



User Manual

18G 2x1 HDMI / USB-C KVM Switcher w/ 100W Power Delivery

Model PT-PSW-21HC-KVM

Designed in Germany

Preface

Read this user manual carefully before using this product. Pictures shown in this manual are for reference only. Different model layouts and specifications are subject to the physical product.

This manual is for operation instructions only, not for any maintenance usage.

In the constant effort to improve our product, we reserve the right to make changes in functions or parameters without prior notice or obligation.

Trademarks

Product model and logo are trademarks. Any other trademarks mentioned in this manual are acknowledged as the properties of the trademark owner. No part of this publication may be copied or reproduced without prior written consent.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.



REACH | 1907/2006/EU

ROHS | 2011/65/EU

PureLink hereby declares that this product **PureTools PT-PSW-21HC-KVM** complies with Directives 1907/2006/EU and 2011/65/EU.

EMC / LVD (Electro Magnetic Compatibility / Low Voltage Directive)

PureLink GmbH hereby declares that this product **PureTools PT-PSW-21HC-KVM** complies with Directives 2014/30/EU and 2014/35/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

http://www.purelink.de/ce/4251364743409_CE.pdf



SAFETY PRECAUTIONS

To ensure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment
 - Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
 - Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
 - Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
 - Refer all servicing to qualified service personnel.
 - To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
 - Do not put any heavy items on the extension cable in case of extrusion.
 - Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
 - Install the device in a place with fine ventilation to avoid damage caused by overheating.
 - Keep the module away from liquids.
 - Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
 - Do not twist or pull by force ends of the optical cable. It can cause malfunction.
 - Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
 - Unplug the power cord when left unused for a long period of time.
 - Information on disposal for scrap devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.
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1. Product Introduction

1.1 Introduction

The PT-PSW-21HC-KVM is an 18G 2x1 HDMI / USB-C KVM Switcher. The switcher is designed to switch between a USB-C input and HDMI+USB-B inputs, to a single HDMI output and provide full Gigabit Ethernet, as well as access to 5Gbps SuperSpeed peripherals. The USB-C input provides an ideal interface for connecting to any modern laptop or USB-C video and data source. It also provides up to 100W Power Delivery. The HDMI input serves as a legacy laptop input or for an under-desk PC or meeting room PC. In addition, there are built-in EDID&HDCP settings, plus balanced audio de-embedding.

1.2 Feature

- 18G 2x1 switcher with HDMI & USB-C inputs;
- Supports HDMI 2.0, 4K@60Hz 4:4:4, HDR 10, HDCP 2.2;
- 5G data transfer rate from peripherals;
- Support PD 3.0 charging up to 100W;
- Support automatic 4K down-scaling to 1080P;
- Each device port provides 5V 900mA power supply;
- Balanced analog audio for output audio de-embedding.

1.3 Package List

- 1x PT-PSW-21HC-KVM
- 2x Mounting ears & 4x Screws
- 4x Rubber feet
- 1x Power adapter (24V, 6.5A)
- 1x 5-pin Terminal block
- 1x Manual

Note: Please contact your distributor immediately if any damage or defect in the components are found.

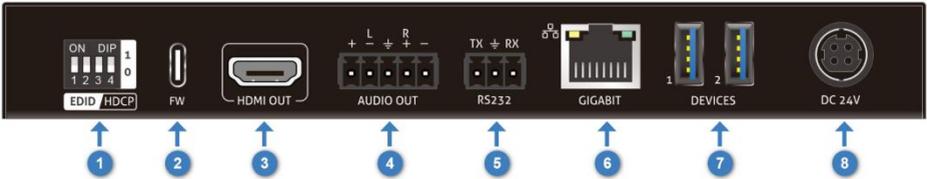
2. Panel Description

Front Panel



No.	Name	Description
①	Power LED	The LED illuminates blue when the device is powered on; The LED illuminates red when the device is in standby.
②	SELECT	The indicator light corresponding to the currently selected source is on. The indicator light of this button describes the mode: Blue light indicates Auto Mode; Red light indicates Manual Mode.
③	INPUT 1	1x Type-B USB port for host connection; 1x Type-A female HDMI input port to connect video source.
④	INPUT 2	1x Type-C USB with PD 3.0 100W charging to connect video source.
⑤	DISPLAY	Press ON to turn on the display. Press OFF to turn off the display. Press  to mute/unmute display audio.

Rear Panel



No.	Name	Description
①	EDID/HDCP	4-pin DIP switch for EDID/HDCP settings.
②	FW	1x USB-C port for firmware upgrade.
③	HDMI OUT	1x Type-A female HDMI output port to connect video display.
④	AUDIO OUT	1x 5-pin terminal block for balanced audio output.
⑤	RS232	1x 3-pin terminal block to connect control device (e.g. PC) or third-party device for RS232 control.
⑥	GIGABIT	1x RJ-45 port, network transparent transmission. Green light for Link, yellow light for data.
⑦	DEVICES	2x USB3.2 Gen1 Type-A ports(5Gbps) to connect KVM devices; Each device port provides 5V 900mA power supply.
⑧	DC 24V	DC port for power adapter connection.

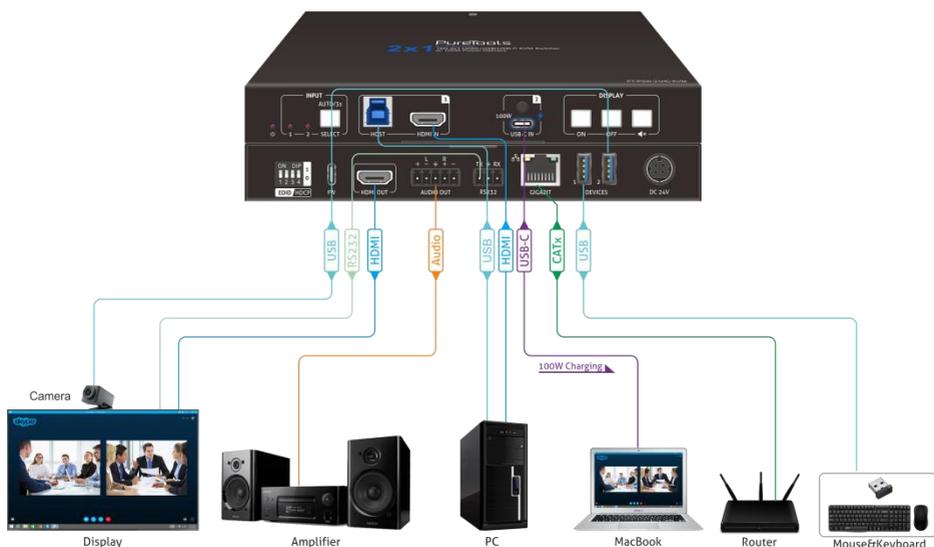
3. Specification

Video			
Input	1x HDMI IN(HDMI 2.0),1x USB-C IN(USB 3.2 Gen1)		
Input Connector	1x Type-A female HDMI,1x Type-C USB		
Input Resolution	Up to 4K 60Hz 4:4:4		
Output	1x HDMI OUT		
Output Connector	1x Type-A female HDMI		
Output Resolution	Up to 4K 60Hz 4:4:4		
Resolution			
UHD/HD/SD	4096x2160@60/50/30/25/24 Hz		
	3840x2160@60/50/30/25/24 Hz		
	1080p@60/59.9/50/30/29.97/25/24/23.98 Hz		
	1080i@30/29.97/25 Hz		
	720p@60/59.94/50 Hz		
	576p@50 Hz		
	576i@25 Hz		
	480p@60/59.96 Hz		
480i@30 Hz			
VESA	2560x1600	2048x1536	1920x1200
	1680x1050	1600x1200	1440x900
	1400x1050	1280x1024	1280x800
	1366x768	1360x768	1152x864
	1024x768	800x600	640x480
Analog Audio			
Fomat	1x AUDIO OUT (Stereo 2-Channel)		
Balanced Output	+6 dBu nominal gain, +8 dB headroom		
Frequency Response	20 Hz to 20 kHz, + 0.5 dB		

THD+N	<0.05% at 20 Hz to 20 kHz
SNR	> 90 dB at 1 kHz, zero clipping @ 0 dBFS, unweighted
Digital Audio	
Optical Output	PCM 2Ch (De-embedded)
HDMI Output	PCM 2Ch, LPCM 5.1, LPCM 7.1, Dolby® Digital, DTS® 5.1, Dolby Digital Plus™, Dolby TrueHD, DTS-HD Master Audio™
HDMI - PCM 2	PCM 2Ch
Sample Rate	44.1kHz,48kHz,96kHz,192kHz
Bit Rate	up to 24-bit
THD+N	<0.05% @ 1 kHz at maximum level
SNR	130dB
Frequency Range	20Hz to 20kHz
USB	
USB device version	USB 3.2Gen1 5Gbps
USB device connector	2x USB-A
USB device power	Max 4.5W per port
USB Host version	USB 3.2Gen1 5Gbps
USB Host power	Max PD 3.0 100W
Number of USB hubs	2 USB hub when transmitting USB 2.0 signals 1 USB hub when transmitting USB 3.0 signals
Ethernet	
Port	1x RJ45
Standards and Protocols	HTTPS, Telnet, mDNS
Speeds	10/100/1000 Mbps
Addressing	DHCP, Static - selectable through rear panel, IP & RS-232 commands, and built-in web server.
General	

HDCP Version	Input: HDCP 2.2, HDCP 1.4 compliant
Operation Temperature	-10 to +55°C(+14° to +131°F)
Storage Temperature	-25 to +70°C(-13° to +158°F)
Relative Humidity	10% to 90%, Non-condensing
Power Supply	DC24V 6.5A
Power Consumption	126W(Max)
Dimension (W*H*D)	195 x 24.5 x 125 mm
Net Weight	545g

4. System Diagram



5. Button Control

5.1 Manual Switching

When the switcher is in the manual switching mode, press the **SELECT** button repeatedly to cycle through the two video inputs, and the corresponding source LED illuminates red immediately.

5.2 Automatic Switching

Press and hold the **SELECT** button for at least three seconds to enable automatic switching.

When in the AUTO mode, the unit will switch according to the following rules:

- New host: Once detecting a new host, the unit will automatically select the new host.
- Pressing the **SELECT** button will forcibly change the host even in AUTO mode.
- After reboot: Once power is restored to the unit, it will automatically reconnect the host that was active before the reboot.
- Source removed: When an active host is removed, the switcher will switch to the other active host.
- Press and hold the **SELECT** button for at least three seconds and the unit will exit AUTO mode and the host will not change.

5.3 Display Control

Manual Control: Press the below **DISPLAY** buttons on the front panel to simultaneously send RS232 and CEC commands to control the display device.

ON: Display On.

OFF: Display Off.



: Mute/Unmute display audio.

6. EDID&HDCP Settings

The switch represents “0” when in the lower (**OFF**) position, and it represents “1” in the upper (**ON**) position.



6.1 EDID Settings

The Extended Display Identification Data (EDID) is used for the source device to match its video resolution with the connected display. By default, the source device obtains its EDID from the first connected display. Meanwhile, since the displays with different capabilities are connected to the switcher, pins1~3 of the DIP switch on the front panel can be used to set the EDID to a built-in fixed value.

Switch Status	Video Resolution	Audio Format
000 (Default)	Get the EDID of the display device	
001	1920x1080p@60Hz 4:4:4 8bit	Audio 2CH PCM
010	3840x2160@30Hz 4:4:4 8bit	Audio 2CH PCM
011	3840x2160@60Hz 4:4:4 8bit	Audio 2CH PCM
100	3840x2160@30Hz 4:4:4 8bit	Audio 7.1CH DTS/Dolby/HD
101	3840x2160@60Hz 4:4:4 8bit	Audio 7.1CH DTS/Dolby/HD
110	3840x2160@60Hz 4:4:4 8bit HDR	Audio 5.1CH DTS/Dolby
111	User Defined	

6.2 HDCP Settings

High-bandwidth Digital Content Protection (HDCP) is a copy-protection scheme to eliminate the possibility of capturing digital content from the source to the display. Pin4 of the DIP switch on the front panel can be used to set HDCP.

Switch Status	Description
1	HDCP follow display.
0(Default)	If the source has HDCP, the output will be set to HDCP1.4; If the source has no HDCP, the output will be set to no HDCP.

7. RS232 Control

Connect an RS232 cable to a control device (e.g. PC) with an RS232 cable. The switcher can then be controlled by sending RS232 commands. The baud rate is selectable as follows: 2400, 4800, 9600(default), 19200, 38400, 57600 or 115200.

7.1 RS232 Control Software

Here take the software **docklight** as an example.

- **Installation**

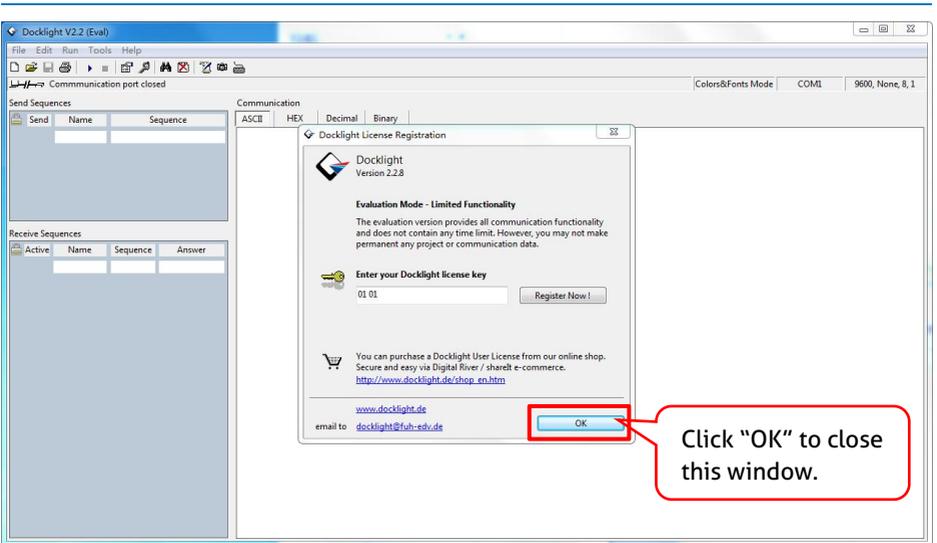
Please download the latest Software Version from the link below:

<https://docklight.de/download/Docklight.zip>

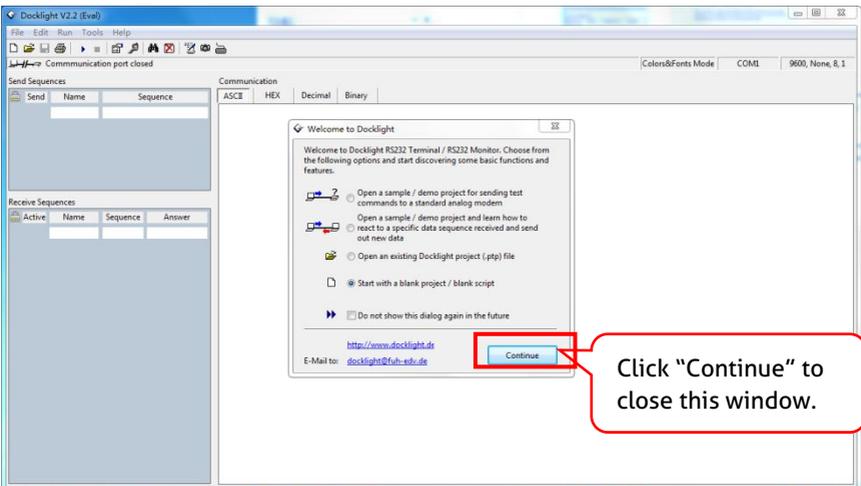
Then follow the installation wizard for installation on Windows 7 and 10.

After the installation, Docklight can be run for the first time and should look like the below screen shot:

Registration is not necessary unless you wish to save settings on exit, so unless you wish to register click on "OK" to close the window.

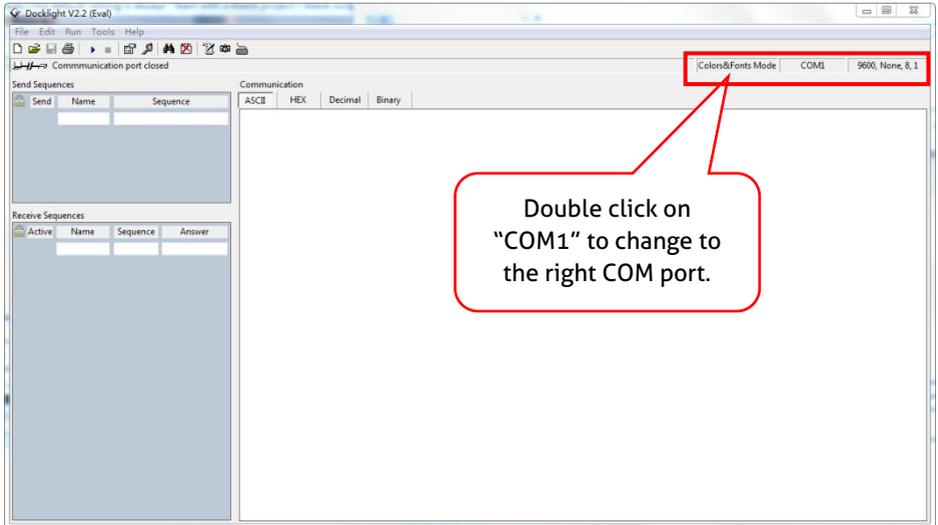


The next pop-up window can also be closed with "Continue". An empty project is enough to send and receive commands easily (The default setting is always "Start with a blank project / blank script")



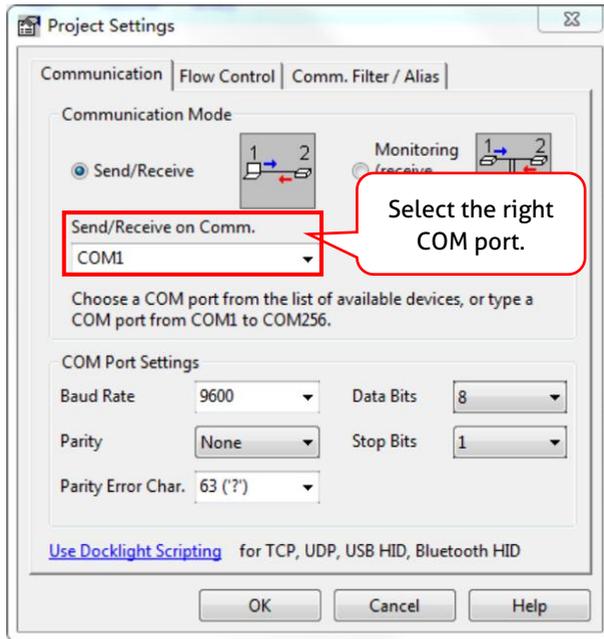
Now you are in the main view, where commands are sent and feedback is received.

The next step is to select the correct COM port of the PC. To do this, double-click on "COM1" in the corresponding setup window.



In the following window, select the drop-down menu labeled "Send / Receive on Comm Channel", select the appropriate COM port and then click on "OK" at the bottom right corner.

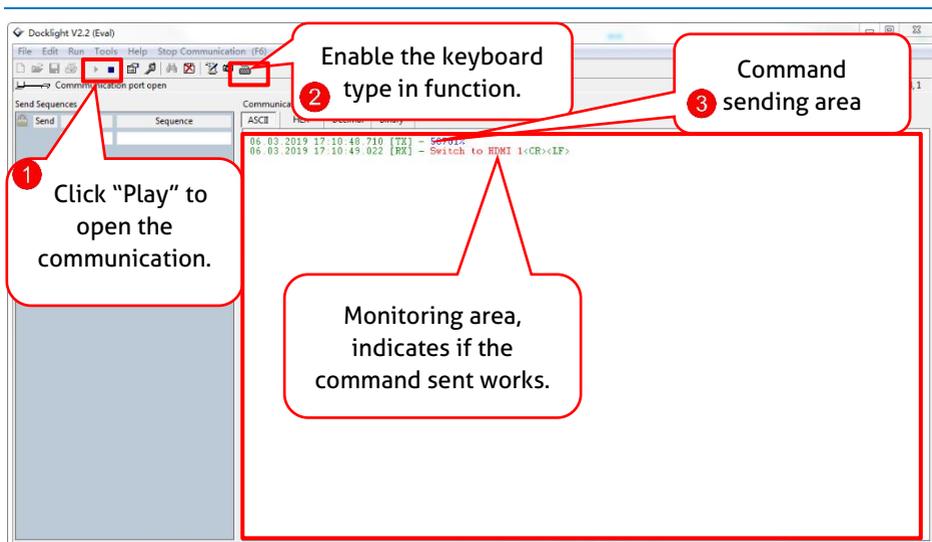
All other settings can be left at default for most applications, but refer to device RS232 settings to be sure.



In order to be able to send commands, open communication with the device by clicking on "Play". **(1)**

Then the keyboard function must be activated, so that commands can be written in the "communication window". **(2)**

Finally enter the command, then confirmed by pressing "Enter" to send. Any response from the connected device will appear in red. **(3)**



7.2 RS232 Command

Communication protocol: RS232 Communication Protocol

Baud rate: 9600

Data bit: 8

Stop bit: 1

Parity bit: none

Note:

- *Commands are not case sensitive;*
- *Commands are not space sensitive;*
- *Commands end with " ";*
- *When the command is wrong, the feedback is "Invalid Command!".*

POWON.	<i>Feedback Example:</i>
Power on	Power On!
POWOFF.	<i>Feedback Example:</i>
Power off	Power Off!
HDMI[x].	<i>Feedback Example:</i>
Input source selection.	HDMI1.
x = 1(HDMI IN 1 selected)	HDMI Out Switch To 01!
x = 2(USB-C IN 2 selected)	
HDMIA.	<i>Feedback Example:</i>
Auto-switch mode on	HDMI Out Switch Auto Mode!
HDMIM.	<i>Feedback Example:</i>
Manual-switch mode on	HDMI Out Switch Manual Mode!
LOCK.	<i>Feedback Example:</i>
Turn on front panel lock	Front Panel Locked!
UNLOCK.	<i>Feedback Example:</i>
Turn off front panel lock	Front Panel UnLock!
RST.	<i>Feedback Example:</i>
Restore Factory	Factory Default!
SIGNALTRG[xx]MODE.	<i>Feedback Example:</i>
When setting the detection mode xx=1, it is 5V detection, and when it is 2, it is	SIGNALTRG01MODE.
	Set Trigger Mode To 5V.

TMDS detection.	
SIGNALTRGSTA.	<i>Feedback Example:</i>
Query the method of signal detection (TMDS or 5V)	Trigger Mode Is 5V.
STA.	<i>Feedback Example:</i>
Status query
KEYCOMMAND[X].	<i>Feedback Example:</i>
Set display key command(CEC,RS232)	KEYCOMMAND1. KEYCOMMAND2. KEYCOMMAND3.
	Display Key Command CEC And RS232! Display Key Command Only CEC! Display Key Command Only RS232!
SetDevicePowerMode[XX].	<i>Feedback Example:</i>
Set the device power supply mode. XX = 00-01	SetDevicePowerMode 00.
00: Follow Host	SetDevicePowerMode: Follow Host!
01: Always On	
SETSTANDBYTIME[yy].	<i>Feedback Example:</i>
Set the delay time for disconnecting 5V output after no source :3-1800(unit: seconds)	SETSTANDBYTIME10. Set POFF Delay To 10 Second(s)!
TVON.	<i>Feedback Example:</i>
Turn on by CEC control	CEC_TV_POWON!
TVOFF.	<i>Feedback Example:</i>
Turn off by CEC control	CEC_TV_POWOFF!
TVMUTE.	<i>Feedback Example:</i>
TV mute by CEC control	CEC_TV_VOLMUTE/UNMUTE!
AOUTOFF.	<i>Feedback Example:</i>
Audio de-embedding off	Audio De-embedding Off!
AOUTON.	<i>Feedback Example:</i>
Audio de-embedding on	Audio De-embedding On!

CEC[I/O][port][command].	<i>Feedback Example:</i>
I/O: Input or Output port port: Port number command: CEC command, HEX format(max12 bytes)	CECI0104444A.(Disc player unloaded) CECO018004.(TV on) CECO018036.(TV standby) CEC Input 01 Send Success! CEC Output 01 Send Success!
/+[X]:XXX.	<i>Feedback Example:</i>
RS232 sends commands to control peripheral devices. [X] = 1~7 (Baud Rate) 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6--57600; 7--115200 XXX: Any ASCII code	/+3:123456. 123456
CMDON/+[X]:XXX.	<i>Feedback Example:</i>
Set the ASCII RS232 command XXX to be sent to control the third-party device when the DISPLAY ON button is pressed. [X] = 1~7 (Baud Rate) 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6--57600; 7--115200 XXX: Any ASCII code	CMDON/+3:455665. CMD_ON Save Success!
CMDOFF/+[X]:XXX.	<i>Feedback Example:</i>
Set the ASCII RS232 command XXX to be sent to control the third-party device when the DISPLAY OFF button is pressed. [X] = 1~7 (Baud Rate) 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6--57600; 7--115200 XXX: Any ASCII code	CMDOFF/+3:455665. CMD_OFF Save Success!
CMDVOLUME/+[X]:XXX.	<i>Feedback Example:</i>

<p>Set the ASCII RS232 command XXX to be sent to control the third-party device when the VOLUME MUTE button is pressed.</p>	<p>CMDVOLMUTE/+3:455665.</p>
<p>[X] = 1~7 (Baud Rate) 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6--57600; 7--115200 XXX: Any ASCII code</p>	<p>CMD_VOLMUTE Save Success!</p>
<p>EDIDUpgrade[xx].</p>	<p><i>Feedback Example:</i></p>
<p>The serial port upgrades EDID data. 1.[xx]=00-02 means to customize the EDID of the corresponding input port (EDID is switched to the custom EDID after customization, and will not be saved in the machine); 00 :All input ports 01-02 :Input 01-02;</p>	<p>EDIDUpgrade01. EDIDUpgradeU1.</p>
<p>2. [xx]=U1 means custom built-in EDID (can be saved in the machine and recalled at any time), only one built-in EDID can be customized, and the current EDID still used after the customization is completed will not switch to the customized EDID . After receiving the instruction, the machine will prompt to send the EDID file. The file format must be .bin within 10s (in order to ensure normal data reception, all HDBaseT must be disconnected before sending the instruction).</p>	<p>Input XX/User Define EDID Upgrade OK!</p>
<p>Baudrate[XXX].</p>	<p><i>Feedback Example:</i></p>
<p>Set control baud rate. [XXX] Support</p>	<p>Baudrate9600.</p>

2400, 4800, 9600, 19200, 38400, 57600, 115200.	Set Local RS232 Baudrate To 9600!
STA_HDCP.	<i>Feedback Example:</i>
Query the current HDCP status	STA_HDCP.
	DIP Passive, HDCP Management!
HDCP_ON.	<i>Feedback Example:</i>
Forced to open the output HDCP, output HDCP1.4.	HDMI Out HDCP On!
HDCP_DIP.	<i>Feedback Example:</i>
Select HDCP definition of DIP Switch	HDCP_DIP.
	DIP Passive, HDCP Management! DIP Active, HDMI Out HDCP Follow Display!

8. After-Sales Service

If there appear some problems when running the product, please check and deal with the problems referring to this user manual. Any transport costs are borne by the users during the warranty.

1) Product Limited Warranty: This product will be free from defects in materials and workmanship for **three years** (The purchase invoice shall prevail).

Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service.

2) What the warranty does not cover (servicing available for a fee):

- Warranty expiration.
- Factory applied serial number has been altered or removed from the product.
- Damage, deterioration or malfunction caused by:
 - Normal wear and tear.
 - Use of supplies or parts not meeting our specifications.
 - No certificate or invoice as the proof of warranty.
 - The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
 - Damage caused by force majeure.
 - Servicing not authorized by distributor.
 - Any other causes which does not relate to a product defect.
- Delivery, installation or labor charges for installation or setup of the product.

3) Technical Support: For any questions or problems, contact your distributor or reseller and tell them the respective product name and version, the detailed failure situation as well as the formation of the cases.

Asking for Assistance

Technical Support:

Phone: +49 5971 800299 - 0

Fax: +49 5971 800299 – 99

Technical Support Hours:

8:30 AM to 5:00 PM Monday thru Thursday

8:30 AM to 4:00 PM Friday

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