User Manual

2x2 HDBaseT 3.0 KVM Extender Set

Model PT-PSW-21KVM

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-PSW-21KVM** 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-PSW-21KVM** 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/ 4251364734810_CE.pdf

CE

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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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Content

1.Product Introduction

1.1 Introduction

PT-PSW-21KVM is an 18Gbps 2x1 switcher extension kit, which supports up to 4K/60/4:4:4, HDR10 and Dolby Vision, HDCP 2.2. It features uncompressed transmission of 18Gbps signals up to 100m. At the same time, it can be connected to peripheral KVM equipment, which is very useful in video conference applications.

1.2 Feature

- 18G, 4K@60HZ 4:4:4, HDR10, Dolby Vision and HDCP 2.2.
- 1 x HDMI input, 1 x USB-B host, 1 x USB-C input, one HDBaseT output with HDMI loop output,
- 6 USB ports for peripheral devices, 2 USB3.0 on Tx(5Gbps), 4 USB2.0 on Rx(3 USB-A+1 1 USB-C),Bandwidth Max up to 250Mbps.
- HDBT 3.0 technology, supports uncompressed 18G signal transmission up to 100m
- USB-C input support 60W charging when system powers up on Tx end.
- The system supports two way PoC.
- Auto switch 5V or TMDS detection
- Support RS232, CEC & TCP/IP control and 3rd party Dry Contact control
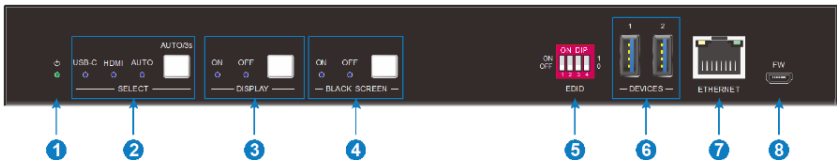
1.3 Package List

- 1x PT-PSW-21KVM Switcher set
- 5 x 3-pin terminal block
- 2 x 5-pin terminal block
- 4 x mounting ears

- 6 x screws
- 8 x Plastic Cushions
- 1 x DC24V/5A power adapter
- 1 x Manual

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

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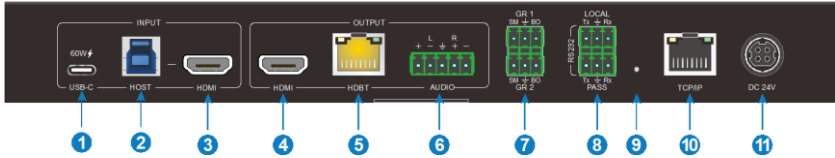# 2. Panel Description

2.1   Tranmitter

2.1.1 Front Panel

No.	Name	Description
①	Power LED	1 x green indicator light, the light is always on when the machine is working, and it goes out when the power is off
②	SELECT	● 1 x White non-backlit button, 3 x blue indicator lights, ● Click the button to select input source, press and hold for 3 seconds to enter or exit automatic switching mode, and the corresponding indicator is always on
③	DISPLAY	● 1 x white non-backlit button, 2 x blue indicator lights; ● Press the button to send the DISPLAY ON/OFF CEC and RS232 commands to control the TX and RX display terminal switches at the same time, and the corresponding indicator light is always on;
④	BLACK SCREEN	● 1 x white non-luminous button, 2 x blue indicator lights; ● Press the button to enter or exit the output black screen state, and the corresponding indicator light is always on;
⑤	EDID	1 x 4-pin DIP switch for EDID management
⑥	DEVICES	2 x USB-A 3.0, connect keyboard, mouse, microphone etc
⑦	ETHERNET	1 x RJ45, used for network passthrough transmission
⑧	FW	1 x Micro-USB, used for MCU firmware upgrade

***Note:*** All the input source LEDs will go out when pressing Black Output button on

2.1.2 Rear Panel

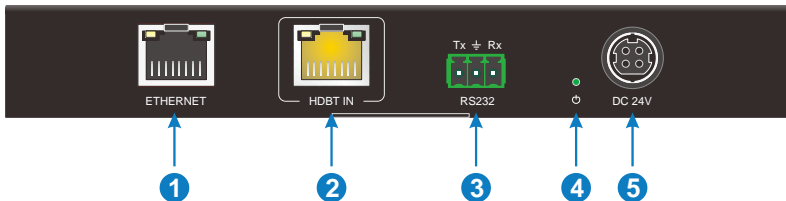| No.	Name	Description
①	USB-C	1 x USB-C 3.0 input, support external 60W charging
②	HOST	1 x USB-B 3.0, connect to HOST devices such as laptops
③	HDMI IN	1 x HDMI input, connect to HOST devices such as laptops
④	HDMI OUT	1 x HDMI loop output
⑤	HDBT	1 x HDBT output, the green light is always on when the signal is with HDCP, flashes when the input signal is without HDCP; the yellow light is always on after the TX and RX are connected;
⑥	AUDIO	1 x 5-pin balanced audio output, output audio de-embedding
⑦	Grommet	GR1: Correspond the USB-C GR2: Conrrespond the HDMI SM: Switch to the current source BO: Print a black screen to all outputs.
⑧	RS232	LOCAL: Connect the control devices to control the transmitter PASS: Bidirectional passthrough transmission with Receiver
⑨	Upgrade	1 x Built-in short-handled buttons, press and hold for 3s to enter the upgrade mode, and the power indicator flashes. At this time, you can upgrade the firmware through the serial port, and press the button again to exit the upgrade mode
⑩	TCP/IP	1 x RJ45, TCP/IP control
⑪	DC 24V	Connect DC24V5A power adapter

2.2 Receiver

2.2.1 Front Panel
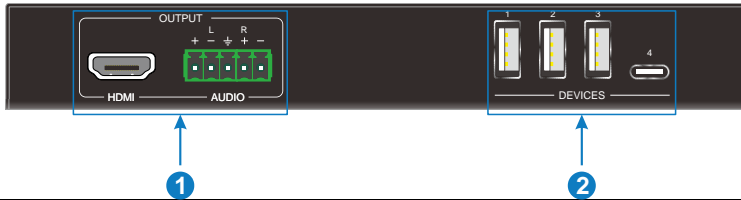
No.	Name	Description
①	OUTPUT	● 1 x HDMI output; ● 1 x 5-pin balanced audio output, HDMI output audio de-embedding
②	DEVICES	3 x USB-A 2.0, 1 x USB-C, connect keyboard, mouse, microphone, printer, camera and other equipment

2.2.2 Rear Panel

No.	Name	Description
	ETHERNET	1 x RJ45, used for network passthrough transmission
②	HDBT IN	1 x RJ45 interface, the green light is always on when the signal is with HDCP, flashes when the input signal is not HDCP; the yellow light is always on after the TX and RX are connected
③	RS232	1 x 3-pin phoenix head, RS232 passthrough transmission
④	Power LED	1 x green indicator light, always on when machine is working
⑤	DC 24v	Connect DC24V5A power adapter

3. EDID Management

EDID are control by the EDID DIP switch, the specific description is as follows:

- 0000 Learn the display EDID in the default mode: read the EDID of the TX HDMI output and RX HDMI output, and output the EDID with the lower resolution of the two, if you can't learn it, then use the built-in 1920x1080@60 8bit Stereo

- 0001 1920x1080@60 8bit High Definition Audio

- 0010 3840x2160@60Hz Deep Color Stereo Audio

- 0011 3840x2160@30Hz 8bit Stereo Audio

- 0100 3840x2160@30Hz Deep Color High Definition Audio

- 0101 3840x2160@60Hz 4:2:0 Deep Color Stereo Audio

- 0110 3840x2160@60Hz Deep Color High Definition Audio

- 0111 3840x2160@60Hz Deep Color HDR LPCM 6CH

- 1011 Custom EDID1

- 1100 Custom EDID2

- 1101 Custom EDID3

- 1110 Custom EDID41111 EDID management

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4. Specification

	Transmitter	Receiver
Video		
Video Input	(1) HDMI IN, (1) USB-C IN	(1) HDBT IN
Video Output Connector	(1) Type-A female HDMI (1) Type-C	(1) RJ45
Input Resolution	HDMI: Up to 4K@60Hz 4:4:4 HDR10, Dolby Vision USB-C: Up to 4K@60Hz 4:4:4	Up to 4K@60Hz 4:2:0
Video Output	(1) HDMI OUT (1) HDBT OUT	(1) HDMI
Video Output Connector	(2) Type-A female HDMI	(1) Type-A female HDMI
Output Resolution	HDMI: Up to 4K@60Hz 4:4:4 HDR10, Dolby Vision HDBT: Up to 4K@60Hz 4:2:0	Up to 4K@60Hz 4:4:4 HDR10, Dolby Vision
HDMI Standard	Up to HDMI 2.0b	Up to HDMI 2.0b
HDCP Version	Up to HDCP 2.2	Up to HDCP 2.2
Audio		
HDMI Embedded Audio Format	LPCM 7.1 audio, Dolby Atmos®, Dolby® TrueHD, Dolby Digital® Plus, DTS:X™, and DTS-HD® Master Audio™ pass-through.	
Audio Output Connector	(1) 5-pin terminal block	(1) 5-pin terminal block
Frequency Response	20Hz–20KHz, ±3dB	
Max Output Level	0.88 Vrms ± 0.5 dB. 2 V = 16 dB headroom above -10 dBV (316 mV) nominal consumer line level signal SPDIF: ±0.05dBFS	
THD+N	< 0.05% (-80 dB), 20 Hz – 20 kHz bandwidth, 1 kHz sine at 0 dBFS level (or max level)	
SNR	> 80dB, 20Hz-20 kHz bandwidth SPDIF: > 90dB, 20Hz-20 kHz bandwidth	

Crosstalk Isolation	< -80 dB, 10 kHz sine at 0 dBFS level (or max level before clipping)	
L-R Level Deviation	< 0.3 dB, 1 kHz sine at 0 dBFS level (or max level before clipping)	
Output Load Capability	1k ohm and higher (supports 10x paralleled 10k ohm loads)	
Noise Level	>70dB @ 1 kHz	
Control		
USB Data	Max up to 5Gbps	Max up to 250 Mbps
Control port	(1) EDID switch, (2) DEVICES (1) ETHERNET, (1) FW, (1) HOST, (2) GR, (2) RS232 (1) TCP/IP	(4) DEVICE, (1) ETHERNET (1) RS232
Control Connector	(1) 4-pin DIP switch (2) USB Type-A, (1) RJ45 (1) Micro-USB, (1) USB Type-B (2) 3-pin terminal block (2) 3-pin terminal block, (1) RJ45	(3) USB Type-A, (1) USB Type-C (1) RJ45, (1) 3-pin terminal block
General		
Operation Temperature	-5 ~ +55℃	
Storage Temperature	-25 ~ +70℃	
Relative Humidity	10% ~ 90%	
External Power Supply	Input: AC 100~240V, 50/60Hz; Output: 24V DC 5A.	
Power Consumption	76.5W (Max)	
USB-C Power Charging	60W(Max)	
Dimension (W*H*D)	265W x 150D x 32H mm	173W x 95D x 24.5H mm
Net Weight	1020g	410g

5. GUI Control

The switcher can be controlled via TCP/IP. The default IP settings are:
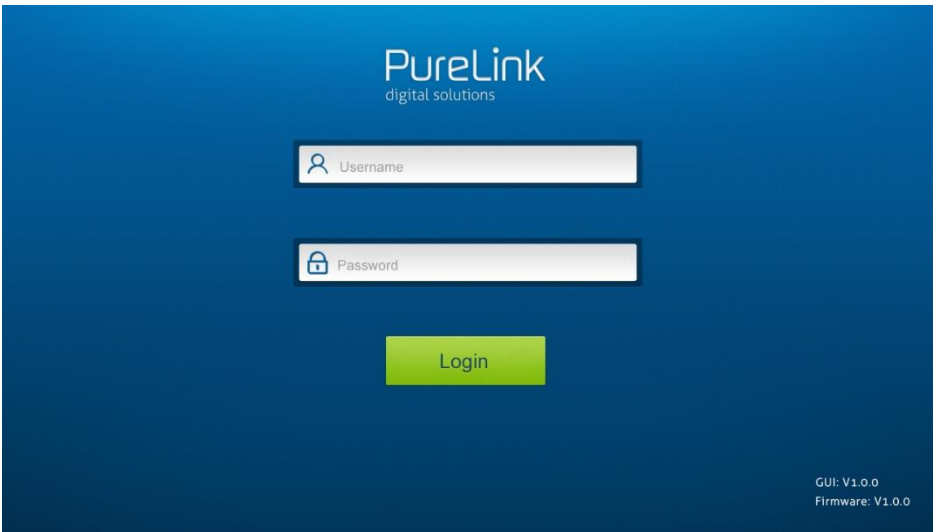
IP Address: 192.168.0.178

Subnet Mask: 255.255.255.0

TCP/IP port: 4001

TCP/IP Commands are same as RS232

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

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Username

Password

Login

GUI: V1.0.0
Firmware: V1.0.0

There are three selectable usernames:

Username	Password	Access Tab
admin	admin	All tabs
User2	User2	configurable
User3	User3	configurable

The username and password can be changed via **Access** tab.

Here we login as "admin" as an example to introduce each GUI tab.

5.1 Video Tab

- Choose the HDMI, USB-C or Auto source according to actual usag

5.2 Configuration Tab

5.2.1 EDID

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

5.2.2 Auto Downscale

- Enable or disable the auto Downscale in TX or RX output.

5.2.3 Tags

- Choose and enter the tags, then click confirm to change the tags.

5.3 CEC Tab

5.3.1 Input

- Select the function and press to control the input

5.3.2 Output

- Select the function button and press to control the output

5.3.3 User-defined

- Define the Trigger of input and output

5.4 RS232 Tab

- Baud Rate: Supports 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-PSW-21KVM.
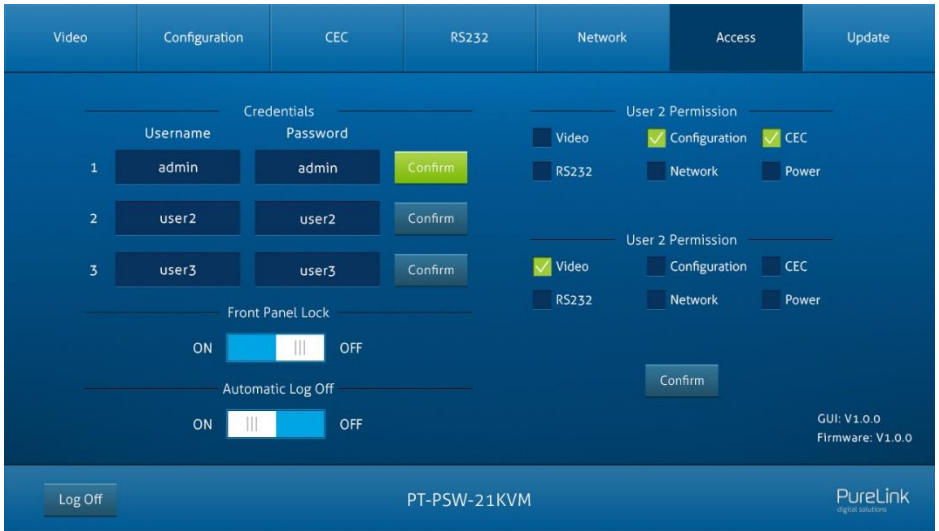
5.5 Network Tab

- Static IP or Dynamic Host Configuration Protocol (DHCP).
- Modify the static IP Address, Subnet Mask, and Gateway.

5.6 Access Tab

- Modify the login username and password.
- Lock or unlock the front panel buttons.
- Enable or disable GUI automatic log-off mode.
- Configure accounts user2 and user3
- Factory default reset

5.7 Update Tab

- Factory Default: set the equipment to factory default setting.
- Firmware Update: update FW to the equipment.

6. RS232 Control

6.1 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.
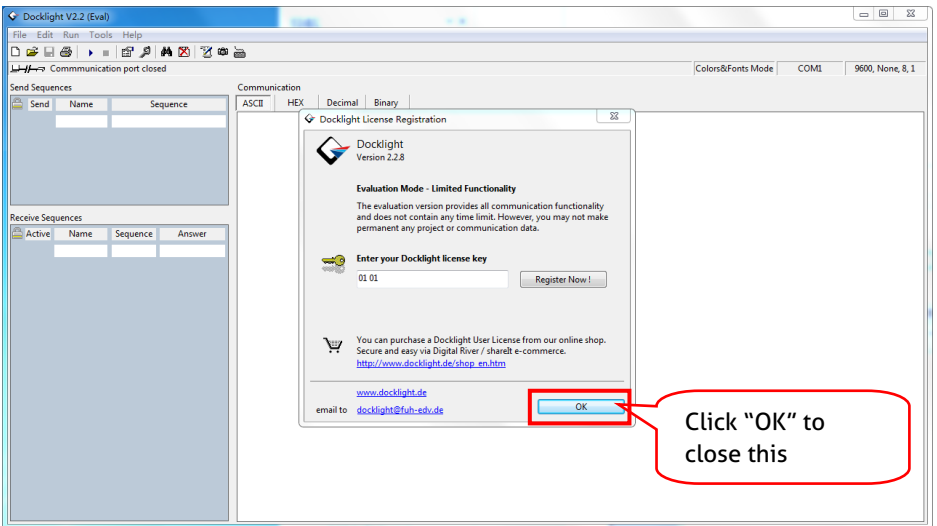
The next pop-up window can also be closed with "Continue". An empty project is enough to send and receive commands easily (The default setting is always "Start with a blank project / blank script")

Click "Continue" to close this window.
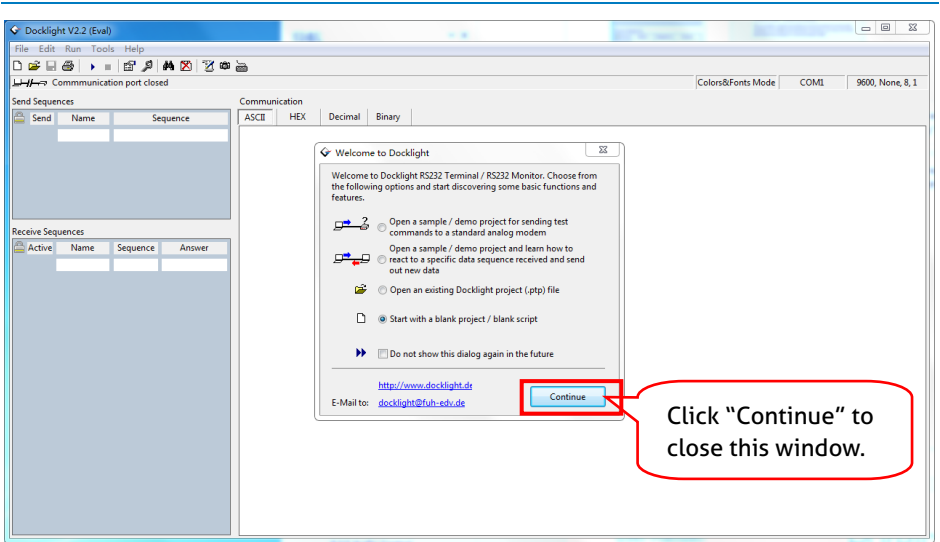
Now you are in the main view, where commands are sent and feedback is received.

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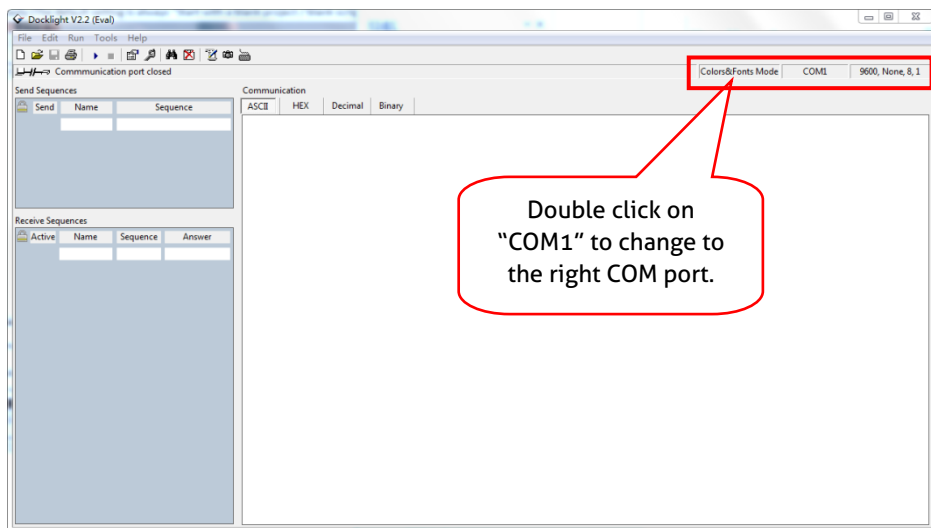
In the following window, select the drop-down menu labeled "Send / Receive on Comm Channel", select the appropriate COM port and then click on "OK" at the bottom right corner.

All other settings can be left at default for most applications, but refer to device RS232 settings to be sure.
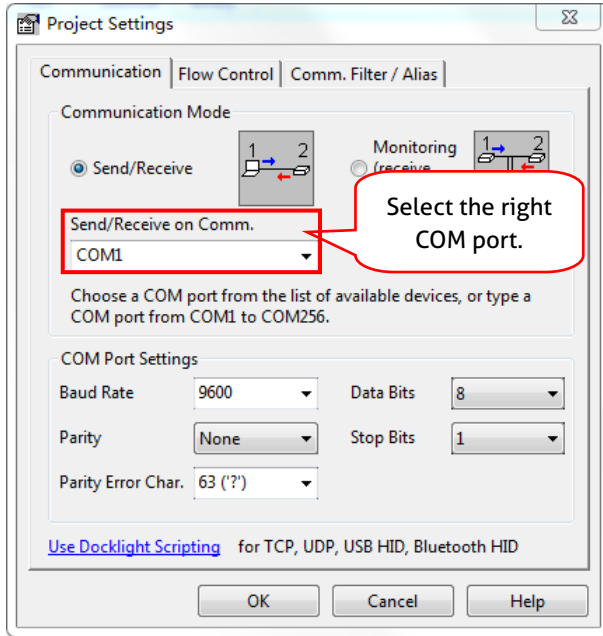
In order to be able to send commands, open communication with the device by clicking on "Play". **(1)**

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

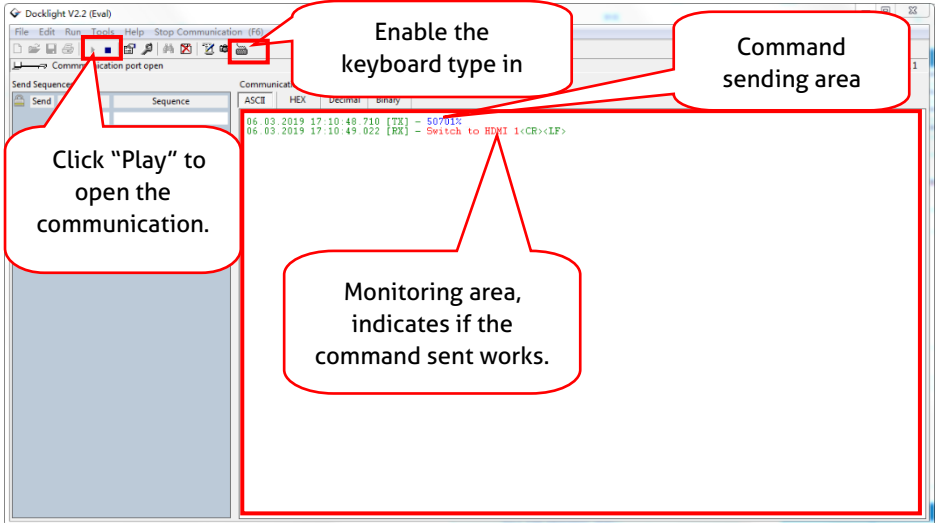Finally enter the command, for example "50701%". This is then confirmed by pressing "Enter" to send. Any response from the connected device will appear in red. **(3)**

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6.2 RS232 Command

Communication protocol: RS232 Communication Protocol

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

The switcher can be controlled by sending the following RS232 commands:

Note:
- Please remember to end the commands with the ending symbols "." or ";".
- Type the command carefully, it is case-sensitive.
- All commands ended <u>with</u> "<CR><LF>".

6.2.1 System control

Command	Description	Command & Feedback Example
PHDBTON.	HDBaseT OUT POC power on	HDBT 01 Power ON!
PHDBTOFF.	HDBaseT OUT POC power off	HDBT 01 Power OFF!
HDMIA.	Auto-switch mode on	HDMI Out Switch Auto Mode!
HDMIM.	Manual-switch mode on	HDMI Out Switch Manual Mode!
HDMI[x].	HDMI input source selection. x = 1 & 2 1 – Type-C 2 – HDMI	HDMI Out Switch To 01! HDMI Out Switch To 01!
POWON.	Turn off standby mode	Power ON!

POWOFF.	Turn on standby mode	Power OFF!
SIGNALTRG[xx]MODE.	When setting the detection mode xx=1, it is 5V detection, and when it is 2, it is TMDS detection.	Set Trigger Mode To 5V.
SIGNALTRGSTA.	Query the method of signal detection (TMDS or 5V)	Get Trigger Mode Is 5V.
RST.	Restore Factory	Factory Default!
Lock.	Turn on front panel lock	Front Panel Locked!
Unlock.	Turn off front panel lock	Front Panel UnLock!

STA.	Status query	PT-PSW-21KVM
		V1.0.0
		PWON!
		HDBT 01 Power ON!
		HDMI OUT 01 Down Scale OFF!
		HDMI OUT 02 Down Scale OFF!
		HDMI Out Switch Auto Mode!
		Get Trigger Mode Is 5V.
		System Unlock!
		Baudrate9600!
		GUI_IP:192.168.0.200!
		HDMI Out Switch To 02!
		Set Output Black Screen ON!
		IN 1 2
		LINK Y Y
		OUT 1 2
		LINK Y Y
		Input 1 EDID From 1 User Define EDID!
		Input 2 EDID From 1 Internal EDID!
		OUT 01 HDCP MAT DISPLAY!
		OUT 02 HDCP MAT DISPLAY!
		Set POFF Delay To 600 Second(s)!

RS232ONSAVE:[Y],[xxx].	Save the display terminal boot command sent when the input is detected. Y is the baud rate, 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6-57600; 7 --115200; xxx is the command data	Save PON Command:YYYYY,Baudrate Is 9600!
RS232OFFSAVE:[Y],[xxx].	Save the display terminal shutdown command sent when no input is detected. Y is the baud rate, 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6-57600; 7--115200; xxx is the command data	Save POFF Command:TTTTTT.,Baudrate Is 9600!
RS232DLYOUT[xx]:[yy].	Set the delayed sending time of the display terminal shutdown command (CEC and RS232). Send when no input is detected; the default time is 10 minutes 600s [xx]=output,00~02 [yy]=second,01~600	Set POFF Delay To 10 Second(s)!

6.2.2 Source control

Command	Description	Command & Feedback Example
TVON.	Turn on TV by CEC control	CEC_TV_POWON! CEC Output 01 Send Success. CEC Output 02 Send Success.
TVOFF.	Turn off TV by CEC control	CEC_TV_POWOFF! CEC Output 01 Send Success. CEC Output 02 Send Success.
TVVOL+.	TV volume plus by CEC control	CEC_TV_VOLUP! CEC Output 01 Send Success. CEC Output 02 Send Success.
TVVOL-.	TV volume down by CEC control	CEC_TV_VOLDOWN! CEC Output 01 Send Success. CEC Output 02 Send Success.
TVMUTE.	TV mute by CEC control	CEC_TV_VOLMUTE/UNMUTE! CEC Output 01 Send Success. CEC Output 02 Send Success.
DS[x]ON.	Turn on the DOWN SCALE of the HDMI output. (Compatible with [X]/[XX]) [x] Value 0-2 or 00-02, 0 means all output	HDMI OUT 01 Down Scale ON! HDMI OUT 02 Down Scale ON!

| DS[x]OFF.	Turn off the DOWN SCALE of the HDMI output. (Compatible with [X]/[XX]) [x] Value 0-2 or 00-02, 0 means all output	HDMI OUT 01 Down Scale OFF! HDMI OUT 02 Down Scale OFF!
STA_IN.	Source connection status	IN 1 2 LINK N N
/+[X]/[YY]:XXX.	RS232 sends commands to control peripheral devices. [YY]The value is 00 or 01; [X] is 1--2400; 2--4800; 3--9600; 4--19200; 5--38400; 6-57600; 7--115200	123456
@OUT[xx].	Turn on the HDMI 5V of the output port. [xx] The value 00-01,00 means all outputs.	Set Output Black Screen ON!
$OUT[xx].	Turn off the HDMI 5V of the output port. [xx] The value 00-01,00 means all outputs.	Set Output Black Screen OFF!
GETGUIIP.	Query GUI IP	GUI_IP:192.168.0.173!
SetGuiIP_DHCP ON.	Dynamic DHCP	GUI IP DHCP ON!
SetGuiIP_DHCP OFF:xxx.xxx.x.x xx.	Static DHCP+set IP (default is 192.168.0.178)	GUI IP DHCP OFF!SETGUIIP:192.168.0.123 !

EDIDUpgrade[xx].	The serial port upgrades EDID data.	Input XX/User Define EDID Upgrade OK By RS232 Or GUI!
	1. [xx] represents the input port, the value is 00-02 and U. [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,	
	2. [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 HDBaseT must be disconnected before sending the instruction)	

EDID/[xx]/[yy].	The input port xx uses the built-in EDID numbered yy.	Input 02 EDID Upgrade OK By 01 Internal EDID!
	[xx] represents the input port, the value 00-02, 00 represents all input ports, 01-02 separately represents input 1-2;	
	[yy] represents the built-in EDID number, the value is 01-12, 01-08 represents the built-in EDID that cannot be customized, and 09-12 represents the customized EDID	
EDIDM[x]B[y].	The input port learns the EDID of the output port.	Input 01 EDID Upgrade OK By 02 EXT EDID!
	[X] represents the output port number, [X] takes the value 1-2 (or 01-02 Note: 01-02 must be used in conjunction with 00-02 below), 1-2 represents output 1-2.1 represents output 1, 2 represents Output 2.	
	[y] represents the input port, the value is 0-2 (00-02), 0 represents all input ports, and 1-2 separates represents input 1-2;	

Baudrate[XXX].	Set control baud rate. [XXX] Support 115200, 57600, 38400, 19200, 9600	Set Local RS232 Baudrate Is 9600!
CEC[I/O][AA][BB][CC][DD].	I/O: means input or output port, AA, BB, CC, DD are all hexadecimal data; AA: indicates the port number, the input is 01-02, the output is 01-02, and FF means all; BB: Indicates the device type (TV: 40, 20, 80, disc player 04, 08, etc.); CC: indicates the CEC function category (for example, 44 indicates the remote control function) DD: indicates the specific data under the function (for example: 41, representing the volume plus), this can send combined data such as two or three groups, or not, up to 9 groups;	CEC Input 01 Send Success! CEC Output 01 Send Success! CEC Output 01 Send Success!

7. System Diagram

The following diagram illustrates typical input and output connections that can be utilized with the KVM switcher.

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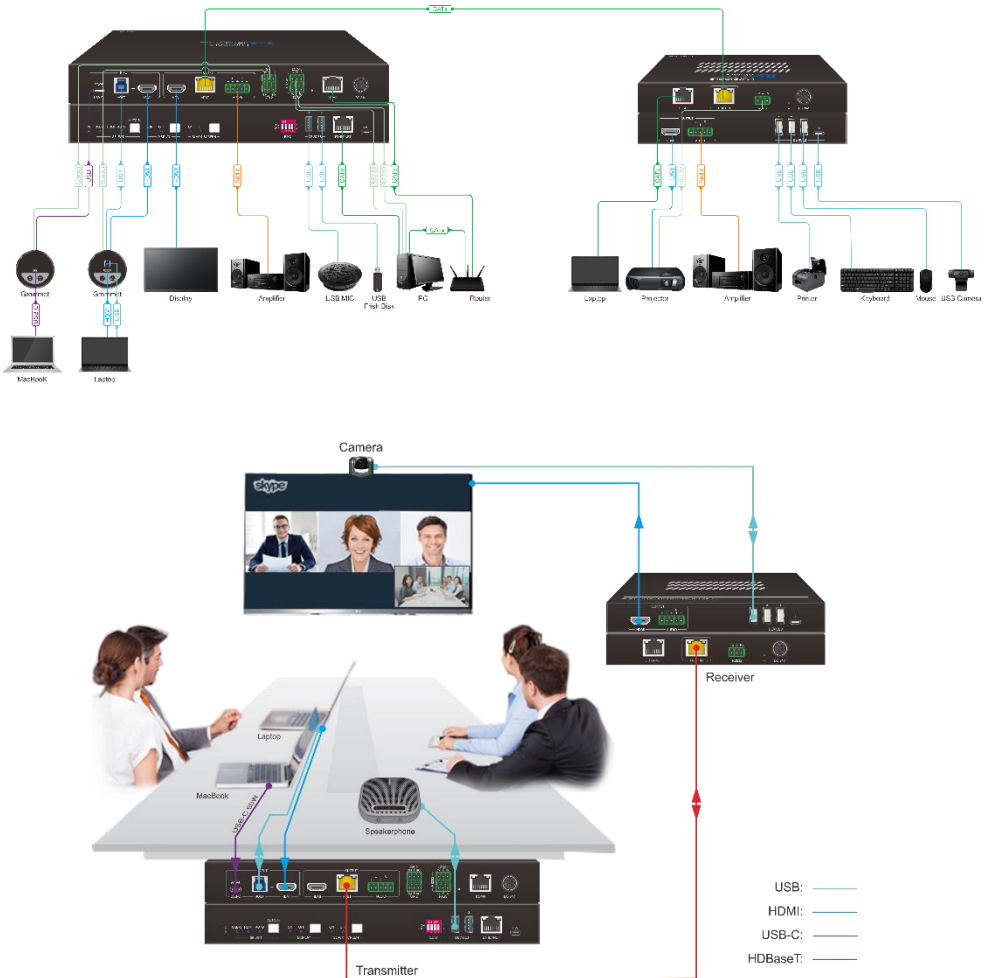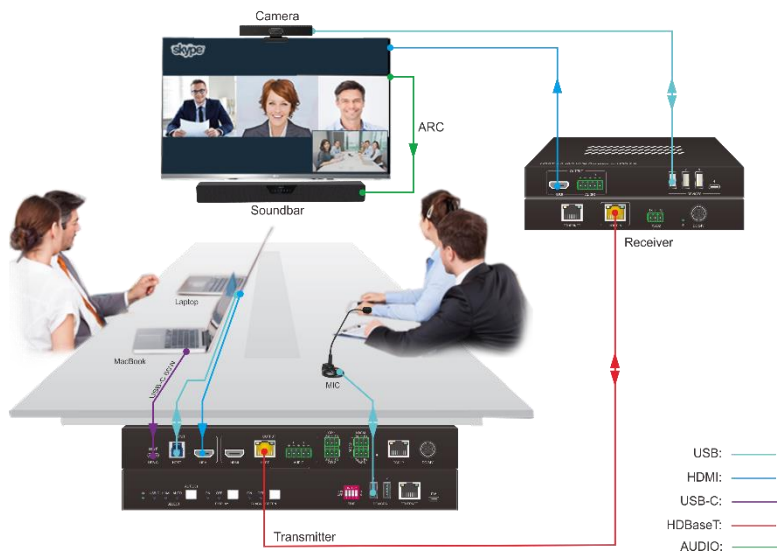
8. After-Sales Service

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.

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Asking for Assistance

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