

# 5K HDMI™ and USB 3.2 Extender 40m over CAT (Receiver, HDMI™ OUT)



## User Manual

VER 1.2

# Thank you for purchasing this product

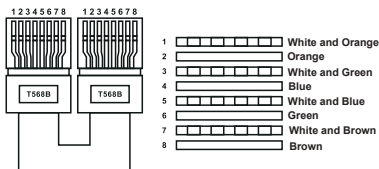
For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

## Surge protection device recommended

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lighting strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

## Caution

The network cable connection method required for this product is direct connection. Please do not cross connect.



Direct Interconnection Method

## Table of Contents

1. Introduction.....	1
2. Features.....	1
3. Package Contents.....	1
4. Specifications.....	2
5. Operation Controls and Functions.....	4
6. API Commands.....	5
7. Application Example.....	8

## 1. Introduction

The extender kit can extend HDMI™ video and USB 3.2 data up to 40m/130ft via a single CAT6a cable. The receiver box (RX) features one HDMI™ output and three USB 3.2 downstream ports. It supports audio de-embedding, RS-232 signal pass-through and bi-directional 24V PoC function. The extender offers the most convenient solution for BYOD extension via a single CAT cable, and it is a perfect solution for commercial A/V applications.

## 2. Features

- ☆ 5K HDMI™ and USB 3.2 Extender with HDMI™ out
- ☆ Extended distance is up to 40m/130ft for 4K signal, 35m/115ft for 5K signal via a single CAT6a cable
- ☆ HDCP 2.3 compliant, to create a secure connection between the source and display
- ☆ Supports USB 3.2 Gen 1 with data transfer rate up to 2.5 Gbps. It does not support 5 Gbps operation
- ☆ Features one HDMI™ output and three USB 3.2 downstream ports
- ☆ Supports audio de-embedding
- ☆ RS-232 pass-through
- ☆ HDR, HDR10+, Dolby Vision LLM and HLG pass-through
- ☆ Bi-directional 24V PoC (power over cable), when TX or RX gets power, the other end does not need an external power supply

## 3. Package Contents

- ① 1× 5K HDMI™ and USB 3.2 Extender (Receiver)
- ② 1× 3-pin 3.5mm Phoenix Connector
- ③ 2× Mounting Ear
- ④ 4× Machine Screw
- ⑤ 1× Hexagonal Copper Stud
- ⑥ 1× User Manual

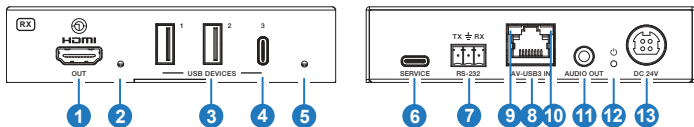
## 4. Specifications

Technical	
USB Protocol	USB 3.2 Gen 1
Transfer Rate	Up to 2.5 Gbps
HDCP Compliance	HDCP 2.3 and HDCP 1.x
HDMI™ Compliance	HDMI™ 2.0b
HDMI™ Video Bandwidth	18Gbps
HDMI™ Video Resolution (Input & Output)	640x480p60Hz, 800x600p60Hz, 1024x768p60Hz, 1280x1024p60Hz, 1360x768p60Hz, 1440x900p60Hz, 1440x1050p60Hz, 1600x1200p60Hz, 720x480i59.94Hz(480i59), 720x480p59.94Hz(480p59), 720x576i50Hz(576i50), 720x576p50Hz(576p50), 1280x720p50Hz(720p50), 1280x720p59.94Hz(720p59), 1280x720p60Hz(720p60), 1920x1080i50Hz(1080i50), 1920x1080i59.94Hz(1080i59), 1920x1080i60Hz(1080i60), 1920x1080p23.98Hz(1080p23), 1920x1080p24Hz(1080p24), 1920x1080p25Hz(1080p25), 1920x1080p29.97Hz(1080p29), 1920x1080p30Hz(1080p30), 1920x1080p50Hz(1080p50), 1920x1080p59.94Hz(1080p59), 1920x1080p60Hz(1080p60), 2560x1080p60Hz, 3440x1440p60Hz, 3840x2160p23.98Hz(2160p23), 3840x2160p24Hz(2160p24), 3840x2160p25Hz(2160p25), 3840x2160p29.97Hz(2160p29), 3840x2160p30Hz(2160p30), 3840x2160p50Hz(2160p50), 3840x2160p59.94Hz(2160p59), 3840x2160p60Hz(2160p60), 4096x2160p23.98Hz, 4096x2160p24Hz, 4096x2160p25Hz, 4096x2160p29.97Hz, 4096x2160p30Hz, 4096x2160p50Hz, 4096x2160p59.94Hz, 4096x2160p60Hz, 5120x1440p50Hz, 5120x1440p60Hz, 5120x2160p50Hz, 5120x2160p60Hz
HDR	HDR, HDR10, HDR10+, Dolby Vision, HLG
Color Depth	8/10/12-bit
Color Space	RGB, YCbCr_4:4:4, YCbCr_4:2:2, YCbCr_4:2:0
Audio Format	<b>HDMI™ OUT:</b> LPCM, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-EX, DTS-96/24, DTS High Res, DTS-HD Master Audio <b>Analog Audio De-embedding:</b> LPCM 2CH (sample rate 32~192kHz)
Transmission Distance	Up to 40m/130ft for 4K and 35m/115ft for 5K via CAT6a (minimum required U/FTP 23AWG) cable; 1.5m/4.9ft via USB 3.2 Gen1 5Gbps passive cable; 3m/9.8ft via HDMI™ passive cable

Audio Parameters	Output Level (Max)	2.2dBu(1Vrms)
	Frequency Response	20Hz to 20kHz ( $\pm 0.5$ dB)
	Dynamic Range	>90dB@0dBu, 1kHz, A-weighted
	Audio S/N Ratio	>90dB@0dBu, 1kHz, A-weighted
	Audio THD+N	< 0.007%@OUT 2.2dBu, 1kHz
ESD Protection	IEC 61000-4-2: $\pm 8$ kV (Air-gap discharge), $\pm 4$ kV (Contact discharge)	
<b>Connections</b>		
Receiver	Input: 1× AV-USB3 IN [RJ45 connector, 24V PoC] Output: 2× USB-A [Downstream, 9-pin female] 1× USB-C [Downstream, 24-pin female] 1× OUT [HDMI™ Type A, 19-pin female] 1× AUDIO OUT [3.5mm audio jack] Control: 1× RS-232 [3pin-3.5mm phoenix connector] 1× SERVICE [USB-C, firmware update port]	
<b>Mechanical</b>		
Housing	Metal Enclosure	
Color	Black	
Dimensions	Receiver: 118mm [W] × 111mm [D] × 25.5mm [H]	
Weight	Receiver: 383g	
Power Supply	Input: AC 100~240V 50/60Hz; Output: DC 24V/2A (US/EU standards, CE/FCC/UL certified)	
Power Consumption	Receiver: 25.4W (Max)	
Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F	
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F	
Operating Humidity	20%~80% relative humidity, non-condensing	
Storage Humidity	10%~90% relative humidity, non-condensing	

## 5. Operation Controls and Functions

### Receiver Panel



No.	Name	Function Description
1	HDMI OUT	HDMI signal output port, connected to a display device such as a monitor with HDMI cable.
2	HDMI OUT LED	The green LED will light up, when the HDMI OUT port is connected to a display device.
3	USB DEVICES 1/2	Downstream USB-A ports, with output power up to 5V/1.5A. Connect to USB devices such as U disk or hard disk.
4	USB DEVICES 3	Downstream USB-C port, with output power up to 5V/1.5A. Connects to USB device such as U disk or hard disk.
5	USB LED	USB signal indicator. <ul style="list-style-type: none"><li>▪ <b>Light On:</b> USB 3.2 signal is detected.</li><li>▪ <b>Light Blinking:</b> USB 2.0 signal is detected.</li><li>▪ <b>Light Off:</b> There is no USB signal.</li></ul>
6	SERVICE	USB 2.0 port, used for firmware upgrade and API control.
7	RS-232	3-pin phoenix connector, connected to a control system for RS-232 signal pass-through.
8	AV-USB3 IN	Connects to the AV-USB3 OUT port on TX with CAT6a cable, used for AV and USB signal transmission and 24V PoC power supply.
9	LINK LED	<ul style="list-style-type: none"><li>▪ <b>Light On:</b> TX and RX are connected and linked.</li><li>▪ <b>Light Off:</b> TX and RX are not connected.</li></ul>
10	VIDEO LED	<ul style="list-style-type: none"><li>▪ <b>Light On:</b> There is video signal transmission with HDCP encryption.</li><li>▪ <b>Light Blinking:</b> There is video signal transmission without HDCP encryption.</li><li>▪ <b>Light Off:</b> There is no video signal transmission.</li></ul>

No.	Name	Function Description
11	AUDIO OUT	HDMI audio de-embedding output port, connected to an audio device.
12	Power LED	The red LED will light up, when the receiver is powered on.
13	DC 24V	DC 24V/2A power input port.

## 6. API Commands

The product supports API commands control. Connect the SERVICE port on the product to a PC, then open a Serial Command tool on PC to send API commands to control the product. The API commands list is shown below.

ASCII Commands				
SERVICE (USB-C port with virtual RS-232) communication protocol (Connect to laptop) Baud rate: 115200 (fixed), Data bit: 8, Stop bit: 1, Parity bit: none				
Commands	Function	Example	Feedback	Default
?	Get the list of all commands	?		
help	Get the list of all commands	help		
get version	Get all firmware version	get version	RX BOOT: V1.1.1 RX FW: V1.00.01 TX FW: V1.00.01 SUB MCU: V1.0.1	
reboot	Reboot the device	reboot	Reboot... System Initializing... Initialization Finished! TX FW v1.0.0 RX FW v1.0.0	
reset	Reset to factory defaults	reset	Sure to RESET to default settings? Type "Yes" after next prompt to confirm...	

Commands	Function	Example	Feedback	Default
status	Get system status	status	Please refer to the note at the end of the list.	
set rx output x source y	Set RX output x (0~1) source to y (y=0~3) x=0:All Outputs x=1:Output 1 y=0:Off y=1:TX input y=2:AVMUTE	set rx output 1 source 1 set rx output 1 source 0	RX output 1 source from tx input 1 RX output 1 source off	1
get rx output x source	Get RX output x (x=0~1) video source	get rx output 1 source	RX output 1 source from tx input 1	
set rx output x hdcp y	Set RX output x (0~1) HDCP mode to (y=0~4) x=0:All Outputs x=1:Output 1 y=0:Signal management y=1:Follow sink (default) y=2:Follow source y=3:Force HDCP 1.4 y=4:Force HDCP 2.3	set rx output 1 hdcp 1	RX output 1 HDCP follow sink	1
get rx output x hdcp	Get RX output x (x=0~1) hdcp mode x=0:All Outputs x=1:Output 1	get rx output 1 hdcp	RX output HDCP follow sink	
get rx output x connected	Get RX output x (x=0~1) cable connected status x=0:All Outputs x=1:Output 1	get rx output 1 connected	RX output 1 connected RX output 1 disconnected	
get rx output x signal	Get RX output x (x=0~1) signal status x=0:All Outputs x=1:Output 1	get rx output 1 signal	RX output 3840x2160p60Hz YUV 4:4:4 8bit RX output no signal	
set rx hdmi out x power y	Set RX HDMI output x (x=0~1) 5V power to y (y=0~2) x=0:All Outputs x=1:HDMI Output 1 y=0:Follow input y=1:Force HDMI out 5V power on y=2:Force HDMI out 5V power off	set rx hdmi out 1 power 1	HDMI out 1 power force 5v always output	0

Commands	Function	Example	Feedback	Default
get rx hdmi out x power	Get HDMI output x (x=0~1) 5V status	get rx hdmi out 1 power	HDMI out 1 power force 5v always on	
set rx usbd x power y	Set RX USB device ports x (x=0~3) power to y (y=0~2) x=0:RX all USB device ports x=1:RX USB device 1 x=2:RX USB device 2 x=3:RX USB device 3 y=0:Follow USB host power y=1:Force power on y=2:Force power off	set rx usbd 0 power 1	RX all USB device ports power follow USB host power	0
get rx usbd x power	Get RX USB device ports x (x=0~3) power status x=0:RX all USB device ports x=1:RX USB device 1 x=2:RX USB device 2 x=3:RX USB device 3	get rx usbd 0 power	RX all USB device ports power follow USB host power	
set hdbt update	Set SERVICE port to HDBT UART for FW update	set hdbt update	HDBT update...	

**Note:** The feedback of the command of "status" is as follow.

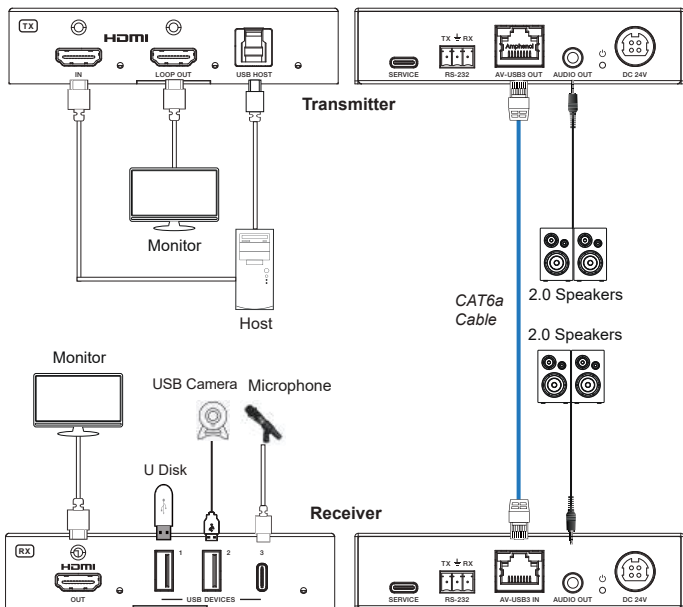
=====  
 Status Info 5K HDMI and USB 3.2 Extender over CAT  
 RX FW v1.0.0

RX	Cable	Signal	HDCP	Source
Output	Connected	3840x2160p60Hz YUV 4:4:4 8bit	HDCP 2.3	TX_Input

RX_USB	USB_Power
RX_01	Follow_host
RX_02	Follow_host
RX_03	Follow_host

=====

## 7. Application Example



**HDMI™**  
HIGH-DEFINITION MULTIMEDIA INTERFACE

The terms HDMI, HDMI High-Definition Multimedia Interface, HDMI trade dress and the HDMI Logos are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.