



## User Manual

4x1 HDMI Switcher HDMI2.0 with Auto Sense and ARC

**Model PT-SW-HD41E**

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.



**REACH | 1907/2006/EU**

**ROHS | 2011/65/EU**

PureLink hereby declares that this product **PureTools PT-SW-HD41E** 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-HD41E** 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/4251364718414\\_CE.pdf](http://www.purelink.de/ce/4251364718414_CE.pdf)



## SAFETY PRECAUTIONS

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

- Unpack the equipment carefully and save the original box and packing material for possible future shipment
  - Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
  - Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
  - Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
  - Refer all servicing to qualified service personnel.
  - To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
  - Do not put any heavy items on the extension cable in case of extrusion.
  - Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
  - Install the device in a place with fine ventilation to avoid damage caused by 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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## 1. Product Introduction

The PT-SW-HD41E is an ultrathin auto switcher with four HDMI video inputs and one HDMI output. This switcher supports HDMI video resolution up to 4Kx2K@60Hz 4:4:4 HDR and multichannel audio. Except passing EDID information from the display, there are multiple built-in EDID settings to simplify an installation. The switcher will de-embed digital stereo audio to provide an analog audio source for an existing audio system. The switcher also supports audio return channel (ARC) for transmitting audio back to HDMI input port from the connected display.

In auto-switch mode, it switches to an HDMI input as soon as a new source is connected. When the active input is removed, the switcher will select the first source on the lowest numbered input. The switcher may also be controlled via RS232, IR with the included remote, or from the source button on the front of the switcher.

### 1.1 Features

- Switches any one of four HDMI inputs to one HDMI output.
- Supports video resolution up to 4Kx2K@60Hz 4:4:4 HDR.
- 18Gbps high bandwidth.
- Fully compliant with the HDMI 2.0 and HDCP2.2 specifications.
- Supports audio return channel (ARC).
- Advanced EDID management: multiple preset and user defined allowed.
- Controllable via RS232 and IR.
- Supports CEC.
- Provides seven LEDs to indicate the current operating status and to assist troubleshooting an installation.
- Firmware upgrade by Micro-USB port.

## 1.2 Package List

- 1x HDMI2.0 4x1 Switcher
- 2x Mounting Ears
- 4x Mounting Screws
- 4x Plastic Cushions
- 1x RS232 Cable (3.5mm to DB9)
- 1x IR Remote
- 1x IR Receiver
- 1x Power Adapter (5V DC 1A)
- 1x User Manual

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

## 2. Technical Specification

Video Input	
Input	(4) HDMI
Input Connector	(4) Female type-A HDMI
HDMI Input Resolution	Up to 4Kx2K@60Hz 4:4:4
HDMI Standard	2.0
HDCP Version	2.2
Video Output	
Output	(1) HDMI
Output Connector	(1) Female type-A HDMI
HDMI Output Resolution	Up to 4Kx2K@60Hz 4:4:4
HDMI Standard	2.0
HDCP Version	2.2
Audio	
Output	(1) AUDIO
Output Connector	(1) 3.5mm mini stereo audio jack
Audio Format	PCM
Audio Output Impedance	70 Ohms
Frequency Response	20Hz to 20kHz, ±3dB
Control	
Control	(1) IR IN; (1) RS232
Control Connector	(2) 3.5mm mini jack
General	
Bandwidth	18Gbps
Operation Temperature	-10°C ~ +55°C
Storage Temperature	-25°C ~ +70°C
Relative Humidity	10%-90%
Power Supply	Input:100V~240V AC; Output: 5V DC 1A
Power Consumption	5W(Max)
Dimension (W*H*D)	194mm x 15mm x 81mm
Net Weight	324g



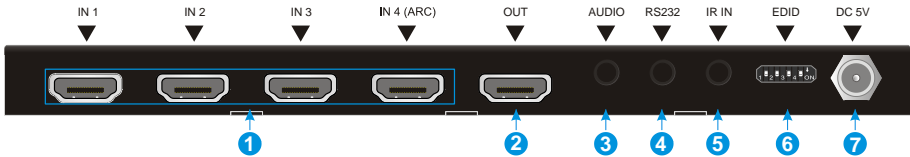
## 3. Panel Description

### 3.1 Front Panel



- ① Auto/Source Button:
  - Press to switch to next input source.
  - Press and hold at least three seconds to switch between manual mode and auto mode.
- ② Power LED: The LED illuminates red when power is applied.
- ③ Audio Mode LED:
  - Illuminates green when de-embedding audio.
  - Illuminates yellow when in ARC mode.
- ④ Switching Mode LED:
  - Illuminates green in manual switch mode.
  - Illuminates yellow in auto-switch mode.
- ⑤ Input 1~4 LED: The LED illuminates green when there is HDMI input on the corresponding channel.
- ⑥ FIRMWARE: Micro-USB port for firmware upgrade.

### 3.2 Rear Panel



- ① IN 1-4: Four type-A female HDMI input ports to connect HDMI sources. The input 4 port supports ARC.
- ② OUT: Type-A female HDMI output port to connect HDMI display.
- ③ AUDIO: 3.5mm mini jack for analog audio output.
- ④ RS232: 3.5mm mini jack to connect control device (e.g. PC).
- ⑤ IR IN: 3.5mm mini jack to connect the included IR receiver for remote control.
- ⑥ EDID: 4-pin DIP switch for EDID setting.
- ⑦ DC 5V: DC port to connect a 5V DC AC power adapter.

**Note:** Output HDCP compliant status depends on input signal. When the input signal is with HDCP, then output signal is with HDCP and vice versa.

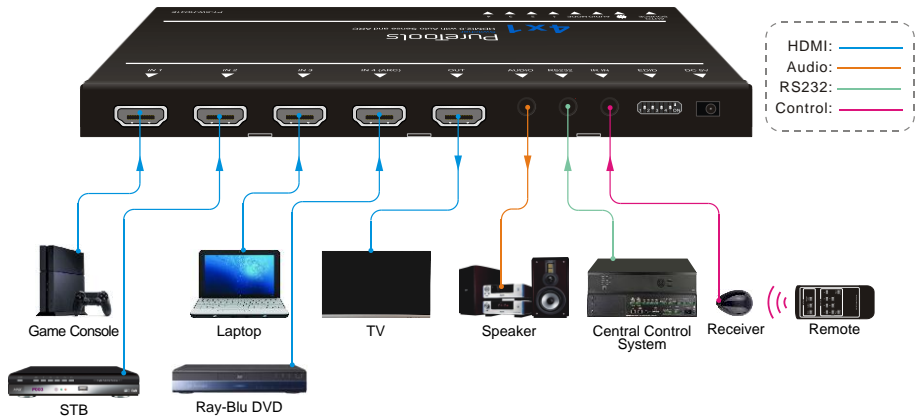
## 4. System Connection

### 4.1 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.

### 4.2 System Diagram

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



## 5. Source Button Control

### 5.1 Manual Switching

When the switcher is in manual switching mode, the Switching Mode LED will be green, and please press **Auto/Source** button to switch to the next input.

### 5.2 Automatic Switching

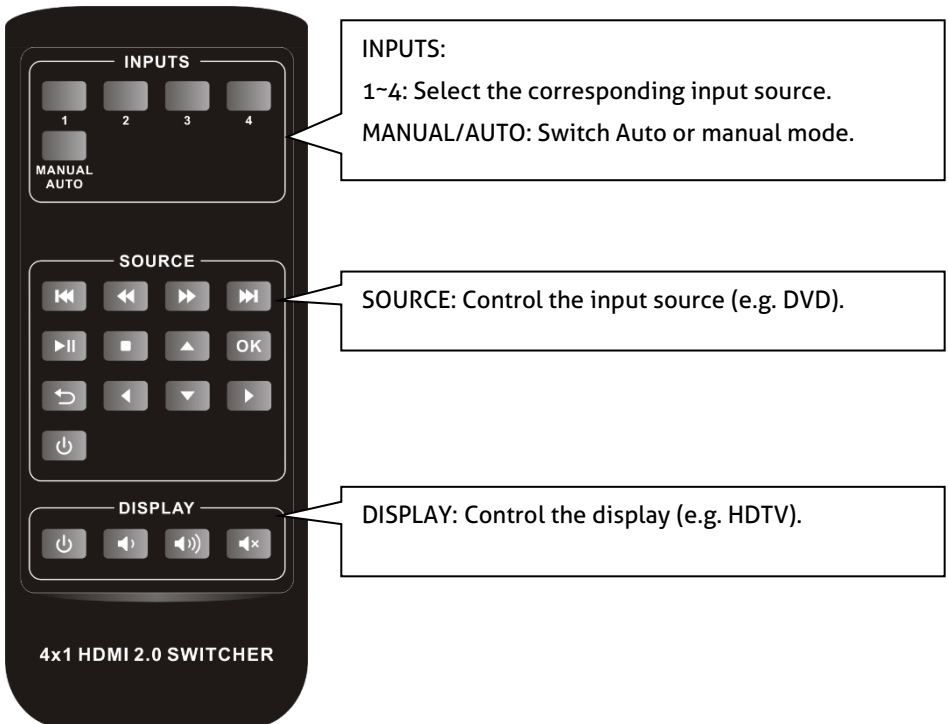
To enable automatic switching, press and hold the **Auto/Source** button for three seconds. The Switching Mode LED will turn to yellow.

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

- **New Input:** Upon detecting a new input, the switcher will automatically select the new source.
- **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 HDMI Input 1.
- **Source Removed:** When an active source is removed, the switcher will switch to the first available active input starting at HDMI Input 1.

## 6. IR Remote Control

Please connect an IR receiver to the IR input port; the IR remote is used for signal switching and it can also be used to control source and display devices based on CEC function.



**Note:**

- Due to the HDMI input 4 port does not support CEC, the source device connected to this port can not be controlled by IR remote.
- The source and display devices are required to support CEC when the IR remote is used to control them.

## 7. RS232 Control

Connect the switcher to the control device (e.g. PC) with RS232 cable and set the parameters in the right manner, the control device is capable to control this switcher by RS232 commands.

### 7.1 RS232 Control Software

**Installation:** Copy the control software file to the computer connected with this switcher.

**Uninstallation:** Delete all the control software files in corresponding file path.

#### Basic Settings

First of all, please connect all needed input devices and output devices, then to connect it with a computer which is installed with RS232 control software.

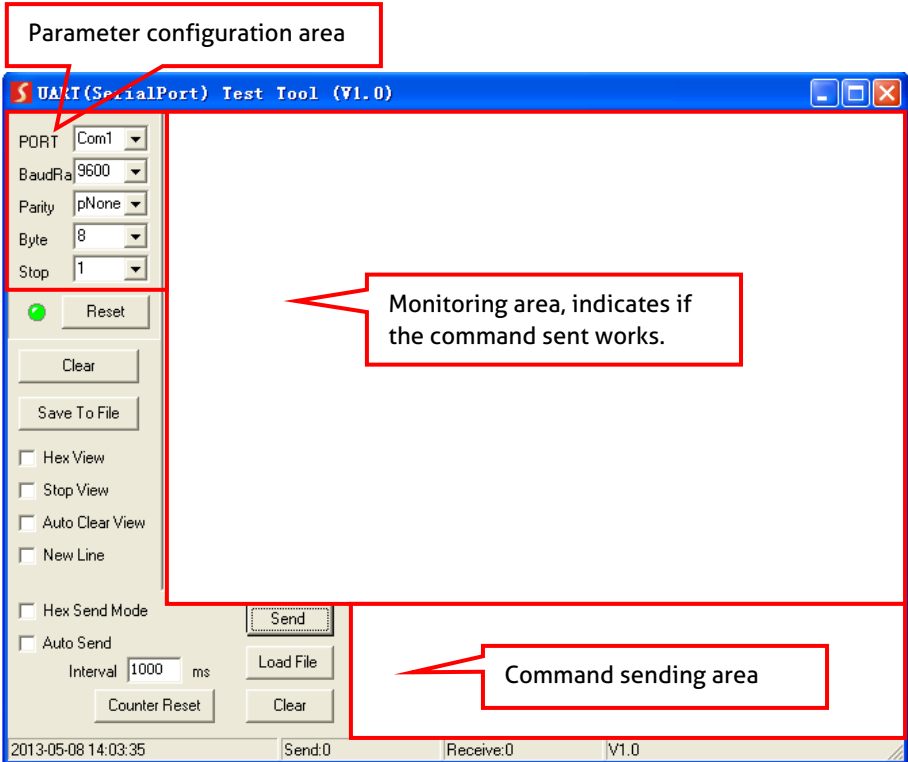
Here take the software **CommWatch.exe** as example.

Double-click the following icon:



CommWatch.exe

The interface of the control software is shown as below:



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

Baud rate: 9600;

Data bit: 8;

Stop bit: 1;

Parity bit: none.

## 7.2 RS232 Command

**Note:** All commands must be ended with "<CR><LF>".

### 7.2.1 Signal Switching

Function	Command	Feedback Example
Switch to HDMI input 1.	>>HDMI1	<<HDMI1
Switch to HDMI input 2.	>>HDMI2	<<HDMI2
Switch to HDMI input 3.	>>HDMI3	<<HDMI3
Switch to HDMI input 4.	>>HDMI4	<<HDMI4
Enable auto-switching mode.	>>AUTO	<<AUTO Switch
Enable manual switching mode.	>>MANUAL	<<MANUAL Switch

### 7.2.2 Source Device Control

**Note:**

- The input source device is required to support CEC.
- Due to the HDMI input 4 port does not support CEC, the source device connected to this port can not be controlled by IR remote.

Function	Command	Feedback Example
Turn on the input source device, e.g. Blue-ray DVD.	>>SRCon	<<SRCon
Turn off the input source device, e.g. Blue-ray DVD.	>>SRCOff	<<SRCOff
Play	>>SRCPlay	<<SRCPlay



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Function	Command	Feedback Example
Pause	>>SRCPause	<<SRCPause
Stop	>>SRCStop	<<SRCStop
Fast Forward x1	>>SRCForward	>>SRCForward
Fast Rewind x1	>>SRCBackward	<<SRCBackward
Next Section	>>SRCSkipForward	>>SRCSkipForward
Previous Section	>>SRCSkipBackward	<<SRCSkipBackward
Open the menu setting	>>SRCMenu	>>SRCMenu
Go back	>>SRCBack	>>SRCBack
Confirm (OK)	>>SRCOk	>>SRCOk
Exit	>>SRCExit	>>SRCExit
Up direction	>>SRCUp	>>SRCUp
Down direction	>>SRCDown	>>SRCDown
Left direction	>>SRCLeft	>>SRCLeft
Right direction	>>SRCRight	<<SRCRight

### 7.2.3 Audio Selection

Function	Command	Feedback Example
Select ARC audio channel.	>>AUDExternal	<<AUDExternal
Select the HDMI audio input channel.	>>AUDInternal	>>AUDInternal

### 7.2.4 Display Device Control

**Note:** The display device is required to support CEC.

Function	Command	Feedback Example
Turn on the display device, e.g. HDTV.	>>TVOn	>>TVOn
Turn off the display device, e.g. HDTV.	>>TVOff	>>TVOff
Volume up.	>>TVVOL+	>>TVVOL+
Volume down.	>>TVVOL-	>>TVVOL-
Mute.	>>TVMUTE	>>TVMUTE
Unmute	<<TVUNMUTE	<<TVUNMUTE

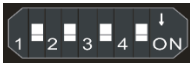
### 7.2.5 System Control

Function	Command	Feedback Example
System reset.	>>RESET	>>RESET
Get system information.	>>SYSInfo	<<AUDExternal << PT-SW-HD41E << V1.0.0 << ----- <<HDMI1 <<Auto Switch <<AUDExternal <<EDIDO

## 8. EDID Management

### 8.1 Predefined EDID Setting

The rear panel boasts a 4-pin DIP switch to set the predefined EDID. The ten types of embedded EDID and their corresponding switch status are shown in the below list.



When in the lower position, the switch represents "ON", while putting the switch in the up position, it represents "OFF".

ID	Switch Status	Video	Audio
0	0000	Pass through	Pass through
1	0001	1920x1080p@60Hz 4:4:4 RGB 8bit	Stereo
2	0010	1920x1080p@60Hz 4:4:4 RGB 8bit	High Definition
3	0011	1920x1080p@60Hz 4:4:4 RGB 12bit	Stereo
4	0100	1920x1080p@60Hz 4:4:4 RGB 12bit	High Definition
5	0101	3840x2160p@60Hz 4:2:0 RGB 8bit	Stereo
6	0110	3840x2160p@60Hz 4:2:0 RGB 8bit	High Definition
7	0111	3840x2160p@60Hz 4:4:4 RGB 10bit HDR	Stereo
8	1000	3840x2160p@60Hz 4:4:4 RGB 10bit HDR	High Definition
9	1001	1280x800@60Hz	Stereo
10	1010	1920x1200@60Hz	Stereo

## 8.2 User Defined EDID Setting

Except directly invoking the embedded EDID, the specific EDID can be customized. There are five EDID can be customized following the below operations.

- 1) Rename the user defined EDID according the following format.

**EC\_xx\_xxxx\_xxx.bin**

- EC: Represents EDID.
- xx: Represents EDID ID. It is 11~15.
- xxxx: Represents the video parameter.
- xxx: Represents the audio format.

Example: EC\_11\_720P\_LPCM.bin

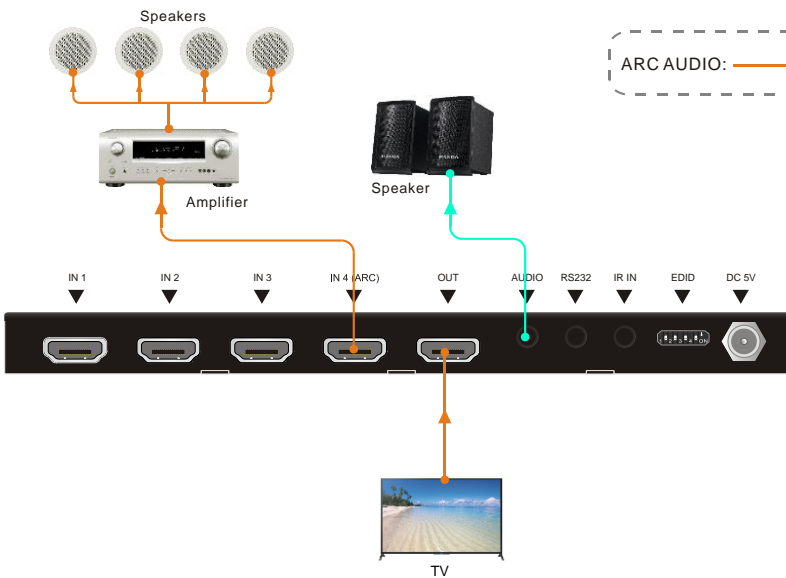
- 2) Power on the switcher, and then connect the switcher to the PC with USB cable. The PC will automatically detect a U-disk named of "BOOTDISK".
- 3) Double-click the U-disk, a file named of "READY.TXT" would be showed.
- 4) Copy the user defined EDID (such as **EC\_11\_720P\_LPCM.bin**) to the "BOOTDISK" U-disk.
- 5) Reopen the U-disk to check the filename "READY.TXT" whether automatically becomes "SUCCESS.TXT", if yes, the user defined EDID was imported into the switcher and saved as its corresponding EDID ID successfully.
- 6) Repeat the above third to fifth step to copy other user defined EDIDs to the "BOOTDISK" U-disk.
- 7) Remove the USB cable, connect the adaptor to power on the switcher.
- 8) The new EDID also can be invoked via the 4-pin DIP switch directly. The EDID ID and its corresponding switch status are shown in the below list.

ID	Switch Status
11	1011
12	1100
13	1101
14	1110
15	1111

## 9. ARC Mode

Audio Return Channel (ARC) allows audio from a display to pass “upstream” through an HDMI cable to an audio processing device, such as an AV amplifier. When ARC mode is active on the switcher, the ARC stream will pass to the active HDMI source device if it can process the signal.

Only the fourth HDMI input port features ARC, when the display and AV amplifier support ARC, the audio connection diagram is shown below:

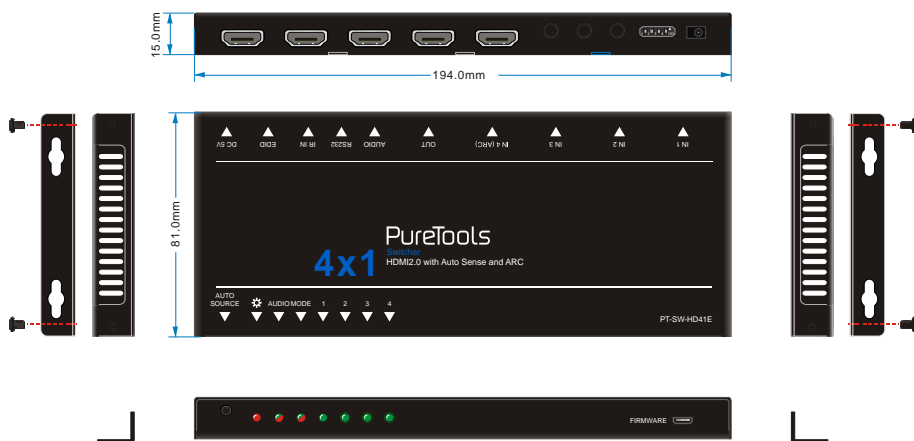


## 10. Firmware Upgrade

Please follow the steps as below to upgrade firmware by the Micro-USB port on the rear panel:

- 1) Prepare the latest upgrade file (.bin) and rename it as "USERAPP.bin"
- 2) Connect the switcher to the PC with USB cable, and then power on the switcher. The PC will automatically detect a U-disk named of "BOOTDISK".
- 3) Double-click the U-disk, a file named of "READY.TXT" would be showed.
- 4) Directly copy the latest upgrade file (.bin) to the "BOOTDISK" U-disk.
- 5) 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.
- 6) Remove the USB cable after firmware upgrade.

## 11. Panel Drawing



## 12. Troubleshooting & Maintenance

Problems	Potential Causes	Solutions
Colour losing or no video signal output in 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 HDMI signal output in this switcher while local HDMI input is in normal working state.		
Splash screen in output devices.	Poor quality of the connecting cable.	Change for another cable of good quality.
Cannot control this switcher 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.
Static becomes stronger when connecting the video connectors.	Bad grounding.	Check the grounding and make sure it is connected well.

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



## 13. 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:** 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 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:**

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D - 48432 Rheine

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