



CPLUS-V1616

16×16 Modular Matrix Chassis
with System Control Card



Operation Manual

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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



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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) are available now and I/O cards supporting HDBaseT (both with and without AVLC) as well as 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×Modular Matrix Chassis (16×16)
- 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 is highly recommended.

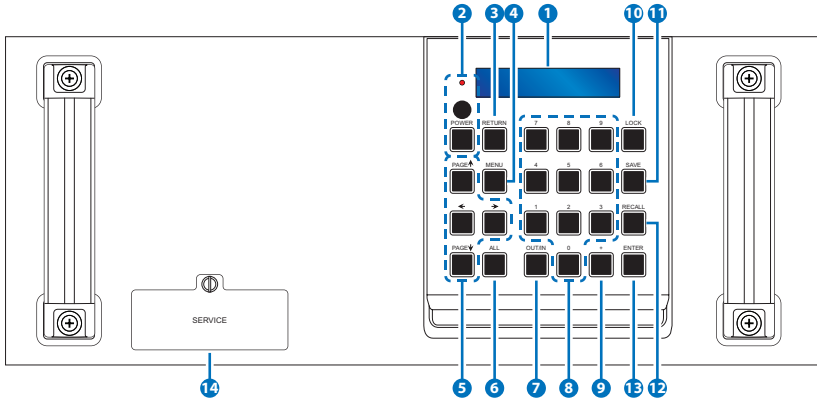


5. FEATURES

- Input and output card slots support 18Gbps (600MHz) 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
- Control via front panel buttons with LCD menu, Ethernet (Telnet & WebGUI), and RS-232
- 4-port HDMI input and 4-port HDMI output cards are available now
- 4-port HDBaseT (with and without AVLC) input and output cards are under development

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



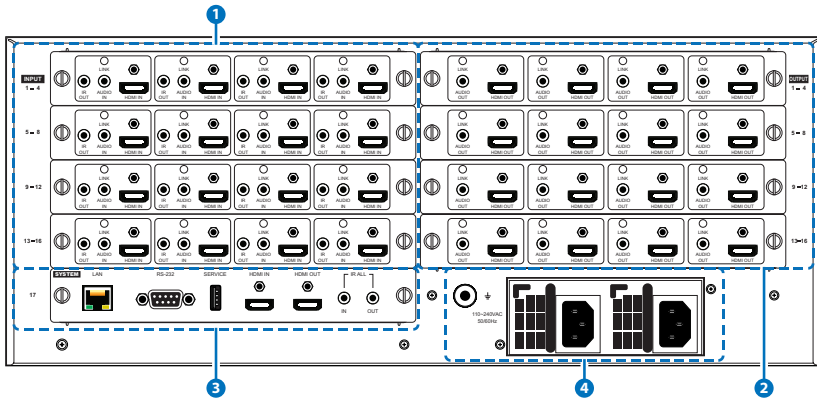
- 1 OLED Window:** Displays the unit's menu, settings and information.
- 2 POWER Button and LED:** Press this button to power the unit on (green LED) or place it into stand-by mode (red LED).
- 3 RETURN Button:** Press this button to return to the previous menu screen when in a front panel menu.
- 4 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. **Cards should only be installed or removed when the chassis is completely powered off (not in stand-by mode).** Please consult each individual card type's manual for more detailed installation and operation information.*

- **4-Port HDMI Input Cards (OPTIONAL):** Each card provides 4 independent, high-bandwidth, HDMI inputs, paired with IR output and analog stereo inputs. Each grouping can be freely routed to any available output within the modular matrix.

HDMI IN Ports: Connect to HDMI source equipment such as media players, game consoles, or set-top boxes.

AUDIO IN Ports: Connect to the stereo analog output of a device such as an audio player or PC.

IR OUT Ports: Connect to an IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.

LINK LEDs: These LEDs will illuminate to indicate that a live source has been detected on the associated input port. When no source is detected the LED will remain off.

- 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. **Cards should only be installed or removed when the chassis is completely powered off (not in stand-by mode).** Please consult each individual card type's manual for more detailed installation and operation information.*

- **4-Port HDMI Output Cards (OPTIONAL):** Each card provides 4 independent, high-bandwidth, HDMI outputs, paired with analog stereo outputs. Each grouping can be freely routed to from any available input within the modular matrix.

HDMI OUT Ports: Connect to HDMI TVs, monitors, or amplifiers for digital video and audio output.

AUDIO OUT Ports: Connect to powered speakers, headphones, or an amplifier for stereo analog audio output.

LINK LED: These LEDs will illuminate to indicate when a valid sink has been detected on the associated output port and a live source has been routed to it. When no sink is detected the LED will remain off.

- 3 SYSTEM Card:** This card 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.

LAN Port: Connect directly, or through a network switch, to your PC/laptop to control the unit via Telnet/WebGUI.

RS-232 Port: Connect directly to a PC, laptop, or other serial control device to send RS-232 commands to control the unit.

SERVICE Port: This port is reserved for firmware update use only.

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.

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.

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.

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.

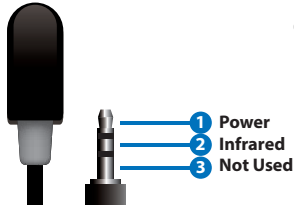
Note: To avoid potential IR signal corruption, please only send IR commands from a single IR remote at a time.

- 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.

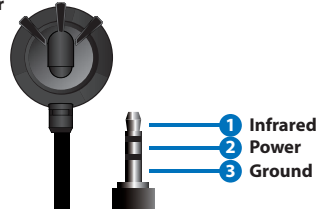
Note: While the unit can operate with only a single power supply, a "power supply failure" alarm will continuously sound until a properly functioning second power supply module is installed and powered on.

6.3 IR Cable Pinouts

IR Blaster Cable

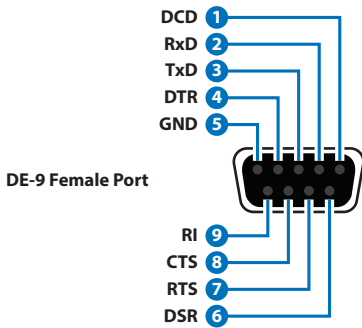


IR Extender Cable



6.4 RS-232 Pinout and Defaults

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



6.5 OSD 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 OLED menu 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]

2. PRESET	
2ND LEVEL	3RD LEVEL
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 (148MHz) & 8-bit color with LPCM 2.0	
2	FHD/MCH	1920×1080p@60Hz (148MHz) & 8-bit color with LPCM 7.1 & Bitstream	
3	UHD/2CH	3840×2160p@30Hz (297MHz) & Deep Color (8/10/12-bit) with LPCM 2.0	
4	UHD/MCH	3840×2160p@30Hz (297MHz) & Deep Color (8/10/12-bit) with LPCM 7.1 & Bitstream	
5	UHD+/2CH	3840×2160p@60Hz (594MHz) & Deep Color (8/10/12-bit) with LPCM 2.0	
6	UHD+/MCH	3840×2160p@60Hz (594MHz) & 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?	On
	OFF

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

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

- 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.


6.6 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.

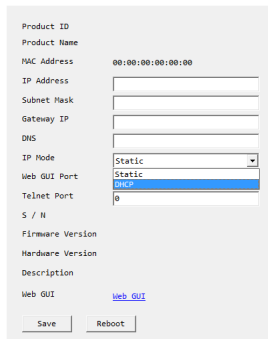
Connect the unit and your PC/Laptop to the same active network and execute the “Device Discovery” software. Click on “Find Devices on Network” and a list of devices connected to the local network will show up indicating their current IP address.

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.



Product Name	Description	IP Address	MAC Address

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



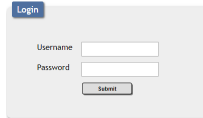
Product ID
Product Name
MAC Address 00:00:00:00:00
IP Address
Subnet Mask
Gateway IP
DNS
IP Mode Static
Web GUI Port Static
Telnet Port 0
S / N
Firmware Version
Hardware Version
Description
Web GUI [Web GUI](#)
Save Reboot

- 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.

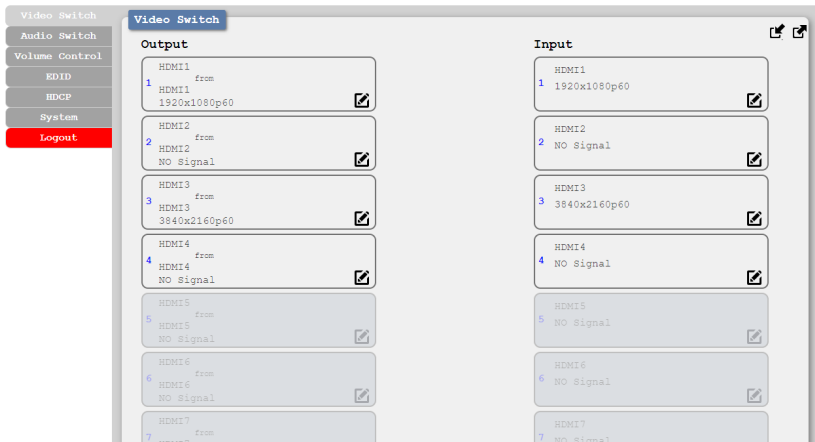
Note: The standard matrix chassis only ships with a System Card pre-installed. The following pages assume that the unit has standard HDMI Input and HDMI Output Cards installed to demonstrate the capabilities of the matrix. Due to the modular nature of this unit, individual user configurations may not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

6.6.1 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. 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 “edit” icon (✎) opens up the Edit Output window 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 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.

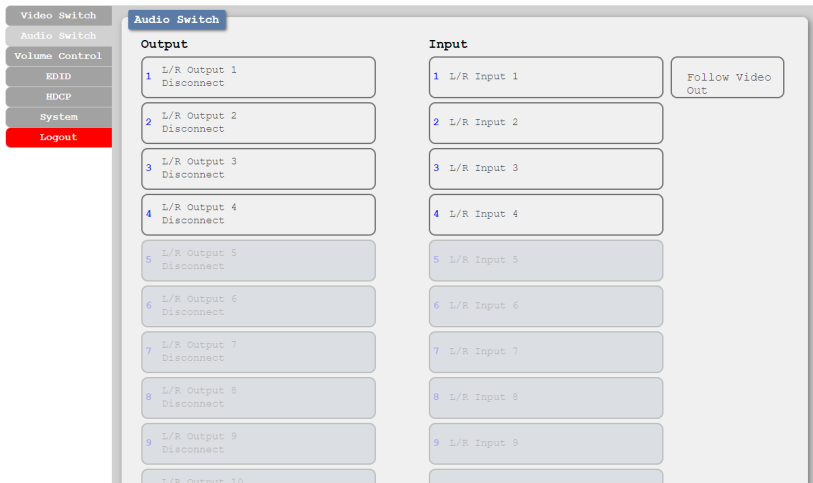
- 2) **Save Working Configuration:** Once you have the routing set the way you like, you can click the "Save Preset" icon (📌) in the upper right corner of the tab to open the Save Working Configuration window. Click on the preferred Preset button when you are ready to commit the preset to memory. You 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.

6.6.2 Audio Switch Tab

This unit offers analog audio routing and digital to analog audio extraction (LPCM 2.0 sources only). Each analog output's volume and 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.



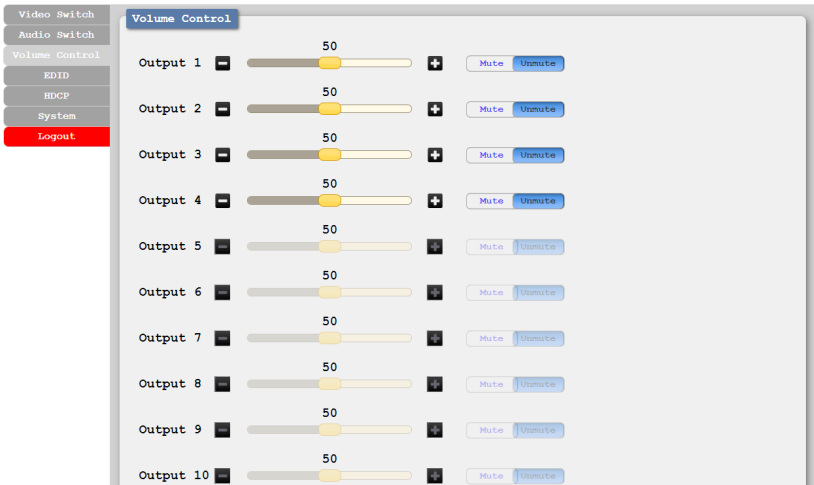
1) Audio Switch:

- **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). Assigning "Follow Video Out" to an output will use the audio extracted from that output's current digital video source (LPCM 2.0 sources only).

6.6.3 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.

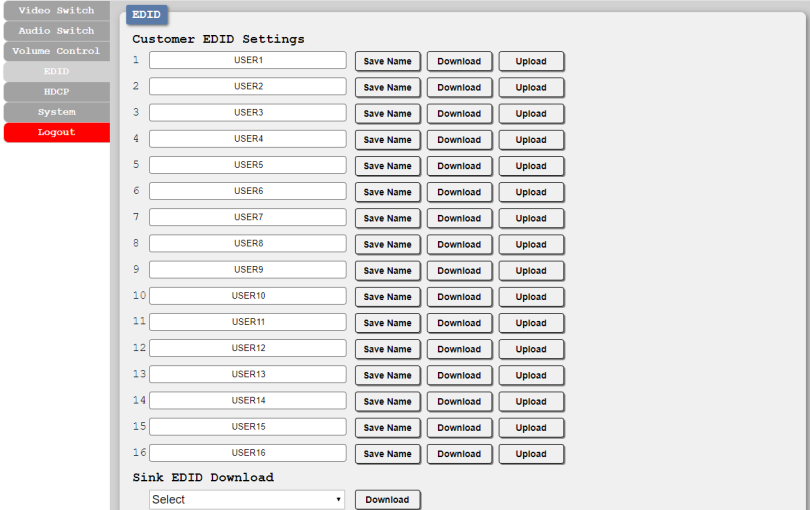
Note: HDMI audio output is always a direct pass-through from the selected source and is not affected by the controls on this tab.



- 1) **Volume Slider:** This provides control for directly adjusting the volume level of each active analog output. Each analog audio output may also be muted or unmuted using the toggle switch.
- 2) **Mute Toggle:** Each analog audio output may also be muted or unmuted using the dedicated toggle switches.

6.6.4 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.

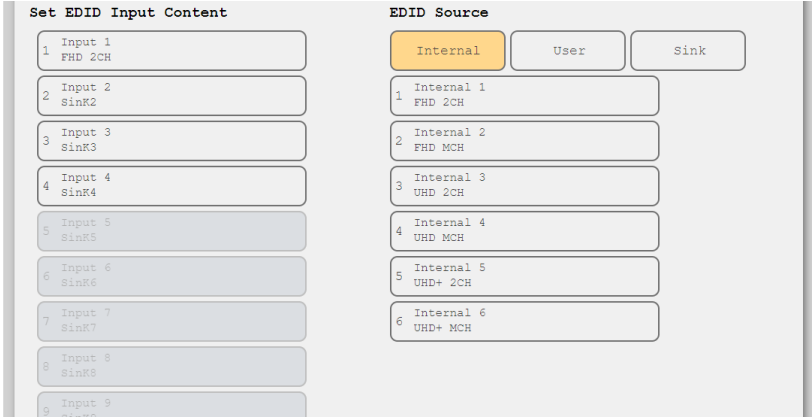


The screenshot shows the EDID configuration interface. On the left is a sidebar with navigation options: Video Switch, Audio Switch, Volume Control, EDID (selected), HDCP, System, and Logout. The main area is titled 'EDID' and contains 'Customer EDID Settings' with 16 rows, each with a text input field (USER1-USER16), a 'Save Name' button, a 'Download' button, and an 'Upload' button. Below this is a 'Sink EDID Download' section with a dropdown menu labeled 'Select' and a 'Download' button.

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:** The Set EDID Input Content section allows for the assignment of a specific EDID to any supported input port. 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.

6.6.5 HDCP Tab

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



6.6.6 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 all 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.
- 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) 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.

- 6) Device Temperature:** Displays the current temperature readings, in Celsius, from all cards currently installed in the unit.
- 7) Fan Status:** Displays the current operational status of all of the unit's cooling fans.

6.7 Telnet Control

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

To Access the Command Line Interface (CLI)	
Windows 7	Click Start , type "cmd" in the search field, and press Enter .
Windows XP	Click Start > Run , type "cmd", and press Enter .
Mac OS X	Click Go > Applications > Utilities > Terminal .

Once in the Command Line Interface (CLI) type "**telnet**" followed by the IP address of the unit (and the port number if it is non-standard) and then hit "**Enter**". This will connect us to the unit we wish to control.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\Administrator>telnet 192.168.1.50 23
```

Note 1: If the IP address 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.

6.8 RS-232 and Telnet Commands

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

COMMAND	
Description and Parameters	
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.
set system reboot ↵	
	Reboot the unit.
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.
set ipaddr N1 ↵	
	Set the unit's static IP address.
N1 = X.X.X.X	[X = 0 ~ 255]
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]
get netmask ↵	
	Show the unit's current netmask.

COMMAND	
Description and Parameters	
set gateway N1 ↵	
Set the unit's static gateway address.	
N1 = X.X.X.X	[X = 0 ~ 255]
get gateway ↵	
Show the unit's current gateway address.	
set webgui user name N1 ↵	
Set the WebGUI login username.	
N1 = {Name}	[16 characters max]
get webgui user name ↵	
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.	
set matrix in N1 name N2 ↵	
Set the name of the specified input port.	
N1 = 1~17	[Input port]
N2 = {Name}	[32 characters max]
get matrix in N1 name ↵	
Show the current name of the specified input.	
N1 = 1~17	[Input port]
set matrix out N1 name N2 ↵	
Set the name of the specified output port.	
N1 = 1~17	[Output port]
N2 = {Name}	[32 characters max]

COMMAND	
Description and Parameters	
get matrix out N1 name ↵	
Show the current name of the specified output port.	
N1 = 1~17	[Output port]
set matrix out N1 route N2 ↵	
Route the specified input to the specified output.	
N1 = 1~17	[Output port]
N2 = 1~17	[Input port]
get matrix out N1 route ↵	
Show the current input routed to the specified output.	
N1 = 1~17	[Output port]
set matrix out route N1,N1,... to N2,N2,... ↵	
Set multiple input/output routes simultaneously. Each N1/N2 pair defines a single route.	
N1 = 1~17	[Output port]
N2 = 1~17	[Input port]
<i>Note: The total number of inputs and total number of outputs used must be the same.</i>	
get matrix out route N1,N1,... ↵	
Show the current routing assignments for all specified outputs.	
N1 = 1~17	[Output port]
set matrix all out route N1... ↵	
Route the specified input to all outputs.	
N1 = 1~17	[Input port]
get matrix all out route ↵	
Show the current routing for all outputs.	
get matrix in name list ↵	
List the names of all inputs on the unit.	

COMMAND	
Description and Parameters	
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	[Input port]
get matrix in N1 vactive ↵	
	Show the vertical active pixel value of the specified input's current video source.
N1 = 1~17	[Input port]
get matrix in N1 refresh rate ↵	
	Show the refresh rate of the specified input's current video source.
N1 = 1~17	[Input port]
get matrix in N1 interlace ↵	
	Show the interlace state of the specified input's current video source.
N1 = 1~17	[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	[Input port]
	Available response values:
0	[No sync]
1	[Active sync]

COMMAND	
Description and Parameters	
get matrix in N1 timing↵	
Show the current resolution detected on the specified input.	
N1 = 1~17	[Input port]
get matrix in N1 deep color↵	
Show the detected bit depth of the signal on the specified input.	
N1 = 1~17	[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.	
get matrix out N1 sync status↵	
Show the current sync state of the specified output.	
N1 = 1~17	[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	[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 keylock N1↵	
Enable or disable the front panel key lock.	
Available values for N1:	
ON	[Locked]
OFF	[Unlocked]

COMMAND	
Description and Parameters	
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]
set matrix audio lr out N1 route lr in N2 ↵	
	Route the specified L/R audio input to the specified L/R audio output.
N1 = 1~16	[L/R output]
N2 = 1~16	[L/R input]
set matrix audio lr out N1 route FV ↵	
	Set the specified L/R audio output to "Follow Video" mode.
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]

COMMAND	
Description and Parameters	
set matrix all audio lr out route lr in N1 ↵	
Route the specified L/R audio input to all L/R outputs.	
N1 = 1~16	[L/R input]
set matrix all audio lr out route fv ↵	
Set all L/R audio outputs to "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]
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]
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]
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]
set matrix audio lr out N1 mute N2 ↵	
Enable or disable muting the specified L/R audio output.	
N1 = 1~16	[L/R output]
Available values for N2:	
ON	[Muted]
OFF	[Unmuted]

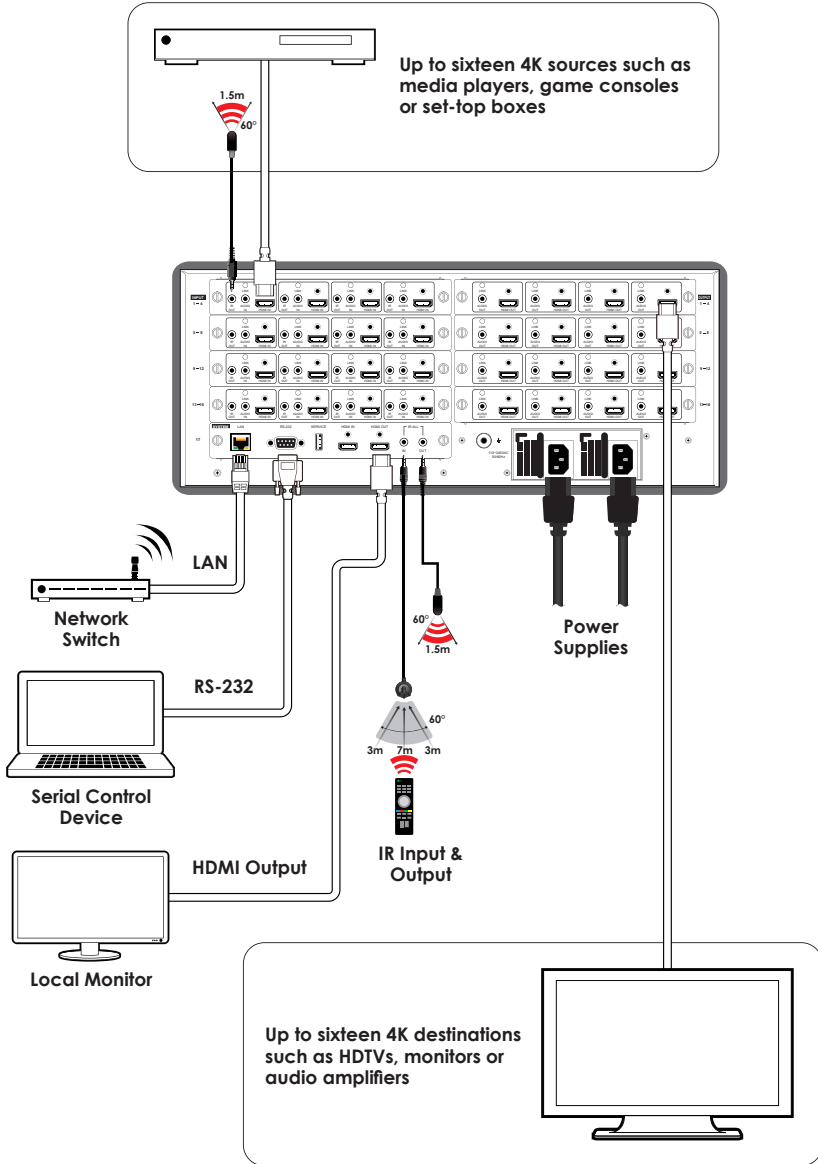
COMMAND	
Description and Parameters	
get matrix audio lr out N1 mute ↵	
Show the current mute state of the specified L/R audio output.	
N1 = 1~16	[L/R output]
set matrix all audio lr out mute N1 ↵	
Enable or disable muting all L/R audio outputs.	
Available values for N1:	
ON	[Muted]
OFF	[Unmuted]
get 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 for the specified L/R audio output.	
N1 = 1~16	[L/R output]
N2 = 1~16	[32 characters max]
get matrix audio lr out N1 name ↵	
Show the current name for the specified L/R audio output.	
N1 = 1~16	[L/R output]
set in N1 edid N2 ↵	
Set the EDID to use on the specified input.	
N1 = 1~16	[Input port]
N2 = 1~38	[EDID number]
<i>Note: Please refer to the chart in Section 6.5 for the fully indexed EDID list.</i>	
get in N1 edid ↵	
Show the EDID currently being used on the specified input.	
N1 = 1~16	[Input port]

COMMAND	
Description and Parameters	
set all in edid N1 ↵	
Set the EDID to use on all inputs.	
N1 = 1~38	[EDID number]
get in edid list ↵	
List all available EDID selections.	
set edid N1 name N2 ↵	
Set the name for the specified EDID.	
N1 = 7 ~ 38	[EDID number]
N2 = {Name}	[32 characters max]
<i>Note: Only User and Sync EDIDs may be renamed.</i>	
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 internal N1 edid data ↵	
Show the specified Internal EDID as HEX data.	
N1 = 1 ~ 16	[Internal EDID]
get user N1 edid data ↵	
Show the current contents of the specified User EDID as HEX data.	
N1 = 1 ~ 16	[User EDID]

COMMAND	
Description and Parameters	
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

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×Ethernet (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	✓	✓

Supported Resolutions (Hz)	Input	Output
	HDMI	HDMI
1680×1050p@60	✓	✓
1920×1080i@50/60	✓	✓
1920×1080p@24/25/30	✓	✓
1920×1080p@50/60	✓	✓
1920×1200p@60RB	✓	✓
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 (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 (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
AV	Audio/Video
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
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GUI	Graphical User Interface
HD	High-Definition
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
LAN	Local Area Network
LCD	Liquid-Crystal Display
LED	Light-Emitting Diode

ACRONYM	COMPLETE TERM
LPCM	Linear Pulse-Code Modulation
MAC	Media Access Control
NTSC	National Television System Committee
OSD	On-Screen Display
PAL	Phase Alternating Line
PD	Powered Device
PoH	Power over HDBaseT
PSE	Power Sourcing Equipment
SDTV	Standard-Definition Television
SNR	Signal-to-Noise Ratio
TCP	Transmission Control Protocol
THD+N	Total Harmonic Distortion plus Noise
UHD	Ultra-High-Definition
UHD+	Ultra-High-Definition Plus
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



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