CPLUS-V1616

16×16 Modular Matrix Chassis with System Control Card

Operation Manual

DISCLAIMERS

The information in this manual has been carefully checked and is believed to be accurate. Cypress Technology assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Cypress Technology assumes no responsibility for any inaccuracies that may be contained in this document. Cypress also makes no commitment to update or to keep current the information contained in this document.

Cypress Technology reserves the right to make improvements to this document and/or product at any time and without notice.

COPYRIGHT NOTICE

TRADEMARK ACKNOWLEDGMENTS

All products or service names mentioned in this document are trademarks of the companies with which they are associated.

SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply. Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

VERSION HISTORY

REV.	DATE	SUMMARY OF CHANGE
RDV1	2019/04/16	Preliminary release
RDV2	2020/06/11	Updated format & added HDBaseT card content

CONTENTS

1. INTRODUCTION

This is a 16×16 Modular Matrix Chassis with four high-bandwidth input card slots, four high-bandwidth output card slots, and a system control card slot. A variety of I/O cards are available, and each standard card, input or output, is equipped with multiple audio/video ports and is capable of handling up to four independent 18Gbps video signals simultaneously. An additional, full bandwidth, HDMI input and output are provided on the included control card which are ideal for connection to a test signal generator and local confidence monitor.

The backplane cross-point can handle a maximum standard I/O configuration of 17×17 (including the CPU Control Card's ports). 4K UHD^{+} video sources, up to and including 4K@60Hz (4:4:4, 8-bit) as well as 10/12-bit sources with HDR are fully supported. All ports support up to 7.1 channel LPCM digital audio as well as Bitstream and HD Bitstream audio formats. I/O cards using the HDMI interface (HDMI 2.0, HDCP 2.2) and HDBaseT (both with and without AVLC) are available now and additional I/O cards supporting other signal formats and features are under development.

The chassis is powered by a pair of high-quality, hot-swappable, load sharing power supplies with an integrated failure alarm system ensuring that mission critical installations can stay online 24/7. Control is via front panel buttons with an LCD menu, WebGUI, Telnet or RS-232.

2. APPLICATIONS

- Residential or Commercial AV matrix installations
- Security systems
- University lecture halls
- Retail point of sale installations

3. PACKAGE CONTENTS

- 1× 16×16 Modular Matrix Chassis
- 1× System Control Card (Pre-installed)
- 1× 3.5mm to IR Extender cable
- 1× 3.5mm to IR Blaster Cable
- 2× Power cord
- 1× Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI source equipment such as a media player, video game console, PC, or set-top box
- HDMI receiving equipment such as an HDTV, monitor, or audio amplifier
- A minimum of one Input Card and one Output Card (see below) is highly recommended.

4.1 Available I/O Cards

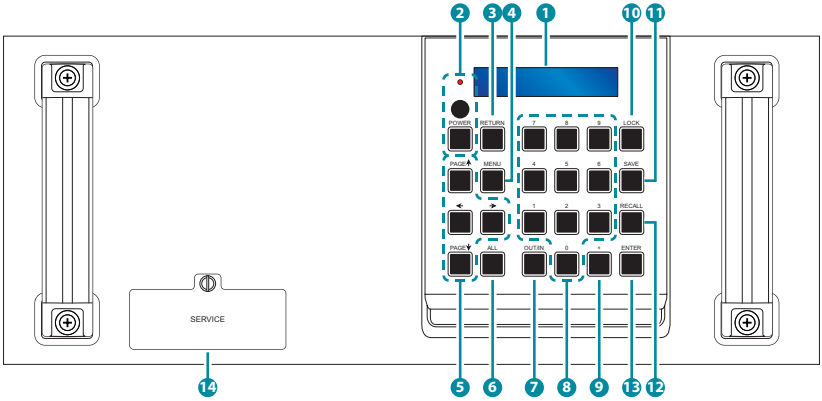
- 4-Port HDMI Input Card
- 4-Port HDMI Output Card
- 4-port HDBT Input Card
- 4-Port HDBT Output Card
- 4-Port HDBT with AVLC Input Card
- 4-Port HDBT with AVLC Output Card
- Additional input and output cards are under development!

5. FEATURES

- Input and output card slots support 18Gbps, 4K UHD+ with HDR signals
- HDCP 1.x and 2.2 compliant
- 8 high-bandwidth card slots (4 dedicated input slots, 4 dedicated output slots) with a maximum matrix configuration of 17×17
- 1 system control card slot (with support for 1 high-bandwidth input port and 1 high-bandwidth output port)
- System Control Card's HDMI ports support UHD+ resolutions up to 3840×2160@60Hz (4:4:4, 8-bit)
- System Control Card's HDMI ports support 4K HDR at 24Hz (4:4:4) and 60Hz (YUV 4:2:0) with up to 12-bit color
- System Control Card's HDMI ports support 12-bit Deep Color up to 1080p@60Hz
- System Control Card's HDMI ports support pass-through of audio formats including LPCM (Up to 8 channels) Bitstream, and HD Bitstream
- Advanced EDID Management for rapid integration of sources and displays
- Field updatable firmware
- 3U rack mounted design
- 2 hot-swappable, load sharing, redundant power supplies
- Integrated component failure alarm system
- Many available I/O card types with more under development
- Control via front panel buttons with LCD menu, Ethernet (Telnet & WebGUI), and RS-232

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel

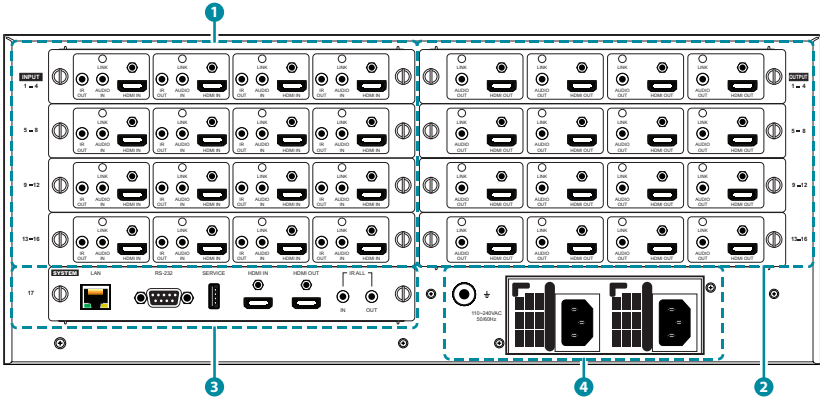


1. **OLED Window:** Displays the unit's menu, settings and information.
2. **POWER Button and LED:** Momentarily press this button to power the unit on (green LED) or place it into standby mode (orange LED). Press and hold the button for 3 seconds to power the unit completely off (red LED).

   Note: In Standby mode, the fans will continue to run in low-power mode and network/RS-232 communication is still available. When powered off, all functionality, including network and RS-232 connectivity, is disabled.
3. **RETURN Button:** Press this button to return to the previous menu screen when in a front panel menu.
4. **MENU Button:** Press to enter the OLED menu, or to exit from the menu completely.
5. **PAGE (▲/▼/◄/►) Buttons:** Press to move up and down or adjust selections within the OLED menus. While not in a menu, pressing left or right will toggle between displaying the current video and audio routing selections. Pressing up or down will step through the display pages of the currently selected routing type.
6. **ALL Button:** Press this button to initiate the routing selection menu for assigning a single input to all outputs. After keying in the preferred input number, press the "Enter" button to activate the new routes.

7. **OUT/IN Button:** Press this button to initiate the routing selection menu for assigning a single input to one or more outputs. The first press allows keying in the preferred output, a second press allows keying in the preferred input. Additional presses toggle between output and input. Multiple outputs can be entered by using the “+” key between each output number. After keying in the preferred input and output numbers, press the “Enter” button to activate the new routes.
8. **0~9 Buttons:** Use these buttons when numerical input is needed within a menu.
9. **PLUS (+) Button:** Press this button to add a “+” between additional output numbers when routing an input to multiple outputs in the OUT/IN routing menu.
10. **LOCK Button:** Press this button to toggle the front panel button lockout function. The OLED will display a message if the front panel lock is active and a button is pressed.
11. **SAVE Button:** Press this button activate the Preset Save menu to store the current routing configuration. After activating the menu, key in a preset number (1~16) to use and then press the “Enter” button to save using that preset slot.
12. **RECALL Button:** Press this button activate the Preset Recall menu to recall a previously stored routing configuration. After activating the menu, key in a preset number (1~16) to recall and then press the “Enter” button to activate that preset.
13. **ENTER Button:** Press to confirm a selection within the OSD or to go deeper into a menu item. Pressing this button when not in a menu will open the routing selection menu.
14. **SERVICE Panel:** This panel covers an Ethernet port and USB port that are for factory use only.

6.2 Rear Panel



1. **INPUT 1~16 Card Slots:** These four high bandwidth card slots accept a variety of specially designed video input cards. Each card typically has 4 primary inputs along with additional auxiliary I/O ports as needed.

   Note: Video input cards are supplied separately. Please consult each individual card type's manual for more detailed information.

2. **OUTPUT 1~16 Card Slots:** These four high bandwidth card slots accept a variety of specially designed video output cards. Each card typically has 4 primary outputs along with additional auxiliary I/O ports as needed.

   Note: Video output cards are supplied separately. Please consult each individual card type's manual for more detailed information.

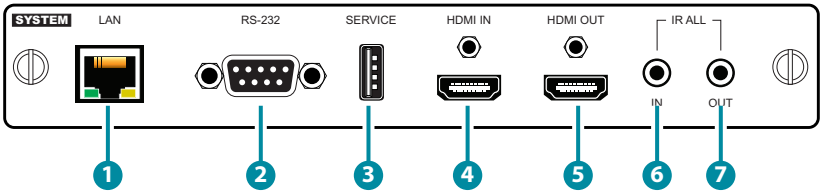
3. **SYSTEM Card Slot:** The card in this card slot controls all functions of the modular matrix and provides ways to externally control the unit via RS-232 or Ethernet. In addition to control, this card also provides a set of global IR I/O ports and an extra HDMI input and HDMI output which can be used for routing or local monitoring/testing.

   Note: This card comes pre-installed in the Modular Matrix Chassis.

4. **Redundant Power Supply Modules:** Plug AC power cords into both power supply modules and connect them to an AC wall outlet for power. The LEDs will illuminate green to indicate the modules are receiving power and functioning normally. These redundant power supplies operate in parallel and are hot-swappable to provide mission critical reliability.

   Note: While the unit can operate with only a single power supply, a "power supply failure" alarm will continuously sound until a properly functioning second power supply module is installed and powered on.

6.3 System Control Card



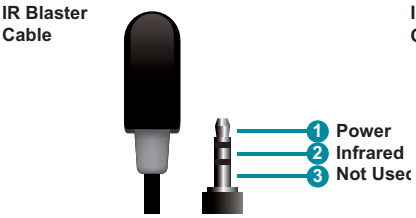
1. **LAN Port:** Connect directly, or through a network switch, to your PC/laptop to control the unit via Telnet/WebGUI.
2. **RS-232 Port:** Connect directly to a PC, laptop, or other serial control device to send RS-232 commands to control the unit.
3. **SERVICE Port:** This port is reserved for firmware update use only.
4. **HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box.

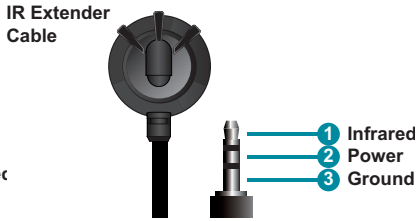
   Note: This port is identified as HDMI input 17. Video sources up to 18Gbps are supported, however the EDID is locked to 1080p60 with 2 channel LPCM.
5. **HDMI OUT Port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.

   Note: This port is identified as HDMI output 17.
6. **IR ALL IN Port:** Connect to an IR Extender to receive IR control signals to be routed to all available IR Outputs on the unit. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
7. **IR ALL OUT Port:** Connect to an IR Blaster to transmit IR signals from all IR Input ports on the unit to devices within direct line-of-sight of the IR Blaster.

   Note: To avoid potential IR signal corruption, please only send IR commands from a single IR remote at a time.

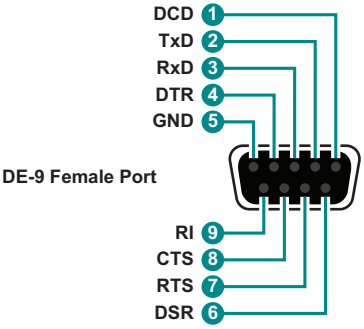
6.4 IR Cable Pinouts





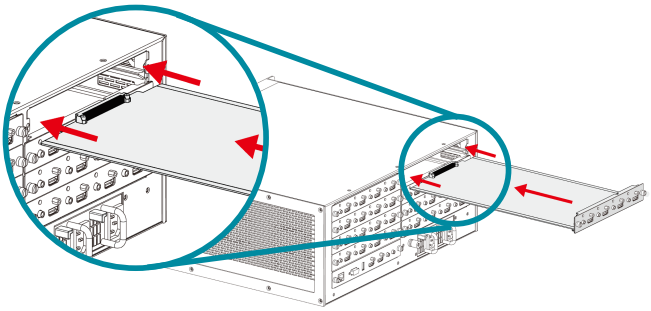
6.5 RS-232 Pinout and Defaults

Serial Port Default Settings	
Baud Rate	19200
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None



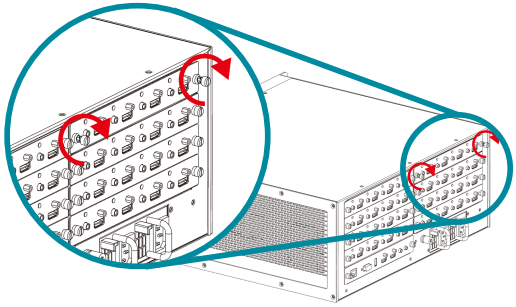
6.6 Card Installation

When installing cards, the unit should be powered off completely (not in standby mode). To install one or more cards into a Modular Matrix Chassis with available high-bandwidth card slots, please follow these steps:



(1) Card Insertion: Identify an available, and appropriate card slot for the card type. Input cards must be installed in the left hand slots and output cards must be installed in the right hand slots. Line both sides of the card up with the alignment grooves of the card slot and gently slide the card into the slot until the front panel of the card is flush with the case.

Note: Excessive force should not be used when inserting the card.

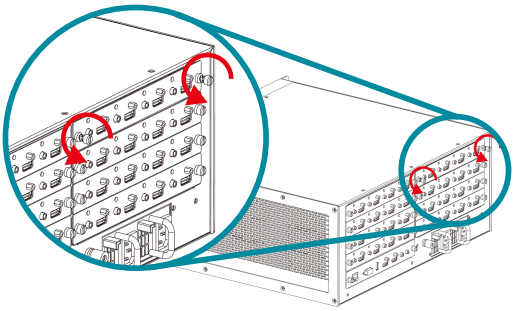


(2) Lock Card: Once the card has been firmly and snugly inserted into the card slot, tighten both thumbscrews by turning them clockwise. The card is now ready to be used. Once all cards have been installed, the unit may be powered on.

Note: Be careful to not overtighten the thumbscrews as this could damage the screw threads.

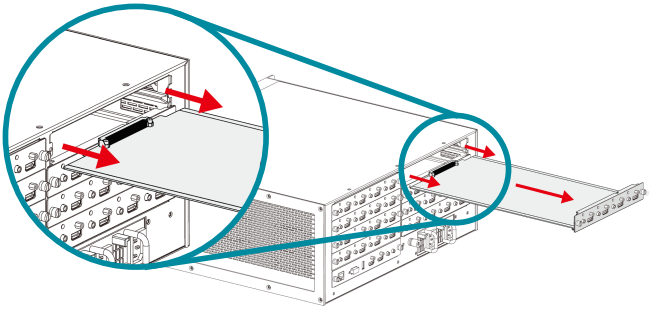
6.7 Card Extraction

When extracting cards, the unit should be powered off completely (not in standby mode). To remove one or more cards from a standard Modular Matrix Chassis, please follow these steps:



(1) Unlock Card: Loosen both thumbscrews by turning them counter-clockwise until they are completely free of the chassis and can be wiggled around freely.

Note: The thumbscrews are connected to the card with a retention mechanism and will not come completely free when they have been unscrewed from the chassis.



(2) Card Extraction: Once the card's thumbscrews have been loosened, gently slide the card straight out of the slot using the thumbscrews as handles. Once the card has been completely removed, be sure to store it in safe, and static free, location.

Note: Excessive force is not required to remove a card. If the card does not come out easily, re-verify that both thumbscrews have been completely unscrewed from the chassis before trying again.

6.8 OLED Menu

All primary functions of this unit can be controlled by using the front panel's OLED menu which is accessed by pressing the MENU button on the front of the unit. Use the PAGE (▲/▼/◄/►) Buttons, RETURN and ENTER buttons to navigate the OLED menu. Press the RETURN button to back out from any menu item or press the MENU button again to completely close the menu. While not in a menu, pressing left or right will toggle between displaying the current video and audio routing selections. Pressing up or down will step through the display pages of the currently selected routing type.

MAIN MENU
1. IPConfig
2. Preset
3. EDID
4. OSD Mode
5. Firmware Version
6. Fadefault

The individual functions of the OSD will be introduced in the following section. Items marked in BOLD are the factory default settings.

1. IPCONFIG	
2ND LEVEL	**3RD LEVEL**
IP Address	[Displays current IP address]
Netmask	[Displays current netmask]
Gateway	[Displays current gateway address]
MAC Address	[Displays MAC address]

1) **IP Config Menu:** Details about the unit's current IP configuration as well as the unit's MAC address are displayed here.

2. PRESET	
2ND LEVEL	**3RD LEVEL**
Recall Preset	[Numerical Entry]
Save Preset	[Numerical Entry]

1) **Recall Preset:** Allows a previously saved routing preset to be recalled. Enter the number of the preferred preset using the number keys and then press “ENTER” to recall the preset.
2) **Save Preset:** Saves the unit’s current routing configuration as a preset with the specified number. Enter the preferred preset number to save using the number keys and then press “ENTER” to save the preset.

   Note: Up to 16 presets may be saved.

3. EDID		
2ND LEVEL	**3RD LEVEL**	**4TH LEVEL**
IN: 1~16 MODE: 1~38	Set In X EDID N	In: [Numerical Entry]
		Mode: [Numerical Entry]
	Set In All EDID N	N: [Numerical Entry]

1) **Set In X EDID N:** Allows setting the preferred EDID to use with one or more inputs. Enter the input number in the top line next to the “IN:” prompt. (If you wish to assign an EDID to multiple inputs at once, use the “+” character between each input number.) Next, use the arrow keys to move to the second line and enter the number of the EDID to use next to the “MODE:” prompt. After all numbers have been entered, press “ENTER” to activate the new EDID.
2) **Set In All EDID N:** Allows assigning a single EDID to all inputs simultaneously. Enter the number of the EDID to use next to the “N:” prompt and then press “ENTER” to activate the new EDID.

   Note: In most cases, assigning a new EDID to an input will cause the affected input to briefly blink out while the source adapts to the new information.

This unit provides the following 38 EDID choices:

#	Default EDIDs	
1	**FHD/2CH**	1920×1080p@60Hz (4.95Gbps) & 8-bit color with LPCM 2.0
2	**FHD/MCH**	1920×1080p@60Hz (4.95Gbps) & 8-bit color with LPCM 7.1 & Bitstream
3	**UHD/2CH**	3840×2160p@30Hz (10.2Gbps) & Deep Color (8/10/12-bit) with LPCM 2.0
4	**UHD/MCH**	3840×2160p@30Hz (10.2Gbps) & Deep Color (8/10/12-bit) with LPCM 7.1 & Bitstream
5	**UHD+/2CH**	3840×2160p@60Hz (18Gbps) & Deep Color (8/10/12-bit) with LPCM 2.0
6	**UHD+/MCH**	3840×2160p@60Hz (18Gbps) & Deep Color (8/10/12-bit) with LPCM 7.1 & Bitstream

#	User EDIDs	#	Sink EDIDs
7	User EDID 1	23	Output 1 Sink
8	User EDID 2	24	Output 2 Sink
9	User EDID 3	25	Output 3 Sink
10	User EDID 4	26	Output 4 Sink
11	User EDID 5	27	Output 5 Sink
12	User EDID 6	28	Output 6 Sink
13	User EDID 7	29	Output 7 Sink
14	User EDID 8	30	Output 8 Sink
15	User EDID 9	31	Output 9 Sink
16	User EDID 10	32	Output 10 Sink
17	User EDID 11	33	Output 11 Sink
18	User EDID 12	34	Output 12 Sink
19	User EDID 13	35	Output 13 Sink
20	User EDID 14	36	Output 14 Sink
21	User EDID 15	37	Output 15 Sink
22	User EDID 16	38	Output 16 Sink

4. OSD MODE	
2ND LEVEL	3RD LEVEL
OSD Mode?	**OFF**
	On

1) **OSD Mode:** Enables or disables the informational OSD on all outputs. The following information will be displayed on each output: The output's number, currently routed input, signal details, and the unit's current IP address.

   Note: No information will be displayed on outputs that do not have valid source signals routed to them.

5. FIRMWARE VERSION	
2ND LEVEL	3RD LEVEL
[Displays the current firmware version]	

1) **Firmware Version:** Displays the unit's current firmware version.

6. FADEFAULT	
2ND LEVEL	3RD LEVEL
Factory Default?	**NO**
	Yes

1) **Factory Default:** Selecting "Yes" will perform a factory reset and return the unit to its factory default state. After the reset is complete, the unit will reboot automatically.

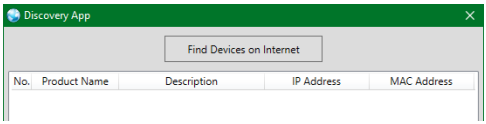
6.9 WebGUI Control

- **Device Discovery**

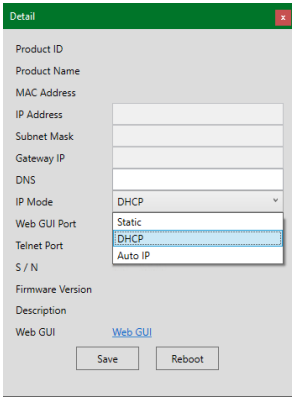
Please obtain the “Device Discovery” software from your authorized dealer and save it in a directory where you can easily find it.

Connect the unit and your PC/Laptop to the same active network and execute the “Device Discovery” software. Click on “Find Devices on Internet” and a list of devices connected to the local network will show up indicating their current IP address.

Note: This unit defaults to DHCP mode. The current IP address can be verified using the OSD or front panel if the Device Discovery software is not available.



By clicking on one of the listed devices you will be presented with the network details of that particular device.

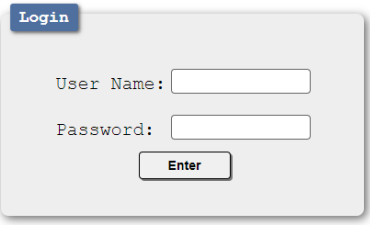


1) **IP Mode:** If you choose, you can alter the static IP network settings for the device, or switch the unit into DHCP mode to automatically obtain proper network settings from a local DHCP server. To switch to DHCP mode, please select DHCP from the IP mode drop-down, then click “Save” followed by “Reboot”.
2) **WebGUI Hotkey:** Once you are satisfied with the network settings, you may use them to connect via Telnet or WebGUI. The network information window provides a convenient link to launch the WebGUI directly.

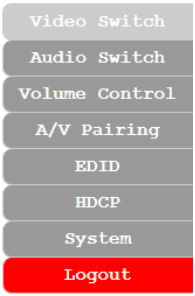
- **WebGUI Overview**

After connecting to the WebGUI's address in a web browser, the login screen will appear. Please enter the appropriate user name and password then click "Submit" to log in.

Note: The default user name and password is "admin".



On the left side of the browser you will see the following menu tabs where all primary functions of the unit are controllable via the built in WebGUI. The individual functions will be introduced in the following sections.



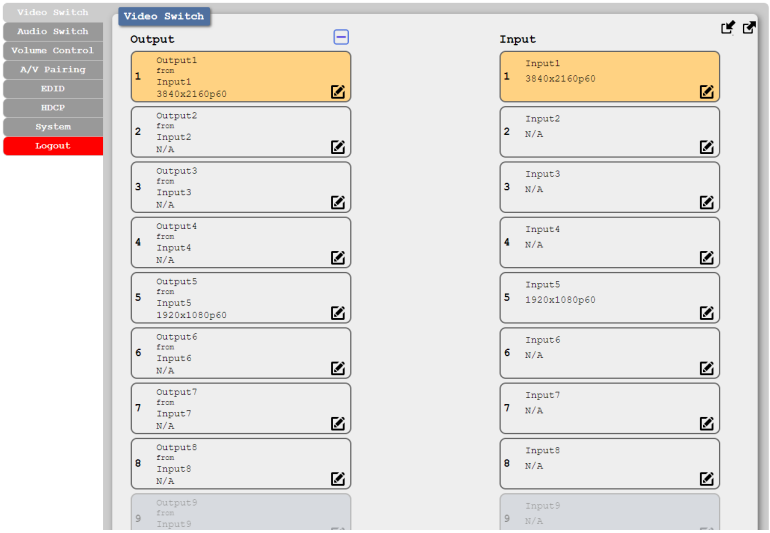
Clicking the red "Logout" tab will automatically log the currently connected user out of the WebGUI and return to login page.

Note: The standard matrix chassis only ships with a System Card preinstalled. The following pages assume that the unit has a set of HDMI and HDBaseT Input and Output Cards installed to demonstrate the capabilities of the matrix. Due to the modular nature of this unit, individual user configurations may not match the example configuration presented here. Please refer to the manuals included with the cards installed in your system for additional information.

6.9.1 Video Switch Tab

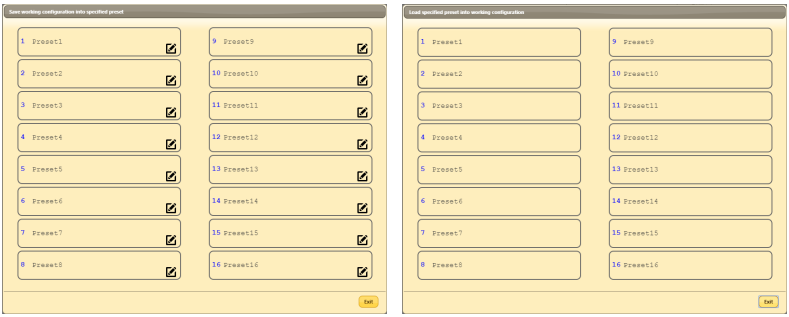
This tab provides A/V routing control, preset management, and I/O renaming options. To assign a new A/V route, please click the button of the output you wish to route a source to on the left and then click on the button of the preferred input port on the right. Selection of multiple outputs simultaneously is possible and clicking on the “Select All” icon (⊟) will automatically select all available outputs. As you select each button they will become yellow. The new route will become active immediately and the routing information displayed on the buttons will change accordingly.

Note: The number of available inputs/outputs will vary depending on how many, and what type of, input/output cards have been installed. Unavailable ports will be greyed out.



1) **Video Switch:**

- **Output:** Buttons for selecting the output (up to 17) to route A/V inputs to. Details about the output names and currently selected input are also displayed here. Clicking on the “Select All” icon (⊟) will select all available outputs. Clicking on the “edit” icon (✎) opens up the Edit Output window for the specific output which allows for changing the output’s name.
- **Input:** Buttons for selecting the input to route to the selected output(s). Detail about the input names and signal information is also displayed here. Clicking on the “edit” icon (✎) opens up the Edit Input window for the specific input which allows for changing the input’s name.



This unit can store up to 16 routing presets. Presets can be utilized to store multiple different routing states in advance for rapid, hassle-free, recall.

2) **Save Working Configuration:** Once you have the routing set the way you like, you can click the “Save Preset” icon ( ) in the upper right corner of the tab to open the Save Working Configuration window. Click on the preferred Preset button when you are ready to commit the preset to memory. You may also rename the preset at this stage by selecting the “edit” icon ( ).

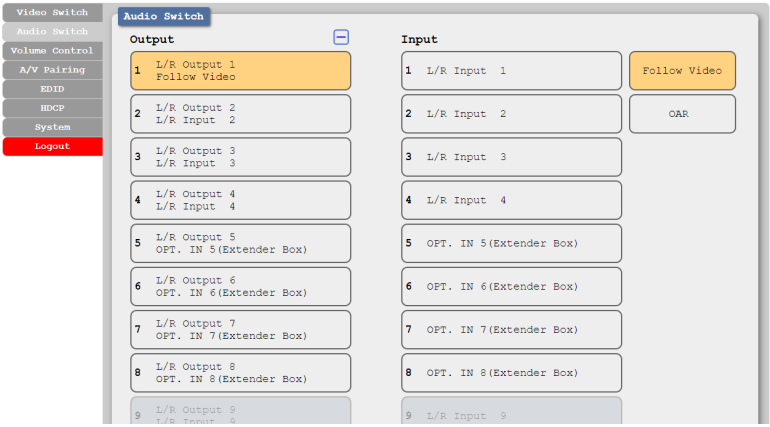
3) **Load Preset:** When you wish to load a previously stored preset, please click the “Load Preset” icon ( ) and you will be presented with a choice of the available presets. The preset will load immediately upon selecting the button.

6.9.2 Audio Switch Tab

This unit offers analog audio routing and digital to analog audio extraction (LPCM 2.0 sources only). Each analog output's audio source can be set on this tab.

To assign a new audio route, please click the button of the audio output you wish to route a source to on the left and then click on the button of the preferred audio source on the right. Selection of multiple outputs simultaneously is possible. As you select each button they will become yellow. The new route will become active immediately and the routing information displayed on the buttons will change accordingly.

Note: The number of available audio inputs/outputs will vary depending on how many, and what type of, input/output cards have been installed. Unavailable ports will be greyed out.



1) **Audio Switch:**

- **Output:** Buttons for selecting the analog audio output (up to 16) to route audio sources to. The currently selected source is displayed below each output name.
- **Input:** Buttons for selecting the audio source to route to the selected output(s) (LPCM 2.0 sources only).
  - Assigning a "L/R Input" input to an output will use the audio provided by the analog audio input paired with the specified HDMI input.

    Note: HDMI input cards only.

- Assigning an “Opt. In (Extender Box)” input to an output will use the audio provided by the optical audio input on the HDBaseT transmitter connected to the selected input.

  Note: HDBaseT 2.0 transmitters with OAR support only.

- Assigning “Follow Video” to an output will use the audio extracted from that output’s current digital video source.
- Assigning “OAR” to an output will use the audio provided by the selected OAR source on the HDBaseT receiver connected to that output.

  Note: HDBaseT 2.0 receivers with OAR support only.

6.9.3 Volume Control Tab

This tab provides control over the analog output volume and muting for any installed output cards that support it. Unsupported outputs will automatically be greyed out.

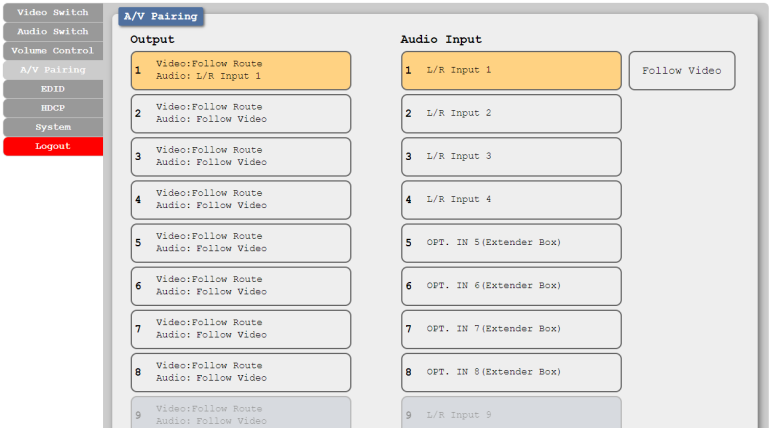
Note: Digital audio output (HDMI & HDBaseT) is not affected by the controls on this tab.

1) **Volume Slider:** This provides controls for directly adjusting the volume level of each active analog L/R output by clicking and dragging the slider. Clicking on the associated “+” and “-” buttons will adjust the volume level one step at a time.
2) **Mute Toggle:** Each analog audio output may also be muted or unmuted using the dedicated toggle switches.

6.9.4 A/V Pairing Tab

This tab provides control over audio source routing behavior for any installed output cards that support it. Unsupported outputs will automatically be greyed out.

Note: The number of available audio inputs/outputs will vary depending on how many, and what type of, input/output cards have been installed. Unavailable ports will be greyed out.



1) A/V Pairing:

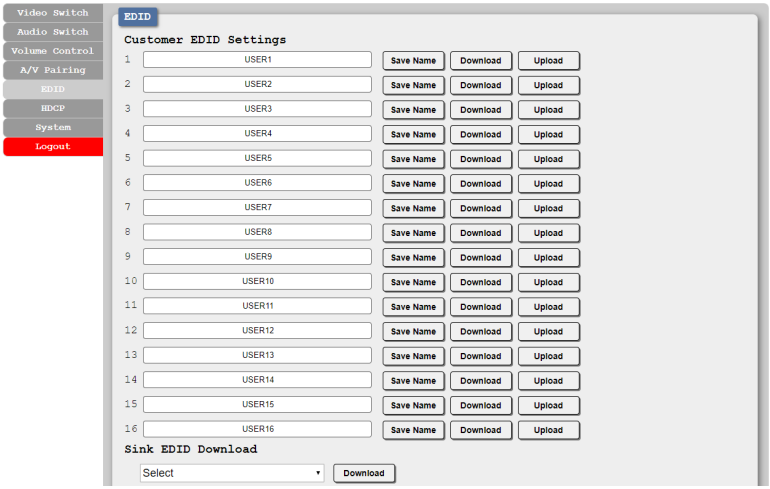
- **Output:** Buttons for selecting the HDBaseT embedded audio output (up to 16) to route audio sources to. The currently selected source is displayed at the bottom of each output's button.
- **Input:** Buttons for selecting the audio source to route to the selected output(s).
  - Assigning "Follow Video" to an output will use the audio from that output's current digital video source.
  - Assigning a "L/R Input" input to an output will use the audio provided by the analog audio input paired with the specified HDMI input.

    Note: HDMI input cards only.
  - Assigning an "Opt. In (Extender Box)" input to an output will use the audio provided by the optical audio input on the HDBaseT transmitter connected to the selected input.

    Note: HDBaseT 2.0 transmitters with OAR support only.

6.9.5 EDID Tab

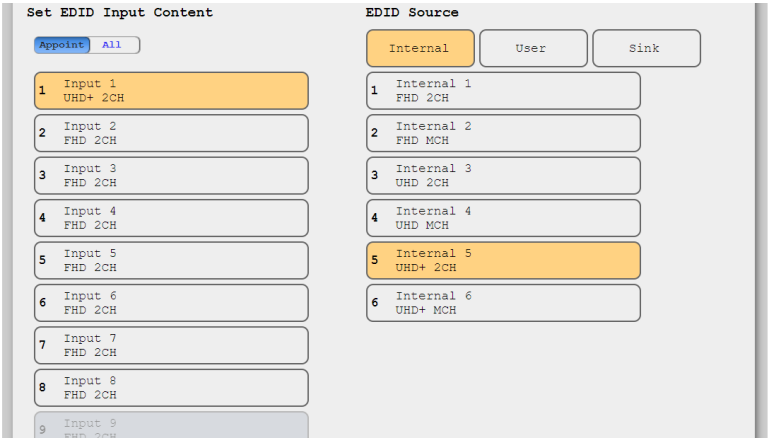
This tab provides the option of six standard EDIDs, 16 customer uploaded User EDIDs, and up to 16 sink sourced EDIDs that can be assigned to any or all of the standard input ports.



1) **Customer EDID Settings:**

- **Save Name:** To modify the name of a User EDID, simply type the new name in the space provided and then click on the “Save Name” button to confirm the change.
- **Download:** To save an existing User EDID to your local PC, press the “Download” button next to the User EDID slot you wish to save. Depending on your browser settings you will either be asked where to save the downloaded file, or the file will be transferred to the default download location on your PC.
- **Upload:** To upload a User EDID, press the “Upload” button next to the User EDID slot you wish to upload into. An EDID Upload window will appear, allowing you to locate and upload the preferred EDID file (*.bin format) from a local PC. Once the correct file has been selected, please click the “Upload” button in the window, and the file will be transferred to the unit.

2) **Sink EDID Download:** To save the EDID from a connected display to your local PC, select the output from the dropdown list then press the "Download" button. Depending on your browser settings you will either be asked where to save the downloaded file, or the file will be transferred to the default download location on your PC.

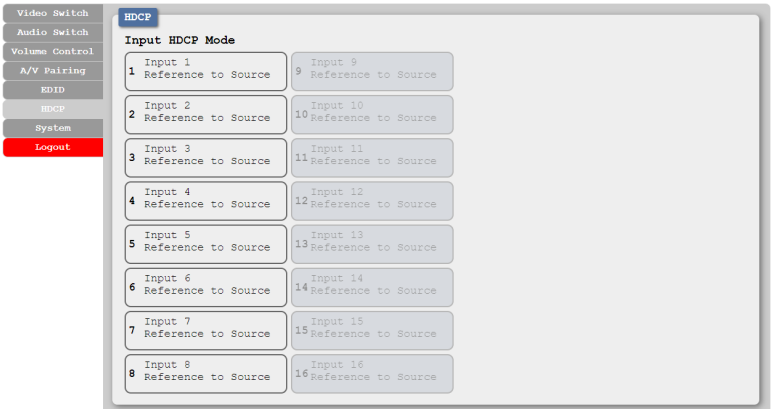


3) **Set EDID Input Content/EDID Source:** This section allows for the assignment of a specific EDID to any supported input port or to all inputs at once. To assign EDIDs to individual inputs, select "Appoint" mode. To assign a single EDID to all inputs, select "All" mode. Click on one or more input buttons on the left, select the EDID category (Internal, User, or Sink), then select the new EDID source to use from the choices on the right. The buttons will change color as you select them and the EDID change will occur immediately across all selected Inputs.

   Note: In most cases, assigning a new EDID to an input will cause the affected input to briefly blink out while the source adapts to the new information.

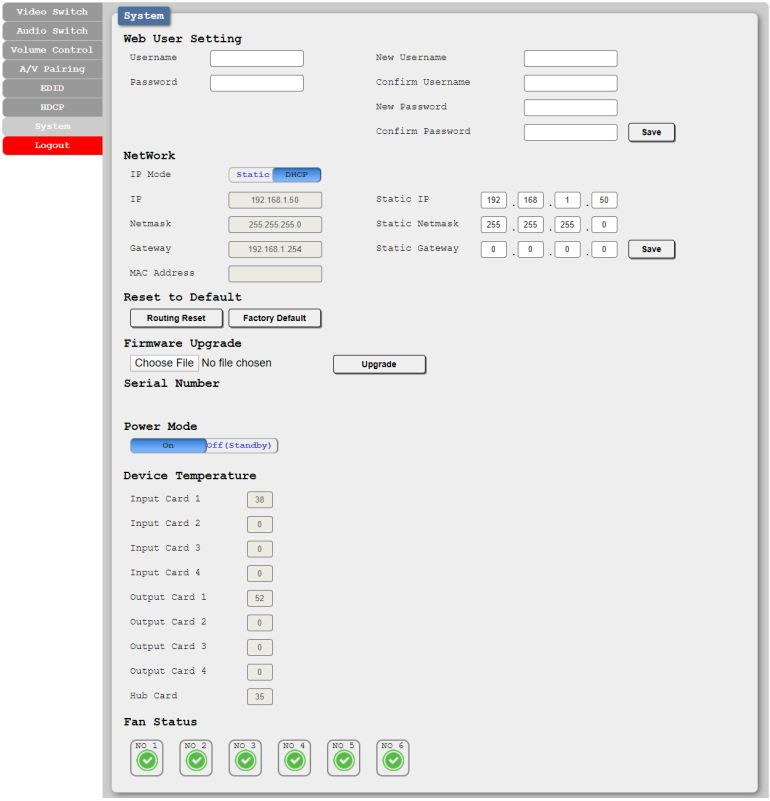
6.9.6 HDCP Tab

This tab is currently informational only and displays the HDCP mode settings for all available inputs.



6.9.7 System Tab

This tab provides system information, network configuration options, system configuration resets, and firmware update functions.



1) **Web User Setting:** This section provides a way to change the user name and password for the Administrator account. Click on “Save” to confirm and activate any changes made to these settings.

   Note: The default username and password is “admin”.

2) **Network:** The unit’s IP mode may be switched between Static IP or DHCP. In Static IP mode the IP, netmask and gateway addresses may be manually set. When in DHCP mode, the unit will attempt to connect to a local DHCP server and obtain IP, netmask and gateway addresses automatically. Please press “Save” after making any changes to the IP configuration or mode.

Note: If the IP address is changed then the IP address required for WebGUI/Telnet access will also change accordingly.

3) **Reset to Default:** Press the “Routing Reset” button to reset video I/O routing configurations to the factory defaults. Press the “Factory Default” button to reset the unit to its factory default state. After the factory reset is complete, the unit will reboot automatically.

   Note: Audio Switch routing and A/V Pairing routing is not reset by the “Routing Reset” function.

4) **Firmware Upgrade:** To update the unit’s firmware, click the “Choose File” button to open the file selection window and then select the firmware update file (*.bin format) located on your local PC. After selecting the file, click the “Upgrade” button to begin the firmware update process. After the upgrade is complete, the unit will reboot automatically.

5) **Serial Number:** Displays the unit’s serial number.

6) **Power Mode:** Press this switch to toggle the unit’s power between ON and OFF (Standby).

   Note: While in standby mode the unit’s WebGUI, Telnet and RS-232 controls are still active.

7) **Device Temperature:** Displays the current temperature readings, in Celsius, from all cards currently installed in the unit.

8) **Fan Status:** Displays the current operational status of all of the unit’s cooling fans.

6.10 Telnet Control

Before attempting to use Telnet control, please ensure that both the unit and the PC are connected to the same active networks.

Start your preferred Telnet/Console client, or use the built in client provided by most modern computer operating systems. After starting the client, connect by using the current IP address of the unit and port 23 (if the communication port number used by the unit has not been changed previously). This will connect us to the unit we wish to control and commands may now be entered directly.

Note 1: If the IP address of the unit is changed then the IP address required for Telnet access will also change accordingly.

Note 2: This unit defaults to DHCP mode. The current IP address can be verified using the OSD or front panel. The default communication port is 23.

6.11 Serial and Telnet Commands

COMMAND Description and Parameters
help↵ Show the full command list.
?↵ Show the full command list.
help N1↵ Show details about the specified command. **N1** = {Command name}
? N1↵ Show details about the specified command. **N1** = {Command name}
get fw ver↵ Show the unit's current firmware version.

COMMAND Description and Parameters
get model name↵ Show the unit's model name.
get model type↵ Show the unit's product type.
get fan N1 speed↵ Show the current speed of the specified fan. **N1** = 1~6 [Fan number]
get device temperature↵ Show the current temperatures reported by all installed cards.
set buzzer **mute N1**↵ Mute or unmute the unit's fault alarm buzzer. Available values for **N1**: ON [Muted] OFF [Unmuted]
get buzzer mute↵ Show the current fault alarm buzzer mute state.
set factory default↵ Reset the unit to the factory defaults.
set factory ipconfig default↵ Reset the unit's network settings to the factory defaults.
set factory out route default↵ Reset the unit's routing to the factory defaults.
get user config↵ Show the system's current network configuration details.

COMMAND Description and Parameters
set power N1↵ Set the unit's power state. Available values for **N1**: ON [Power the unit on] STANDBY [Place the unit into standby mode] OFF [Power the unit off completely] *Note: When powered off, all functionality, including RS-232 and network connectivity, is disabled.*
get power↵ Show the unit's current power state.
set system reboot↵ Reboot the unit.
set uart 1 reset↵ Reset the System Control Card's RS-232 settings to the factory defaults.
set uart 1 baudrate N1↵ Set the baud rate of the System Control Card's RS-232 port. Available values for **N1**: 4800 [4800 baud] 9600 [9600 baud] 19200 [19200 baud] 38400 [38400 baud] 57600 [57600 baud] 115200 [115200 baud]
get uart 1 baudrate↵ Show the current baud rate of the System Control Card's RS-232 port.
set uart 1 stop bit N1↵ Set the number of stop bits for the System Control Card's RS-232 port. **N1** = 1~2 [Stop bits]

COMMAND Description and Parameters
get uart 1 stop bit↵ Show the current number of stop bits of the System Control Card's RS-232 port.
set uart 1 data bit N1↵ Set the data bits for the System Control Card's RS-232 port. **N1** = 5~8 [Data bits]
get uart 1 data bit↵ Show the current number of data bits of the System Control Card's RS-232 port.
set uart 1 parity N1↵ Set the parity of the System Control Card's RS-232 port. Available values for **N1**: 0 [None] 1 [Odd] 2 [Even]
get uart 1 parity↵ Show the current parity setting of the System Control Card's RS-232 port.
get uart list↵ List all available RS-232 ports.
set ip mode N1↵ Set the IP address assignment mode. Available values for **N1**: 0 [Static IP mode] 1 [DHCP mode]
get ip mode↵ Show the current IP address assignment mode.
get ipconfig↵ Show the unit's current IP configuration information.

COMMAND Description and Parameters
set ipaddr N1↵ Set the unit's static IP address. **N1** = X.X.X.X [X = 0~255, IP address]
get ipaddr↵ Show the unit's current IP address.
set netmask↵ Set the unit's static netmask. **N1** = X.X.X.X [X = 0~255, Netmask]
get netmask↵ Show the unit's current netmask.
set gateway N1↵ Set the unit's static gateway address. **N1** = X.X.X.X [X = 0~255, Gateway address]
get gateway↵ Show the unit's current gateway address.
get mac addr↵ Show the unit's MAC address.
set webgui username N1↵ Set the WebGUI login username. **N1** = {Name} [16 characters max]
get webgui username↵ Show the current WebGUI login username.
set webgui password N1↵ Set the WebGUI login password. **N1** = {Password} [16 characters max]
get webgui password↵ Show the current WebGUI login password.

COMMAND Description and Parameters
set matrix **in N1 name N2**↵ Set the name of the specified video input port. **N1** = 1~17 [Video input port] **N2** = {Name} [32 characters max]
get matrix in N1 name↵ Show the current name of the specified video input. **N1** = 1~17 [Video input port]
set matrix out N1 name N2↵ Set the name of the specified video output port. **N1** = 1~17 [Video output port] **N2** = {Name} [32 characters max]
get matrix out N1 name↵ Show the current name of the specified video output port. **N1** = 1~17 [Video output port]
set matrix out N1 route N2↵ Route the specified input to the specified video output. **N1** = 1~17 [Video output port] **N2** = 1~17 [Video input port]
get matrix out N1 route↵ Show the current input routed to the specified video output. **N1** = 1~17 [Video output port]

COMMAND Description and Parameters
set matrix out route N1,N1,... to N2,N2,...↵ Set multiple input/output routes simultaneously. Each N1/N2 pairing defines a single route. **N1** = 1~17 [Video output port] **N2** = 1~17 [Video input port] *Note: The total number of inputs and total number of outputs used must be the same.*
get matrix out route N1,N1,...↵ Show the current routing assignments for all specified video outputs. **N1** = 1~17 [Video output port]
set matrix all out route N1↵ Route the specified input to all video outputs. **N1** = 1~17 [Video input port]
get matrix all out route↵ Show the current routing for all video outputs.
get matrix in name list↵ List the names of all inputs on the unit.
get matrix out name list↵ List the names of all outputs on the unit.
get matrix in N1 hactive↵ Show the horizontal active pixel value of the specified input's current video source. **N1** = 1~17 [Video input port]
get matrix in N1 vactive↵ Show the vertical active pixel value of the specified input's current video source. **N1** = 1~17 [Video input port]

COMMAND Description and Parameters
get matrix in N1 refresh rate↵ Show the refresh rate of the specified input's current video source. **N1** = 1~17 [Video input port]
get matrix in N1 interlace↵ Show the interlace state of the specified input's current video source. **N1** = 1~17 [Video input port] Available response values: 0 [Progressive] 1 [Interlaced]
get matrix in N1 sync status↵ Show the current sync state of the specified input. **N1** = 1~17 [Video input port] Available response values: 0 [No sync] 1 [Active sync]
get matrix in N1 timing↵ Show the current resolution detected on the specified input. **N1** = 1~17 [Video input port]
get matrix in N1 deep color↵ Show the detected bit depth of the signal on the specified input. **N1** = 1~17 [Video input port]
get matrix in type list↵ Show the current input type for all inputs.
get matrix out type list↵ Show the current output type for all outputs.

COMMAND Description and Parameters
get matrix out N1 sync status↵ Show the current sync state of the specified output. **N1** = 1~17 [Video output port] Available response values: 0 [No sync] 1 [Active sync]
get matrix out N1 timing↵ Show the current resolution detected on the specified output. **N1** = 1~17 [Video output port]
get matrix in port number↵ Show the total number of inputs on the unit.
get matrix out port number↵ Show the total number of outputs on the unit.
set matrix out N1 osd info display N2↵ **N1** = 1~17 [Video output port] Available values for **N2**: ON [Info OSD enabled] OFF [Info OSD disabled] *Note: Only available on HDMI outputs.*
get matrix out N1 osd info display↵ **N1** = 1~17 [Video output port]
set matrix out N1 4k downscale N2↵ **N1** = 1~16 [Video output port] Available values for **N2**: ON [4K downscale mode] OFF [4K bypass mode] *Note: Downscaling is only available on standard, non-AVLC, HDBaseT output cards. This setting will be reset if the unit is powered off.*

COMMAND Description and Parameters
get matrix out N1 4k downscale↵ **N1** = 1~16 [Video output port] *Note: Downscaling is only available on standard, non-AVLC, HDBaseT output cards.*
set keylock N1↵ Enable or disable the front panel key lock. Available values for **N1**: ON [Locked] OFF [Unlocked]
get keylock N1↵ Show the current front panel lock state.
set current route to preset N1↵ Save all current routing assignments to the specified preset. **N1** = 1~16 [Preset number]
get matrix preset N1 list↵ List the routing assignments stored in the specified preset. **N1** = 1~16 [Preset number]
set matrix route preset N1 name N2↵ Set a name for the specified preset. **N1** = 1~16 [Preset number] **N2** = {Name} [32 characters max]
get matrix route preset N1 name↵ Show the current name of the specified preset. **N1** = 1~16 [Preset number]

COMMAND Description and Parameters
set matrix audio lr out N1 route N2↵ Route the specified audio source to the specified L/R audio output. **N1** = 1~16 [L/R output port] Available values for **N2**: LR IN 1~16 [HDMI input's analog audio input port] OPT IN 1~16 [HDBaseT transmitter's optical input port] FV [Follow video mode] OAR [HDBaseT receiver's OAR source]
get matrix audio lr out N1 route↵ Show the current audio source routed to the specified L/R audio output. **N1** = 1~16 [L/R output port]
set matrix all audio lr out route N1↵ Route the specified audio source to all L/R outputs. Available values for **N1**: LR IN 1~16 [HDMI input's analog audio input port] OPT IN 1~16 [HDBaseT transmitter's optical input port] FV [Follow video mode]
get matrix all audio lr out route↵ Show the current routing for all L/R audio outputs.
set matrix audio lr out N1 volume N2↵ Set the volume level of the specified L/R output's audio. **N1** = 1~16 [L/R output port] **N2** = 0~100 [Volume in dB]
set matrix audio lr out N1 volume up↵ Increase the volume level of the specified output's audio by 1 unit. **N1** = 1~16 [L/R output port]
set matrix audio lr out N1 volume down↵ Decrease the volume level of the specified output's audio by 1 unit. **N1** = 1~16 [L/R output port]

COMMAND Description and Parameters
get matrix audio lr out N1 volume↵ Show the current volume level of the specified L/R output's audio. **N1** = 1~16 [L/R output port]
set matrix audio lr out N1 mute N2↵ Enable or disable muting the specified L/R audio output. **N1** = 1~16 [L/R output port] Available values for **N2**: ON [Muted] OFF [Unmuted]
get matrix audio lr out N1 mute↵ Show the current mute state of the specified L/R audio output. **N1** = 1~16 [L/R output port]
set matrix all audio lr out mute N1↵ Enable or disable muting all L/R audio outputs. Available values for **N1**: ON [Muted] OFF [Unmuted]
get matrix all audio lr out mute↵ Show the current mute state of all L/R audio outputs.
set matrix audio lr out N1 name N2↵ Set the name of the specified L/R audio output. **N1** = 1~16 [L/R output port] **N2** = {Name} [32 characters max]
get matrix audio lr out N1 name↵ Show the current name of the specified L/R audio output. **N1** = 1~16 [L/R output port]

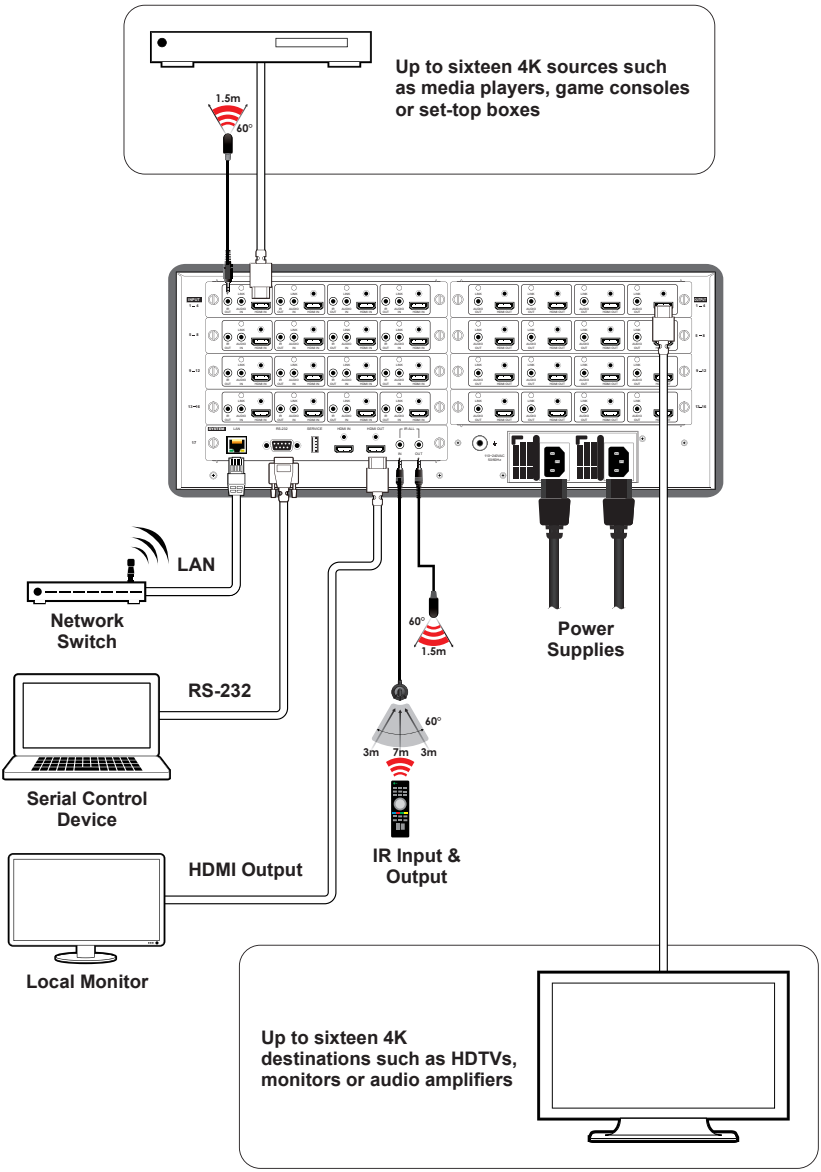
COMMAND Description and Parameters
set matrix video out N1 audio route N2↵ Route the specified audio source to the specified video output. **N1** = 1~16 [Video output port] Available values for **N2**: LR IN 1~16 [HDMI input's analog audio input port] OPT IN 1~16 [HDBaseT transmitter's optical input port] FV [Follow Video mode]
get matrix video out N1 audio route↵ Show the current audio source routed to the specified video output. **N1** = 1~16 [Video output port]
set matrix video out N1 audio mute N2↵ Enable or disable muting the audio on the specified video output. **N1** = 1~16 [Video output port] Available values for **N2**: ON [Muted] OFF [Unmuted]
get matrix video out N1 audio mute↵ Show the current mute state of the audio on the specified video output.
set matrix all video out audio route N1↵ Route the specified audio source to all video outputs. Available values for **N1**: LR IN 1~16 [HDMI input's analog audio input port] OPT IN 1~16 [HDBaseT transmitter's optical input port] FV [Follow Video mode]
get matrix all video out audio route↵ Show the current audio routing for all video outputs.

COMMAND Description and Parameters
set matrix all video out audio mute N1↵ Enable or disable muting the audio on all video outputs. Available values for **N1**: ON [Muted] OFF [Unmuted]
get matrix all video out audio mute↵ Show the current mute state of the audio on all video outputs.
set in N1 edid N2↵ Set the EDID to use on the specified input. **N1** = 1~16 [Input port] **N2** = 1~38 [EDID number] *Note: Please refer to the chart in Section 6.5 for the fully indexed EDID list.*
get in N1 edid↵ Show the EDID currently being used on the specified input. **N1** = 1~16 [Input port]
set all in edid mode↵ Select the EDID management mode to use (All or Appoint) for all inputs. Available values for **N1**: ON [All mode] OFF [Appoint mode]
get all in edid mode↵ Show the current EDID management mode used by all inputs.
set all in edid N1↵ Set the EDID to use on all inputs when “All EDID Mode” is active. **N1** = 1~38 [EDID number] *Note: This can only be set when “All EDID Mode” is active.*
get in edid list↵ List all available EDID selections.

COMMAND Description and Parameters
set edid N1 name N2↵ Set the name for the specified EDID. **N1** = 7~38 [EDID number] **N2** = {Name} [32 characters max] *Note: Only User and Sync EDIDs may be renamed.*
get edid N1 name↵ Show the current name for the specified EDID. **N1** = 1~38 [EDID number]
set user N1 edid data N2↵ Upload a new EDID (in hex format) for use as the specified User EDID. **N1** = 1~16 [User EDID] **N2** = {EDID data} [Comma delimited hex pairs]
get user N1 edid data↵ Show the current contents of the specified User EDID as hex data. **N1** = 1~16 [User EDID]
get internal N1 edid data↵ Show the specified Internal EDID as hex data. **N1** = 1~6 [Internal EDID]
get sink N1 edid data↵ Show the EDID from the display connected to the specified output as hex data. **N1** = 1~16 [Output port]
get in N1 edid data↵ Show the EDID currently used by the specified input as HEX data. **N1** = 1~16 [Input port]

Note: Commands will not be executed unless followed by a carriage return.
Commands are not case-sensitive.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

Note: The supplied specifications are for the Matrix Chassis w/ System Control Card only. Please refer to the manuals included with the cards installed in your system for their individual specifications.

8.1 Technical Specifications

HDMI Bandwidth	18Gbps
Input Ports	4×Input Card Slots 1×HDMI (Type-A)
Output Ports	4×Output Card Slots 1×HDMI (Type-A)
Pass-through Ports	1×IR Extender (3.5mm) 1×IR Blaster (3.5mm)
Control Ports	1×RS-232 (DE-9) 1×IP Control (RJ-45)
Service Port	1×USB 2.0 (Type-A)
IR Frequency	30 ~ 50kHz (30 ~ 60kHz under ideal conditions)
Baud Rate	19200
Power Supply	12V/41A, 5V/3A (Redundant, Hot-swappable) (US/EU standards, CE/FCC/UL certified)
ESD Protection (HBM)	±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions (W×H×D)	440mm×177mm×429mm [Case Only] 484mm×182mm×482mm [All Inclusive]
Rackmount Size	3U
Weight	19kg
Chassis Material	Metal (Steel)
Chassis Color	Black
Operating Temperature	0˚C – 40˚C/32˚F – 104˚F
Storage Temperature	-20˚C – 60˚C/-4˚F – 140˚F
Relative Humidity	20 – 90% RH (Non-condensing)
Power Consumption	150W (Full load), 25W (Standby)

8.2 Video Specifications

Supported Resolutions (Hz)	Input	Output
	HDMI	HDMI
720×400p@70/85	✓	✓
640×480p@60/72/75/85	✓	✓
720×480i@60	✓	✓
720×480p@60	✓	✓
720×576i@50	✓	✓
720×576p@50	✓	✓
800×600p@56/60/72/75/85	✓	✓
848×480p@60	✓	✓
1024×768p@60/70/75/85	✓	✓
1152×864p@75	✓	✓
1280×720p@50/60	✓	✓
1280×768p@60/75/85	✓	✓
1280×800p@60/75/85	✓	✓
1280×960p@60/85	✓	✓
1280×1024p@60/75/85	✓	✓
1360×768p@60	✓	✓
1366×768p@60	✓	✓
1400×1050p@60	✓	✓
1440×900p@60/75	✓	✓
1600×900p@60RB	✓	✓
1600×1200p@60	✓	✓
1680×1050p@60	✓	✓
1920×1080i@50/60	✓	✓
1920×1080p@24/25/30	✓	✓
1920×1080p@50/60	✓	✓
1920×1200p@60RB	✓	✓

Supported Resolutions (Hz)	Input	Output
	HDMI	HDMI
2560×1440p@60RB	✓	✓
2560×1600p@60RB	✓	✓
2048×1080p@24/25/30	✓	✓
2048×1080p@50/60	✓	✓
3840×2160p@24/25/30	✓	✓
3840×2160p@50/60 (4:2:0)	✓	✓
3840×2160p@24, HDR10	✓	✓
3840×2160p@50/60 (4:2:0), HDR10	✓	✓
3840×2160p@50/60	✓	✓
4096×2160p@24/25/30	✓	✓
4096×2160p@50/60 (4:2:0)	✓	✓
4096×2160p@24, HDR10	✓	✓
4096×2160p@50/60 (4:2:0), HDR10	✓	✓
4096×2160p@50/60	✓	✓

8.3 Audio Specifications

8.3.1 Digital Audio

HDMI Input / Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	Standard & High-Definition

8.4 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	5m	3m
HDMI Output	15m	10m	5m	3m

Bandwidth Category Examples:

- **1080p (FHD Video)**
  - Up to 1080p@60Hz, 12-bit color
  - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **4K30 (4K UHD Video)**
  - 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit color
  - Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps
- **4K60 (4K UHD+ Video)**
  - 4K@50/60Hz (4:4:4, 8-bit)
  - 4K@50/60Hz (4:2:0, 10-bit HDR)
  - Data rates higher than 10.2Gbps

9. ACRONYMS

ACRONYM	COMPLETE TERM
ADC	Analog-to-Digital Converter
ASCII	American Standard Code for Information Interchange
AVLC	Adaptive Visually Lossless Compression
Cat.5e	Enhanced Category 5 cable
Cat.6	Category 6 cable
Cat.6A	Augmented Category 6 cable
Cat.7	Category 7 cable
CEC	Consumer Electronics Control
CLI	Command-Line Interface
DAC	Digital-to-Analog Converter
dB	Decibel
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
Gbps	Gigabits per second
GUI	Graphical User Interface
HDBT	HDBaseT
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
IP	Internet Protocol
IR	Infrared
kHz	Kilohertz
LAN	Local Area Network
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
MHz	Megahertz

ACRONYM	COMPLETE TERM
OAR	Optical Audio Return
OLED	Organic Light-Emitting Diode
OSD	On-Screen Display
PD	Powered Device
PoH	Power over HDBaseT
PSE	Power Sourcing Equipment
S/PDIF	Sony/Philips Digital Interface Format
SNR	Signal-to-Noise Ratio
TCP	Transmission Control Protocol
THD+N	Total Harmonic Distortion plus Noise
TMDS	Transition-Minimized Differential Signaling
4K UHD	4K Ultra-High-Definition (10.2Gbps max)
4K UHD+	4K Ultra-High-Definition (18Gbps max)
UHDTV	Ultra-High-Definition Television
USB	Universal Serial Bus
VGA	Video Graphics Array
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array
Ω	Ohm

CYPRESS TECHNOLOGY CO., LTD.
www.cypress.com.tw