

CPLUS-V6H2HP

4K UHD+ 6×2 HDMI Matrix with Audio De-Embedding





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.

REVISION HISTORY

VERSION NO.	DATE (DD/MM/YY)	SUMMARY OF CHANGE
RDV1	29/06/16	Preliminary release
VS1	30/08/17	Updated text/diagrams
VS2	05/09/17	Changed remote control



CONTENTS

1. Introduction	1
2. Applications	1
3. Package Contents	1
4. System Requirements	2
5. Features	2
6. Operation Controls and Functions	3
6.1 Front Panel	3
6.2 Rear Panel	5
6.3 Remote Control	6
6.4 IR Cable Pin Assignments	7
6.5 RS-232 Protocol	7
6.6 RS-232 and Telnet Commands	8
6.7 Telnet Control	12
6.8 WebGUI Control	13
6.8.1 Device Discovery APP	13
6.8.2 WebGUI Overview	14
7. Connection Diagram	20
8. Specifications	21
8.1 Technical Specifications	21
8.2 Video Specifications	22
9. Acronyms	23



1. INTRODUCTION

This 4K UHD+ 6 by 2 Matrix provides the ability to connect up to six 4K UHD HDMI sources to up to two 4K UHD HDMI displays and freely switch between them. This unit comes with full support for 18Gbps (600Mhz) resolutions up to, and including 4K@60Hz (4:4:4, 8-bit) as well as support for 16-bit Deep Color (up to 1080p@60Hz), HDR (High Dynamic Range), HD audio and other features defined by the HDMI 2.0 specification. With a comprehensive EDID management feature that includes the ability to select between six built in default EDIDs, or an EDID copied from a connected sink device, this matrix can solve many interconnectivity problems. Added flexibility comes from the ability to extract audio from each HDMI output's source and output it as optical digital audio (LPCM 2.0 and standard Bitstream only). Six fully configurable presets are also provided to simplify the routing process. This unit provides an intuitive set of front panel controls with associated LCD, as well as RS-232, Telnet, WebGUI, and IR remote control options.

2. APPLICATIONS

- Entertainment Rooms & Home Theaters
- Lecture Rooms
- Showrooms & Demo Rooms
- Public Commercial Displays

3. PACKAGE CONTENTS

- 1×4K UHD+ 6 by 2 HDMI Matrix
- 1×Remote Control (CR-175)
- 1×IR Extender Cable
- 1×5V/3A DC Power Adaptor
- 1×Rack Mount Ears (Set of 2)
- 1×Operation Manual



4. SYSTEM REQUIREMENTS

- HDMI source equipment such as media players, video game consoles or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- The use of "Premium High Speed HDMI" cables is highly recommended.

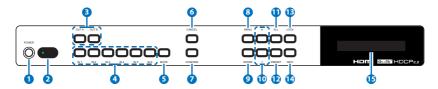
5. FEATURES

- HDMI input and output with 18Gbps (600MHz) 4K UHD support
- DVI 1.0 compliant with the use of an HDMI-DVI adaptor
- HDCP 1.4 and 2.2 compliant
- Supports HD resolutions up to 3840×2160@60Hz (YUV 4:4:4, 8-bit) and 4096×2160@60Hz (YUV 4:4:4, 8-bit)
- Supports 16-bit Deep Color up to 1080p@60Hz
- 6 HDMI inputs and 2 HDMI outputs
- Supports pass-through of audio formats including LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream
- Display any of 6 high-definition sources on up to 2 HDTV displays simultaneously
- Optical audio extraction paired with each HDMI output (LPCM 2.0 or Bitstream only)
- Supports 6 internal EDIDs or 2 external EDIDs copied from connected devices
- Controllable via front panel buttons with LCD, WebGUI, Telnet, RS-232, and IR remote



6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



1 POWER: Press this button to power the unit on (green LED) or place it into stand-by mode (red LED).

Note: Ethernet, RS-232, and IR remain active while the unit is in stand-by mode.

- 2 IR WINDOW: Accepts IR signals from the included IR remote for control of this unit only.
- 3 OUT A~B: Press the "OUT" keys (A or B) of the outputs you wish to route a source to (the letter will flash in the LCD to indicate selection). Pressing an OUT button a second time will de-select that output.
- 4 IN 1~6: After selecting one or more outputs, press the "IN" key of the input (1~6) you wish to route to the selected output(s). In Preset selection mode, these buttons are used to select the saved preset to use.

Note: The "CONFIRM" button (Item 7) must be pressed to activate the selected routing configuration.

- **5 MUTE:** The "MUTE" button functions as a blank audio/video source. To use it, follow the standard matrix routing instructions, but use the "MUTE" button as the input to blank out the selected outputs. When a "MUTE" input is in use it will show up as "M" within the routing display.
- **6 CANCEL:** Press to cancel/undo any un-confirmed routing change selections.
- **CONFIRM:** Press to confirm and activate newly made input/output routing selections.

Note: It is possible to configure multiple I/O routes prior to pressing the "CONFIRM" button.



- 8 MENU: Press to enter the LCD menu, or to back out from menu items.
- ENTER: Press to confirm a selection within the LCD menu or to go deeper into a menu item.
- 10 + & -: Press to move up and down or adjust selections within the LCD menus.
- (the letters will flash in the LCD to indicate selection). Press it a second time to de-select all outputs.
- PRESET: Press to enter the preset recall menu in the LCD window. Press the numbered "IN" button of the Preset you wish to activate followed by the "CONFIRM" button to activate it.
- 13 LOCK: Press to lock all button functions on the front panel. Press and hold for 3 seconds to release the lock function. The LCD will display "Lock" when the function is active.
- **INFO:** Press to show the current input/output routing and detected resolution on each output's OSD.
- **15 LCD WINDOW:** Displays the unit's menu, settings, and information.



6.2 Rear Panel

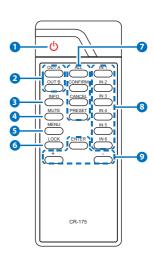


- 1 HDMI IN 1~6: Connect to HDMI source equipment such as media players, game consoles or set-top boxes. DVI source equipment may be connected by using HDMI to DVI adapters.
- 2 HDMI OUT A~B: Connect to HDMI TVs, monitors or amplifiers for digital video and audio output. DVI display equipment may be connected by using HDMI to DVI adapters.
- 3 OPTICAL OUT A~B: Connect to powered speakers or amplifiers for digital audio output using appropriate optical cables. The audio from each optical output will be the same as the HDMI output it is paired with (LPCM 2.0 and standard Bitstream only).
- 4 SERVICE: This slot (USB 2.0) is reserved for firmware update use only.
- **5 CONTROL:** Connect directly, or through a network switch, to your PC/laptop to control the unit via Telnet/WebGUI.
- 6 RS-232: Connect directly to your PC/laptop to send RS-232 commands to control the unit.
- 7 IR IN: Connect to the provided IR Extender to extend the IR control range of the unit. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 8 DC 5V: Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.



6.3 Remote Control

- 1 POWER: Press this button to switch the unit between On and Stand-by mode.
- 2 OUT A~B: Press the button (A or B) of the output(s) you wish to route a source to.
 Pressing an OUT button a second time will de-select that output.
- 3 INFO: Press to show the current input/ output routing and detected resolution on each output's OSD.
- MUTE: Press this button to route a blank audio/video source to the selected output(s).



- **S** MENU: Press to enter the LCD menu, or to back out from menu items.
- **6 LOCK:** Press to lock all button functions on the front panel. Press and hold for 3 seconds to release the lock function.
- 7 ALL: Press to select all outputs simultaneously for routing. Press it a second time to de-select all outputs.

CONFIRM: Press to confirm and activate newly made input/output routing selections.

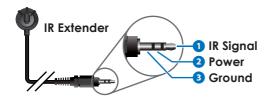
CANCEL: Press to cancel/undo any un-confirmed routing change selections.

PRESET: Press to enter the preset recall menu in the LCD window. Press the numbered "IN" button of the Preset you wish to activate followed by the "TAKE" button to activate it.

- (8) IN 1~6: After selecting one or more outputs, press the "IN" button of the input (1~6) you wish to route to the selected output(s). In Preset selection mode, these buttons are used to select the saved preset to use.
- **ENTER:** Press to confirm a selection within the LCD menu or to go deeper into a menu item.
 - + & -: Press to move up and down or adjust selections within the LCD menus.



6.4 IR Cable Pin Assignments



6.5 RS-232 Protocol

UNIT	
Pin	Definition
1	NC
2	TxD
3	RxD
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

REMOTE SYSTEM			
Pin	Definition		
1	NC		
2	RxD		
3	TxD		
4	NC		
5	GND		
6	NC		
7	NC		
8	NC		
9	NC		

Baud Rate: 115200bps

Data Bits: 8 Parity Bits: None

Stop Bit: 1

Flow Control: None



6.6 RS-232 and Telnet Commands

COMMAND	DESCRIPTION AND PARAMETERS	
HELP	Show the full command list.	
?	Show the full command list.	
? N1	Show help details about command N1.	
	N1 = {Any command name}	
PO	Turn unit's power off. (Stand-by mode)	
P1	Turn unit's power on.	
INNAME N1 N2	Set the name of input N1 to N2.	
	N1 = 1~6 [Input number]	
	N2 = {name} [8 characters max]	
INNAME N1	Show the input name of N1.	
	N1 = 1~6 [Input number]	
INNAME	Show the names of all inputs.	
OUTNAME N1 N2	Set the name of output N1 to N2.	
	N1 = A~B [Output letter]	
	N2 = {name} [8 characters max]	
OUTNAME N1	Show the name of output N1.	
	N1 = A~B [Output letter]	
OUTNAME	Show the names of all inputs.	
A N1	Set the input to be routed to output A.	
	N1 = 1~6 [Input number]	
Α	Show the current input routing for output A.	
B N1	Set the input to be routed to output B.	
	N1 = 1~6 [Input number]	
В	Show the current input routing for output B.	



COMMAND	DESCRIPTION AND PARAMETERS		
OUT N1	Set a single input to be routed to both		
	outputs (A & B).		
	N1 = 1~6 [Input number]		
OUT	Show the current input routing for both		
	outputs.		
PRESET N1 N2	Set the routing for preset N1 to configuration N2.		
	N1 = 1~6 [Preset number]		
	N2 = AxBx [x = 1~6]		
PRESET N1	Activate preset N1.		
	N1 = 1~6 [Preset number]		
PRESET	Show the current preset routing		
	configuration.		
SOURCEDET	Show all source detection information.		
SINKINFO	Show all sink information.		
HDCPIN N1 N2	Set the HDCP mode for input N1.		
	N1 = 1~6 [Input number]		
	Available values for N2:		
	0 [Standard]		
	1 [Apple Mode]		
HDCPIN N1	Show the HDCP settings for input N1.		
	N1 = 1~6 [Input number]		
HDCPIN	Show all current HDCP input settings.		
EDIDMODE N1	Set the EDID mode.		
	Available values for N1:		
	0 [Appoint]		
	1 [All]		
EDIDMODE	Show the current EDID mode setting.		



COMMAND	DESCRIPTION	N AND PARAMETERS
EDIDALL	Set the EDID to use in "All" mode.	
	Available values for N1:	
	0	[OUTPUT A]
	1	[OUTPUT B]
	2	[FHD/2ch]
	3	[FHD/Mch]
	4	[4K UHD/2ch]
	5	[4K UHD/Mch]
	6	[4K UHD+/2ch]
	7	[4K UHD+/Mch]
EDIDALL	Show the cu	urrent EDID selection for "All"
	mode.	
EDIDIN N1 N2	Set the EDID to use in "Appoint" mode.	
	N1 = 1~6	[Input number]
	Available values for N2:	
	0	[OUTPUT A]
	1	[OUTPUT B]
	2	[FHD/2ch]
	3	[FHD/Mch]
	4	[4K UHD/2ch]
	5	[4K UHD/Mch]
	6	[4K UHD+/2ch]
	7	[4K UHD+/Mch]
EDIDIN N1	Show the current EDID selection for input N1	
	in "Appoint" mode.	
	N1 = 1~6	[Input number]
EDIDIN	Show the cu	urrent EDID selections for all inputs
	in "Appoint" mode.	
FADEFAULT	Reset the unit to the factory defaults.	
REBOOT	Reboot the unit.	



COMMAND	DESCRIPTION AND PARAMETERS
LOCK N1	Set the front panel lock state for the unit.
	Available values for N1:
	0 [Off]
	1 [On]
LOCK	Show the current front panel lock state.
VER	Show the unit's current firmware version.
IPCONFIG	Show the current IP configuration.
SIPADDR N1	Set the static IP Address.
	N1 = X.X.X.X [X = 0~255]
SNETMASK N1	Set the Ethernet netmask.
	N1 = X.X.X.X [X = 0~255]
SGATEWAY N1	Set the Ethernet gateway.
	N1 = X.X.X.X [X = 0~255]
HTTPPORT N1	Set the HTTP port.
	N1 = 0~65535
TELNETPORT N1	Set the Telnet port.
	N1 = 0~65535
IPMODE N1	Set the current IP address mode.
	Available values for N1:
	0 [Static IP]
	1 [DHCP]
READMAC	Show the unit's MAC address.
UPDATE	Update firmware.

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



6.7 Telnet Control

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

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

Once in the CLI (Command Line Interface) type "Telnet" followed by the IP address of the unit and "23", then hit "Enter".

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

This will connect us to the unit we wish to control. Type "help" to list the available commands.

Note: The unit's default IP address is 192.168.1.50. If the IP address is changed then the IP address required for Telnet access will also change accordingly.



6.8 WebGUI Control

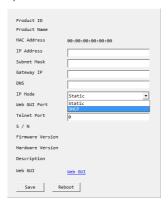
6.8.1 Device Discovery APP

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. (The unit's default IP address is 192.168.1.50)



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



- 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".
- 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.



6.8.2 WebGUI Overview

All functions, including status, power, input selection, preset activation & management, EDID management, HDCP management, Ethernet settings, and reset/firmware functions are controllable via multiple tabs in the WebGUI interface allowing for intuitive operation. To view the contents of a tab, click on the appropriate button at the bottom of the window. The individual tabs and functions will be introduced in the following sections.

Status

The status tab provides access to information about the current routing selection and power state. It also provides information about each preset's configuration as well as a button to instantly activate each preset.



To activate a stored preset, click on the appropriate button. The new routing will take effect immediately.



I/O Status

This tab provides detailed information about all connected sink devices including type, manufacturer name, native resolution, color depth, 3D support, 4K support and audio format support as well as basic source detection information.



When a live input source is detected on one of the 6 HDMI inputs the corresponding input in this tab will display "ON". If no source is detected on that input, it will display "OFF".

The six HDMI input ports and two HDMI output ports may be freely renamed. Each name can be up to 8 characters long. Please click the associated "Save Name" button to store any changes made.



Matrix Control

This tab provides direct control over the unit's power state, input/output routing, and EDID management. A way to reboot the unit, or perform a factory reset is also provided.



Any of the available inputs may be selected as a source for either of the two outputs by selecting the preferred input from the dropdown next to the "Output A" and "Output B" text.



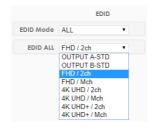
It is also possible to select a single source to be routed to both outputs quickly by selecting a source from the "Output All From" dropdown. Selecting "Masked" will output a blank video signal with no audio.

The EDID section of the Matrix Control tab controls the EDID management for the unit. All inputs can share the same assigned EDID, or each input can have a discrete EDID assigned to it.

Note: Changes to the EDID selection will result in a brief blanking of the video signal.



- Selecting the "ALL" mode will send the selected EDID to all inputs.
- Selecting the "APPOINT" mode allows each input to have a different EDID assigned to it.



The available EDID options are:

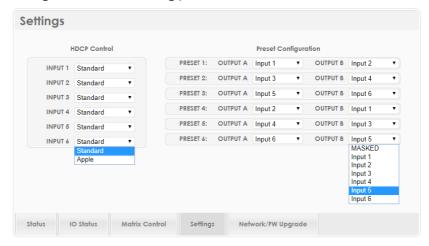
- **OUTPUT A:** EDID is passed from the currently connected display
- OUTPUT B: EDID is passed from the currently connected display
- FHD/2ch: 1080p@60Hz, 8-bit & LPCM 2.0
- FHD/Mch: 1080p@60Hz, 8-bit & LPCM 7.1/Bitstream/HD Bitstream
- 4K UHD/2ch: 4K@30Hz, 8-bit & LPCM 2.0
- 4K UHD/Mch: 4K@30Hz. 8-bit & LPCM 7.1/Bitstream/HD Bitstream
- 4K UHD+/2ch: 4K@60Hz (4:4:4), 8-bit & LPCM 2.0
- 4K UHD+/Mch: 4K@60Hz (4:4:4), 8-bit & LPCM 7.1/Bitstream/HD Bitstream

The unit can also be powered on or off from this tab. Note that Ethernet, RS-232, and IR will remain active while the unit is in "OFF" (stand-by) mode. To perform a factory reset on the unit, please click the "Factory Reset" button. To reboot the unit, please click the "Reboot" button.



Settings

This tab allows for control over each inputs HDCP mode as well as configuration of all 6 routing presets.



The HDCP mode for each input may be switched between the "Standard" and "Apple" modes. "Apple" mode allows for the display of non-HDCP required content from Apple, and similar, devices on non-HDCP displays.

Note: Changes to the HDCP mode may result in a brief blanking of the video signal.

All 6 routing presets may be set here as well. Select the preferred video source (or "Masked" for a blank video signal with no audio) for each output to be recalled when the specified preset is activated.



Network/FW Upgrade

This tab provides control over the unit's network settings as well as providing a simple way to update the unit's firmware, if necessary.



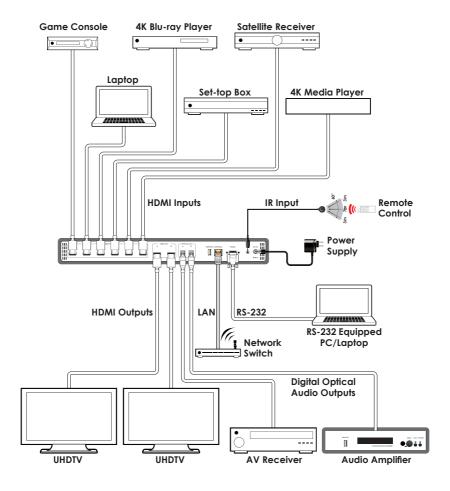
The Address Type dropdown allows selection between Static IP (manual configuration) or DHCP (automatic IP configuration) modes. When in STATIC mode the IP address, netmask and gateway can be defined manually. The HTTP and Telnet ports can also be changed from their defaults here. After making any changes, please press "Save" to store the new settings in the unit. If the IP address has been changed, it will be necessary to re-connect to the WebGUI using the new IP address.

The Firmware Upgrade section of this tab provides a way to easily update the firmware of the unit.

- **BROWSE:** Click the "BROWSE" button to select the firmware update *.bin file which is located on your local PC.
- **UPDATE**: Click the "UPDATE" button to begin the firmware update process.



7. CONNECTION DIAGRAM





8. SPECIFICATIONS

8.1 Technical Specifications

Video Bandwidth 600MHz/18Gbps

Input Ports 6×HDMI
Output Ports 2×HDMI

2×TOSLINK (S/PDIF Audio)

Control Interfaces 1×IR Extender (3.5mm)

1×RS-232 (9-pin D-sub) 1×IP Control (RJ45)

Supported Resolutions 480i@60Hz - 4K@60Hz (4:4:4, 8-bit)

VGA@60Hz - WUXGA@60Hz (RB)

HDMI Cable Length 10m (1080p@60Hz, 12-bit)

5m (4K@60Hz, 4:4:4, 8-bit)

IR Frequency 30 - 50kHz (30 - 60kHz under ideal

conditions)

Baud Rate 115200bps

Power Supply 5V/3A DC (US/EU standards, CE/FCC/UL

certified)

ESD Protection Human Body Model:

±12kV (Air Discharge)

±8kV (Contact Discharge)

Dimensions 438mm×44mm×269mm (W×H×D)

[Case Only]

482mm×52mm×276mm (W×H×D)

[All Inclusive]

Weight 2,840g
Chassis Material Metal
Silkscreen Color Black

Operating Temperature $0^{\circ}\text{C} - 40^{\circ}\text{C}/32^{\circ}\text{F} - 104^{\circ}\text{F}$ Storage Temperature $-20^{\circ}\text{C} - 60^{\circ}\text{C}/-4^{\circ}\text{F} - 140^{\circ}\text{F}$



Relative Humidity 20 - 90% RH (Non-condensing)

Power Consumption 12.65W

8.2 Video Specifications

Supported Resolutions (Hz)	Input	Output
640×480@60/72/75/85	✓	✓
800×600@60/72/75/85	✓	✓
1024×768@60/70/75	✓	✓
1366×768@60	✓	✓
1280×1024@60	✓	✓
1600×1200@60	✓	✓
1920×1200@60	✓	✓
480i/576i	✓	✓
480p/576p	✓	✓
720p@50/60	✓	✓
1080i@50/60	✓	✓
1080p@24/50/60	✓	✓
3840×2160p@24/25/30	✓	✓
4096×2160p@24/50/60	✓	✓



9. ACRONYMS

ACRONYM	COMPLETE TERM
CLI	Command Line Interface
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GUI	Graphical User Interface
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
НТТР	HyperText Transfer Protocol
IP	Internet Protocol
IR	Infrared
LPCM	Linear Pulse-Code Modulation
PC	Personal Computer
S/PDIF	Sony/Philips Digital Interface Format
UHD	Ultra-High-Definition
USB	Universal Serial Bus
VGA	Video Graphics Array (640×480@60Hz)
WUXGA	Wide Ultra Extended Graphics Array (1920×1200@60Hz)

