PureTools

User Manual

4x1 4K HDMI with KVM Switcher

Model PT-SW-HD41USB

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-SW-HD41USB** 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-SW-HD41USB** 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/ 4251364734964_CE.pdf

CE

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.

Content

PureTools

1.Product Introduction

1.1 Introduction

Thanks for choosing the professional PT-SW-HD41USB 4x1 Switcher. The switcher features four HDMI video inputs and one HDMI output. It supports HDMI video resolution up to 4K@60Hz 4:4:4 HDR 10 and Dolby Vision. The switcher provides one stereo audio output for audio de-embedding, and provides four type-B USB ports and three type-A USB ports for KVM management, the four HDMI computers can be controlled via one keyboard, one mouse and one monitor. In addition, the switcher features four GR ports to connect the PT-IPF-HU interface panels for source selection and black screen setting. The switcher can also be controlled via RS232 and front panel buttons.

1.2 Feature

- 4x1 HDMI 2.0 Switcher with KVM.
- Supports video resolution up to 4K@60Hz 4:4:4, HDR 10 and Dolby Vision.
- HDCP 2.2 compliant.
- Compatible with Windows, Linux and Mac OS.
- 3.5mm stereo audio output for audio de-embedding.
- Convenient and cost-effective USB 3.0 peripheral sharing.
- Controls four HDMI computers via one keyboard, one mouse and one monitor.
- KVM auto-switching based on TMDS/5V detection.
- Controllable by buttons, RS232 commands and the PT-IPF-HU interface panels.
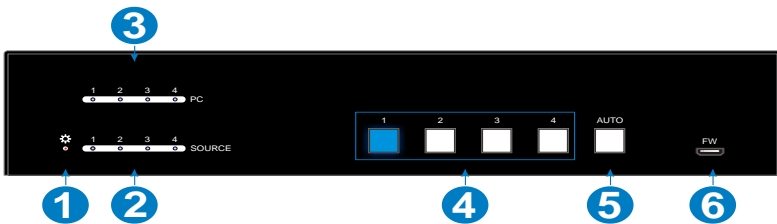- Simplifies wiring for easy installation

1.3 Package List

- 1x 4x1 Switcher
- 2x Mounting Ears with 4 Screws
- 4x Plastic Cushions
- 1x Power Adapter (12V DC 2A)
- 4x 3-pin Terminal Blocks
- 1x User Manual

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

2. Panel Description

2.1 Front Panel

No.	Name	Description
①	POWER LED	The LED illuminates red when power is applied
②	SOURCE LEDs	Total four LEDs, any one of which illuminates blue to indicate its corresponding HDMI port is connected to an active source device.
③	PC LEDs	Total four LEDs, any one of which illuminates blue to indicate its corresponding type-B USB port is connected to an active PC.
④	SOURCE BUTTONS	Four buttons for input source selection, one of which illuminates blue to indicate which source device is selected.
⑤	AUTO	Press it to enable auto switching mode, and it will illuminate blue. Press again can exit auto switching mode.
⑥	FW	Micro-USB port for firmware upgrade.

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

2.2 Rear Panel
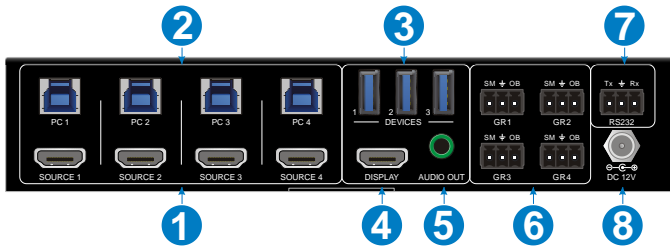
No.	Name	Description
①	SOURCE1~SOURCE4	Four type-A female HDMI input ports to connect HDMI source devices (PC, Blu-ray Disc™ or DVD player, etc.).
②	PC1-PC4	Four type-B USB ports to connect PCs. The PC can be a source device connected to the corresponding HDMI input port.
③	DEVICEs(1-3)	Three type-A USB ports to connect USB devices (Keyboard, Mouse or camera, etc.). These USB devices are used to control the PC which is connected to the selected HDMI input port and the corresponding type-B USB port. These type-A USB ports can power these USB devices with 1A.
④	DISPLAY	Type-A female HDMI output port to connect display device (e.g. Projector).
⑤	AUDIO OUT	3-pin terminal block to connect speakers or amplifiers for audio output.
⑥	GR1~GR4	Four 3-pin terminal blocks to connect four PT-IPF-HU interface panels for source selection and black screen setting.
⑦	RS232	3-pin terminal blocks to a control device (e.g. PC) to control the switcher..
⑧	DC 12V	Power port for power adapter connection.

3. Specification

Video Input	
Input	(4) SOURCE 1~4
Input Connector	(4) Female type-A HDMI
HDMI Input Resolution	Up to 4K@60Hz 4:4:4, HDR10, Dolby Vision
HDMI Standard	2.0
HDCP Version	2.2
Video Output	
Output	(1) DISPLAY
Output Connector	(1) Female type-A HDMI
HDMI Output Resolution	Up to 4K@60Hz 4:4:4, HDR10, Dolby Vision
HDMI Standard	2.0
HDCP Version	2.2
Audio	
Output	(1) AUDIO OUT
Output Connector	(1) 3.5mm mini stereo audio jack
Audio Format	PCM 2CH
Frequency Response	20Hz to 20KHz, ±1dB
Max Output Level	2.0Vrms ± 0.5dB. 2V = 16dB headroom above -10dBV (316 mV) nominal consumer line level signal.
THD+N	< 0.05%, 20Hz - 20KHz bandwidth, 1KHz sine at 0dBFS level (or max level).
SNR	> 80dB, 20Hz - 20KHz bandwidth.
Crosstalk Isolation	< -80 dB, 10 kHz sine at 0dBFS level (or max level before clipping).
L-R Level Deviation	< 0.05 dB, 1 kHz sine at 0dBFS level (or max level before clipping).
Output Load Capability	1Kohm and higher (supports 10x paralleled 10k ohm loads).

|	
Noise Level	-80dB
Control	
Control	(1) FW, (4) PC 1~4, (3) DEVICES 1~3, (4) GR 1~4, (1) RS232
Control Connector	(1) Micro-USB, (4) Type-B USB, (3) Type-A USB, (5) 3-pin Terminal Blocks
General	
Bandwidth	18Gbps
Operation Temperature	-10℃ ~ +55℃
Storage Temperature	-25℃ ~ +70℃
Relative Humility	10%-90%
Type-A USB Power Supply	1A
System Power Supply	Input:100V~240V AC; Output: 12V DC 2A
System Power Consumption	14W(Max)
Dimension (W*H*D)	200mm x 40mm x 100mm
Net Weight	685g

4. System Diagram

Usage Precaution

- Make sure all components and accessories 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

The following diagrams illustrate typical input and output connections that can be utilized with this switcher:
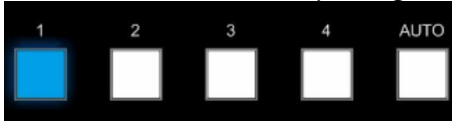
The switcher is used alone:
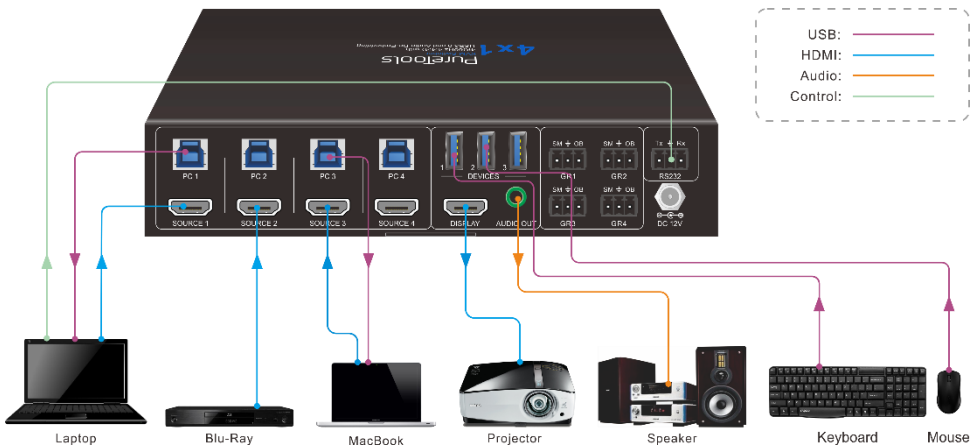
5. Button Control

5.1 Manual Switching

Press button 1~4 to the corresponding HDMI input source.

5.2 Auto Switching

Press **AUTO** to enable auto switch mode, and then the button LED will illuminate blue.

When in auto mode, the switcher follows the rules in the certain circumstances:

- The switcher will automatically switch to the first available active input starting at input 1 to 4.
- Press the source button (1, 2, 3 or 4) can directly change the input source.
- New Input: Upon detecting a new input, the switcher will automatically select the new source.
- Detection input signal source: 5V(Default) or TMDS.
- Reboot: Once power is restored to the switcher, if the last selected source is still available, the switcher will still output this signal, otherwise, the switcher will switch to the first available active input starting at input 1.
- Source Removed: When an active source is removed, the switcher will switch to the first available active input starting at input 1.
- Press **AUTO** again can exit auto switch mode, but the input source will remain the current setting.

Note: The factory default is auto switching mode.

6. Interface Panel Control

The optional interface panel (PT-IFP-HU) can be used for input source selection and black screen.

Press Show Me on interface panel (PT-IFP-HU) to select HDMI source.

Press Black Output on interface panel (PT-IFP-HU) to let display be black screen.

7. RS232 Control

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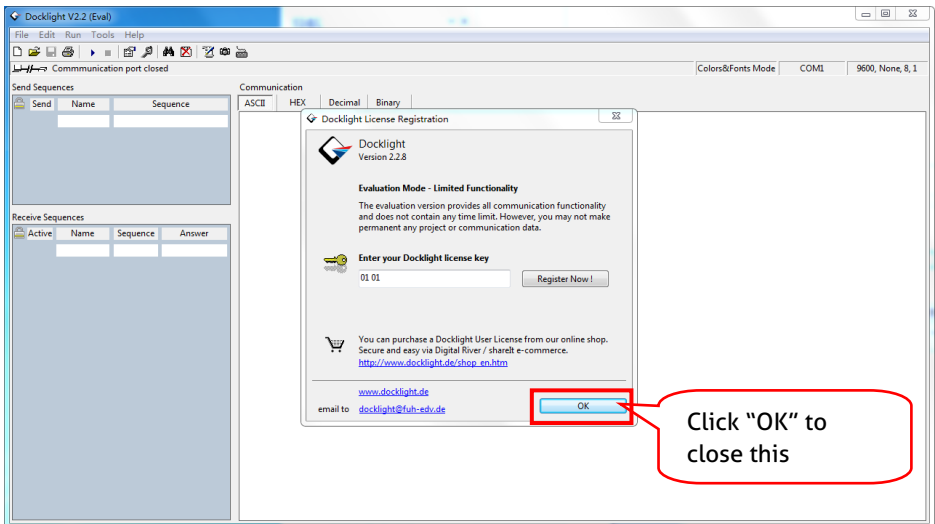
The next pop-up window can also be closed with "Continue". An empty project is enough to send and receive commands easily (The default setting is always "Start

with a blank project / blank script")
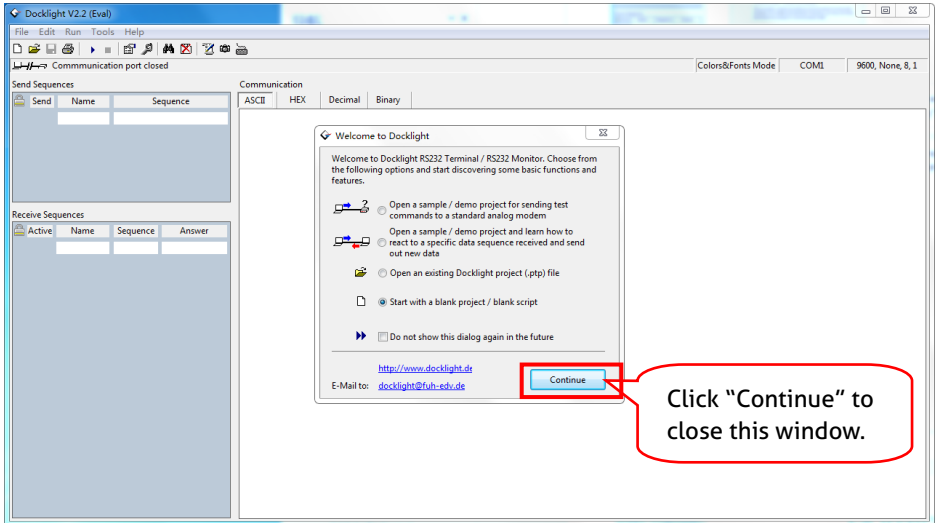
Now you are in the main view, where commands are sent and feedback is received.

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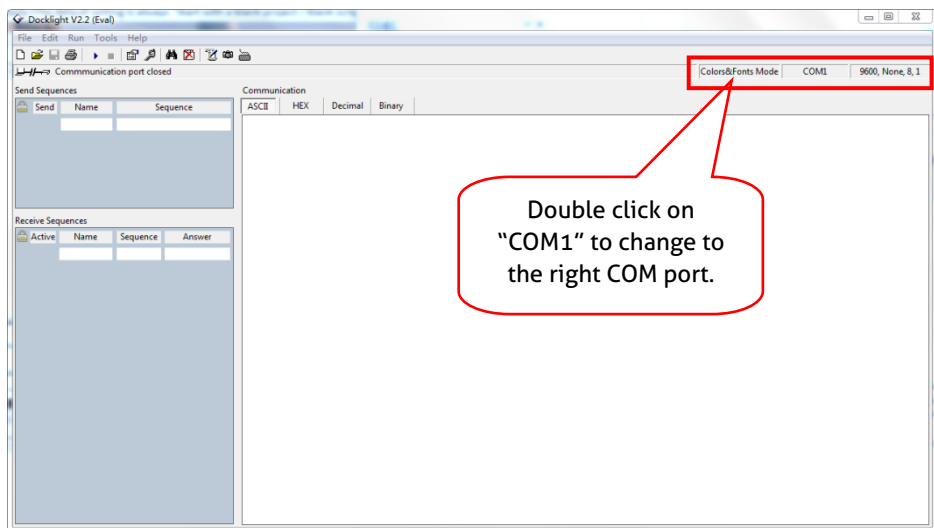
In the following window, select the drop-down menu labeled "Send / Receive on Comm Channel", select the appropriate COM port and then click on "OK" at the bottom right corner.

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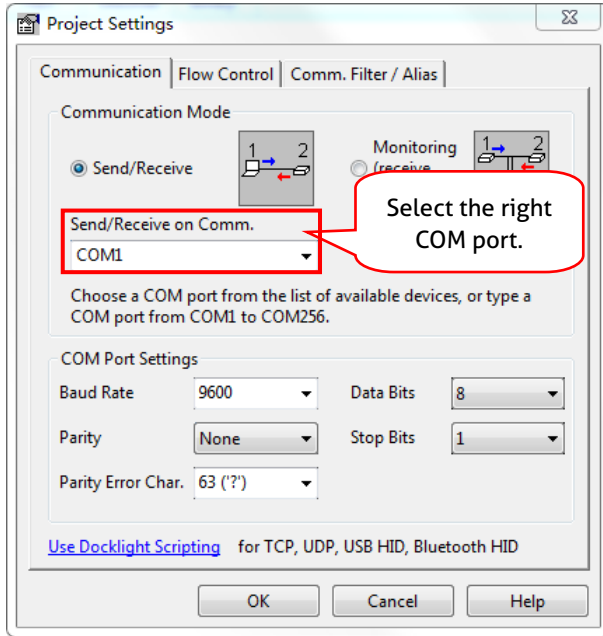
In order to be able to send commands, open communication with the device by clicking on "Play". **(1)**

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

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

7.2 RS232 Command

Note: All commands need to be ended with "<CR><LF>".
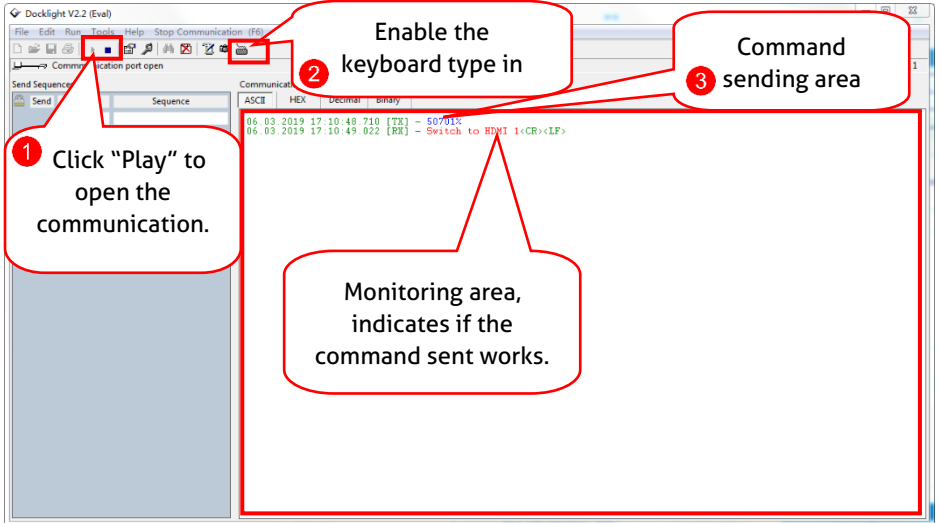
7.2.1 Device Control

Command	Description	Command Example and Feedback
#GET_FIRMWARE_VERSION	Get the software version.	@V1.0.0
#SET_KEYPAD_LOCK 0	Unlock the front panel buttons (Factory default).	@FRONT PANEL UNLOCK!
#SET_KEYPAD_LOCK 1	Lock the front panel buttons.	@FRONT PANEL LOCK!
#GET_KEYPAD_LOCK	Get the locking status of front panel buttons.	@FRONT PANEL UNLOCK!
		@FRONT PANEL LOCK!
#SET_AUTO_KEY_LOCK 0	Unlock the AUTO button.	@AUTO PANEL UNLOCK!
#SET_AUTO_KEY_LOCK 1	Lock the AUTO button.	@AUTO PANEL LOCK!
#GET_AUTO_KEY_LOCK	Get the locking status of AUTO button.	@AUTO PANEL UNLOCK!
		@AUTO PANEL LOCK!
#SET_HDMI_DETECTION_MODE 0	Set the detection method of HDMI source input to 5V.	@INPUT_SIGNAL_DETECTION 0!
#SET_HDMI_DETECTION_MODE 1	Set the detection method of HDMI source input to TMDS.	@INPUT_SIGNAL_DETECTION 1!
#GET_HDMI_DETECTION_MODE	Get the detection method of HDMI source input.	@INPUT_SIGNAL_DETECTION 0!
		@INPUT_SIGNAL_DETECTION 1!
#GET_STATUS	Get the system status.	@RS232 QUERY STATUS! @WUH4-HUB @V1.0.0 @FRONT PANEL UNLOCK! @HDMI OUT SWITCH TO AUTO MODE!

Command	Description	Command Example and Feedback
		@HDMI IN SWITCH TO 1! @OUTPUT_HDCP 0! @INPUT_SIGNAL_DETECTION 0! @IIS OUT ON! @SWITCHMODE 0! @USB SWITCH MODE TO 0! @USB SWITCH TO 1! @AUTO PANEL UNLOCKED! @RS232 BAUDRATE IS 1!
#FACTORY_RESET	Restore factory default	@FACTORY DEFAULT! @WUH4-HUB @V1.0.0 @HDMI OUT SWITCH TO AUTO MODE! @OUTPUT_HDCP 0! @IIS OUT ON! @INPUT_SIGNAL_DETECTION 0! @HDMI IN SWITCH TO 1! @USB SWITCH MODE TO 0! @RS232 BAUDRATE IS 1!
#REBOOT	Reboot the device.	@REBOOT
#HELP	Get all commands and its usage.	...

Command	Description	Command Example and Feedback
#SET_AV H1	Switch to HDMI source 1.	@HDMI IN SWITCH TO 1!
#SET_AV H2	Switch to HDMI source 2.	@HDMI IN SWITCH TO 2!
#SET_AV H3	Switch to HDMI source 3.	@HDMI IN SWITCH TO 3!
#SET_AV H4	Switch to HDMI source 4.	@HDMI IN SWITCH TO 4!
#GET_AV	Get the current HDMI source.	@HDMI IN SWITCH TO 1!
#SET_AUTO_SWITCH 1	Enable auto switching (Factory default).	@HDMI OUT SWITCH TO AUTO MODE!
#SET_AUTO_SWITCH 0	Disable auto switching	@HDMI OUT SWITCH TO MANUAL MODE!
#GET_AUTO_SWITCH	Get the auto switching status.	@HDMI OUT SWITCH TO AUTO MODE!
		@HDMI OUT SWITCH TO MANUAL MODE!
#SWITCH_MODE 1	Switching mode 1. Quick switching.	@SWITCHMODE 1!
#SWITCH_MODE 0	Switching mode 2. Normal switching.	@SWITCHMODE 0!
#GET_SWITCH_MODE	Get the switching mode.	@SWITCHMODE 0!
#SET_SWITCH_USB [PARAM]	Switch USB to [PARAM]. [PARAM] = 1~4. 1 - PC1 2 - PC2 3 - PC3 4 - PC4	#SET_SWITCH_USB 1
		@SET SWITCH MODE 1! @SET USB SWITCH TO 1!
#GET_SWITCH_USB	Get the PC which switching USB to.	@USB SWITCH TO 1!

Command	Description	Command Example and Feedback
#SET_USB_SWITCH_MODE 0	Set USB switching mode to follows the video switching.	#SET_USB_SWITCH_MODE 0
#SET_USB_SWITCH_MODE 1	Set USB switching mode to command control by "#SET_SWITCH_USB".	@SET USB SWITCH MODE 1!
#GET_USB_SWITCH_MODE	Get USB switching mode.	@USB SWITCH MODE TO 0!

7.2.3 Audio Setting

Command	Description	Command Example and Feedback
#SET_IIS 1	Turn on stereo audio output.	@IIS OUT ON!
#SET_IIS 0	Turn off stereo audio output.	@IIS OUT OFF!
#GET_IIS	Get the stereo audio output status.	@IIS OUT ON! @IIS OUT OFF!

7.2.4 EDID Management

Command	Description	Command Example and Feedback
#SET_EDID_MODE [PARAM]	[PARAM]= 0000~0011 [PARAM]=0000, set the EDID mode to Pass-through (Factory default). If the source device can't read EDID from display device, it will use the built-in EDID: 3840x2160@60Hz Deep Color Stereo Audio. [PARAM]=0001/0010/0011, set the EDID of source device to user-defined EDID 0001/0010/0011.	#SET_EDID_MODE 0000 @EDID_MODE 0000!

Command	Description	Command Example and Feedback
#GET_EDID_MODE	Get the EDID mode.	@EDID_MODE 0000!
#EDIDR [PARAM]	Get the EDID value. [PARAM]= 0000~0011.	@EDID HEX STRING OF '0000': 00 FF FF FF FF FF FF 00 41 0C F2 08 50 12 00 00 ... ...
#UPLOAD_USER_EDID [PARAM]	[PARAM]=0001/0010/0011, upload user-defined EDID. When the command applied, system prompts to upload the EDID file (.bin). Operation will be cancelled in 10 seconds.	#UPLOAD_USER_EDID 0001 @PLEASE SEND THE EDID FILE! ... ... @RECEIVED THE FILE, LENGTH=256! @EDID0001 UPDATE SUCCESSFULLY!

7.2.5 Baud Rate Setting

Command	Description	Command Example and Feedback
#SET_RS232_BAUD 1	Set RS232 baud rate to 9600.	@RS232 BAUDRATE IS 1!
#SET_RS232_BAUD 2	Set RS232 baud rate to 19200	@RS232 BAUDRATE IS 2!
#SET_RS232_BAUD 3	Set RS232 baud rate to 38400	@RS232 BAUDRATE IS 3!
#SET_RS232_BAUD 4	Set RS232 baud rate to 57600	@RS232 BAUDRATE IS 4!
#SET_RS232_BAUD 5	Set RS232 baud rate to 115200	@RS232 BAUDRATE IS 5!
#GET_RS232_BAUD	Get the RS232 baud rate.	@RS232 BAUDRATE IS 1!

7.2.6 Display Control

Command	Description	Command Example and Feedback
#SET_THE_DISPLAY_TO 0	Set the display to output black screen.	@THE DISPLAY SIDE SCREEN IS BLACK! @THE DISPLAY IS ALREADY OFF!
#SET_THE_DISPLAY_TO 1	Wake up the display screen.	@WAKE UP THE SCREEN! @THE DISPLAY IS ALREADY ON!
#GET_THE_DISPLAY	Get the status of display device.	@THE DISPLAY IS OFF!
		@THE DISPLAY IS ON!

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8. Firmware Upgrade

Please follow the steps as below to upgrade firmware by the **FW** port on the front panel:

1) Prepare the latest upgrade file (.bin) and rename it as "FW_MERG.bin" on PC.

2) Power off the switcher, and connect the **FW** port of switcher to the PC with USB cable.

3) Power on the switcher, and then the PC will automatically detect a U-disk named of "BOOTDISK".

4) Double-click the U-disk, a file named of "READY.TXT" would be showed.

5) Directly copy the latest upgrade file (.bin) to the "BOOTDISK" U-disk.

6) Reopen the U-disk to check the filename "READY.TXT" whether automatically becomes "SUCCESS.TXT", if yes, the firmware was updated successfully, otherwise, the firmware updating is fail, the name of upgrade file (.bin) should be confirm again, and then follow the above steps to update again.

7) Remove the USB cable after firmware upgrade.

8) After firmware upgrade, the switcher should be restored to factory default by sending command.

9. Troubleshooting & Maintenance

Problems	Potential Causes	Solutions
Output image with white noise.	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 switcher 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.
Cannot control the device by control device (e.g. a PC) through RS232 port.	Wrong RS232 communication parameters.	Type in correct RS232 communication parameters.
	Broken RS232 port.	Send it to authorized dealer for checking.

10. 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

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