User Manual

2x1 18G KVM Transmitter over HDBaseT 3.0

Model PT-HDBT-1021KVM-TX

Designed in Germany

VersionV1.0

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-HDBT-1021KVM-TX** 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-HDBT-1021KVM-TX** 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/ 4251364750667_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 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 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.

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Product Introduction

Thanks for choosing PT-HDBT-1021KVM-TX; a 2x1 18G KVM transmitter over HDBaseT V3. With an appropriate receiver (from the PureLink 1020 series or other compatible RX) connected to the this product, video signals can be transmitted up to 40m at 4K 60Hz and 70m at 4K 30Hz via a CAT6A cable. It also supports audio pass-through, two-way IR, USB 2.0 extension and RS232 pass-through. The 24V PoC feature makes it possible for the TX and the RX to be powered from each other and only one power adapter is needed in system.

Feature

- 18Gbps high bandwidth, HDMI V2.0.
- HDMI and USB-C video resolution up to 4K@60Hz 4:4:4, HDR10, Dolby Vision.
- Supports to transmit up to 40m at 4K@60Hz or 70m at 4K@30Hz, with HDCP 2.2.
- Controlled by button on the front panel, GUI via TCP/IP and RS232.
- Two-way IR and RS232 pass-through.
- Supports audio separation for PCM 2.0, and audio pass-through.
- Supports two-way 24V PoC.
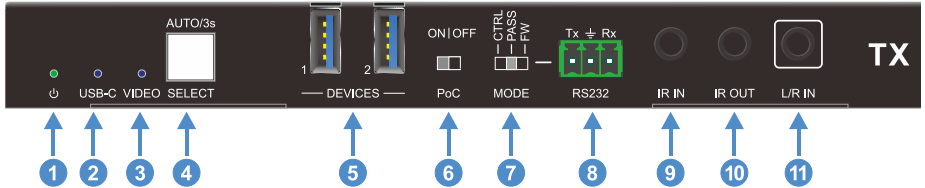- Provides HDMI loop out.

Package List

- 1x PT-HDBT-1021KVM-TX Transmitter
- 2x Mounting Ears with 2 Screws
- 1x 5-pin Terminal Block
- 4x Rubber Feet
- 1x Power Adapter (DC24V 1.5A)
- 1x User Manual

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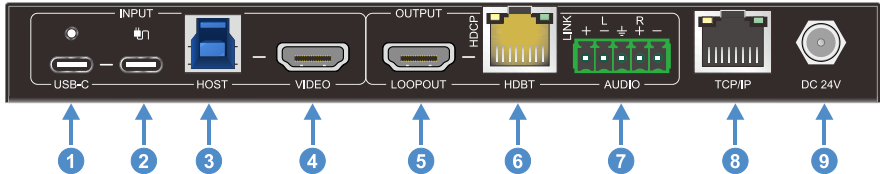
Panel Description

Front Panel

No.	Name	Description
①	POWER LED	Illuminates green when power is applied.
②	USB-C LED	Illuminates when USB-C is selected to be the video input source.
③	VIDEO LED	Illuminates when HDMI (VIDEO port) is selected to be the video input source.
④	SELECT Button	Switch video input source from either USB-C or HDMI.
⑤	DEVICES	Two USB3.2 Gen1 Type-A ports, provide 500mA shared current in total.
⑥	PoC	DIP switch for PoC ON/OFF.
⑦	MODE	DIP switch for RS232 mode selection. ・CTRL: Execute commands locally that is sent to the ・PASS: RS232 pass-through. ・FW: Firmware upgrade.
⑧	RS232	3-pin Phoenix socket, used for control, pass-through or upgrading.
⑨	IR IN	Connects to the IR receiver for IR pass-through.
⑩	IR OUT	Connects to the IR emitter for IR pass-through.
⑪	L/R IN	3.5mm jack for audio input.

Rear Panel

| No.	Name	Description
①	USB-C IN	USB Type-C with charging capability to connect the source device.
②	Power	USB Type-C connect to external PD PSU to charge USB-C IN.
③	HOST	USB3.2 Gen1 Type-B port for PC connection. The PC can be controlled by the USB devices which are connected to the HOST port of transmitter.
④	VIDEO	Connects to HDMI source device.
⑤	LOOPOUT	Connects to HDMI display device.
⑥	HDBT OUT	RJ45 port to connect the HDBT output port of receiver by CAT6A Ethernet cable. The LINK LED (green LED) illuminates when there is a valid HDBaseT link between the transmitter and the receiver. The HDCP LED (yellow LED) illuminates when the video contains HDCP content, and the HDCP LED flashes when there is no HDCP.
⑦	AUDIO	5-pin terminal block for balanced audio output.
⑧	TCP/IP	1x RJ45 port for GUI control.
⑨	DC 24V	DC barrel port for power adapter connection.

Specification

Video	
Input	1x HDMI IN, 1x USB-C
Input Connector	1x Type-A female HDMI, 1x USB Type-C
Input Resolution	Both HDMI and USB-C support up to 4K@60Hz 4:4:4
Output	1x HDBT OUT, 1x LOOPOUT
Output Connector	1x RJ45, 1x Type-A female HDMI
Output Resolution	Up to 4K@60Hz 4:4:4
Audio	
Input	1x L/R IN
Input Connector	1x 3.5mm jack
Output	1x Analog audio output, 1x L/R OUT
Output Connector	1x 5-Pin terminal block, 1x 3.5mm jack
Audio Format	Both 3.5mm Audio Jack and 5-pin terminal block support PCM 2.0
Frequency Response	20Hz ~ 20KHz, ±3dB
Max Output Level	2.0Vrms ± 0.5dB. 2V = 16dB headroom above -10dBV (316mV) nominal consumer line level signal
THD+N	< 0.05% (-80dB), 20Hz~20KHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 80dB, 20Hz-20kHz bandwidth
Crosstalk Isolation	-70dB, 1kHz sine at 0dBFS level (or max level before clipping)
L-R Level Deviation	< 0.3dB, 1kHz sine at 0dBFS level (or max level before clipping)
Frequency Response Deviation	20Hz - 20kHz, ±3dB
Output Load Capability	1KΩ and higher (Supports 10x paralleled 10KΩ loads)
Stereo Channel Separation	>70dB@1KHz
Control	
Control Part	2x DEVICES, 1x HOST, 1x USB-C, 1x PoC Switch, 1x MODE Switch, 1x RS232, 1x IR IN, 1x IR OUT, 1x TCP/IP
Control Connector	2x USB 3.2 Gen1 Type-A, 1x USB 3.2 Gen1 Type-B, 1x USB-C, 2x 3.5mm Jacks, 1x 3-pin Terminal Block, 1x 2-pin DIP Switch

General	
Bandwidth	18Gbps
HDMI Standard	2.0
HDCP Version	Input: HDCP 2.2, HDCP 1.4 compliant. Support HDCP management.
Two-way PoC	Supported two-way 24V
HDMI V2.0 Cable Length	4K@60Hz 4:4:4 ≤ 5m, 4K@30Hz 4:4:4 ≤ 10m, 1080P ≤ 15m
Transmission Standard	HDBaseT
Transmission Distance	4K@60 4:4:4 ≤ 40m; 4K@30 4:4:4 ≤ 70m, 1080p@60 4:4:4 ≤ 70m
Operation Temperature	-5°C to +55°C (+23° to +131°F)
Storage Temperature	-25°C to +70°C (-13°F to +158°F)
Relative Humidity	10% to 90%, non-condensing
Power Supply	DC 24V 1.5A
Power Consumption	35.5W (Max)
Dimension (W x H x D)	190mm x 21.7mm x 130mm
Net Weight	520g

Note: Please use high-qualified HDMI cable fully compliant with HDMI V2.0 for reliable transmission and connection.

System Diagram
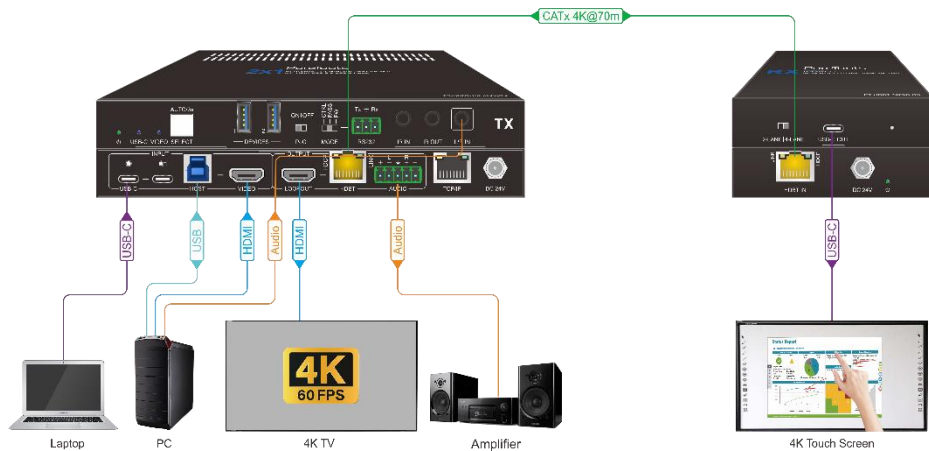
Button Control

Manual Switching

When the extender is in the manual switching mode, press the **SELECT AUTO/3s** button repeatedly to cycle through the two video inputs, and the corresponding source LED illuminates blue immediately.

Automatic Switching

Press and hold the **SELECT AUTO/3s** button at least 3 seconds to enable automatic switching.

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

- Press and hold the **SELECT AUTO/3s** button at least three seconds again will exit AUTO mode.

- New input: Once detecting a new input, the extender will automatically select the new input.

- Reboot: Once power is restored to the extender, it will automatically reconnect the input before powered off.

- Source removed: When an active source is removed, the extender will switch to the other active input.

GUI Control

Login

The extender also be controlled via TCP/IP. The default IP settings are:
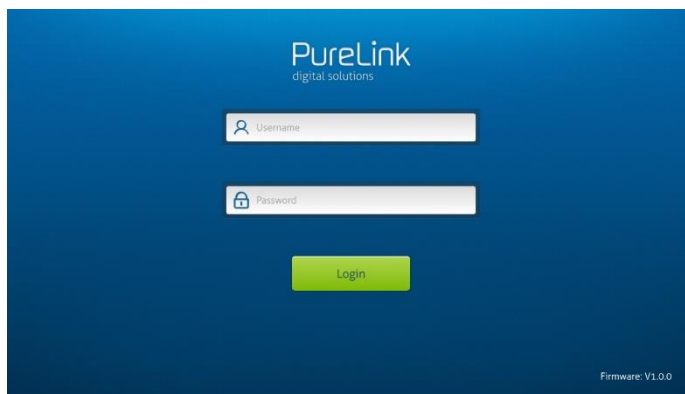
IP Address: 192.168.0.178

Subnet Mask: 255.255.255.0

Gateway: 192.168.0.1

Telnet Port: 4001

Type **192.168.0.178** in the internet browser, it will enter the below log-in webpage:

User Name: admin

Password: admin

Enter the username and password into the respective input fields, then click the **Login** button.

Control Tab

Selection of Video Input Source

Select a video input source from either USB-C or Video (HDMI port).

USB-C: Select the video input source as USB-C.

Video (HDMI port): Select the video input source as Video.

Auto: In this mode, it will automatically switch to the new connection source or the one that is just been powered on. When the currently active source loses power or is disconnected, it will seamlessly switch to another input source with active signal.

Also, when the transmitter restarts, it will remember the last connected video input source automatically.

Audio De-embedding Switch

Enable/disable the output of the 5-pin terminal block.

ON: Enable audio output from the 5-pin terminal block.

OFF: Disable audio output from the 5-pin terminal block.

Configuration Tab

EDID Settings

Choose the desired EDID format or define the appropriate EDID format.

- **Pass Through: Tx**
  Retrieve the EDID of the screen connected to the VIDEO port on the TX, then provide it to the video source. This will ensure that the image on the screen connected to the RX is adjusted to match the screen connected to the TX.

- **Pass Through: Rx**

  Retrieve the EDID of the screen connected to the VIDEO OUT port on the RX, then provide it to the video source. This will ensure that the image on the screen connected to the TX is adjusted to match the screen connected to the RX.

- **Built-in EDID:** There are 7 built-in EDID values can be selected by this tab.

- **User-defined EDID:** There are four EDID values can be customized by the below steps:

  Step 1: Prepare the EDID file (.bin) on the control PC.

  Step 2: Select the user-defined.

  Step 3: Click the black box [.bin], and then select the EDID file (.bin) according the tooltip.

  Step 4: Click **Apply** to upload the user-defined EDID.

HDCP Settings

Select an HDCP mode.

Auto Downscale

Enable: When the resolution of the display is lower than video input source, the resolution will automatically be downscaled to 1080p.
This feature enables the screen to at least show a relative low-resolution image instead of a blank screen.
Disable: Disable auto downscale feature.

Display

The page help to render the display connects to the Rx to turn on/off when the Tx is turned on/off.

Devices Power

Follow Host: Whether or not the devices connected to the DEVICES ports would get power depends on the ON/OFF state of the device connected to the HOST port. For example, when a camera connects to DEVICES ports, and a PC connects to HOST port. When the PC is turned on, the camera would automatically be turned on. When the PC is turned off, no power would be provided to the camera.

Always On: There will always power be provided to the devices connected to the DEVICES ports, even though the device connected to HOST port is powered off.

CEC Tab

If the input source devices and HDBaseT output devices support CEC, they can be controlled by the following CEC interface.
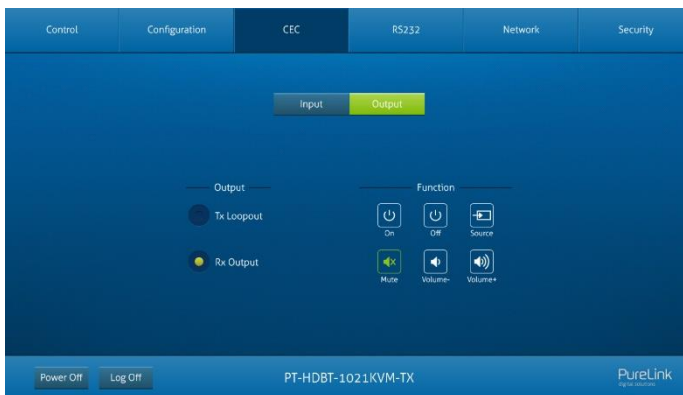
1) **Input Source Device Control**

Select the input source from USB-C or Video that need to be controlled, then press the function button at the right side.

2) **Output Device Control**

Select the output source from Tx Loopout or Rx Output that need to be controlled, then press the function button at the right side.

RS232 Tab

Baud Rate: Supports 2400, 4800, 9600, 19200, 38400, 57600, 115200.

Command Ending: NULL, CR, LF or CR+LF can be chosen.

Command: Type the command in the box to control the third-party device which is connected to the RS232 port of the PT-HDBT-1021KVM-TX.

Network Tab

Toggle either Static IP or DHCP (Dynamic Host Configuration Protocol).

DHCP: The device will automatically generate the IP Address, Subnet Mask and Gateway.

Static IP: Manually modify the static IP Address, Subnet Mask, and Gateway.

Security Tab

In this tab, you can change the login password, upgrade the firmware, lock the Front Panel and factory reset the device.

● Password: Modify the GUI login password;

● Choose the firmware upgrade file and click confirm to upgrade the firmware;

● Lock or unlock the front panel buttons;

● Factory Default the device.

RS232 Control

RS232 Control Software

Connect the RS232 port to control device (e.g. PC) with RS232 cable. The switcher can be controlled by sending RS232 commands.

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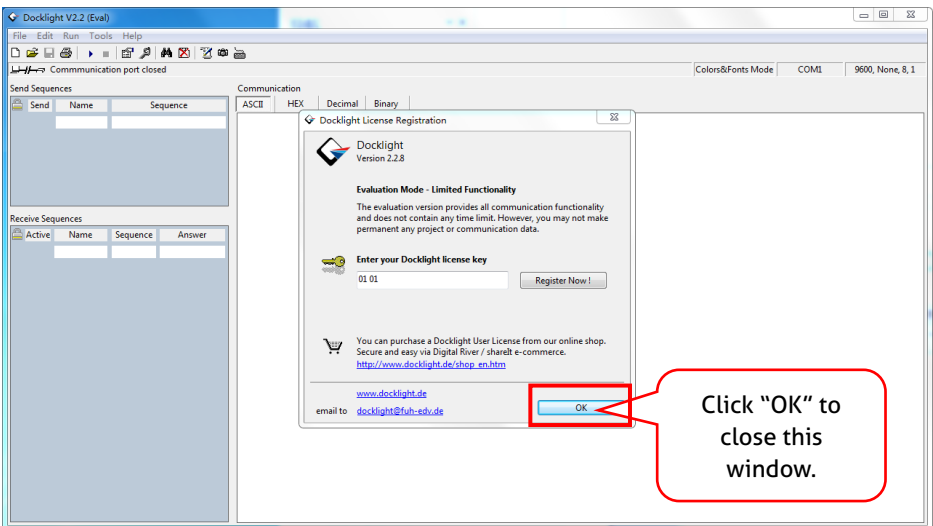
The next pop-up window can also be closed with "Continue". An empty project is enough to send and receive commands easily (The default setting is always "Start with a blank project / blank script ")
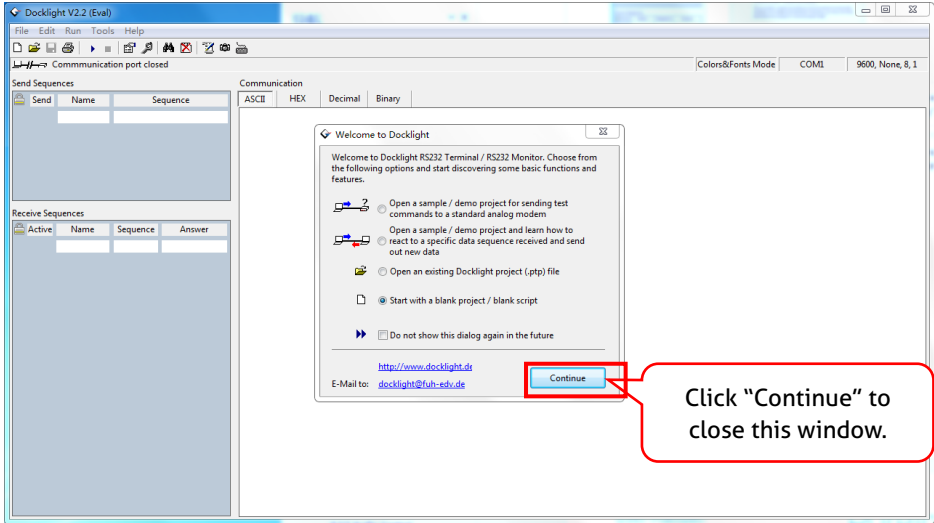

Now you are in the main view, where commands are sent and feedback is received.

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.

Double click on "COM1" to change to the right COM port.
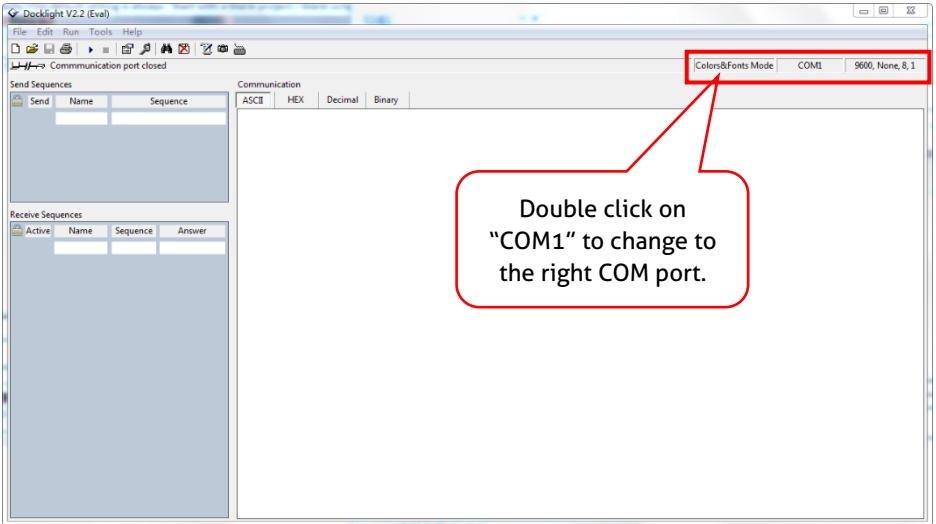
In the following window, select the drop-down menu labeled "Send / Receive on Comm Channel", select the appropriate COM port and then click on "OK" at the bottom right corner.

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

Select the right COM port.

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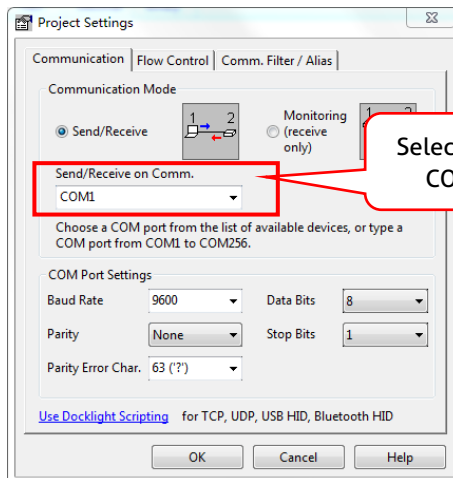
In order to being able to send commands, open communication with the device by clicking on "Play". **(1)**

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

Finally enter the command, for example "50701%". This is then confirmed by pressing "Enter" to send. Any response from the connected device will appear in red. **(3)**
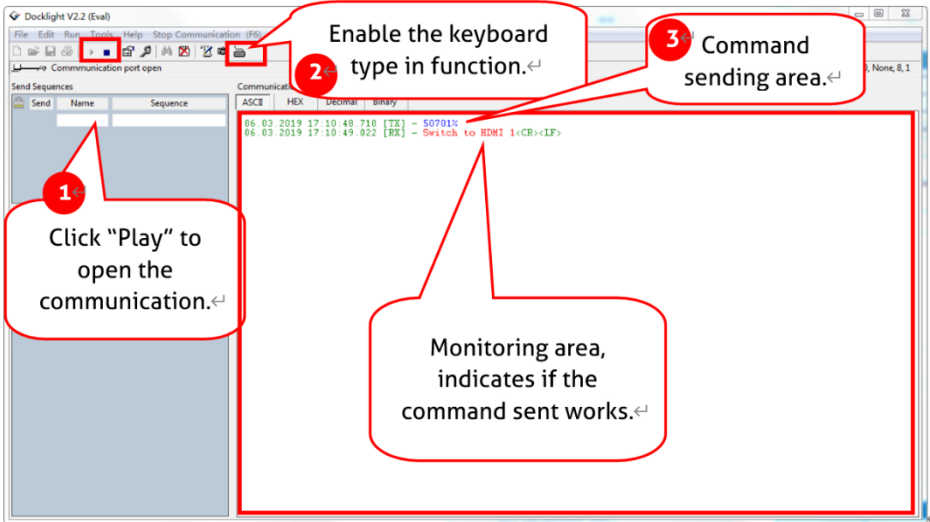
RS232 Command

Communication protocol: RS232 Communication Protocol

Baud rate: 9600   Data bit: 8   Stop bit: 1   Parity bit: none

Command	Description	Command Example and Feedback
STA.	Report system status.	PT-HDBT-1021KVM-TX 2x1 18G KVM Extender over HDBaseT 3.0 FW Version: V1.0.0a Power On! Front Panel Unlock! Local RS232 Baudrate Is 9600! MAC:50-2E-AB-0C-DE-7C! GUI IP DHCP:OFF! GUI_IP:192.168.0.178! GUI_SM:255.255.255.0! GUI_GW:192.168.0.1! HDMI Out Switch Auto Mode! HDMI Out Switch To 01! Input 01 EDID From 03 EDID! Input 02 EDID From 03 EDID! Out HDCP Follow Output! Tx Loopout Down Scale On! Trigger Mode Is 5V! Audio De-embedding On! Device Power Mode Is Follow Host!
RST.	Factory reset.	Factory Default!
Baudrate[x].	Set baud rate to **[x]**. **[x]** can be **2400**, **4800**, **9600**, **19200**, **38400**, **57600**, or **115200**.	Example: Baudrate9600. Feedback: Set Local RS232 Baudrate To 9600!

POWON.	Power on system.	Power On!
POWOFF.	System standby.	Power Off!
HDMI[X].	Select X as the video input source. **[X]** can be 1-2.	HDMI Out Switch To 01!
HDMIA.	Enable Auto-Switch Mode.	HDMI Out Switch Auto Mode!
HDMIM.	Enable Manual Switch Mode.	HDMI Out Switch Manual Mode!
AOUTON.	Turn on the audio de-embedding.	Audio De-embedding On!
AOUTOFF.	Turn off the audio de-embedding.	Audio De-embedding Off!
EDID/[XX]/[YY].	Render the video source that connected to the [xx] port on the transmitter to use the EDID of [yy]. **[XX]** represents the video input port. 00: represents all the input ports. 01: represents No. 1 video input port. 02: represents No. 2 video input port. **[YY]** represents the included EDID as below: **01**: Use the EDID of the screen that connect to the transmitter (TX). **02**: Use the EDID of the screen that connected to the receiver (RX). **03**:1920x1080@60 8bit Stereo (default) **04**:1920x1080@60 8bit High Definition Audio **05**:3840x2160@30Hz 8bit Stereo Audio **06**:3840x2160@30Hz Deep Color High Definition Audio	Example: EDID/01/01. Feedback: Input 01 EDID Upgrade OK By 01 EDID!

	07:3840x2160@60Hz 4:2:0 Deep Color Stereo Audio **08**:3840x2160@60Hz Deep Color Stereo Audio **09**:3840x2160@60Hz Deep Color High Definition Audio **10**:3840x2160@60Hz Deep Color HDR LPCM 6CH **11**: User-defined EDID1 **12**: User-defined EDID2 **13**: User-defined EDID3 **14**: User-defined EDID4	
EDIDUpgrade[xx].	The serial port upgrades EDID data. **[xx]** represents the input port, the value can be 00, 01, 02, U1, U2, U3 and U4. **[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 means to operate on all input ports, 01-02 means input 01-02. **[xx]**=U1-U4 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	Input XX/User Define EDID Upgrade OK!

	HDBaseT must be disconnected before sending the instruction).	
LOCK.	Lock front panel buttons.	Front Panel Locked!
UNLOCK.	Unlock front panel buttons.	Front Panel Unlock!
SetDevicePowerMode[XX].	Set the power mode: **XX** = 00-01 **00**: Follow Host **01**: Always On	Set Device Power Mode To Follow Host! Set Device Power Mode To Always On!
SetGuiIP:xxx.xxx.xxx.xxx.	Set GUI IP to [xxx.xxx.xxx.xxx].	Example: SetGuiIP:192.168.0.18. Feedback: SETGUIIP:192.168.0.18!
SetGuiIP_DHCPON.	Enable DHCP	GUI IP DHCP ON!
SetGuiIP_DHCPOFF.	Enable Static IP.	GUI IP DHCP OFF!
/+[X]:XXX.	Control the surrounding devices that connects to it. **[X]** represent the baud rate; it can be 1-7. **1**—2400, **2**—4800, **3**—9600, **4**—19200, **5**—38400, **6**—57600, **7**—115200 **XXX** represents the ASCII code.	Example: /+3:123456. Feedback: 123456
SIGNALTRG[XX]MODE.	When setting the detection mode **[xx]** is **1**, it is 5V detection. And when it is **2**, it is TMDS detection.	Set Trigger Mode To 5V!
DSON.	Enable downscale.	Tx Loopout Down Scale On!
DSOFF.	Disable downscale.	Tx Loopout Down Scale Off!
CEC[I/O][port][command].	**[I/O]**: represent either video input ports or video output port the command will be sent to. **I**: means the CEC command will be sent to video input port, which are the USB-C and VIDEO (HDMI port).	Example: CECI010444A Feedback: CEC Input 01 Send Success! Example: CECO018004

	O: means the command will be sent to video output port, which are LOOPOUT (HDMI port) and the HDBT. **[port]**: specify the exact port of input/output to pass the command. When **[I/O]** is set to **I**, check the clarification if the **[port]** is set to below: **00**: the command will be sent to both USB-C and VIDEO port. **02**: the command will only be sent to the VIDEO port. When **[I/O]** is set to **O**, check the clarification if the **[port]** is set to below: **00**: the command will be sent to LOOPOUT and HDBT. **01**: the command will be sent to the display that connects to LOOPOUT port. **02**: the command will be sent to the HDBT port, and finally will be send to the display that connects to the receiver remotely. **[commands]**: represents the exact CEC commands that need to be sent to. Please note, the CEC command must in hexadecimal format with a maximum length of 12 bytes.	Feedback: CEC Output 01 Send Success!
HDCPPAS.	Render the HDCP of the output follows the input.	HDCP Follow Input!

	If the input has HDCP 2.2, the output will also have HDCP 2.2. If the input has HDCP 1.4, the output will have HDCP 1.4. If the input does not have HDCP, the output will not either.	
HDCPMAT.	Render the HDCP of the output follows the display.	HDCP Follow Output!
HDCPACT.	Render the HDCP of the output follows the input. If the input has HDCP, no matter which version it is, the output will have HDCP 1.4. If the input does not have HDCP, the output will not either.	HDCP Active!
HDCPOFF.	Turn off the HDCP of output. If it is turned off, there will not be any HDCP on the video output, regardless of whether the video input has HDCP or not.	Out HDCP DBG OFF!
SETMAC:AA-BB-CC-DD-EE-FF	Set a MAC address for the device.	Example: SETMAC:01-02-03-04-05-06 Feedback: MAC:01-02-03-04-05-06!

Troubleshooting & Maintenance

Problems	Potential Causes	Solutions
Output image with snowflake	Bad quality of the connecting cable.	Try another high-quality cable.
	Fail or loose connection.	Make sure the connection is good
No output image when switching	No signal at the input / output end.	Check with oscilloscope or multimeter if there is any signal at the input/output end.
	Fail or loose connection.	Make sure the connection is good.
	The extender is broken.	Send it to authorized dealer for repairing.
POWER indicator doesn't work or no respond to any operation	Fail connection of power cord.	Make sure the power cord connection is good.
Static becomes stronger when connecting the video connectors	Bad grounding.	Check the grounding and make sure it is connected well.
Cannot control the device by control device (e.g. a PC) through RS232 port	Broken RS232 port.	Send it to authorized dealer for checking.

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

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 **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 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

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