Show Global System Status                                                            =
=   SET RST                      : Reset to Factory Defaults                                                            =
=   SET ADDR xx                  : Set System Address to xx {xx=[00~99](00=Single)}                                     =
=   SET BAUDR x                  : Set System BaudRate to x{x=[0~5](0=9600,1=14400,2=19200,3=38400,4=57600,5=115200)}   =
=   SET CAS EN/DIS               : Set Cascade Mode Enable/Disable                                                      =
=   SET LCD ON Tx                : Set LCD Remain On Time{x=[0~3](0=Always ON,1=15,2=30,3=60Sec)}                       =
=   SET KEY LOCK ON/OFF          : Set Key Lock On/Off                                                                  =
=   GET ADDR                     : Get System Address                                                                   =
=   GET BAUDR                    : Get System BaudRate Status                                                           =
=   GET STA                      : Get System System Status                                                             =
=   GET CAS                      : Get Cascade Mode Status                                                              =
=   GET INx SIG STA              : Get Input x Signal Status{x=[0~8](0=ALL)}                                            =
=   GET LCD ON T                 : Get LCD Remain On Time                                                               =
=   GET KEY LOCK                 : Get Key Lock Status                                                                  =
=-------------------------------------------------------------------------------------------------------------------------=
=Output Setup Commands:                                                                                                 =
=   SET OUTx VS INy              : Set Output x To Input y{x=[0~8](0=ALL), y=[1~8]}                                     =
=   SET OUTx HP VIDEOy           : Set HDMI Output  VIDEO Mode                                                          =
=                                  {x=[0~8](0=ALL), y=[1,3](1=BYPASS,3=2K->4K)}                                         =
=   SET OUTx TP VIDEOy           : Set HDBT Output VIDEO Mode                                                           =
=                                  {x=[0~8](0=ALL), y=[2,5](2=4K->2K,5=ICT Mode)}                                       =
=   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)}=
=   SET EXAMX MODEx              : Set Ex-Audio Matrix Mode{x=[0~2](0=Bind To Output,1=Bind To Input,2=Matrix}          =
=   SET OUTx AS INy              : Set Ex-Audio Output x To Input y{x=[0~8](0=ALL), y=[1~8]}                             =
=   SET OUTx HP SGM EN/DIS       : Set  HDMI Output Signal Generator Enable/Disable{x=[0~8](0=ALL)}                     =
=   SET OUTx TP SGM EN/DIS       : Set  HDBT Output Signal Generator Enable/Disable{x=[0~8](0=ALL)}                     =
=   SET OUTx HP STREAM ON/OFF    : Set HDMI Output x Stream ON/OFF{x=[0~8](0=ALL)}                                      =
=   SET OUTx TP STREAM ON/OFF    : Set HDBT Output x Stream ON/OFF{x=[0~8](0=ALL)}                                      =
=   GET OUTx VS                  : Get Output x Video Route{x=[0~8](0=ALL)}                                             =
=   GET OUTx HP VIDEO            : Get HDMI Output x Video Mode{x=[0~8](0=ALL)}                                         =
=   GET OUTx TP VIDEO            : Get HDBT Output x Video Mode{x=[0~8](0=ALL)}                                         =
=   GET OUTx HP EDID DATA        : Get HDMI Output x EDID DATA{x=[1~8]}                                                 =
=   GET OUTx TP EDID DATA        : Get HDBT 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)}                                     =
=   GET EXAMX MODE               : Get Ex-Audio Matrix Mode                                                             =
=   GET OUTx AS IN               : Get  Output x  Ex-Audio Route{x=[0~8](0=ALL)}                                        =
=   GET OUTx HP SGM              : Get  HDMI Output Signal Generator Enable/Disable Status{x=[0~8](0=ALL)}              =
=   GET OUTx TP SGM              : Get  HDBT Output Signal Generator Enable/Disable Status{x=[0~8](0=ALL)}              =
=   GET OUTx HP STREAM           : Get HDMI Output x Stream ON/OFF Status{x=[0~8](0=ALL)}                               =
=   GET OUTx TP STREAM           : Get HDBT Output x Stream ON/OFF Status{x=[0~8](0=ALL)}                               =
```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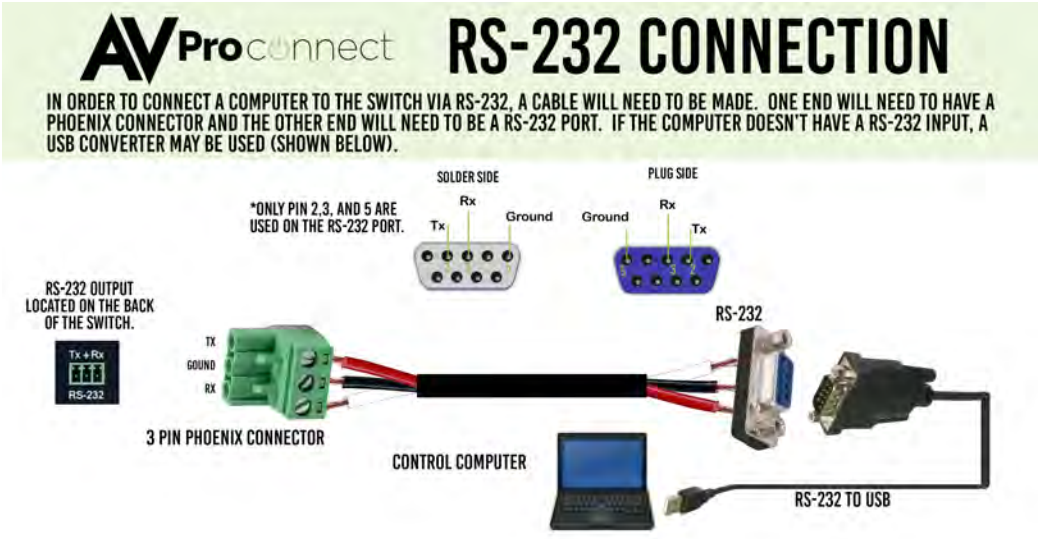
RS-232 Commands cont.:

```
=Input Setup Commands:                                                                                         =
=   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:USER1_EDID                   31:USER2_EDID                  32:USER3_EDID     =
=   SET INx EDID CY OUTy HP     : Copy HDMI Output y EDID To Input x(USER1 BUF){x=[0~8](0=ALL), y=[1~8]}     =
=   SET INx EDID CY OUTy TP     : Copy HDBT 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]}                                   =
=--------------------------------------------------------------------------------------------------------------=
=Network Setup Command: ( xxx=[000-255], zzzz=[0001~9999]                                                     =
=   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 Route Setup Command:                                                                                       =
=   SET IRT OUTx IS INy         : Set Output x IR Route{x=[0~8](0=all),y=[1~8]}                               =
=   SET LIR EXT SW x1.x2.x3.x4.x5 : Set Local IR Extender Switch{x1~x8=[0,1](0=Disable,1=Enable)}             =
=                 .x6.x7.x8     :                                                                             =
=   SET CIR EXT SW x1.x2.x3.x4.x5 : Set Callback IR Extender Switch{x1~x8=[0,1](0=Disable,1=Enable)}          =
=                 .x6.x7.x8     :                                                                             =
=   GET IRT OUTx IS             : Get Output x IR Route{x=[0~8](0=all)}                                       =
=   GET LIR EXT SW              : Get Local IR Extender Switch Status                                         =
=   GET CIR EXT SW              : Get Callback IR Extender Switch Status                                      =
=--------------------------------------------------------------------------------------------------------------=
=RS232 Route Setup Command:                                                                                    =
=   SET RS CHy MUX x1.x2.x3.x4.x5 : Set the RS232 MUX{y=[1-8],x1~x8=[0-1](0=Disable,1=Enable)}                =
=                 .x6.x7.x8     :                                                                             =
=   SET RS PTH OUTx LENy BRz    : Set RS232 Control Pass Through to Outputx                                   =
=                                 {x=[0-8](0=ALL),y=[1~800],z=[0~5](0=9600,1=14400,2=19200,3=38400,4=57600,5=115200)} =
=   GET RS CHx MUX              : Get the RS232 MUX Status{x=[0~8](0=all)}                                    =
=--------------------------------------------------------------------------------------------------------------=
=IR Code Setup Command:                                                                                        =
=   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]}                               =
=   GET IR SYS                  : Get IR Custom Code                                                          =
=   GET IR OUTx INy CODE        : Get IR Data Code                                                            =
=--------------------------------------------------------------------------------------------------------------=
=**************************************************************************************************************=
================================================================================================================
```

RS-232 Wiring Diagram:



RS-232 to HDBaseT Output Receivers:

RS232 Broadcast Mode:

RS232 Broadcast Mode is a very simply way to implement things like "ALL ON" and "ALL OFF" for displays in a system. Broadcast Mode allows you simply pass RS232 signals through without having to use advanced routing details like baud rate. To send broadcast RS232 commands you must simply plug into the "HDBT" RS232 port and send the commands there.

NOTE: For Broadcast Mode baud rate does not matter, this will be set by the device sending the RS232 Signal (i.e Control Processor) - RS232 command is sent to ALL open ports.

For Advanced RS232 Routing see the RS232 section later in the manual

Broadcast RS232 commands to all HDBaseT Outputs

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Device Addresses When Using Serial Communication:

NOTE: Only set device address when cascading multiple units together and using RS232 as your control method! You also have to send the device address when doing advanced routing while sending commands by serial (next page) even if it is default "A00". You NEVER use device addresses when using IP control or TELNET

When using serial communication it is good to be aware of the devices "Address" You will want to know the device address as this will determine which unit will receive a command.

All devices are addressed "A00" by default and if you are using just one device you do not need to place this in front of the serial command.

EX1: If you have a standalone unit and are using serial control you can just send a command without the address:

"SET OUT1 VS IN3" ----This will set Output 1 to Input 3

EX2: If you have two units in a "stack" you have to label them A01 and A02, so a command will look like:

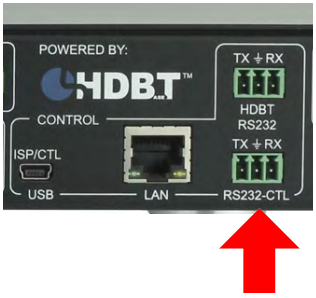
"A02SET OUT1 VS IN3" ----This will set Output 1 to Input 3 ON SWITCH TWO. Also, please note that there is no "space" between the address and the command

To set and device address you can use the PC Control Software or send the command "SET ADDR xx" (xx = 01 through 99)

Advanced RS232 Routing:

In addition to doing RS232 "Broadcast" (Described in the beginning of the manual) you can route RS232 commands to a single specific output. This allow for finite control of displays and the ability to create specific zones. You can send advanced routing commands:

1. By directly plugging a serial cable into the "RS232-CTL" port on the switch. Sending Telnet commands via the LAN Port.



To do Advanced Routing, send RS232 signals here

OR

Send TELNET Commands through LAN

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How to route RS232 Commands when using serial:

The routing command is very straight forward but you have to take care to make sure you format it correctly. The main thing to consider before you begin:

1. You are actually sending 2 commands (route & device command) so depending on what you are using to send the command the format varies slightly - We show some examples below.
2. You have to know the baud rate of the device you are sending the command to.
3. For "hybrid" ASCII commands, you may have to convert the numbers to the decimal value.

Ex: If the command is "ka 00 01" you only send "ka 0 1"

The Command:

The fist command is your "route" and it looks like this: **AxxSET RS PTH OUTx LENx BRx**

A = Device Address (use this even if using a single unit, just put 00)
OUT = The Output you want to route the forthcoming command to
LEN = Forthcoming command length - for ASCII this includes EVERY character including spaces. For HEX it includes only the BYTE count.

Ex1: If the ASCII command is "ka 0 1" the length is 6. Count spaces. NOTE: You can exceed the length by 2 if unsure. If you exceed the length by more than 2 it will not work.

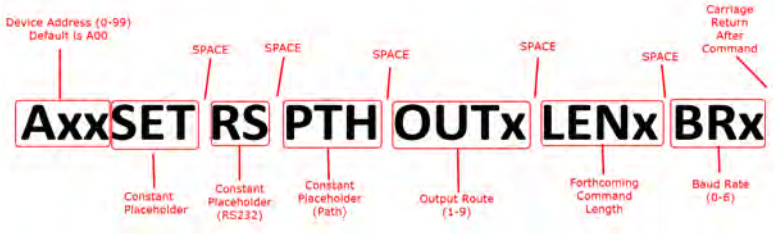
Ex2: If HEX command is "6B 68 20 30 20 31" the length is 6. Do not count spaces. Again, you can exceed by 2.

BR = Baud Rate of the device you are sending to - You use a single digit to replace "x" and they are:

0 - 9600
1 - 14400
2 - 19200
3 - 38400
4 - 57600
5 - 115200

There is a carriage return immediately following this command.

After this command you immediately follow it with the command you want to send to the device (no spaces). That command it then followed by another carriage return.



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Command Examples:

Using A Terminal Program (RS232):

In the following example we are using a program called MYUART Assist. We make this program freely available form www. .com.

You will notice in the example that it is on 2 lines. This is because you have to separate the commands with a return.

The command below was sent through the HDBaseT Rx on Output 5 to successfully "Power On" a LG TV.

The firmware will send a command acknowledgment at 57600 to the extender. This shows up as "RS DEV MUX 0.0.0.0.0.0.0.0.0.0”, if the end device is receiving at 57600. The Matrix itself also sends an acknowledgment commands SET RS PTH OUT5 LEN10 to confirm the rout was set and command sent.

Using TELNET (IP):

You can also send these commands by TELNET. When sending TELNET you **do not** send the "Axx" portion of the command. Here is an example command that has been tested:

Green = Route Command

Red = Command to be sent to device

"\rSET RS PTH OUT3 LEN10 BR0\r\n\rka 0 1\n\r\r”

This example will send the string “\n\rka 0 1\n\r” at 9600 baud to the extender on output #3.

Note that “\n" and “\r" need to be replaced by the literal newline (\n) and carriage-return (\r) characters (hex 0x0a 0x0d). How this is done is dependent on what the control system does, later you see examples form On Controls that uses HEX for commands. The leading and trailing “\r” are for the 9x9 firmware to be able to sync and parse the command correctly. The leading and trailing \n\r are for the end device to be able to parse the command. Because we added 2 characters on each end of the string, I also added 4 to the overall length.

The firmware will send a command acknowledgment at 57600 to the extender. This shows up as "RS DEV MUX 0.0.0.0.0.0.0.0.0.0”, if the end device is receiving at 57600. The Matrix itself also sends an acknowledgment commands SET RS PTH OUT5 LEN10 to confirm the rout was set and command sent.

Using TELNET (IP): On Controls Examples

Green = Route Command

Red = Command to be sent to device

This first example is when sending an ASCII Command

\x0DA01SET RS PTH OUT1 LEN17 BR4\x0D\x0A\x0DSET OUT4 VS IN5\x0A\x0D\x0D

You can also convert to pure HEX and send a command this way:

\x0A\x41\x30\x31\x53\x45\x54\x20\x52\x53\x20\x50\x54\x48\x20\x4F\x55\x54\x31\x20\x4C\x45\x4E
\x31\x37\x20\x42\x52\x34\x0D\x0A\x53\x45\x54\x20\x4F\x55\x54\x32\x20\x56\x53\x20\x49\x4E\x32
\x0D\x0A

A hybrid ascii-hex combo:

Notice one less carriage return at the end of the string - because the device we were sending to did not require a carriage return at the end of the command:

\x0DSET RS PTH OUT1 LEN13 BR5\x0D\x0A\x0D\xAA\x02\x00\x07\x00\x00\x00\x00\x10\x03\x00\x3A
\x0A\x0D

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▪ Maintenance

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.

- 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.
- Do not operate these products outside the specified temperature and humidity range given in the above specifications.
- Ensure there is adequate ventilation to allow this product to operate efficiently.
- Repair of the equipment should only be carried out by qualified professionals as these products contain sensitive components that may be damaged by any mistreatment.
- Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.
- Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzene to clean this unit.

▪ Damage Requiring Service

The unit should be serviced by qualified service personnel if:

- The DC power supply cord or AC adaptor has been damaged
- Objects or liquids have gotten into the unit
- The unit has been exposed to rain
- The unit does not operate normally or exhibits a marked change in performance
- The unit has been dropped or the housing damaged

Safety Instructions:

To ensure reliable operation of this product and to protect the safety of any person(s) 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 that it's connected to.
2. Do not operate this product 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 equipment that may be damaged by mistreatment.
5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with this product.
6. Due to the weight and physical size of this matrix switch, correct handling and lifting should be observed at all times in order to minimize the risk of injury.

After Sale Service

1. Should you experience any problems while using this product, first, 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 issue and any conditions under which the issue is occuring.
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 issues you may have to your local dealer before contacting AVProEdge.

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Thank you for choosing AVProEdge!

Please contact us with any questions. We are happy to be of service!

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