CPLUS-V2PEL

4K UHD+ HDMI to Dual HDMI Scaler with Signal Event Automation

HDMI
HIGH-DEFINITION MULTIMEDIA INTERFACE

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.

REVISION HISTORY

VERSION NO.	DATE	SUMMARY OF CHANGE
RDV1	18/05/18	Preliminary release
VS1	21/05/18	Final technical review

CONTENTS

1. INTRODUCTION

This HDMI 4K UHD Scaler with Test Patterns and Signal Event Automation is designed to upscale 1080p signals into 4K UHD (18Gbps) or downscale 4K UHD (18Gbps) signals into 1080p with synchronized digital audio output. A friendly and simple interface design allows the user to control the unit while viewing the OSD directly on the HDMI outputs. The input signal can be output to both HDMI outputs simultaneously with a different resolution on each or the unit can generate a test pattern at a preferred video resolution for easy on-site display testing and validation.

Additional functionality such as EDID and HDCP management, and basic signal event automation (via RS-232 or CEC) is also provided. This UHD Scaler is the best tool to use with your HD and UHD signals. This unit can be controlled easily by use of the front panel controls (with OSD) or by RS-232.

2. APPLICATIONS

- HDMI signal splitting
- On-site equipment testing
- Production testing
- R&D design and testing

3. PACKAGE CONTENTS

- 1×HDMI to Dual HDMI Scaler
- 1×5V/2.6A DC Power Adapter
- 2×3-pin Terminal Block to 9-pin D-sub Adapter Cable
- 1×Shockproof Feet (Set of 4)
- 1×Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI input source equipment such as a media player, video game console or set-top box.
- 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 with HDR support
- DVI 1.0 compliant with the use of an HDMI-DVI adaptor
- HDCP 2.2 and HDCP 1.x compliant
- 1 HDMI input and 2 HDMI outputs
- Supports HDCP 2.2 to HDCP1.4 conversion
- HDMI signal bypass on both outputs or upscales 1080p signals to 4K on output B and downscales 4K signals to 1080p on output A
- Supports HD resolutions up to 3840×2160@60Hz (4:4:4, 8-bit)
- Supports 4K HDR at 24/30Hz (YUV 4:4:4) and 50/60Hz (YUV 4:2:0) with up to 12- bit color
- Supports 16-bit Deep Color up to 1080p@60Hz
- Supports pass-through of many audio formats including LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream
- Supports color space conversion of 4K@50/60Hz (4:4:4, 8-bit) or 4K@any (10/12-bit) sources
- Integrated EDID and HDCP management
- Basic signal event automation (via RS-232 or CEC)
- Test pattern generation at selected resolutions for on-site display testing
- Controllable via front panel with OSD, and RS-232

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel
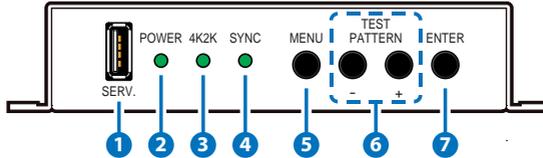
1 **SERV.:** This slot is reserved for firmware update and EDID upload use only.

2 **POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.

3 **4K2K LED:** This LED will illuminate when the input source contains a 4K UHD signal.

4 **SYNC LED:** This LED will illuminate when the input source is sending signal.

5 **MENU Button:** Press to enter the OSD menu, or to back out from menu item.

6 **− & +/TEST PATTERN Buttons:** When the OSD menu is in use, press these buttons to move within the menu. Outside of the OSD, press these buttons together to instantly set the output timing to 1280x720@60Hz and display test patterns on both outputs.

7 **ENTER Button:** Press to confirm a selection within the OSD or to go deeper into a menu item.

6.2 Rear Panel
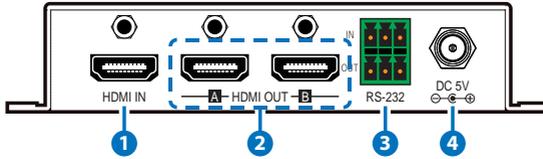
1 **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.

2 **HDMI OUT A~B:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output. Each output can display a different resolution with a choice between the HDMI source or a test pattern.

3 **RS-232:** Connect the upper 3-pins directly to a PC, laptop or other serial control device to send RS-232 commands to control the unit. Connect the lower 3-pins directly to a serial controllable device to send signal event automation RS-232 commands to it.

4 **DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.

6.3 OSD Menu

All primary functions of this unit can be controlled by using the OSD (On Screen Display) which is activated by pressing the Menu button on the front of the unit. Use the + (PLUS), − (MINUS), and ENTER buttons to navigate the OSD menu. Press the Menu button to back out from any menu item and then press it again to close the menu.

MAIN MENU STRUCTURE
Output
EDID
HDCP
OSD
Test Pattern A
Test Pattern B
Information
Firmware Update
EDID Upload
Factory Setting

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

OUTPUT	
2nd Level	3rd Level
Output A	
Input 4K2K	**PASS THROUGH**
	Down Scaler 1080P
	Fix Color YUV 4:2:0
	Fix Deep Color 8 bit
	YUV 4:2:x to RGB
	Fix Color RGB
Output B	
Input 1080P	**PASS THROUGH**

OUTPUT	
2nd Level	**3rd Level**
Input 1080P	Up Scaler 4K2K
	Up Scaler 4K2K YUV 4:2:0
Input 4K2K	**PASS THROUGH**
	Fix Color YUV 4:2:0
	Fix Deep Color 8 bit
	YUV 4:2:x to RGB
	Fix Color RGB
Up 4K2K Scaler Enhancement	
Gain	Level 1 (Weak)
	Level 2
	LEVEL 3
	Level 4
	Level 5
	Level 6 (Strong)

Output A

1) **Input 4K2K:** Controls the scaling of 4K sources on Output A.

- **Pass Through:** Will pass all 4K sources without modification.
- **Down Scaler 1080P:** Will convert all 4K sources to 1080P at the same frame rate as the original.
- **Fix Color YUV 4:2:0:** Will convert 4K@50/60 (4:4:4) sources to the YUV 4:2:0 color space.
- **Fix Deep Color 8 bit:** Will reduce any 4K sources with a bit depth above 8-bit to 8-bit color.
- **YUV 4:2:x to RGB:** Will convert any 4K source using the YUV 4:2:2 or 4:2:0 color space to the RGB color space.
- **Fix Color RGB:** Will convert any 4K source using the YUV color space to the RGB color space.

Output B

2) **Input 1080P:** Controls the scaling of 1080P sources on Output B.

- **Pass Through:** Will pass 1080p sources without modification.
- **Up Scaler 4K2K:** Will scale all 1080p sources to 4K(4:4:4) at the same frame rate.
- **Up Scaler 4K2K YUV 4:2:0:** Will scale all 1080p@50/60Hz sources to 4K(4:2:0) at the same frame rate.

3) **Input 4K2K:** Controls the scaling of 4K sources on Output B.

- **Pass Through:** Will pass all 4K sources without modification.
- **Fix Color YUV 4:2:0:** Will convert 4K@50/60 (4:4:4) sources to the YUV 4:2:0 color space.
- **Fix Deep Color 8 bit:** Will reduce any 4K sources with a bit depth above 8-bit to 8-bit color.
- **YUV 4:2:x to RGB:** Will convert any 4K source using the YUV 4:2:2 or 4:2:0 color space to the RGB color space.
- **Fix Color RGB:** Will convert any 4K source using the YUV color space to the RGB color space.

Up 4K2K Scaler Enhancement

1) **Gain:** Provides control over the aggressiveness of the digital gain processing when applied to the scaled output image.

EDID
2nd Level
INTERNAL FHD 2CH
Internal FHD 8CH
Internal UHD 2CH
Internal UHD 8CH
Internal UHD+ 2CH
Internal UHD+ 8CH
User
Sink Output A
Sink Output B

1) **EDID:** Select the EDID to use with the HDMI input.

HDCP
2nd Level
HDCP Support Off
Reference to Source
REFERENCE TO DISPLAY

1) HDCP: Selects the HDCP logic to use with the HDMI input.

OSD	
2nd Level	**3rd Level**
Display Information	**ON**
	Off
OSD Timeout	Off
	5 SEC.
	10 Sec.
	15 Sec.
	20 Sec.
	25 Sec.
	30 Sec.
	35 Sec.
	40 Sec.

1) Display Information: Enable or disable the informational OSD.

2) OSD Timeout: Set the length of time to wait before automatically turning off the OSD menu if there is no user interaction. The timer may also be disabled.

TEST PATTERN A	
2nd Level	**3rd Level**
Mode	**OFF**
	On
	Auto Pattern
	Auto Timing
Pattern	**WHITE COLOR**
	Red Color
	Green Color
	Blue Color
	Magenta Color
	Yellow Color
	Cyan Color
	Color Bar
	Ramp
	Toggle
Resolution	720×480p@60
	720×576p@50
	1280×720p@50
	1280×720P@60
	1920×1080p@50
	1920×1080p@60
	3840×2160p@24
	3840×2160p@25
	3840×2160p@30
	4096×2160p@24
	4096×2160p@25
	4096×2160p@30
HDCP	**DISABLE**
	Enable

TEST PATTERN A	
2nd Level	**3rd Level**
Switch Time	**10 SEC.**
	20 Sec.
	30 Sec.
	40 Sec.
	50 Sec.
	1 Min.
	2 Min.
	3 Min.
	5 Min.
Auto Timing Select	720×480p@60
	720×576p@50
	1280×720p@50
	1280×720p@60
	1920×1080p@50
	1920×1080p@60
	3840×2160p@24
	3840×2160p@25
	3840×2160p@30
	4096×2160p@24
	4096×2160p@25
	4096×2160p@30

1) **Mode:** Enable or disable the test pattern function on Output A.

   ■ **Auto Pattern:** Will make the test patterns automatically change based on the "Switch Time" setting.

   ■ **Auto Timing:** Will show the selected test pattern and make the output resolution automatically change based on the "Switch Time" setting and the resolutions enabled under "Auto Timing Select".

2) **Pattern:** Selects the test pattern to output.

3) **Resolution:** Selects the output resolution to use.

4) **HDCP:** Enable or disable HDCP while outputting the test pattern.

5) **Switch Time:** Select the length of time between pattern or resolution changes in the "Auto Pattern" and "Auto Timing" modes.

6) **Auto Timing Select:** Select the resolutions to rotate through when the "Auto Timing" mode has been enabled.

TEST PATTERN B	
2nd Level	**3rd Level**
Mode	**OFF**
	On
	Auto Pattern
	Auto Timing
Pattern	**WHITE COLOR**
	Red Color
	Green Color
	Blue Color
	Magenta Color
	Yellow Color
	Cyan Color
	Color Bar
	Ramp
	Toggle
Resolution	720×480p@60
	720×576p@50
	1280×720p@50
	1280×720P@60
	1920×1080p@50
	1920×1080p@60
	3840×2160p@24

TEST PATTERN B	
2nd Level	**3rd Level**
Resolution	3840×2160p@25
	3840×2160p@30
	4096×2160p@24
	4096×2160p@25
	4096×2160p@30
HDCP	**DISABLE**
	Enable
Switch Time	**10 SEC.**
	20 Sec.
	30 Sec.
	40 Sec.
	50 Sec.
	1 Min.
	2 Min.
	3 Min.
	5 Min.
Auto Timing Select	720×480p@60
	720×576p@50
	1280×720p@50
	1280×720p@60
	1920×1080p@50
	1920×1080p@60
	3840×2160p@24
	3840×2160p@25
	3840×2160p@30
	4096×2160p@24
	4096×2160p@25
	4096×2160p@30

1) **Mode:** Enable or disable the test pattern function on Output A.

   ■ **Auto Pattern:** Will make the test patterns automatically change based on the "Switch Time" setting.

   ■ **Auto Timing:** Will show the selected test pattern and make the output resolution automatically change based on the "Switch Time" setting and the resolutions enabled under "Auto Timing Select".

2) **Pattern:** Selects the test pattern to output.

3) **Resolution:** Selects the output resolution to use.

4) **HDCP:** Enable or disable HDCP while outputting the test pattern.

5) **Switch Time:** Select the length of time between pattern or resolution changes in the "Auto Pattern" and "Auto Timing" modes.

6) **Auto Timing Select:** Select the resolutions to rotate through when the "Auto Timing" mode has been enabled.

INFORMATION	
2nd Level	**3rd Level**
Timing	
Input	[Current Status Details]
Output A	
Output B	
HDCP	
Output A	[Current Status Details]
Output B	
Firmware Version	[Current Firmware Version]

1) **INFORMATION:** This screen displays information about the unit's current state, input and output status, as well as the current firmware version.

FIRMWARE UPDATE	
2nd Level	3rd Level
Are You Sure?	**NO**
	Yes

1) **Firmware Update:** Provides a way to update the unit's firmware. Insert a USB thumb drive, with a valid firmware file (*.bin format) in the root directory, into the unit's USB service port then select this option. After the update is complete the unit will automatically reboot.

EDID UPLOAD	
2nd Level	3rd Level
Are You Sure?	**NO**
	Yes

1) **EDID UPLOAD:** Provides a way to upload a previously saved user EDID. Insert a USB thumb drive, with a valid EDID file (*.bin format) in the root directory, into the unit's USB service port then select this option. After the upload is complete the EDID will be available under the EDID option as "User".

FACTORY SETTING	
2nd Level	3rd Level
Are You Sure?	**NO**
	Yes

1) **FACTORY SETTING:** Selecting this will reset all of the unit's settings back to their factory defaults.

6.4 RS-232 Control

Terminal Block In	
Pin	**Definition**
1	TX
2	RX
3	GND

Terminal Block Out	
Pin	**Definition**
1	TX
2	RX
3	GND

Controlling PC	
Pin	**Definition**
1	
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

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

6.5 RS-232 Commands

COMMAND
Description and Parameters
?↵
Show the full command list.
? N1↵
Show information about command **N1**.   **N1** = {command}　　　　[RS-232 command]
HELP↵
Show the full command list.
HELP N1↵
Show information about command **N1**.   **N1** = {command}　　　　[RS-232 command]

COMMAND
Description and Parameters
GET FW VER↵
Show the current firmware version.
GET MODEL NAME↵
Show the unit's model name.
SET FACTORY DEFAULT↵
Reset the unit to the factory defaults.
SET SYSTEM REBOOT↵
Reboot the unit.
SET UART 1 BAUDRATE N1↵
Set the RS-232 baud rate to **N1**.
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 RS-232 baud rate.
SET UART 1 STOP BIT N1↵
Set the RS-232 stop bits to **N1**.
N1 = 1 ~ 2   [Stop bits]
GET UART 1 STOP BIT↵
Show the current RS-232 stop bits.
SET UART 1 DATA BIT N1↵
Set the RS-232 data bits to **N1**.
N1 = 5 ~ 8   [Data bits]

COMMAND
Description and Parameters
GET UART 1 DATA BIT↵
Show the current RS-232 data bits.
SET UART 1 PARITY N1↵
Set the RS-232 parity value.
Available values for **N1**: 0 [None] 1 [Odd] 2 [Even]
GET UART 1 PARITY↵
Show the current RS-232 parity value.
SET IN 1 NAME N1↵
Set the text name for the Input.
N1 = {Name string}   [Input name]
GET IN 1 NAME↵
Show the Input's current text name.
SET OUT N1 NAME N2↵
Set the text name for Output **N1**.
N1 = A ~ B   [Output port]
N2 = {Name string}   [Output name]
GET OUT N1 NAME↵
Show the current text name for Output **N1**.
N1 = A ~ B   [Output port]
GET IN NAME LIST↵
Show all Input text names.
GET OUT NAME LIST↵
Show all Output text names.

COMMAND
Description and Parameters

GET IN 1 HACTIVE↵

Show the current number of horizontal active pixels from the source on the Input.

GET IN 1 VACTIVE↵

Show the current number of vertical active pixels from the source on the Input.

GET IN 1 REFRESH RATE↵

Show the current refresh rate of the source on the Input.

GET IN 1 INTERLACE↵

Show the current interlace state of the source on the Input.

GET IN 1 SYNC STATUS↵

Show the current sync status of the source on the Input.

SET IN 1 EDID N1↵

Set the EDID to use with the Input.

Available values for **N1**:

1	[FHD 2CH]
2	[FHD MCH]
3	[UHD 2CH]
4	[UHD MCH]
5	[UHD+ 2CH]
6	[UHD+ MCH]
7	[User 1]
8	[Sink A]
9	[Sink B]

GET IN 1 EDID↵

Show the currently selected EDID used by the Input.

GET EDID LIST↵

List all available EDID selections.

COMMAND
Description and Parameters
SET USER 1 EDID DATA N1↵
Upload a new User EDID in HEX format. **N1** = {EDID data in hh,hh,hh,hh,... HEX pair format}
GET USER 1 EDID DATA↵
Show the Current User EDID as HEX data.
GET SINK N1 EDID DATA↵
Show the EDID from Output **N1** as HEX data. **N1** = A ~ B   [Output port]
GET IN 1 EDID DATA↵
Show the EDID currently used by the input as HEX data.
GET INTERNAL N1 EDID DATA↵
Show Internal EDID **N1** as HEX data. **N1** = 1 ~ 6   [Internal EDID number]
SET IN 1 HDCP MODE N1↵
Set the unit's HDCP behavior. Available values for **N1**: 0   [Disable HDCP] 1   [Follow source] 2   [Follow display]
GET IN 1 HDCP MODE↵
Show the unit's current HDCP behavior setting.
GET IN 1 HDCP STATUS↵
Show the current status of HDCP on the Input. Available responses: 0   [No HDCP] 1   [HDCP 1.x] 2   [HDCP 2.2]

COMMAND
Description and Parameters
GET OUT N1 HDCP STATUS↵
Show the current status of HDCP on Output **N1**.

N1 = A ~ B   [Output port]

Available responses:

0	[No HDCP]
1	[HDCP 1.x]
2	[HDCP 2.2]
3	[HDCP 1.x failed]
4	[HDCP 2.x failed]

GET OUT N1 HDCP ABILITY↵

Show the detected HDCP capability of Output **N1**.

N1 = A ~ B   [Output port]

Available responses:

0	[No HDCP support]
1	[HDCP 1.x only]
2	[HDCP 2.2 only]
3	[HDCP 1.x + 2.2]

GET IN 1 HDCP ABILITY↵

Show the detected HDCP capability of the Input.

Available responses:

0	[No HDCP support]
1	[HDCP 1.x only]
2	[HDCP 2.2 only]
3	[HDCP 1.x + 2.2]

GET AUTOMATION EVENT LIST↵

List all available automation event types.

COMMAND
Description and Parameters
SET AUTOMATION EVENT N1 UART A N2↵
Enable or disable RS-232 automation event type **N1**. Available values for **N1**: 1   [Power on] 2   [Out A sync active] 3   [Out A sync lost] 4   [Out B sync active] 5   [Out B sync lost] **N2** = ON, OFF   [Enable/Disable event type]
GET AUTOMATION EVENT N1 UART A↵
Show the current state of RS-232 automation event type **N1**. Available values for **N1**: 1   [Power on] 2   [Out A sync active] 3   [Out A sync lost] 4   [Out B sync active] 5   [Out B sync lost]
SET AUTOMATION EVENT N1 UART A COMMAND N2↵
Set the RS-232 command to send when automation event **N1** is triggered. Available values for **N1**: 1   [Power on] 2   [Out A sync active] 3   [Out A sync lost] 4   [Out B sync active] 5   [Out B sync lost] **N2** = {Command}   [Command to send]

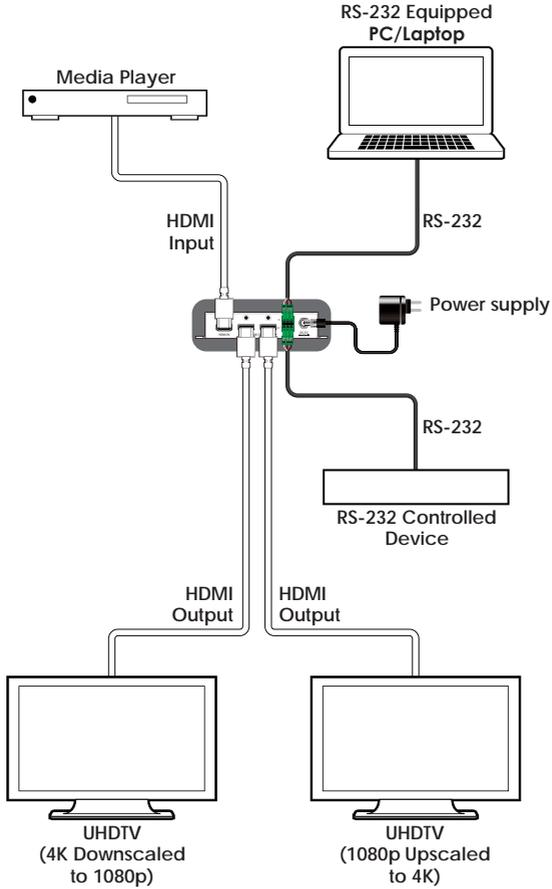| COMMAND |
| --- |
| **Description and Parameters** |
| **GET AUTOMATION EVENT N1 UART A COMMAND**↵ |
| Show the currently defined RS-232 command to send when automation event **N1** is triggered.

Available values for **N1**:
1   [Power on]
2   [Out A sync active]
3   [Out A sync lost]
4   [Out B sync active]
5   [Out B sync lost] |
| **SET AUTOMATION EVENT N1 UART A DELAY N2 SEC**↵ |
| Set the delay (in seconds) to wait before triggering RS-232 automation event **N1**.

Available values for **N1**:
1   [Power on]
2   [Out A sync active]
3   [Out A sync lost]
4   [Out B sync active]
5   [Out B sync lost]
N2 = 0 ~ 240   [Delay in seconds] |
| **GET AUTOMATION EVENT N1 UART A DELAY**↵ |
| Show the currently set delay (in seconds) to wait before triggering RS-232 automation event **N1**.

Available values for **N1**:
1   [Power on]
2   [Out A sync active]
3   [Out A sync lost]
4   [Out B sync active]
5   [Out B sync lost] |

COMMAND

Description and Parameters

SET AUTOMATION EVENT N1 UART A WAIT N2 SEC↵

Set the wait time (in seconds) before sending a command after RS-232 automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = 0 ~ 240	[Wait time in seconds]

GET AUTOMATION EVENT N1 UART A WAIT↵

Show the currently set wait time (in seconds) observed before sending a command after RS-232 automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]

GET AUTOMATION EVENT CEC COMMAND LIST↵

List all available CEC commands for use with automation events.

SET AUTOMATION EVENT N1 CEC N2 N3↵

Enable or disable CEC automation event type **N1**.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]

COMMAND

Description and Parameters

N2 = A ~ B	[Target output port]
N3 = ON, OFF	[Enable/Disable event type]

GET AUTOMATION EVENT N1 CEC N2↵

Show the current state of CEC automation event type **N1**.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]

SET AUTOMATION EVENT N1 CEC N2 COMMAND N3↵

Set the CEC command to send when automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]

Available values for **N3**:

0	[TV power off]
1	[TV power on]

COMMAND
Description and Parameters
GET AUTOMATION EVENT N1 CEC N2 COMMAND↵

Show the currently defined CEC command to send when automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]

SET AUTOMATION EVENT N1 CEC N2 DELAY N3 SEC↵

Set the delay (in seconds) to wait before triggering CEC automation event **N1**.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]
N3 = 0 ~ 240	[Delay in seconds]

GET AUTOMATION EVENT N1 CEC N2 DELAY↵

Show the currently set delay (in seconds) to wait before triggering CEC automation event **N1**.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]

COMMAND
Description and Parameters

5	[Out B sync lost]
N2 = A ~ B	[Target output port]

SET AUTOMATION EVENT N1 CEC N2 WAIT N3 SEC↵

Set the wait time (in seconds) before sending a command after CEC automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]
N3 = 0 ~ 240	[Wait time in seconds]

GET AUTOMATION EVENT N1 CEC N2 WAIT↵

Show the currently set wait time (in seconds) observed before sending a command after CEC automation event **N1** is triggered.

Available values for **N1**:

1	[Power on]
2	[Out A sync active]
3	[Out A sync lost]
4	[Out B sync active]
5	[Out B sync lost]
N2 = A ~ B	[Target output port]

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

7. CONNECTION DIAGRAM

RS-232 Equipped
PC/Laptop

Media Player

HDMI
Input

RS-232

Power supply

RS-232

RS-232 Controlled
Device

HDMI
Output

HDMI
Output

UHDTV
(4K Downscaled
to 1080p)

UHDTV
(1080p Upscaled
to 4K)

8. SPECIFICATIONS

8.1 Technical Specifications

HDMI Bandwidth	600MHz/18Gbps
Input Port	1×HDMI
Output Ports	2×HDMI
Control Ports	2×RS-232 (3-pin Terminal Blocks)
Baud Rate	Up to 115200bps
Power Supply	5V/2.6A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body Model: ±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions	128mm×25mm×75mm (W×H×D) [Case Only] 128mm×25mm×83mm (W×H×D) [All Inclusive]
Weight	272g
Chassis Material	Metal
Silkscreen 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	4.3W

8.2 Video Specifications

8.2.1 Supported Resolutions

Supported PC Resolution (Hz)		HDMI Input	HDMI Output
800×600	56/60/72/75/85	✓	✓
1024×768	60/70/75/85	✓	✓
1280×768	60/75	✓	✓
1280×800	60/75	✓	✓
1280×1024	60/75	✓	✓
1366×768	60	✓	✓
1400×1050	60/75	✓	✓
1440×900	60/75	✓	✓
1600×900	60	✓	✓
1600×1200	60	✓	✓
1680×1050	60	✓	✓
1920×1200	60	✓	✓

Supported TV Resolution (Hz)		HDMI Input	HDMI Output
640×480i	60	✓	✓
640×480p	60	✓	✓
720×480p	60	✓	✓
720×576i	50	✓	✓
720×576p	50	✓	✓
1280×720p	50/60	✓	✓
1920×1080i	50/60	✓	✓
1920×1080p	24/25/30/50/60	✓	✓
3840×2160p	24/25/30/50/60	✓	✓
4096×2160p	24/25/30/50/60	✓	✓

8.2.2 4K Conversion Rules

DOWN 1080P		
Input Resolution (Hz)		**Output Resolution (Hz)**
3840×2160p@24	→	1920×1080p@24
3840×2160p@25	→	1920×1080p@25
3840×2160p@30	→	1920×1080p@30
3840×2160p@50	→	1920×1080p@50
3840×2160p@60	→	1920×1080p@60
4096×2160p@24	→	1920×1080p@24
4096×2160p@25	→	1920×1080p@25
4096×2160p@30	→	1920×1080p@30
4096×2160p@50	→	1920×1080p@50
4096×2160p@60	→	1920×1080p@60

UP 4K2K		
Input Resolution (Hz)		**Output Resolution (Hz)**
1920×1080p@24	→	3840×2160p@24
1920×1080p@25	→	3840×2160p@25
1920×1080p@30	→	3840×2160p@30
1920×1080p@50	→	3840×2160p@50
1920×1080p@60	→	3840×2160p@60

UP 4K2K (YUV 420)		
Input Resolution (Hz)		**Output Resolution (Hz)**
RGB & YCbCr 4:4:4/4:2:2		**YCbCr 4:2:0**
1920×1080p@50	→	3840×2160p@50
1920×1080p@60	→	3840×2160p@60

FIX 4K2K		
Input Resolution (Hz)		**Output Resolution (Hz)**
RGB & YCbCr 4:4:4/4:2:2		**YCbCr 4:2:0**
3840×2160p@50	→	3840×2160p@50
3840×2160p@60	→	3840×2160p@60
4096×2160p@50	→	4096×2160p@50
4096×2160p@60	→	4096×2160p@60

FIX 8 BITS		
Input Resolution (Hz)		**Output Resolution (Hz)**
RGB & YCbCr 4:4:4/4:2:2, 10/12/16-bit		**RGB & YCbCr 4:4:4/4:2:2, 8-bit**
3840×2160p@24	→	3840×2160p@24
3840×2160p@25	→	3840×2160p@25
3840×2160p@30	→	3840×2160p@30
4096×2160p@24	→	4096×2160p@24
4096×2160p@25		4096×2160p@25
4096×2160p@30		4096×2160p@30
YCbCr 4:2:0, 10/12/16-bit		**YCbCr 4:2:0, 8-bit**
3840×2160p@50	→	3840×2160p@50
3840×2160p@60	→	3840×2160p@60
4096×2160p@50	→	4096×2160p@50
4096×2160p@60	→	4096×2160p@60

8.3 Audio Specifications

Digital (HDMI) Input	
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192

Digital (HDMI) Output	
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192

8.4 Cable Specifications

| HDMI Cable Length | 1080p@60Hz | | 4K@30Hz | 4K@60Hz |
	8-bit	12-bit	8-bit	8-bit
Input	15m	10m	5m	3m
Output	15m	10m	5m	3m

9. ACRONYMS

ACRONYM	COMPLETE TERM
CEC	Consumer Electronics Control
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
LPCM	Linear Pulse-Code Modulation
OSD	On-Screen Display
PC	Personal Computer
UHD	Ultra-High-Definition
UHDTV	Ultra-High-Definition Television
USB	Universal Serial Bus
VGA	Video Graphics Array
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)