



User Manual

HDMI V2.0 1x16 Splitter with Downscaling and AOC Supported

Model PT-SP-HD116DA

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-SP-HD116DA** 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-SP-HD116DA** 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/4251364721551_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 protrusion.
 - Do not remove the housing of the device as opening or removing the housing may expose you to dangerous voltage or other hazards.
 - Install the device in a place with sufficient ventilation to avoid damage caused by overheat.
 - Keep the module away from liquids.
 - Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
 - Do not twist or pull by force ends of the optical cable. It can cause malfunction.
 - Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
 - Unplug the power cord when left unused for a long period of time.
 - Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.
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Table of Contents

1. Product Introduction	5
1.1 Features.....	5
1.2 Package List	5
2. Specification	6
3. Panel Description	8
3.1 Front Panel	8
3.2 Rear Panel.....	9
4. System Connection	10
4.1 Usage Precaution	10
4.2 System Diagram	10
5. DIP Switch Operation	11
6. RS232 Control	12
6.1 RS232 Control Software.....	12
6.2 RS232 Communication Commands	17
6.2.1 System Commands.....	17
6.2.2 Setting Commands.....	18
7. Firmware Upgrade	20
8. After-Sales Service.....	21

1. Product Introduction

Thank you for choosing the PT-SP-HD116DA HDMI V2.0 1x16 Splitter, which can distribute one HDMI input to sixteen HDMI outputs. The splitter supports 4K signals up to 4K@60Hz 4:4:4, HDR 10, Dolby Vision and features advanced EDID management option using 4-pin DIP switch on the front panel of the unit. It also supports downscaling so a 4K video input can automatically be down scaled to a 1080p output when connecting a display that only supports resolution up to 1080p. Stereo analog L/R audio output is provided for audio de-embedding from HDMI input and the splitter supports CEC and RS232 control.

1.1 Features

- HDMI V2.0, 4K@60Hz 4:4:4 8bit, HDR 10, Dolby Vision.
- HDCP 2.2 compliant.
- Compatible with HDMI AOC cable, provides up to 5V100mA power on each output.
- Auto 4K to 1080p downscaling.
- Stereo analog L/R audio output for audio de-embedding from HDMI input.
- Smart EDID management and HDCP management.
- CEC and RS232 control.

1.2 Package List

- 1x PT-SP-HD116DA 1x16 Splitter
- 2x Mounting Ears with 4 Screws
- 1x User Manual
- 1x Power Adapter (24V DC, 1.25A)
- 4x Plastic Cushions

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

2. Specification

Video	
Input	(1) HDMI
Input Connector	(1) Type-A female HDMI
Input Video Resolution	Up to 4K@60Hz 4:4:4 8bit, HDR10, Dolby Vision
Output	(16) HDMI
Output Connector	(16) Type-A female HDMI
Output Video Resolution	Up to 4K@60Hz 4:4:4 8bit, HDR10, Dolby Vision, supports 4K to 1080p down-scaling.
HDMI Output	Supports up to 5V100mA power for AOC cable.
HDMI Standard	V2.0
HDCP Version	2.2
HDMI Audio Signal	LPCM 7.1 audio, Dolby Atmos®, Dolby® TrueHD, Dolby Digital® Plus, DTS:X™, and DTS-HD® Master Audio™ pass-through.
Analog Audio Output	
Output	(1) AUDIO
Output Connector	(1) RCA (L+R)
Frequency Response	20Hz~20kHz, ±1dB
Max output level	2.0Vrms ± 0.5dB. 2V=16dB headroom above-10dBV (316mV) 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	< -80dB, 10kHz sine at 0dBFS level (or max level before clipping)
L-R level deviation	< 0.05dB, 1kHz sine at 0dBFS level (or max level before clipping)
Output load capability	1Kohm and higher (supports 10x paralleled 10Kohm loads)
Noise Level	- 80dB
Control Part	
Control Port	(1) EDID Switch, (1) FW, (1) RS232
Control Connector	(1) 4-pin DIP switch, (1) Micro-USB, (1) Female DB9

General	
Bandwidth	18Gbps
Operation Temperature	-5°C ~ +55°C
Storage Temperature	-25°C ~ +70°C
Relative Humidity	10%-90%
External Power Supply	Input: AC 100~240V, 50/60Hz; Output: 24V DC 1.25A
Power Consumption	26W (Max)
Dimension (W*H*D)	268mm x 40mm x 125mm
Net Weight	1.14KG

Video Resolution Down-scaling:

The splitter supports video resolution downscaling, the 4K input can be automatically degraded to 1080p output for compatibility with 1080p display, shown in the below chart.

#	Resolution	Input		Downscale	Output
		Refresh	Color Space		1080p Specs
1	3840x2160	60	4:4:4	Support	1080p@60Hz 4:4:4
2	3840x2160	50	4:4:4	Support	1080p@50Hz 4:4:4
3	3840x2160	30	4:4:4	Support	1080p@30Hz 4:4:4
4	3840x2160	25	4:4:4	Support	1080p@25Hz 4:4:4
5	3840x2160	24	4:4:4	Support	1080p@24Hz 4:4:4
6	3840x2160	23	4:4:4	Support	1080p@23Hz 4:4:4
7	3840x2160	60	4:2:0	Support	1080p@60Hz 4:4:4
8	3840x2160	50	4:2:0	Support	1080p@50Hz 4:4:4
9	3840x2160	30	4:2:0	Support	1080p@30Hz 4:4:4
10	3840x2160	25	4:2:0	Support	1080p@25Hz 4:4:4
11	3840x2160	24	4:2:0	Support	1080p@24Hz 4:4:4
12	3840x2160	23	4:2:0	Support	1080p@23Hz 4:4:4

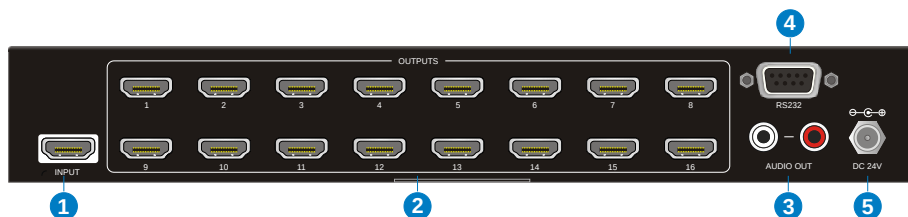
3. Panel Description

3.1 Front Panel



- ① **POWER SWITCH:** Power on/off the splitter.
- ② **POWER LED:** Illuminates red when the device is powered on.
- ③ **INPUT LED:** Illuminates green when there is HDMI input.
- ④ **OUTPUT LEDs (1~16):** Illuminates green when there is HDMI output on the corresponding channel.
- ⑤ **EDID:** 4-pin DIP switch for EDID setting and HDCP mode selection. Please refer to the chapter [DIP Switch Operation](#) for more details.
- ⑥ **FW:** Micro-USB port for firmware upgrade.

3.2 Rear Panel



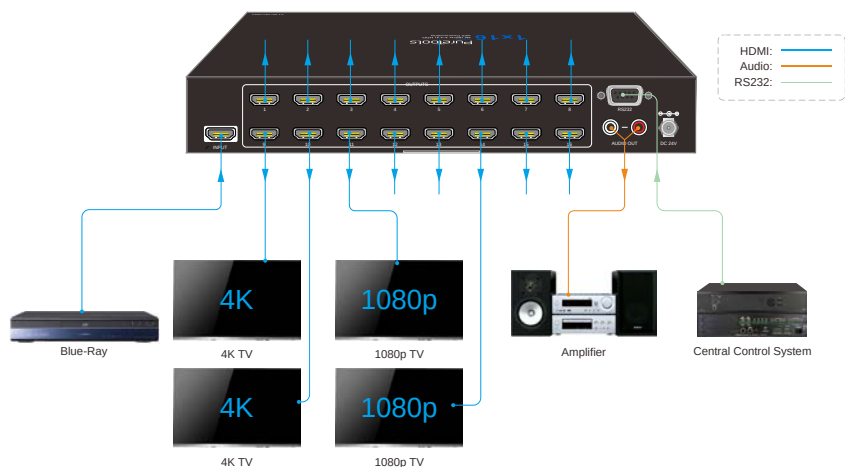
- ① **INPUT:** Connect HDMI source.
- ② **OUTPUTS:** Total sixteen HDMI outputs to connect HDMI displays.
- ③ **AUDIO OUT:** Connect audio device (e.g. Amplifier) for audio de-embedding from HDMI input.
- ④ **RS232:** Connect control device (e.g. PC) to control the splitter by sending RS232 commands.
- ⑤ **DC 24V:** DC connector for the power adapter connection.

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



5. DIP Switch Operation

The 4-pin DIP switch on the front panel of the unit is used for EDID management and HDCP management. It represents “0” when in the lower (OFF) position, and it represents “1” while putting the switch in the upper (ON) position.



Switch 1~3 are used for EDID setting. The switch status and its corresponding setting are shown at the below chart.

Switch Status (PIN 1~3)			EDID Value
1	2	3	
0	0	0	Obtains EDID from the first detected display starting at HDMI OUT1>OUT2>.....>OUT16.
0	0	1	1920x1080@60Hz 8bit Stereo
0	1	0	1920x1080@60Hz 8bit High Definition Audio
0	1	1	3840x2160@30Hz 8bit Stereo Audio
1	0	0	3840x2160@30Hz Deep Color High Definition Audio
1	0	1	3840x2160@60Hz Deep Color Stereo
1	1	0	3840x2160@60Hz Deep Color HDR LPCM 6CH

Switch 4 is used for HDCP setting. The switch status and its corresponding setting are shown at the below chart.

Switch 4 Status	HDCP
OFF (0)	Automatically follows the HDCP version of display device. When display device has no HDCP, if source device have no HDCP content, the video output has no HDCP content; if source device has HDCP content, there are no video output.
ON (1)	Automatically follows the HDCP version of source device.

Note: The factory default switch status is “0000”, and it needs to be set to “1111” when enable RS232 control to set EDID and HDCP.

6. RS232 Control

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

6.1 RS232 Control Software

Here take the software **docklight** as an example.

- **Installation**

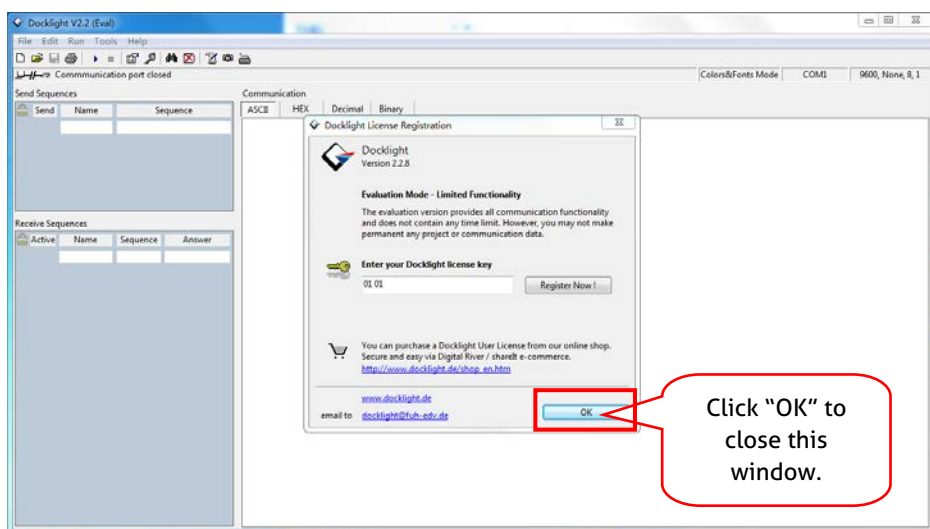
Please download the latest Software Version from the link below:

<https://docklight.de/download/Docklight.zip>

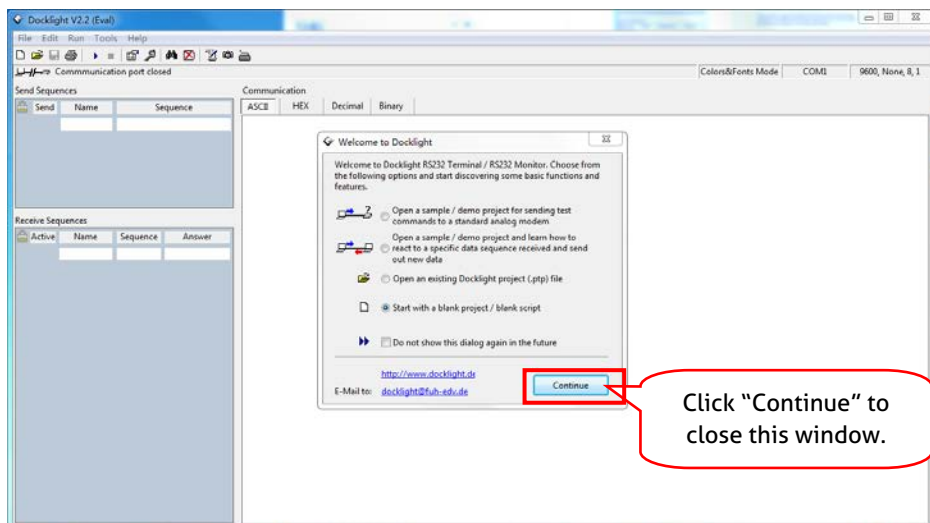
Then follow the installation wizard for installation on Windows 7 and 10.

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.

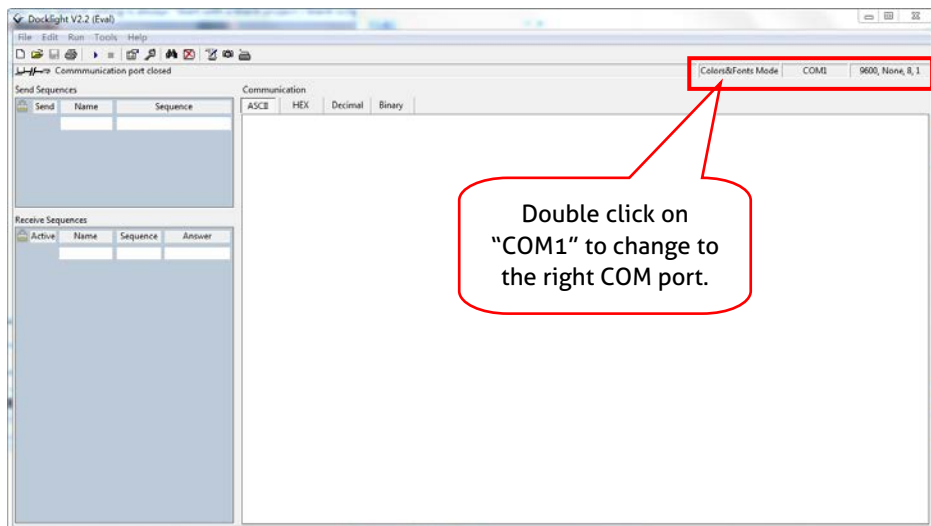


The next pop-up window can also be closed with "Continue". An empty project is enough to send and receive commands easily (The default setting is always "Start with a blank project / blank script")



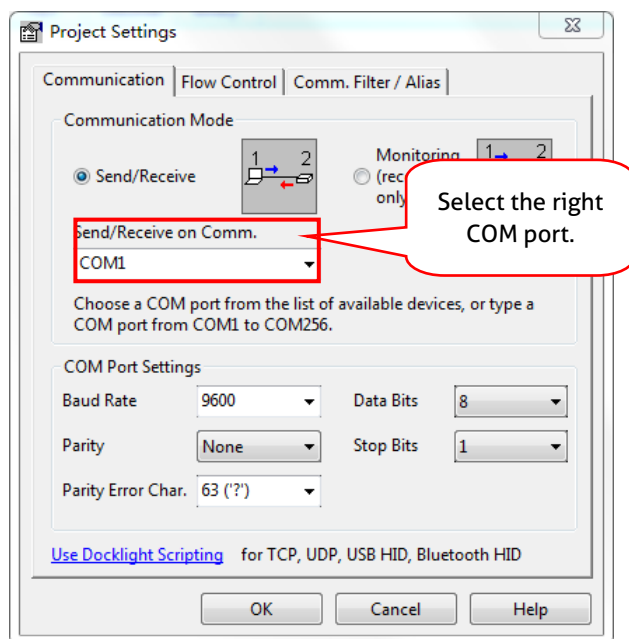
Now you are in the main view, where commands are sent and feedback is received.

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.

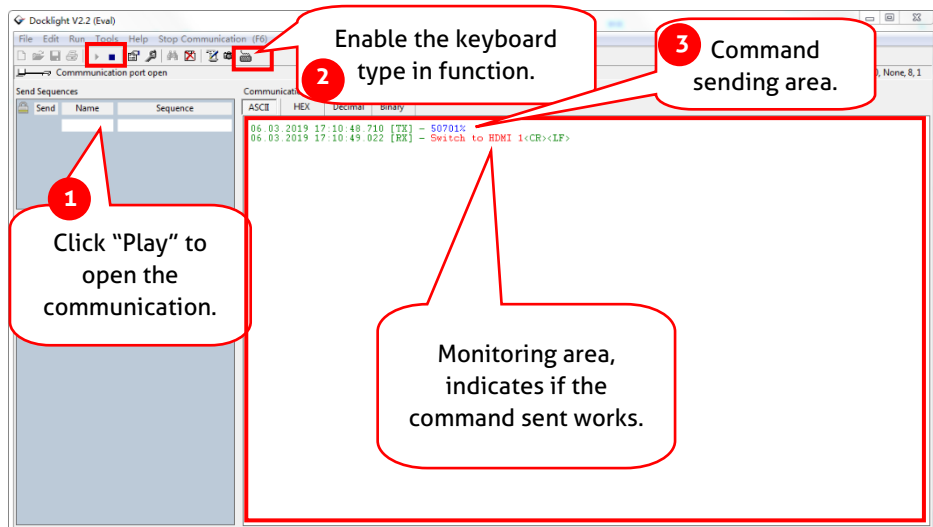
All other settings can be left at default for most applications, but refer to device RS232 settings to be sure.



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)



6.2 RS232 Communication Commands

Communication protocol: RS232 Communication Protocol

Baud rate: 9600

Data bit: 8

Stop bit: 1

Parity bit: none

Note:

- All commands need to be ended with "<CR><LF>".
- In the commands, "[" and "]" are symbols for easy reading and do not need to be typed in actual operation.
- Type the command carefully, it is case-sensitive.

6.2.1 System Commands

Command	Description	Command Example and Feedback
>GetFirewareVersion	Get firmware version.	<V1.0.0
>SetFactoryReset	Reset to factory default.	<FactoryReset_True
>SetReboot	System reboot.	<Reboot_EN
>SetHelp [Param]	Get the command details. [Param]= Any command.	>SetHelp SetHdcpActiveMode <Set the HDCP bypass from SRC or SINK >SetHdcpActiveMode Param Param = Src,Sink Src - Active by src Sink - Active by Sink

6.2.2 Setting Commands

Command	Description	Command Example and Feedback
>SetUpdateEdid	Upload user-defined EDID. The EDID DIP switch must be set as "1111".	<User edid ready,Please send edid data in 10s. <SetUpdateEdid_True/False / <Time out to send edid
>SetInPortEdid [Param]	Set the EDID to [Param]. [Param]=0~7. 0 - BYPASS 1 - 1920x1080@60 8bit Stereo 2 - 1920x1080@60 8bit High Definition Audio 3 - 3840x2160@30Hz 8bit Stereo Audio 4 - 3840x2160@30Hz Deep Color High Definition Audio 5 - 3840x2160@60Hz Deep Color Stereo Audio 6 - 3840x2160@60Hz Deep Color HDR LPCM 6CH 7 - USER EDID The EDID DIP switch should be set as "1111".	>SetInPortEdid 0
		<InPortEdid 0
>GetInPortEdid	Get the EDID.	<InPortEdid 0
>SetHdcpActiveMode [Param]	Set the HDCP active mode. [Param]= Src, Sink Src - Active by Src. Follow source. Sink - Active by Sink. Follow display. Note: The EDID switch must be switched to "1111" before sending the command.	>SetHdcpActiveMode Src
		<HdcpActiveMode Src
>GetHdcpActiveMode	Get the HDCP active mode.	<HdcpActiveMode Src
>SetVideoOutput	Enable or disable video output.	>SetVideoOutput 1,EN

[Param1],[Param2]	[Param1]=1~16. Output port. [Param2]= EN, Dis Dis - Disable En - Enable	<VideoOutput 1 True
>GetVideoOutput [Param]	Get video output status. [Param]=1~16.Output port.	>GetVideoOutput 1 <VideoOutput 1 True
>SetAutoDownScaler [Param]	Enable/disable 4K to 1080p down-scaling function. [Param]= EN, Dis Dis - Disable En - Enable	>SetAutoDownScaler EN <AutoDownScaler True
>GetAutoDownScaler	Get the on-off status of down-scaling function.	<AutoDownScaler True
>SetRS232Baudrate [Param]	Set the baud rate to [Param]. [Param]=1~7 1 - 115200 2 - 57600 3 - 38400 4 - 19200 5 - 9600 6 - 4800 7 - 2400	>SetRS232Baudrate 1 <RS232Baudrate 1
>GetRS232Baudrate	Get the RS232 baud rate.	<RS232Baudrate 1

7. Firmware Upgrade

Please follow the below steps to upgrade firmware by the Micro-USB port:

- 1) Prepare the latest upgrade file (.bin) and rename it as "FW_MERG.bin" on PC.
- 2) Power off the splitter and connect the Micro-USB (FW) port of splitter to the PC with USB cable.
- 3) Power on the splitter and then the PC will automatically detect a U-disk named of "BOOTDISK".
- 4) Double-click to open the U-disk, a file named of "READY.TXT" will be showed.
- 5) Directly copy the latest upgrade file (.bin) to the "BOOTDISK" U-disk.
- 6) Reopen the U-disk to check whether there is a filename "SUCCESS.TXT", if yes, the firmware was updated successfully, otherwise, the firmware updating is fail, the name of upgrade file (.bin) should be confirmed again, and then follow the above steps to update again.
- 7) Remove the USB cable and reboot the splitter after firmware upgrade.

8. After-Sales Service

If problems occur while operating the product, please use the troubleshooting and maintenance information in this manual to deal with these problems. Any transport costs are borne by the user during the warranty period.

- 1) **Product Limited Warranty:** The product will be free from defects in materials and workmanship for **two years** (purchase invoice date shall prevail).
A proof of purchase is the evidence that the unit is within the warranty period. A bill of sale or receipted invoice must be presented to obtain warranty service.
- 2) **What the warranty does not cover (servicing available for a fee):**
 - Warranty has expired
 - The factory applied serial number has been altered or removed from the product.
 - Damage, deterioration or malfunction caused by:
 - Normal wear and tear.
 - Use of accessories, supplies or parts, not meeting our specifications.
 - No bill of delivery or invoice as proof of warranty.
 - The product model displayed on the warranty card does not match the product model for repairing or it has been altered.
 - Damage caused by force majeure.
 - Servicing, not authorized by distributor.
 - Any other cause not related to a product defect.
 - Delivery, installation or labor charges for product installation and/or product setup.
- 3) **Technical Support:** For any questions or problem troubleshooting inquiries, contact your distributor or reseller. Please provide the respective product name and version, a detailed description of the failure situation as well as how the failure occurred.

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

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