5K USB-C and USB 3.2 Extender

40m over CAT (Transmitter, USB-C IN)

User Manual

VER 1.1

Thank you for purchasing this product

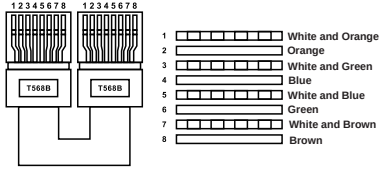
For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

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 full USB-C signal (video and USB 3.2 data) up to 40m/130ft via a single CAT6a cable. The transmitter box (TX) features one full USB-C input, with DisplayPort Alt mode standards (v1.4a) A/V, USB 3.2 Gen 1 data, and PD 100W charging to a laptop. It supports audio de-embedding, RS-232 signal pass-through and bi-directional 24V PoC function.

The extender offers the most convenient solution for full USB-C extension via a single CAT cable, and it is a perfect solution for commercial A/V applications.

2. Features

- ☆ 5K full USB-C and USB 3.2 extender with USB-C input and output
- ☆ Extended distance is up to 40m/130ft for 4K signal, 35m/115ft for 5K signal via a single CAT6a cable
- ☆ Compliant with VESA DisplayPort 1.4a
- ☆ Compliant with USB-C Power Delivery 3.0
- ☆ HDCP 2.3 compliant, creating 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 full USB-C input, supporting DP Alt mode standards (v1.4a) A/V, USB 3.2 Gen 1 data and up to 100W charging
- ☆ 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

(**Note:** USB-C charging is supported only when TX gets power supply.)

3. Package Contents

① 1× 5K USB-C and USB 3.2 Extender (Transmitter)
② 1× 24V/7.5A Power Adapter
③ 1× 3-pin 3.5mm Phoenix Connector
④ 2× Mounting Ear
⑤ 4× Machine Screw
⑥ 1× User Manual

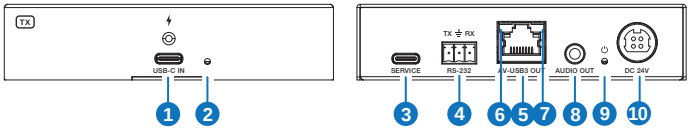
4. Specifications

Technical	
USB Protocol	USB 3.2 Gen 1 and USB 2.0
Transfer Rate	Up to 2.5 Gbps
HDCP Compliance	HDCP 2.3 and HDCP 1.x
DP Compliance	DisplayPort 1.4a
Video Bandwidth	18Gbps
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, 8-bit (5K60Hz, 4:2:2)
Color Space	RGB, YCbCr_4:4:4, YCbCr_4:2:2, YCbCr_4:2:0
Audio Format	**USB-C IN:** LPCM, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-EX, DTS-96/24, DTS High Res, DTS-HD Master Audio **Analog Audio De-embedding:** 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 Gen 1 passive cable; 2m/6.6ft via USB 2.0 passive cable

Analog Audio Parameters	Output Level (Max)	2.2dBu(1Vrms)
	Frequency Response	20Hz to 20kHz (±0.5dB)
	Dynamic Range	>90dB@0dBu, 1kHz, A-weighted
	Audio S/N Ratio	>90dB@0dBu, 1kHz, A-weighted
	Audio THD+N	< 0.006%@+2.2dBu, 1kHz
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge), ±4kV (Contact discharge)	
Connections		
Transmitter	Input: 1× USB-C IN [USB-C, 24-pin female] Output: 1× AUDIO OUT [3.5mm audio jack] 1× AV-USB3 OUT [RJ45 connector, 24V PoC] Control: 1× RS-232 [3-pin 3.5mm phoenix connector] 1× SERVICE [USB-C, firmware update port]	
Mechanical		
Housing	Metal Enclosure	
Color	Black	
Dimensions	Transmitter: 118mm [W] × 111mm [D] × 25.5mm [H]	
Weight	Transmitter: 359g	
Power Supply	Input: AC 100~240V 50/60Hz; Output: DC 24V/7.5A (US/EU standards, CE/FCC/UL certified)	
Power Consumption	4.36W (Max, without USB-C charging); 106W (Max, with 100W USB-C charging)	
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

Transmitter Panel



No.	Name	Function Description
1	USB-C IN	Full-featured USB-C port, connected to a laptop. Supporting DP-Alt mode and USB 3.2 Gen 1 data and PD 100W charging.
2	USB-C IN LED	▪ The LED lights up red, when the USB-C IN port is used for charging. ▪ The LED lights up green, when the USB-C IN port is connected an active source device but not for charging.
3	SERVICE	USB 2.0 port, used for firmware upgrade and API control.
4	RS-232	3-pin phoenix connector, connected to a computer for RS-232 signal pass-through.
5	AV-USB3 OUT	Connects to the AV-USB3 IN port on RX with CAT6a cable, used for AV and USB signal transmission and 24V PoC power supply.
6	LINK LED	▪ **Light On:** TX and RX are connected and linked. ▪ **Light Off:** TX and RX are not connected.
7	VIDEO LED	▪ **Light On:** There is video signal transmission with HDCP encryption. ▪ **Light Blinking:** There is video signal transmission without HDCP encryption. ▪ **Light Off:** There is no video signal transmission.
8	AUDIO OUT	Audio de-embedding output port, connected to an audio device.
9	Power LED	The red LED will light up, when the transmitter is powered on.
10	DC 24V	DC 24V/7.5A 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	TX BOOT: V1.01.01 TX FW: V1.00.01 RX FW: V1.00.01 SUB MCU1: V1.00.00.01 SUB MCU2: V1.00.17	
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…	
status	Get system status	status	Please refer to the note at the end of the list.	
set tx input x hdcp y	Set tx input x (x=0~1) HDCP to y (y=0~2) x=0:All Inputs, x=1:Input 1, y=0:HDCP off, y=1:HDCP 1.4, y=2:HDCP 2.3	set tx input 0 hdcp 2 set tx input 1 hdcp 0	TX all input HDCP 2.3 TX input 1 HDCP off	HDCP 2.3
get tx input x hdcp	Get TX input x (x=0~1) HDCP status	get tx input 1 hdcp	TX input 1 HDCP 2.3	

Commands	Function	Example	Feedback	Default
get tx input x connected	Get TX input x (x=0~1) cable connected status x=0:All Inputs x=1:Input 1	get tx input 1 connected	TX input 1 connected TX input 1 disconnected	
get tx input x signal	Get TX input x (x=0~1) signal status	get tx input 1 signal	TX input 1 3840x2160p 60Hz YUV 4:4:4 8bit TX input 1 no signal	
set tx input x edid y	Set TX input (x=0~1) EDID to y (01~23) x=0:All inputs x=1:Input 1 y=01:Copy EDID from RX output(default) y=02:1080p60,2CH PCM y=03:1080p60,5.1CH DTS/DOLBY y=04:1080p60,7.1CH DTS/DOLBY/HD y=05:4K60,2CH PCM y=06:4K60,5.1CH DTS/DOLBY y=07:4K60,7.1CH DTS/DOLBY/HD y=08:5K60,2CH PCM y=09:5K60,5.1CH DTS/DOLBY y=10:5K60,7.1CH DTS/DOLBY/HD y=11:4K30,2CH PCM y=12:4K30,5.1CH DTS/DOLBY y=13:4K30,7.1CH DTS/DOLBY/HD y=14:720p60,2CH PCM y=15:1920x1200p60,2CH PCM y=16:1680x1050p60,2CH PCM y=17:1600x1200p60,2CH PCM y=18:1440x900p60,2CH PCM y=19:1360x768p60,2CH PCM y=20:1280x1024p60,2CH PCM y=21:1024x768p60,2CH PCM y=22:User Defined 1 y=23:User Defined 2	set tx input 1 edid 1	TX input 1 EDID 01:auto EDID (default)	1
get tx input x edid	Get TX input x (x=0~1) EDID	get tx input 1 edid	TX input 1 EDID 01: Auto EDID (default)	
get tx input x edid data	Get TX input x (x=0~1) EDID data	get tx input 1 edid data	TX input 1 EDID <00 FF FF FF….>	

Commands	Function	Example	Feedback	Default
set user edid x <y>	Set user defined EDID x (x=0~2) to y x=0: User Defined 1 and User Defined 2 x=1: User Defined 1 x=2: User Defined 2 y=00 FF FF FF ….. (y is 256 bytes EDID data)	set user edid 1 <00 FF FF FF ….>	User Defined 1 EDID is loaded	
get user edid x	Get user defined EDID x (x=0~2) data x=0: User Defined 1 and User Defined 2 x=1: User Defined 1 x=2: User Defined 2	get user edid 1	<00 FF FF FF….>	
get tx usb connected	Get TX USB cable connected status	get tx usb connected	TX USB connected TX USB disconnected	1
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 USB-C and USB 3.2 Extender over CAT
TX FW v1.0.0
TX      Cable       Signal                              HDCP        EDID
Input   Connected   3840x2160p60Hz YUV 4:4:4 8bit       HDCP 2.3    01_Auto EDID (default)

TX_USB  Cable
TX_01   Connected
================================================================================
```

7. Application Example