User Manual

VLHDBSP1X4V2

1x4 HDBaseT Splitter

VIVOLINK™
PROFESSIONAL AV SOLUTIONS

Version: VLHDBSP1X4V2_2022V1.0

Preface

Read this user manual carefully before using the product. Pictures shown in this manual are for reference only. Different models and specifications are subject to real product.

This manual is only for operation instruction, please contact the local distributor for maintenance assistance. The functions described in this version were updated till January, 2019. In the constant effort to improve the product, we reserve the right to make functions or parameters changes without notice or obligation. Please refer to the dealers for the latest details.

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.

SAFETY PRECAUTIONS

To ensure the best performance 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.

Elektro- und Elektronikgeräte

Informationen für private Haushalte

Das Elektro- und Elektronikgerätegesetz (ElektroG) enthält eine Vielzahl von Anforderungen an den Umgang mit Elektro- und Elektronikgeräten. Die wichtigsten sind hier zusammengestellt.

1. Getrennte Erfassung von Altgeräten

Elektro- und Elektronikgeräte, die zu Abfall geworden sind, werden als Altgeräte bezeichnet. Besitzer von Altgeräten haben diese einer vom unsortierten Siedlungsabfall getrennten Erfassung zuzuführen. Altgeräte gehören insbesondere nicht in den Hausmüll, sondern in spezielle Sammel- und Rückgabesysteme.

2. Batterien und Akkus sowie Lampen

Besitzer von Altgeräten haben Altbatterien und Altakkumulatoren, die nicht vom Altgerät umschlossen sind, sowie Lampen, die zerstörungsfrei aus dem Altgerät entnommen werden können, im Regelfall vor der Abgabe an einer Erfassungsstelle vom Altgerät zu trennen. Dies gilt nicht, soweit Altgeräte einer Vorbereitung zur Wiederverwendung unter Beteiligung eines öffentlich-rechtlichen Entsorgungsträgers zugeführt werden.

3. Möglichkeiten der Rückgabe von Altgeräten

Besitzer von Altgeräten aus privaten Haushalten können diese bei den Sammelstellen der öffentlich-rechtlichen Entsorgungsträger oder bei den von Herstellern oder Vertreibern im Sinne des ElektroG eingerichteten Rücknahmestellen unentgeltlich abgeben.Rücknahmepflichtig sind Geschäfte mit einer Verkaufsfläche von mindestens 400 m² für Elektro- und Elektronikgeräte sowie diejenigen Lebensmittelgeschäfte mit einer Gesamtverkaufsfläche von mindestens 800 m², die mehrmals pro Jahr oder dauerhaft Elektro- und Elektronikgeräte anbieten und auf dem Markt bereitstellen. Dies gilt auch bei Vertrieb unter Verwendung von Fernkommunikationsmitteln, wenn die Lager- und Versandflächen für Elektro- und Elektronikgeräte mindestens 400 m² betragen oder die gesamten Lager- und Versandflächen mindestens 800 m² betragen. Vertreiber haben die Rücknahme grundsätzlich durch geeignete Rückgabemöglichkeiten in zumutbarer Entfernung zum jeweiligen Endnutzer zu gewährleisten. Die Möglichkeit der unentgeltlichen Rückgabe eines Altgerätes besteht

bei rücknahmepflichtigen Vertreibern unter anderem dann, wenn ein neues gleichartiges Gerät, das im Wesentlichen die gleichen Funktionen erfüllt, an einen Endnutzer abgegeben wird. Wenn ein neues Gerät an einen privaten Haushalt ausgeliefert wird, kann das gleichartige Altgerät auch dort zur unentgeltlichen Abholung übergeben werden; dies gilt bei einem Vertrieb unter Verwendung von Fernkommunikationsmitteln für Geräte der Kategorien 1, 2 oder 4 gemäß § 2 Abs. 1 ElektroG, nämlich „Wärmeüberträger", „Bildschirmgeräte" oder „Großgeräte" (letztere mit mindestens einer äußeren Abmessung über 50 Zentimeter). Zu einer entsprechenden Rückgabe-Absicht werden Endnutzer beim Abschluss eines Kaufvertrages befragt. Außerdem besteht die Möglichkeit der unentgeltlichen Rückgabe bei Sammelstellen der Vertreiber unabhängig vom Kauf eines neuen Gerätes für solche Altgeräte, die in keiner äußeren Abmessung größer als 25 Zentimeter sind, und zwar beschränkt auf drei Altgeräte pro Geräteart.

4. Datenschutz-Hinweis

Altgeräte enthalten häufig sensible personenbezogene Daten. Dies gilt insbesondere für Geräte der Informations- und Telekommunikationstechnik wie Computer und Smartphones. Bitte beachten Sie in Ihrem eigenen Interesse, dass für die Löschung der Daten auf den zu entsorgenden Altgeräten jeder Endnutzer selbst verantwortlich ist.

5. Bedeutung des Symbols „durchgestrichene Mülltonne"

Das auf Elektro- und Elektronikgeräten regelmäßig abgebildete Symbol einer durchgestrichenen Mülltonne weist darauf hin, dass das jeweilige Gerät am Ende seiner Lebensdauer getrennt vom unsortierten Siedlungsabfall zu erfassen ist

Table of Contents

1. Product Introduction

Thanks for choosing this1x4 HDBaseT Splitter! This device accepts a single HDMI input and splits it into one HDMI and four HDBaseT outputs. The splitter is designed with an IR loop out and loop in which are intended to cascade to additional units. It supports video resolutions up to 4K@60Hz 4:4:4 8bit and all HDMI audio formats. It can extend 1080p signals on each output to distance up to 229 feet (70 meters) and 4K signals to distance up to 131 feet (40 meters) over a single CATx Ethernet cable. It supports the Power over HDBaseT (PoC) feature, which allows the HDBaseT receivers (Sold separately) to be powered from the splitter over the Ethernet cables. It supports bidirectional IR pass-through and IR, RS232 cascade control.

1.1 Features

- Support HDMI 2.0, video resolutions up to 4K@60Hz 4:4:4.
- Distribute one UHD/4K HDMI signal to four HDBaseT outputs and one loop HDMI output.
- Supports cascade connection, distribute video signal to multiple video displays.
- Maximum transmission distance is up to 40m for 4K, and 70m for 1080p.
- Supports video resolution down-scaling, 4K input can be automatically downgraded to 1080 output.
- Supports audio de-embedding.
- Each HDBaseT output supports IR pass-through.
- Support RS232 and IR cascade control.
- Support 24V PoC, the HDBaseT receiver can be powered by HDBaseT splitter.

1.2 Package List

- 1x VLHDBSP1X4V2 1x4 HDBaseT Splitter
- 2x Mounting Ears with 4 Screws
- 4x Plastic Cushions
- 1x IR Cable (3.5mm to 3.5mm, used for IR cascade)
- 4x IR Receivers
- 1x IR Emitter
- 1x RS232 Cable (3-pin to 3-pin, used for RS232 cascade)
- 1x RS232 Cable (3-pin to DB9)
- 1x 5-pin terminal block
- 1x Power Adaptor (24V DC 5A)
- 1x User Manual

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

2. Technical Specification

2.1 HDBaseT Splitter

Video Input	
Input	(1) HDMI
Input Connector	(1) Female type A HDMI
HDMI Input Resolution	Up to 4K@60Hz 4:4:4 8bit
Video Output	
Output	(1) HDMI, (4) HDBT
Output Connector	(1) Female type A HDMI; (4) RJ45
HDMI Output Resolution	Up to 4K@60Hz 4:4:4
HDBT Output Resolution	Up to 4K@60Hz 4:4:4 (Signal has been compressed.)
SPDIF Audio Output	
Audio Output	(1) SPDIF
Audio Output Connector	(1) Toslink
Audio Format	LPCM 2ch, Dolby Digital 2ch, 5.1ch, 7.1ch, Dolby TureHD 7.1ch, DTS 2ch, 5.1ch
Output Level	±0.05dBFS
Frequency Response	20Hz ~20kHz, ±1dB
THD+N	< 0.05%, 20Hz ~20kHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 90dB, 20Hz ~20kHz bandwidth
Crosstalk Isolation	> 70dB, 10kHz sine at 0dBFS level (or max level before clipping)
Noise	-90dB
Stereo Balanced L/R Audio Output	
Audio Output	(1) Stereo balanced L/R audio
Audio Output Connector	(1) 5-pin terminal block
Audio Format	PCM
Frequency Response	20Hz ~20kHz, ±1dB
Max output level	2.0Vrms ± 0.5dB.
THD+N	< 0.05%, 20Hz ~20kHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 80dB, 20Hz ~20kHz bandwidth
Crosstalk Isolation	> 70 dB, 10kHz sine at 0dBFS level (or max level before clipping)
L-R Level Deviation	< 0.3 dB, 1kHz sine at 0dBFS level (or max level before clipping)
Output Load Capability	1kohm and higher (supports 10x paralleled 10kohm loads)
Noise	- 80dB
Control	

Control port	(1) EDID, (1) FIRMWARE, (1) ID PRESET, (1) IR ALL IN/LOOP IN, (1) IR OUT, (4) IR IN, (1) IR LOOP OUT, (1) RS232 IN, (1) RS232 OUT,
Control Connector	(1) 4-pin DIP switch, (1) Micro-USB, (1) DIP switch, (7) 3.5mm mini jacks, (2) 3-pin terminal blocks
General	
HDMI Standard	2.0
HDCP Version	2.2
Transmission Mode	HDBaseT
Transmission Distance	1080p ≤ 229 feet (70 meters), 4K ≤ 131 feet (40 meters)
Operation Temperature	-10 ~ +55℃
Storage Temperature	-25~ +70℃
Relative Humidity	10% ~ 90%
AC Adapter Input Power	100V~240V AC, 50/60Hz
Input Power	24V DC 5A
Power Consumption	47W (Max)
Dimension (W*H*D)	250mm x 44mm x 148mm
Net Weight	1.16kg

Note: *SPDIF audio output does not support DTS-HD Master Audio and Dolby TrueHD format.*

2.2 Video Resolution Down-scaling

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

HDMI Output:

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

HDBT Output:

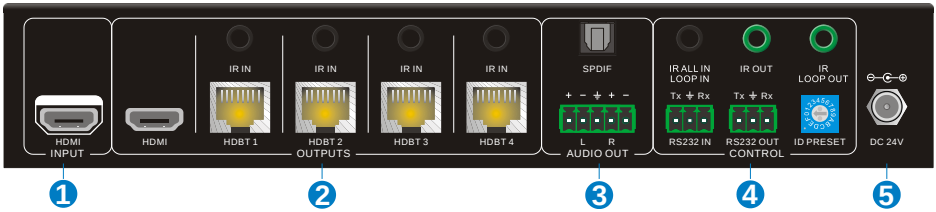
	Input			Output	
#	Resolution	Refresh	Color Space	Downscale	1080p Specs
1	3840x2160	60	4:4:4	Support	1080p@60Hz 4:4:4
2	3840x2160	30	4:4:4	Support	1080p@30Hz 4:4:4
3	3840x2160	24	4:4:4	Support	1080p@24Hz 4:4:4
4	3840x2160	60	4:2:0	Support	1080p@60Hz 4:4:4
5	3840x2160	60	4:2:2	Support	1080p@60Hz 4:4:4
6	3840x2160	30	4:2:2	Not Support	N/A
7	3840x2160	24	4:2:2	Not Support	N/A
8	3840x2160	60	RGB	Support	1080p@60Hz 4:4:4
9	3840x2160	30	RGB	Support	1080p@30Hz RGB
10	3840x2160	24	RGB	Support	1080p@24Hz RGB

3. Panel Description

3.1 Splitter Front Panel

1. POWER LED: Illuminates red when power is applied.
2. INPUT LED: Illuminates green when there is HDMI source input.
3. OUTPUT LEDs: The HDMI LED illuminates green when there is HDMI output. The HDBT 1~3 LEDs illuminate green when there is a valid HDBaseT link between the splitter and the receiver.
4. 4-pin DIP switch for EDID setting and HDCP mode selection.
5. FIRMWARE: Micro-USB port for firmware upgrade.

3.2 Splitter Rear Panel



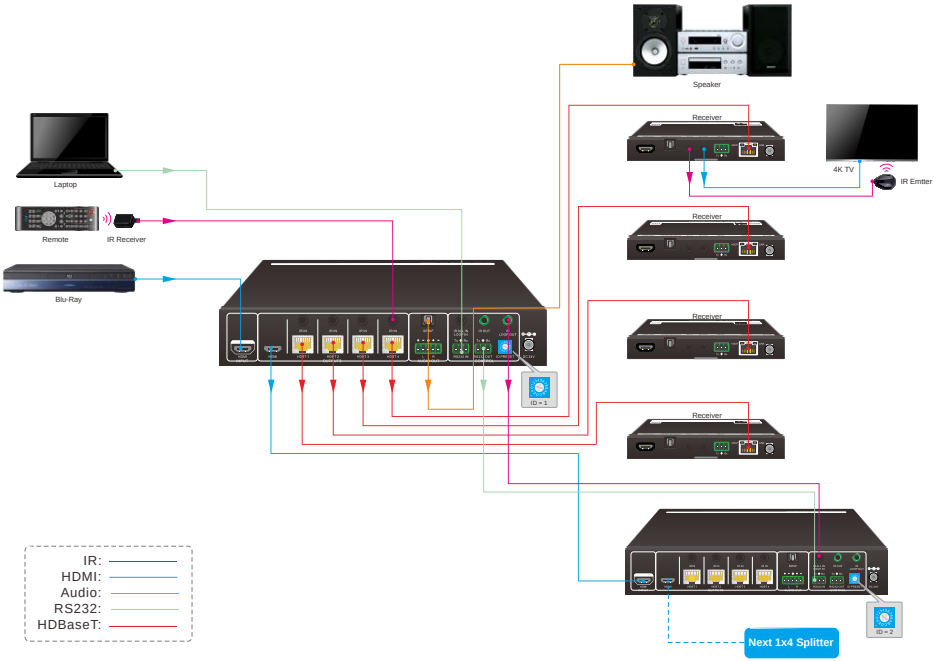
1. HDMI INPUT: Connects to HDMI source device.
2. OUTPUTS:
   - HDMI: Connects to local HDMI display device.
   - HDBT 1~4: Connect to four HDBaseT receivers.
   - IR IN: Connect to four IR receivers to control far-end third-party devices by IR.
3. AUDIO OUT:
   - Toslink audio output for audio de-embedding from HDMI output.
   - Balanced L/R audio output for audio de-embedding from HDMI output.

4. CONTROL:

- IR ALL IN/LOOP IN: Connects to IR receiver to control far-end display device, or it can be connected to IR LOOP OUT of previous splitter.
- IR OUT: Connects to IR emitter to control the local source device by IR.
- IR LOOP OUT: Connects to IR ALL IN port of next splitter.
- RS232 IN: Connects to control device (e.g. PC) to control the splitter or far-end third-party devices by RS232, or it can be connected to the RS232 OUT port of previous splitter.
- RS232 OUT: Connects to the RS232 IN port of next splitter.
- ID PRESET: Assigns a unique ID to each splitter when cascading multiple splitters. There are sixteen ID (0~9, A~F) can be set by using a small, flathead screwdriver. The new ID will take effect after device reboot.

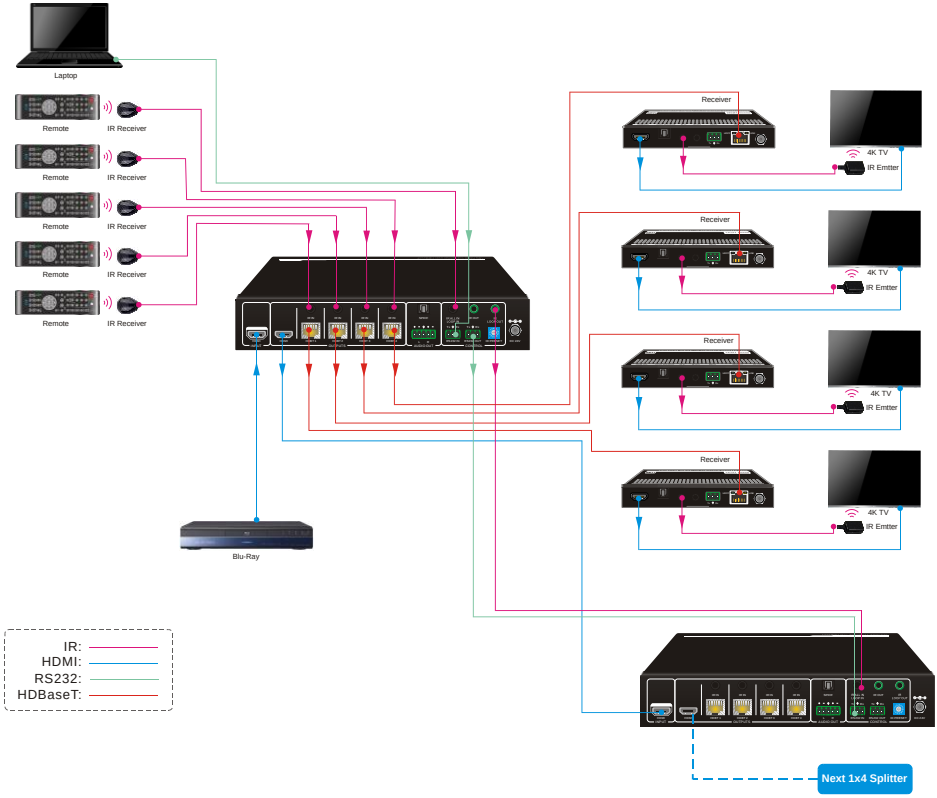
5. DC 24V: DC connector for the power adapter connection.

4. System Connection



Cascade Connection:

The splitter supports cascade connection to distribute video signal to multiple video displays. Use the following connection diagram as a guide for cascading multiple units. Note that each unit must have a unique ID if using RS232 control.

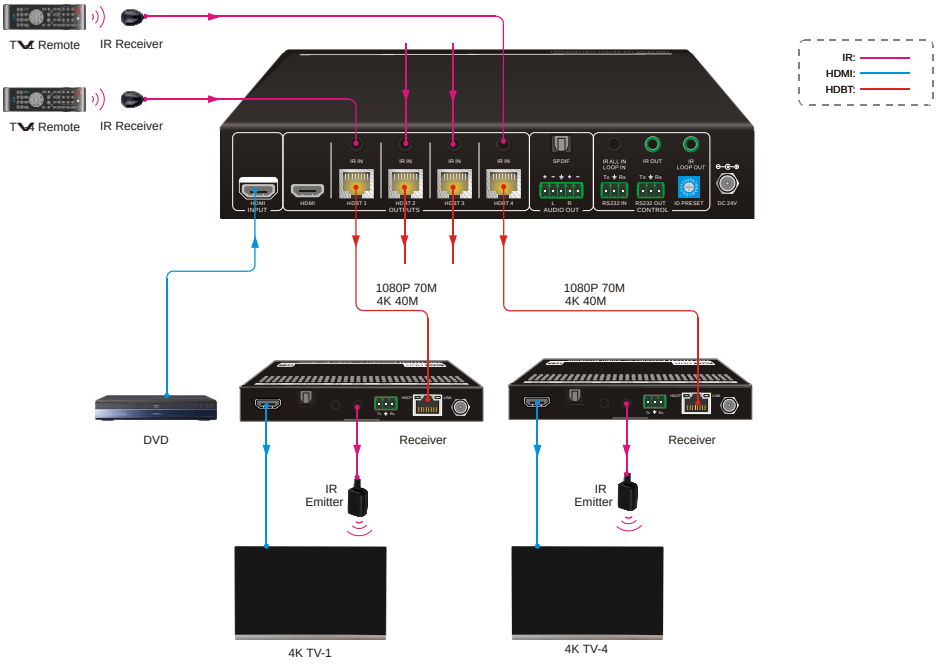


5. IR Control

The IR receivers and emitters can be connected to the system to allow for IR control of remote devices. The bidirectional IR feature provides the two-way control either for the source or display device(s). Use the following sample connection diagrams to connect for IR remote control.

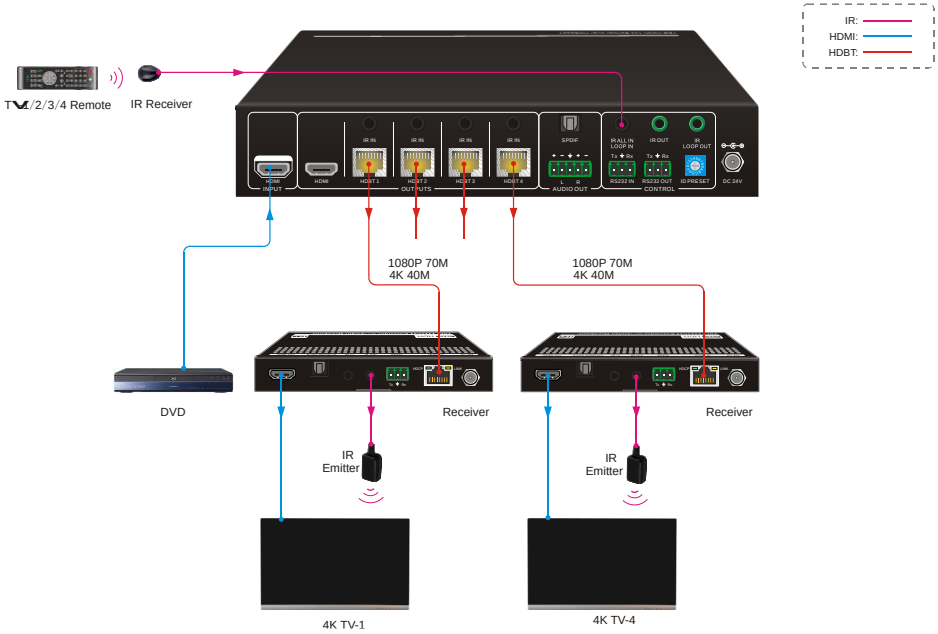
5.1 Controlling the Display Device by IR IN

The four **IR IN** ports of the splitter can receive IR signals from remotes to send to control displays. Connect four IR receiver to **IR IN** ports of the splitter, and then connect four IR emitters to **IR OUT** ports on HDBaseT receivers.



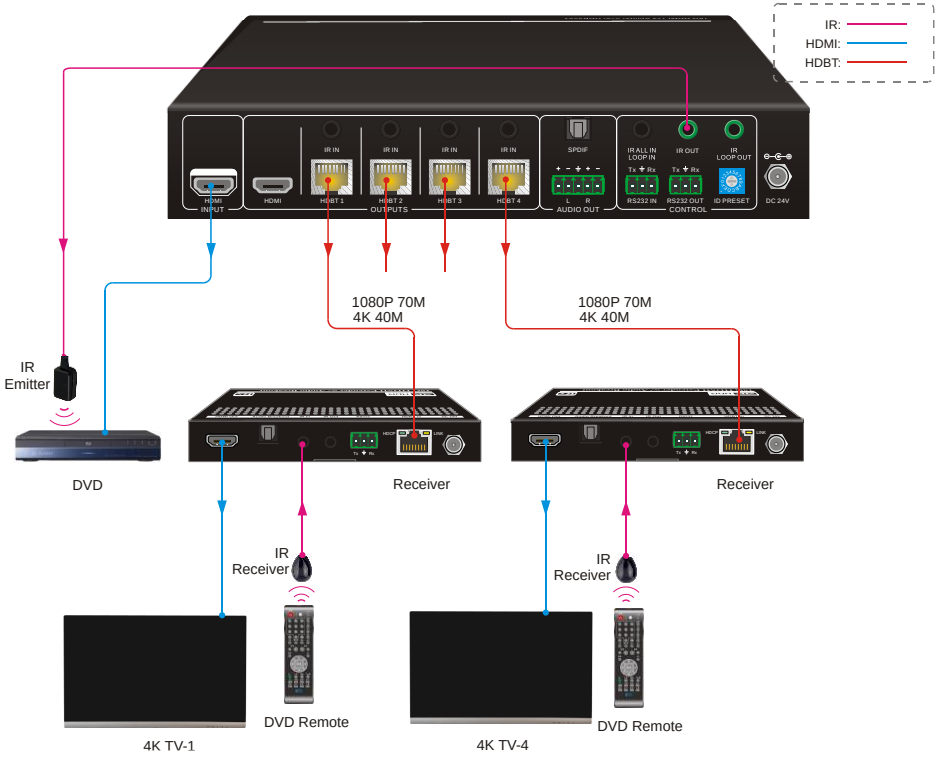
5.2 Controlling the Display Device by IR ALL IN

The **IR ALL IN** port of the splitter can receive all IR signals from remotes to send to control displays. Connect an IR receiver to **IR ALL IN** port of the splitter, and then connect four IR emitters to **IR OUT** port on HDBaseT receivers.



5.3 Controlling the Source Device

The **IR OUT** port of the splitter can send all IR signals to control source device. Connect four IR receivers to **IR IN** ports on HDBaseT receivers, and then connect an IR emitter to **IR OUT** port of the splitter.



6. RS232 Control

The splitter and compatible receivers features RS232 ports to transmit RS232 signals from computer to control far-end third-party devices by using 3-pin to DB9 cable and a RS232 control software, such as **docklight**. After installing the RS232 control software, please set the parameters of COM number, bound rate, data bit, stop bit and the parity bit correctly. Compatible receivers must be able to communicate at 2400, 4800, 9600, 19200, 38400, 57600, or 115200 baud. The splitter requires the following communication protocol parameters:

Baud rate: 9600 (default)

Data bit: 8

Stop bit: 1

Parity bit: none

RS232 Commands

The end mark of below commands is “<CR><LF>”.

Command	Function	Command Example and Feedback
#param1_GET_FIRMWARE_VERSION	Get the firmware version. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_GET_FIRMWARE_VERSION @5_V1.0.0
#param1_FACTORY_RESET	Restore to factory Default setting. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_FACTORY_RESET @5_FACTORY_RESET
#param1_SET_RS232_BAUD param2	Set the baud rate of splitter. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.param1=ALL. param2=0~4. Baud rate. 0=9600 1=19200 2=38400 3=57600 4=115200	#5_SET_RS232_BAUD 0 @5_RS232_BAUD 9600
#param1_GET_RS232_BAUD	Get the baud rate of splitter. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_GET_RS232_BAUD @5_RS232_BAUD 9600
#param1_GET_STATE	Get system status.	#5_GET_STATE

Command	Function	Command Example and Feedback
	param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	@ID:5 @5_V1.x.x @5_RS232_BAUD xxx @5_HDBT_PoC_x_ON/OFF @5_SPDIF_ON/OFF @5_I2S_ON/OFF @5_EDID:xxx @5_HDCP:xxx
#param1_GET_DIP	Get EDID DIP switch status. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_GET_DIP @5_EDID:xxx @5_HDCP:xxx
#param1_SET_HDBT_PoC param2 param3	Turn on/off PoC of HDBT output. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters. param2=1~4. HDBT output 1~4. param2=0. All HDBT outputs. Param3=ON/OFF. PoC ON/OFF.	#5_SET_HDBT_PoC 1 ON @5_HDBT_PoC_1_ON
#param1_GET_HDBT_PoC	Get PoC on-off status.	#5_GET_HDBT_PoC @5_HDBT_PoC_1_ON
#param1_SET_SPDIF param2	Turn on/off SPDIF audio output. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters. param2=ON/OFF.	#5_SET_SPDIF ON @5_SPDIF_ON
#param1_GET_SPDIF	Get the on-off status of SPDIF audio output. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_GET_SPDIF @5_SPDIF_ON
#param1_SET_I2S param2	Turn on/off balanced audio (L/R) output. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters. param2=ON/OFF.	#5_SET_I2S ON @5_I2S_ON
#param1_GET_I2S	Get the on-off status of balanced audio (L/R) output. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters.	#5_GET_I2S @5_I2S_ON

The following commands do not require end mark.

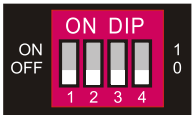
Command	Function	Command Example and Feedback
#param1_SEND_A_param2_param3:param4	Send ASCII command to control the far-end third-party device which is connected to the RS232 port of HDBaseT receiver. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters. param2=1~4. HDBT output 1~4. param2=0. All HDBT outputs. param3=0~4. Baud rate. 0=9600 1=19200, 2=38400 3=57600 4=115200 param4=ASCII command.	#5_SET_A_1_0:ABC12345 67 …
#param1_SET_H_param2_param3:param4	Send HEX command to control the far-end third-party device which is connected to the RS232 port of HDBaseT receiver. param1=0~15. The splitter ID 0~9, A~F. param1=ALL. All splitters. param2=1~4. HDBT output 1~4. param2=0. All HDBT outputs. param3=0~4. Baud rate. 0=9600 1=19200, 2=38400 3=57600 4=115200 param4=HEX command.	#5_SET_H_1_0:11 22 33 44 55 …

7. DIP Switch Operation

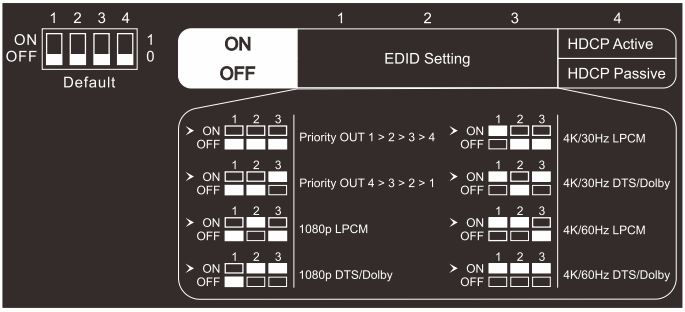
7.1 EDID Management

The DIP switch on the front panel can be used to set the EDID to a fixed value to ensure the compatibility in video resolution.

The switch 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 DIP switch status and its corresponding setting are shown at the back of the product.



Switch Status	EDID
000	Obtains the EDID from the first detected display device which is connected to HDBaseT receiver starting at HDBT output 1>2>3>4 (Default).
001	Obtains the EDID from the first detected display device which is connected to HDBaseT receiver starting at HDBT output 4>3>2>1.
010	1080p LPCM
011	1080p DTS/Dolby
100	3840x2160@30Hz HDR LPCM
101	3840x2160@30Hz HDR DTS/Dolby
110	3840x2160@60Hz HDR LPCM
111	3840x2160@60Hz HDR DTS/Dolby

7.2 HDCP Mode

Put switch 4 on "**ON**" position to select HDCP Active mode, or to "**OFF**" for HDCP Passive mode.

Switch Status	Mode	HDCP
OFF (0)	Passive (Default)	Automatically follows the HDCP version of source device.
ON (1)	Active	● If the input video has HDCP content, the HDCP version of HDMI output is HDCP 1.4 for broader video solution. ● If the input video has no HDCP content, the HDMI output has no HDCP either.

8. 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 (FIRMWARE) 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.