User Manual

18G In-line HDMI Controller with Auto Display Control

Model PT-C-HDCEC

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 the 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.

FC

REACH | 1907/2006/EU

ROHS | 2011/65/EU

PureLink hereby declares that this product **PureTools PT-C-HDCEC** complies with Directives 1907/2006/EU und 2011/65/EU.

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

PureLink GmbH hereby declares that this product **PureTools PT-C-HDCEC** 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/4251364718339_CE.pdf

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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 protrusion.
- Do not remove the housing of the device as opening or removing the housing may expose you to dangerous voltage or other hazards.
- Install the device in a place with sufficient ventilation to avoid damage caused by overheat.
- 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 scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

Table of Content

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1. Product Introduction

Thanks for choosing the PT-C-HDCEC 18G In-line HDMI Controller, which is designed for automatic system control and HDMI signal extension in small meeting rooms and huddle spaces. The controller supports a variety of system trigger methods, via IR signal input or video signal detection (5V "Hot-Plug-Detect" or "TMDS sensing"). It automatically triggers CEC commands as well as pre-loaded RS232 and IR commands to turn on or off devices as well as relay control to lower and raise projection screens. It supports video resolutions up to 4K@60Hz 4:4:4 with HDR 10 and Dolby Vision support and is capable of 4K to 1080p down-scaling, for compatibility with 1080p display devices. Besides passing EDID information from the display, there are multiple built-in EDID settings that can be selected using the 4-pin DIP switch on the front panel. In addition, the controller supports CEC pass-through, RS232 control, IR learning and relay control.

1.1 Features

- Supports up to 4K@60Hz, 4:4:4 with HDR10 and Dolby Vision support, HDCP 2.2 compliant.
- HDCP pass-through or conversion to HDCP 1.4 for better compatibility.
- Supports 4K to 1080p down-scaling.
- Comprehensive EDID management with 8 EDID options for various applications.
- Display control options via CEC, RS232 and IR.
- Contact closure input for the connection with a variety of periphals, such as sensors and switches.
- Relay control, e. g. for lowering and raising projection screens.
- Built-in signal equalizer for longer HDMI cable runs.

1.2 Package List

- 1x 18G In-line HDMI Controller
- 4x Plastic Cushions
- 1x Power Adapter (5V DC 1A)
- 1x User Manual

- 2x Mounting Ears with 4 Screws
- 3x 3-pin Terminal Blocks
- 1x RS232 Cable (3-pin to DB9)

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

2. Technical Specification

Video Input	
Input	(1) HDMI IN
Input Connector	(1) Female type-A HDMI
Input Video Resolution	Up to 4Kx2K@60Hz 4:4:4 8bit
Video Output	
Output	(1) HDMI OUT/CEC
Output Connector	(1) Female type-A HDMI
Output Video Resolution	Up to 4Kx2K@60Hz 4:4:4 8bit
Control	
Control	(1) SET Button, (1) 4-pin DIP Switch, (1) FW, (1) IR OUT, (1) RS232, (1) Sensor, (2) Relay (1~2)
Control Connector	(1) Type-A USB, (1) 3.5mm mini jack, (4) 3-pin terminal blocks
General	
HDMI Standard	2.0
HDCP Version	2.2
HDCP Pass-through	Supported
CEC Control	Supported
Hot-plug	Supported
Bandwidth	18Gbps
HDMI Cable Length	1080p@60Hz ≤ 33 feet (10 meters), 4K@60Hz ≤ 16 feet (5 meters)
Operation Temperature	-5℃ ~ +55℃
Storage Temperature	-25℃ ~ +70℃
Relative Humidity	10%-90%
Power Supply	Input:100V~240V AC; Output: 5V DC 1A
Power Consumption	Max. 2.5W
Dimension (W*H*D)	120mm x 28mm x 84mm
Net Weight	305g

Note: Please only use high-quality HDMI cables, supporting all characteristics of HDMI 2.0 for a reliable connection and signal transmission.

3. Panel Description

3.1 Front Panel
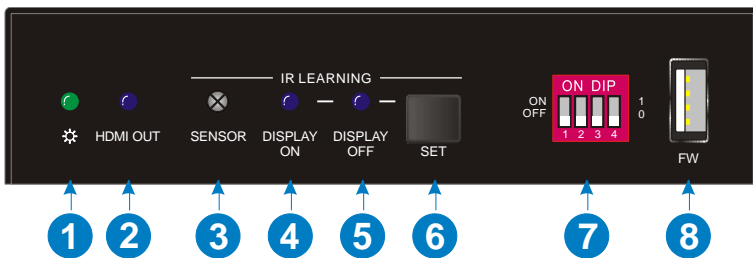
① **POWER LED: T**he LED illuminates green when power is applied.

② **HDMI OUT LED:** The LED illuminates blue when there is HDMI signal output.

③ **SENSOR:** Built-in IR sensor to receive IR signal.

④ **DISPLAY ON LED:** The LED blinks blue when the controller is in IR learning mode; and will illuminate blue after successfully learning the IR command.

⑤ **DISPLAY OFF LED:** The LED blinks blue when the controller is in IR learning mode; and will illuminate blue after successfully learning the IR command.

⑥ **SET:** Press the button to enable IR learning mode. Please refer to *chapter 6.2* for more details.

⑦ 4-pin DIP switch for EDID setting and HDCP mode selection.

⑧ **FW:** Type-A USB port for firmware upgrade.

3.2 Rear Panel
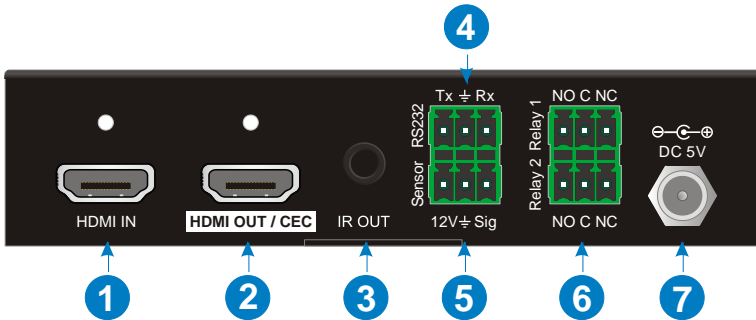
① **HDMI IN:** Type-A female HDMI input port to connect HDMI source device.

② **HDMI OUT/CEC:** Type-A female HDMI output port to connect HDMI display, supports CEC.

③ **IR OUT:** 3.5mm mini jack to connect the IR emitter and send IR signals.

④ **RS232:** 3-pin terminal block to connect the RS232 control device (e.g. PC) or a device (e.g. projector) to be controlled by RS232 commands.

⑤ **Sensor:** 3-pin terminal block to connect external sensor or switch.

⑥ **Relay 1~2:** Two 3-pin terminal blocks to connect relay controlled devices, such as projection screens.

⑦ **DC 5V:** DC connector for the power adapter connection.

4. System Connection

4.1 Usage Precaution

- Make sure all components and accessories are included before installation.
- System should be installed in a clean environment with proper temperature and humidity.
- All of the power switches, plugs, sockets, and power cords should be insulated and safe.
- All devices should be connected before power on.

4.2 System Diagram

The following diagram illustrates typical input and output connections that can be utilized with this controller:

# PureTools
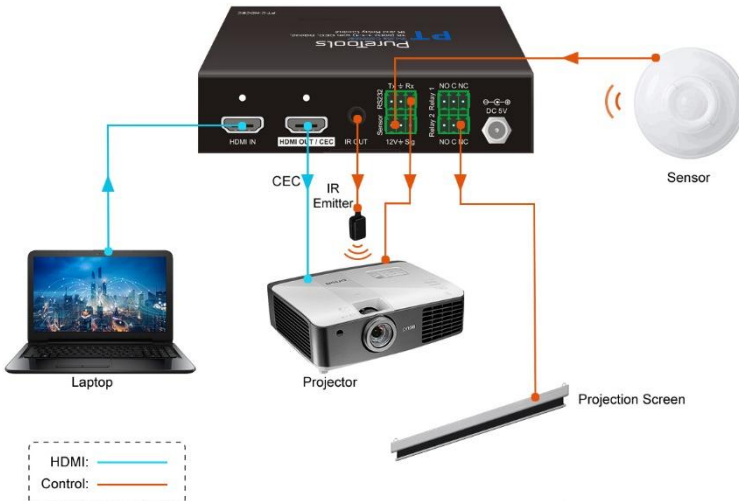
5. DIP Switch Operation

5.1 EDID Management

The Extended Display Identification Data (EDID) is used by 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, when a display with different capabilities is connected to the controller, the DIP switch on the front panel can be used to set the EDID to a fixed value to ensure the compatibility in video resolution.

The switch represents "**0**" when in the lower (**OFF**) position, and it represents "**1**" when putting the switch in the upper (**ON**) position.
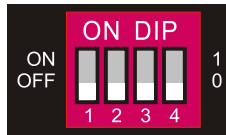
Switch 1~3 are used for setting the EDID. The DIP switch status indicator and its corresponding setting are shown on the back of the product.
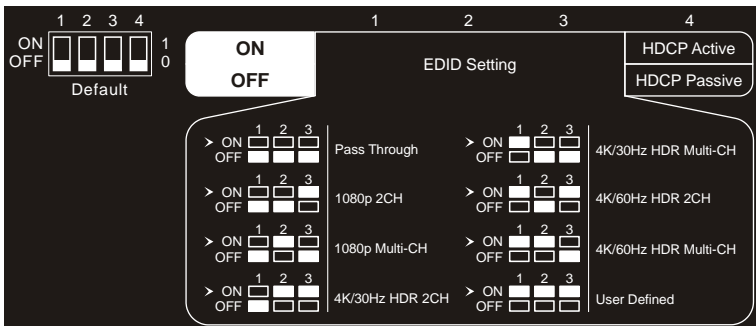
Switch Status	Video Resolution	Audio Format
000	Pass Through	
001	1080p	2CH
010	1080p	Multi-CH
011	3840x2160@30Hz HDR	2CH
100	3840x2160@30Hz HDR	Multi-CH
101	3840x2160@60Hz HDR	2CH
110	3840x2160@60Hz HDR	Multi-CH
111	User-defined EDID (Upload the EDID by type-A USB port)	

Note:

- *2CH: Supports LPCM 2CH.*

- *Multi-CH: Supports LPCM 8CH, Dolby TrueHD, DTS-HD , Dolby Digital5.1, DTS 5.1, Dolby Digital Plus.*

- **User-defined EDID Setting**

Except directly invoking the built-in EDID, the specific EDID can be customized by following the operation process below.

1) Rename the user-defined EDID as "**EC_11.bin**".

2) Connect the **FW** port of the controller to the PC using a USB cable, and then power on the controller, the PC will automatically detect a virtual disk named of "BOOTDISK".

3) Double-click to open the disk, a file named of "READY.TXT" will be showed.

4) Copy the user-defined EDID to the "BOOTDISK" disk.

5) Reopen the disk to check the filename "READY.TXT" whether automatically becomes "SUCCESS.TXT", if yes, the user-defined EDID was imported into the controller and saved as its corresponding EDID ID successfully.

6) Remove the USB cable, and then reboot the controller.

7) Now the new EDID can be invoked by setting the DIP switch status to "111".

5.2 HDCP Mode

Put switch 4 on "**ON**" position to select **HDCP Active** mode, or to "**OFF**" for **HDCP Passive** mode.

Switch Status	Mode	HDCP
OFF (0)	Passive (Default)	Automatically follows the HDCP version of source device.
ON (1)	Active	● If the input video has HDCP content, the HDCP version of HDMI output is automatically set to HDCP 1.4 for better compatibility. ● If the input video has no HDCP content, the HDMI output has no HDCP either.

6. System Control Setting

● **SYSTEM ON**

When the controller detects a video signal via hot-plugging (5V HPD) or TMDS sensing (active video stream) or even an input IR signal, the system will start and automatically perform the actions below, all at the same time.

✓ *Send CEC ON to turn on display.*

✓ *Send RS232 ON + Delay Time (default 3s, range of 1~180s) + User-defined RS232 command to display.*

✓ *Send IR ON + Delay Time (default 3s, range of 1~180s) + User-defined IR command to display.*

✓ *Toggle the state of relay 1 as follow.*

I/O State	Relay State	
	NO	NC
On (Closed)	Closed	Open
Off (Open)	Open	Closed

● **SYSTEM OFF**

When the controller detects that all input source devices have been removed or does not receive an IR signal within the delay time (default 10mins, range of 5mins-180mins), the system will turn off and automatically perform the actions below, all at the same time.

✓ *Send CEC OFF to turn off display.*

✓ *Send RS232 OFF to display. The number of sending command is default 1 time, it can be set to 2 times by RS232 command.*

✓ *Send IR OFF to display. The number of sending command is default 1 time, it can be set to 2 times by RS232 command.*

✓ *Toggle the state of relay 2.*

6.1 RS232 Command Setting

Trigger commands SYSTEM ON and SYSTEM OFF as well as CEC, RS232, IR and relay control actions can be set using RS232 commands.

6.1.1 RS232 Control Software

Installation: Copy the control software file to the PC which is connected to the controller.
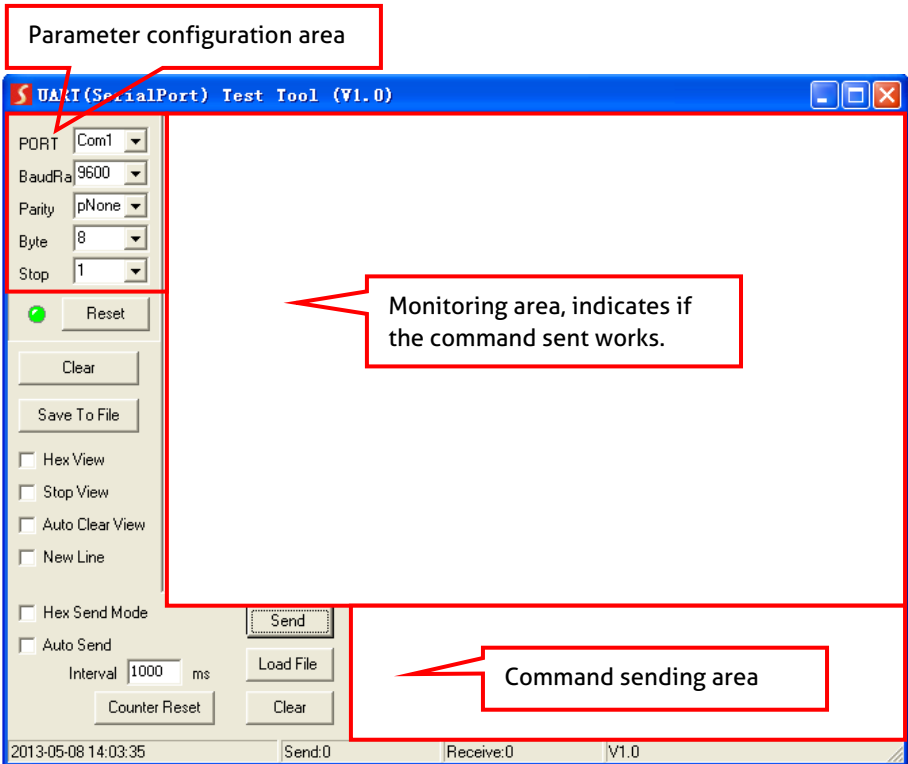
Uninstallation: Delete all the control software files in corresponding file path.

The software **CommWatch.exe** is used as an example. Double-click the following icon:

The interface of the control software is shown as below:

Parameter configuration area

Monitoring area, indicates if the command sent works.

Command sending area

Please set the parameters of COM number, baud rate, data bit, stop bit and the parity bit correctly. The RS232 commands can then be sent using the Command Sending Area.

Baud rate: 9600;

Data bit: 8;

Stop bit: 1;

Parity bit: none.

6.1.2 Trigger Method Setting

Command	Function			Feedback Example
SYSONMETH[X].	Set the trigger method to perform SYSTEM ON.			SYSONMETH1.
	X	Description		
	0	Detects IR signal		
	1	Detects HDMI video signal (default 5V, or TMDS)		SET DETECT VEDIO TRIGGER!
	2	Detects IR or video signal		
SYSOFFMETH[X].	Set the trigger method to perform SYSTEM OFF.			SYSOFFMETH1.
	X	Description		
	0	Detects no IR signal		
	1	Detects no HDMI video signal (default 5V, or TMDS)		SET NOT DETECT VEDIO TRIGGER!
	2	Detects no IR and video signal		
NOSIGDLY:[XXXXX].	Set the system off time to xxxxx (default 10mins, range of 5mins to 180mins). When no HDMI video signal has been detected, the system will switch off, according to the set time.			SET DETECT NOSIGNAL DELAY TIME [XXX]S
NOIRDLY:[XXXXX].	Set the system off time to xxxxx (default 10mins, range of 5mins to 180mins). When no IR signal has been detected, the system will switch off, according to the set time.			SET DETECT NO IR DELAY TIME [XXX]S
5VORTMDS[X].	Set the HDMI video signal trigger condition.			5VORTMDS0.
	X	Description		
	0	Detects 5V signal.		DETECT INPUT SOURCE USE 5V!
	1	Detects TMDS signal.		

Command	Function	Feedback Example
GSYSONMETH.	Report the trigger method of SYSTEM ON.	SELECT DETECT VEDIO TRIGGER!
GSYSOFFMETH.	Report the trigger method of SYSTEM OFF.	SELECT NO DETECT VEDIO TRIGGER!
GNOSIGDLY.	Report the delay time of SYSTEM OFF when the controller detects no input source signal (5V/TMDS).	SET DETECT NOSIGNAL DELAY TIME 300S
GNOIRDLY.	Report the delay time of SYSTEM OFF when the controller detects no IR sensor signal.	SET DETECT NO IR DELAY TIME 300S
G5VORTMDS.	Report the detection method of input source. 5V/TMDS	SELECT DETECT INPUT SOURCE USE 5V!

6.1.3 CEC Control Setting

Command	Function	Feedback Example
CECON.	Enable CEC.	Open CEC Function!
CECOFF.	Disable CEC.	Close CEC Function!
GCECSTAUS.	Report CEC status.	CEC FUNCTION IS OPEN!
TVON.	Turn on display (e.g. TV)	
TVOFF.	Turn off display (e.g. TV)	

6.1.4 RS232 Control Setting

Command	Function		Feedback Example
RS232ON/+[X]:XXX	When detecting a triggering signal, automatically send ASCII command XXX to the third-party device (e.g. Projector) whose baud rate is X.		RS232ON/+3:123abc
	X	Baud Rate	Send the ASCII command "123abc" to the third-party whose baud rate is 9600.
	1	2400	
	2	4800	
	3	9600	
	4	19200	
	5	38400	
	6	57600	
	7	115200	
RS232ON/-[X]:XXX	When detecting a triggering signal, automatically send HEX command XXX to the third-party device (e.g. Projector) whose baud rate is X.		RS232ON/-3:30 31 32
			Send the HEX command "30 31 32" to the third-party whose baud rate is 9600.
RS232OFF/+[X]:XXX	When not detecting any triggering signal, automatically send ASCII command XXX to the third-party device (e.g. Projector) whose baud rate is X.		RS232OFF/+3:123abc
			Send the ASCII command "123abc" to the third-party whose baud rate is 9600.
RS232OFF/-[X]:XXX	When not detecting any triggering signal, automatically send HEX command XXX to the third-party device (e.g. Projector) whose baud rate is X.		RS232OFF/-3:30 31 32
			Send the HEX command "30 31 32" to the third-party whose baud rate is 9600.
RS232U/+[X]:XXX	Set the user-defined ASCII command to send to the third-party device (e.g. projector) whose baud rate is X.		RS232USER/+3:123abc
			Send the user-defined command "123abc" to the third-party whose baud rate is 9600.

| Command	Function	Feedback Example
RS232U/-[X]:XXX	Set the user-defined HEX command to send to the third-party device (e.g. projector) whose baud rate is X.	RS232USER/-3:30 31 32
		Send the user-defined command "30 31 32" to the third-party whose baud rate is 9600.
RS232DLY:[XXX].	Set the sending interval time between RS232 ON and RS232 USER to XXX (default 3s, range of 1S to 180s).	SET RS232 ON DELAY TIME [XXX]S
RS232PCS[X].	Set the sending number of RS232 OFF to X. | X	Description
0	1 time
1	2 times		SET SEND RS232 OFF ONE TIME!
RS232OFFDLY:[XX].	Set the two times sending interval time of RS232 OFF to XX (default 2s, range of 1S to 10s).	SET RS232 OFF SEND DELAY TIME [XXX]S
GRS232DLY.	Report the sending interval time between RS232 ON and RS232 USER.	SET RS232 ON DELAY TIME 3S
GRS232PCS.	Report the sending number of RS232 OFF	SELECT SEND RS232 OFF ONE TIME!
GRS232OFFINT.	Report the two times sending interval time of RS232 OFF.	SET RS232 OFF SEND DELAY TIME 2S

6.1.5 IR Control Setting

Command	Function	Feedback Example
IRSTUDY[X].	Learns the IR command from IR remote. | X	Description
0	STUDY IR DISPLAY OFF
1	STUDY IR DISPLAY ON
2	STUDY IR USER		IRSTUDY0.
		READY STUDY IR DISPLAY OFF,PLEASE REMOTE CONTROL RECEIVER IN 10S!

Command	Function		Feedback Example
IRSEND[X].	Send the learned IR command.		IRSEND0.
	X	Description	
	0	SEND IR DISPLAY OFF	SEND IR DISPLAY OFF!
	1	SEND IR DISPLAY ON	
	2	SEND IR USER	
IRDLY:[XXX].	Set the sending interval time between IR ON and IR USER to XXX (default 3s, range of 1S to 180s).		SET IR ON DELAY TIME [XXX]S
IRPCS[X].	Set the sending number of IR OFF to X.		SET SEND IR OFF ONE TIME!
	X	Description	
	0	1 time	
	1	2 times	
IROFFDLY:[XX].	Set the two times sending interval time of IR OFF to XX (default 2s, range of 1S to 10s).		SET IR OFF SEND DELAY TIME [XXX]S
GIRDLY.	Report the sending interval time between IR ON and IR USER.		SET IR ON DELAY TIME 3S
GIRPCS.	Report the sending number of IR OFF.		SELECT SEND IR OFF ONE TIME!
GIROFFINT.	Report the two times sending interval time of IR OFF.		SET IR OFF SEND DELAY TIME 2S

6.1.6 Relay Control Setting

Command	Function	Feedback Example
RELAY1DLY:[XXX].	Set the Relay 1 delay time to XXX (default 10s, range of 3S to 180s).	SET RELAY 1 TIME DELAY TIME [XXX]S
RELAY2DLY:[XXX].	Set the Relay 2 delay time to XXX (default 10s, range of 3S to 180s).	SET RELAY 2 TIME DELAY TIME [XXX]S
GRELAY1COT.	Report Relay 1 delay time.	SET RELAY 1 TIME DELAY TIME 10S
GRELAY2COT.	Report Relay 2 delay time.	SET RELAY 2 TIME DELAY TIME 10S

Relay Port Definition
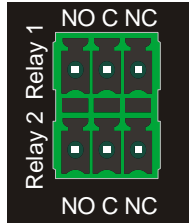
When the controller is powered on, the Relay 1 port will perform the actions below:

1) *The **NO** connection closes, and **NC** connection opens.*

2) *When the delay time is up, the **NO** connection opens, and **NC** connection closes.*

When the controller is turned off, the Relay 2 port will perform the actions below:

1) *The **NO** connection closes, and **NC** connection opens.*

2) *When the delay time is up, the **NO** connection opens, and **NC** connection closes.*

6.1.7 System Command

| Command	Function			Feedback Example
RST.	Factory reset.			Factory Default!
DOWNSCALER[X].	Enable or disable 4K to1080p down-scaling function.			DOWNSCALER0.
	X	Description		Close Down Scaler Function!
	0	Disable		
	1	Enable		
GDOWNSCALER.	Report down-scaling status.			DOWN SCALER FUNCTION IS OPEN!
GALLINFO.	Report all device information.			
GEDIDMODE.	Report EDID.			EDID:PASS THROUGH
GHDCPMODE.	Report HDCP mode.			

6.2 Front Panel IR Learning

Besides configuring IR control using RS232 commands. The IR commands can be learned from the IR remote by the **SET** button on the front panel.

Please follow the steps below to learn the IR commands from the IR remote:

Step 1: Press **SET** to choose **DISPLAY ON** or **DISPLAY OFF** command to be set.

- ✓ **DISPLAY ON LED:** Flashing indicates that **DISPLAY ON** mode is selected.
- ✓ **DISPLAY OFF LED:** Flashing indicates that **DISPLAY OFF** mode is selected.
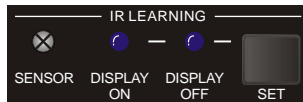

Step 2: Point the IR remote at the **SENSOR** and press the respective button on the IR remote.

Step 3: The **DISPLAY ON** or **DISPLAY OFF** LED will stop flashing and remain lit to indicate that IR command has been learnt.

Step 4: Pressing and holding the **SET** button for 5 seconds can learn user-defined IR commands, and both **DISPLAY ON** and **DISPLAY OFF** LEDs are flashing. Then repeat the step 2 and both LEDs will stop flashing and remain lit to indicate that IR command has been learnt.

Step 5: The IR learning mode will self-terminate after 10 seconds of inactivity. Both the **DISPLAY ON** and **DISPLAY OFF** LED swill switch off when exiting the IR learning mode.

7. Panel Drawing
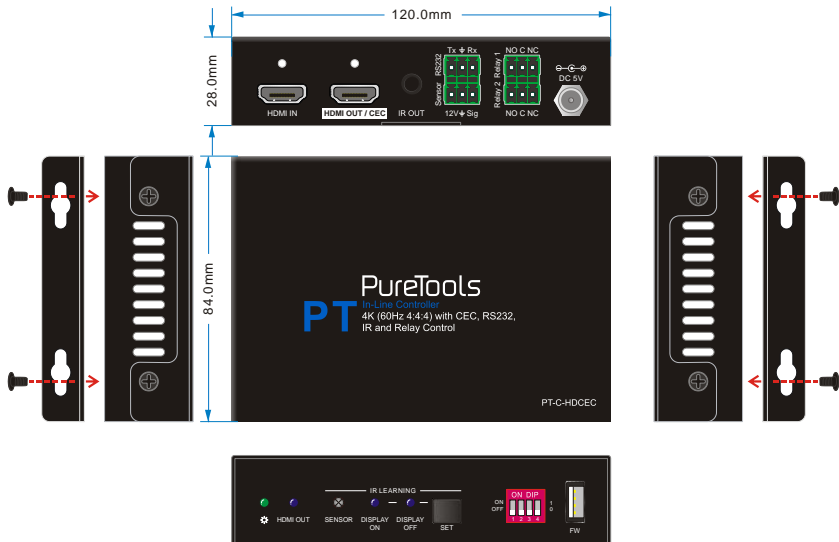
8. Troubleshooting & Maintenance

Problems	Potential Causes	Solutions
Loss of color or missing video signal output on HDMI display.	The connecting cables may not be connected correctly or it may be broken.	Check whether the cables are connected correctly and in working condition.
No signal output from this switcher while local input is in normal working state.		
Splash screen on output devices.	Poor quality of the connecting cable.	Change for another cable of good quality.
Cannot control this controller by control device (e.g. a PC) through RS232 port.	Wrong RS232 communication parameters.	Make sure the RS232 communication parameters are correct.
	This switcher is broken.	Send it to authorized dealer for repairing.

Note: If your problem is still remaining after following the above troubleshooting steps, please contact your local dealer or distributor for further assistance.

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9. After-Sales Service

If problems appear when using the product, please deal with the problems referring to this user manual. During the warranty period, any transport costs are borne by the customer.

1) **Product Limited Warranty:** The product will be free from defects in materials and workmanship for **two 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 shown 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

Write to:
PureLink GmbH
Von-Liebig-Straße 10
D - 48432 Rheine
www.purelink.de
info@purelink.de