User Manual

VIVOLINK®
PROFESSIONAL AV SOLUTIONS

VLHUB121-EXT

18Gbps HDMI™/USB-C and USB 2.0 over CAT 70m



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Version: VLHUB121-EXT_2026V1.0

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. 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"

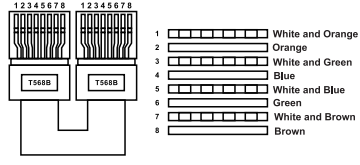
Das auf Elektro- und Elektronikgeräten regelmäßig abgebildete Symbol einer durchgestrichenen Mülltonne weist darauf hin, dass das jeweilige Gerät am Ende seiner Lebensdauer getrennt vom unsortierten Siedlungsabfall zu erfassen ist.

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

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1. Introduction

This 18Gbps HDBaseT 3.0 Extender can extend uncompressed HDMI™/USB-C signals, bi-directional IR, RS-232, and USB 2.0 signals up to 230ft/70m (4K30/1080P) or 131ft /40m (4K60) via a single CAT6A/7 cable. Video resolution is up to 4K2K@ 60Hz YUV 4:4:4. The transmitter features with 1x HDMI™ input, 1x USB-C input (60W charging), 1x USB Host and 3x USB Device ports. The receiver features with 1x HDMI™ output, 2x USB Device ports. Both transmitter and receiver support 3.5mm analog audio de-embedding, EDID management, bi-directional IR and RS-232 signal pass-through. This product supports bi-directional 24V POC function.

The Extender offers the most convenient solution for video extension via a single CAT cable with long distance capability, and it is the perfect solution for home/commercial application.

2. Features

- ☆ Compliant with HDMI™ 2.0b and HDCP 2.3, 18Gbps video bandwidth
- ☆ HDBaseT 3.0 VS300R chipset based design
- ☆ Support video resolution up to 4K2K@60Hz (YUV 4:4:4)
- ☆ Uncompressed video signal transmission distance can be extended up to 230ft/70m for 4K@30Hz, or 131ft/40m for 4K@60Hz over a single CAT6A/7 cable
- ☆ TX features with 1x HDMI™ input, 1x USB-C input, 1x HDBT output, 1x USB 2.0 host and 3x USB 2.0 clients
- ☆ RX features with 1x HDMI™ output, 2x USB 2.0 clients
- ☆ USB-C and HDMI™ signal inputs support auto or manual switching mode
- ☆ Auto switching supports HDMI™ 5V or signal detect selection
- ☆ USB-C supports DP-ALT mode, USB 2.0 data and power charging up to 60 watts
- ☆ TX/RX USB-A client ports VBUS on or off depends on USB host is connected or not
- ☆ HDR, HDR10, HDR10+, Dolby Vision LLM and HLG pass-through
- ☆ 4K to 1080p downscaling features on HDMI™ output, no frame rate conversion
- ☆ Both TX and RX support analog audio de-embedding
- ☆ RS-232 signal pass-through and guest-mode control
- ☆ Support bi-directional IR signal pass-through, USB 2.0 signal transmission
- ☆ Advanced EDID management
- ☆ Each USB-A port provides power up to 5V/500mA
- ☆ Support bi-directional 24V PoC, with PoC switch
- ☆ Compact design for easy and flexible installation

3. Package Contents

① 1× 18Gbps HDMI™/USB-C over HDBaseT 3.0 Extender (Transmitter)
② 1× 18Gbps HDMI™/USB-C over HDBaseT 3.0 Extender (Receiver)
③ 1× IR Blaster Cable (1.5 meters)
④ 1× IR Wideband Receiver Cable (1.5 meters)
⑤ 2× 3pin-3.81mm Phoenix Connector (male)
⑥ 4× Mounting Ear
⑦ 8× Machine Screw (KM3*4)
⑧ 1× 24V/3.75A Desktop Power Supply
⑨ 1× User Manual

4. Specifications

Technical	
HDMI™ Compliance	HDMI™ 2.0b
HDCP Compliance	HDCP 2.3
USB Compliance	USB 2.0
Video Bandwidth	18Gbps
Video Resolution	Up to 4K@60Hz 4:4:4
Color Space	RGB, YCbCr 4:4:4, YCbCr 4:2:2, YCbCr 4:2:0
Color Depth	8/10/12bit
IR Level	12Vp-p
IR Frequency	Wideband 20k-60kHz
HDR	HDR, HDR10, HDR10+, Dolby Vision, HLG
Audio Formats	**HDMI™/USB-C/HDBT:** LPCM 2/5.1/7.1CH, Dolby Digital/Plus/EX, Dolby True HD, DTS, DTS-EX, DTS-96/24, DTS High Res, DTS-HD Master Audio, DSD **3.5mm Analog Audio:** LPCM 2CH
Transmission Distance	**4K60:** 131ft/40m (CAT6A/7) **4K30/1080P:** 230ft/70m (CAT6A/7)
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge), ±4kV (Contact discharge)

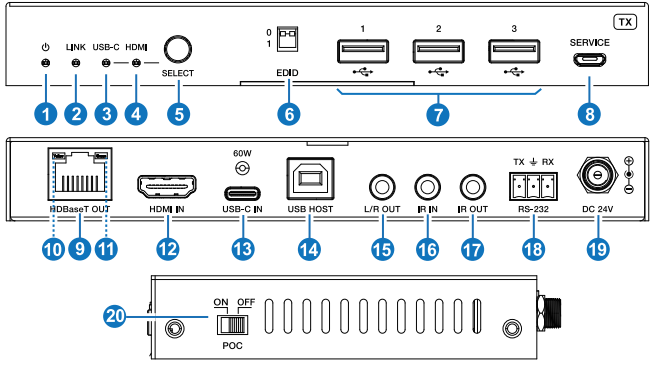
Connection	
Transmitter	Input: 1× HDMI™ IN [Type A, 19-pin female] 1× USB-C IN [USB Type C, 24-pin female] Output: 1× HDBaseT OUT [RJ45, 8-pin female] 1× L/R OUT [3.5mm Stereo Mini-jack] Control: 1× IR IN [3.5mm Stereo Mini-jack] 1× IR OUT [3.5mm Stereo Mini-jack] 1× RS-232 [3pin-3.81mm phoenix connector] 1× SERVICE [Micro USB, 5-pin female] 1× USB HOST [USB Type B, 4-pin female] 3× USB Devices [USB Type A, 4-pin female]
Receiver	Input: 1× HDBaseT IN [RJ45, 8-pin female] Output: 1× HDMI™ OUT [Type A, 19-pin female] 1× L/R OUT [3.5mm Stereo Mini-jack] Control: 1× IR IN [3.5mm Stereo Mini-jack] 1× IR OUT [3.5mm Stereo Mini-jack] 1× RS-232 [3pin-3.81mm phoenix connector] 1× SERVICE [Micro USB, 5-pin female] 2× USB Devices [USB Type A, 4-pin female]
Mechanical	
Housing	Metal Enclosure
Color	Black
Dimensions	Transmitter: 170mm [W] × 102mm [D] × 22mm [H] Receiver: 144mm [W] × 78mm [D] × 23mm [H]
Weight	Transmitter: 484g, Receiver: 318g
Power Supply	Input: AC 100 - 240V 50/60Hz; Output: DC 24V/3.75A (US/EU standard, CE/FCC/UL certified)
Power Consumption (Max)	94.32W (Power supply from TX, 60W USB-C charging, PoC to RX) 10.8W (Power supply from TX or RX, without USB-C charging)
Operating Temperature	32 - 104°F / 0 - 40°C
Storage Temperature	-4 - 140°F / -20 - 60°C
Operating Humidity	20%~80% relative humidity, non-condensing
Storage Humidity	10%~90% relative humidity, non-condensing

Resolution / Cable Length	**4K60**	**4K24**	**1080P60**
IN / OUT	26ft / 8m	39ft / 12m	50ft / 15m

The use of “Premium High Speed HDM™” cable is highly recommended.

5. Operation Controls and Functions

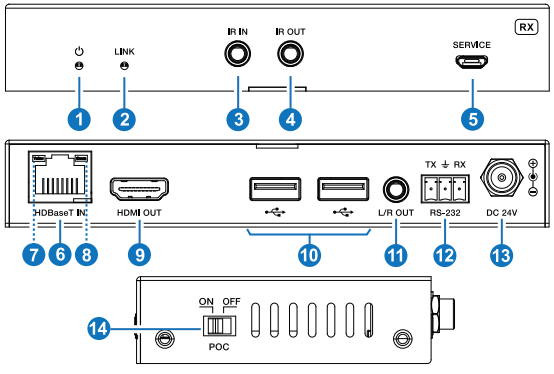
5.1 Transmitter Panel



No.	Name	Function Description
1	Power LED	Red LED indicates that the transmitter is powered on.
2	LINK LED (Green)	▪ Light on: Transmitter and receiver are in good connection status. ▪ Light flashing: Transmitter and receiver are in poor connection status. ▪ Light off: Transmitter and receiver are not connected.
3	USB-C LED (Green)	When the USB-C IN port is selected as the video signal input channel, the USB-C LED will be on.
4	HDMI LED (Green)	When the HDMI IN port is selected as the video signal input channel, the HDMI LED will be on.
5	SELECT button	Press this button to switch HDMI/USB-C signal input.
6	EDID DIP switch	Used for EDID setting: 00- Copy display's EDID (as factory default) 01- 4K30 4:4:4 10- 1080p60 4:4:4 11- 1200p60 4:4:4
7	USB Device ports	Three USB extension ports, connected to mouse, keyboard, USB Flash Drive or other USB devices, with a maximum power supply of 500mA.

No.	Name	Function Description
8	SERVICE	Firmware update and API command control port.
9	HDBaseT OUT	HDBaseT output port, connected to the HDBaseT IN port of receiver with a CAT6A/7 cable. It is used for various signals pass-through.
10	Data Signal Indicator (Yellow)	▪ Light on: There is video signal with HDCP encryption. ▪ Light flashing: There is video signal without HDCP encryption. ▪ Light off: There is no video signal transmission.
11	Link Signal Indicator (Green)	▪ Light on: Transmitter and receiver are in good connection status. ▪ Light flashing: Transmitter and receiver are in poor connection status. ▪ Light off: Transmitter and receiver are not connected.
12	HDMI IN	HDMI signal input port, connected to HDMI source device.
13	USB-C port	USB Type C port with following three functions: (1) USB-C video signal input port, connected to source device. (2) USB-C host port. When the USB-C port is selected as the video signal input channel, the USB-C port can be used as a USB 2.0 signal transmission port simultaneously. (3) USB-C charging port. Only when TX is connected to the 24V/3.75A power supply, the USB-C port can provides 60W charging power for external USB-C devices. When TX is not connected to the power supply and RX is connected to the power supply, the USB-C port can not provide charging function.
14	USB HOST	USB host port, connected to PC. It follows the HDMI IN port. When the HDMI IN port is selected as the input channel, the USB 2.0 signal can only be output through the USB HOST port.
15	L/R OUT	Analog audio output port, used for audio de-embedding output.
16	IR IN	IR signal input port, connected with the IR Receiver cable.
17	IR OUT	IR signal output port, connected with the IR Blaster cable.
18	RS-232	RS-232 serial port, used for RS-232 command pass-through and API command control.
19	DC 24V	DC 24V/3.75A power supply input port. *Note that the extender supports PoC function. It means that either transmitter or receiver is powered on by the power adapter, the other one doesn't need power supply.*
20	PoC switch	Use the switch to turn on/off the PoC function.

5.2 Receiver Panel

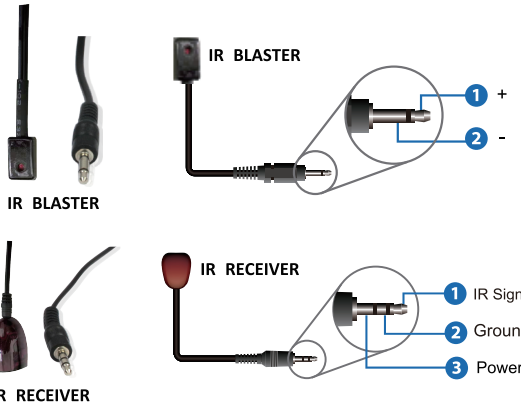


No.	Name	Function Description
1	Power LED	Red LED indicates that the receiver is powered on.
2	LINK LED (Green)	▪ Light on: Transmitter and receiver are in good connection status. ▪ Light flashing: Transmitter and receiver are in poor connection status. ▪ Light off: Transmitter and receiver are not connected.
3	IR IN	IR signal input port, connected with the IR Receiver cable.
4	IR OUT	IR signal output port, connected with the IR Blaster cable.
5	SERVICE	Firmware update and API command control port.
6	HDBaseT IN	HDBaseT input port, connected to the HDBaseT OUT port of transmitter with a CAT6A/7 cable. It is used for various signals pass-through.
7	Data Signal Indicator (Yellow)	▪ Light on: There is video signal with HDCP encryption. ▪ Light flashing: There is video signal without HDCP encryption. ▪ Light off: There is no video signal.
8	Link Signal Indicator (Green)	▪ Light on: Transmitter and receiver are in good connection status. ▪ Light flashing: Transmitter and receiver are in poor connection status. ▪ Light off: Transmitter and receiver are not connected.
9	HDMI OUT	HDMI signal output port, connected to a display device, such as TV or monitor.

No.	Name	Function Description
10	USB Device ports	Two USB extension ports, connected to mouse, keyboard, USB Flash Drive or other USB devices.
11	L/R OUT	Analog audio output port, used for audio de-embedding output.
12	RS-232	Used for RS-232 command pass-through and API command control.
13	DC 24V	DC 24V power supply input port. *Note that the extender supports PoC function, it means that either transmitter or receiver is powered on by the power adapter, the other one doesn't need power supply.*
14	PoC switch	Use the switch to turn on/off the PoC function.

5.3 IR Pin Definition

IR Receiver and Blaster pin's definition is as below:



Note: When the angle between the IR receiver and the remote control is 45 °, the transmission distance is 0-5 meters; when the angle between the IR receiver and the remote control is 90 °, the transmission distance is 0-8 meters.

6. API Commands

The product also supports API commands control. Connect the RS-232 port on the product to a PC or control system with a 3-pin phoenix connector cable, or connect the SERVICE port of the product to a PC with a Micro USB cable. Then, open a serial command tool on PC to send ASCII commands to control the product.
The ASCII commands list about the product is shown as below.

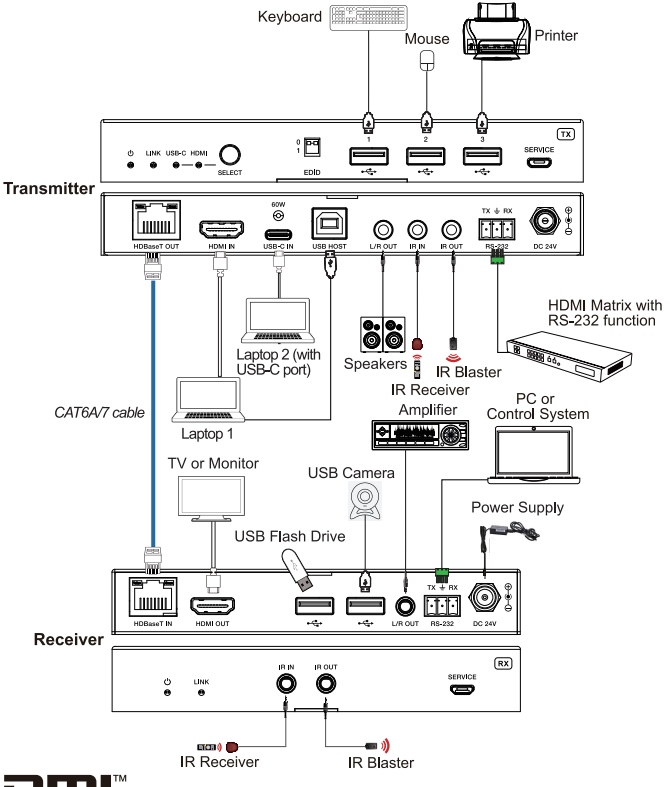
ASCII Commands				
RS-232 Communication Protocol: Baud rate: 115200; Data bit: 8; Stop bit: 1; Parity bit: none.				
Commands	**Function Description**	**Example**	**Feedback**	**Default**
help	Get the list of all commands	help	========== Help Info FW Version:TX 1.00.02 RX 1.00.02 000. help 001. r fw version 002. s reboot 003. s reset 004. r status 005. s tx input x 006. r tx input 007. s tx autoswitch x 008. r tx autoswitch 009. s tx autoswitch mode x 010. r tx autoswitch mode 011. s rx downscale x 012. r rx downscale 013. s tx audio mute x 014. r tx audio mute 015. s rx audio mute x 016. r rx audio mute 017. s edid x to y 018. r edid x 019. r edid data x 020. s user edid x <y> 021. r user edid x ==========	
r fw version	Get the firmware version	r fw version	TX 1.0.0 RX 1.0.0	
s reboot	Reboot the device	s reboot	Reboot… System Initializing... Initialization Finished! TX 1.0.0 RX 1.0.0	
s reset	Reset to factory defaults	s reset	Sure to RESET to default settings? Type "Yes" after next prompt to confirm…	

Commands	Function Description	Example	Feedback	Default
r status	Get system status	r status	Input: USB-C Video: 1920x1080p60 Audio: 48K PCM 2CH HDCP: 1.4 USB Host: Connected HDBT Link: ON HDBT Signal: ON EDID: DIP_00 (Copy display's EDID)	
s tx input x	Set TX input video x = USBC, HDMI, AVMUTE, OFF	s tx input USBC	Set tx input from USBC	USBC
r tx input	Get TX input port	r tx input	USBC	
s tx autoswitch x	Set TX auto-switching on/off, x = ON, OFF	s tx autoswitch ON	Set tx autoswitch ON	ON
r tx autoswitch	Get TX auto-switching status	r tx autoswitch	ON	
s tx autoswitch mode x	Set TX auto-switching mode x = 0: 5V detection 1: signal detection	s tx autoswitch mode 1	Set tx autoswitch mode 1: signal detection	1: signal detection
r tx autoswitch mode	Get TX auto-switching mode status	r tx autoswitch mode	TMDS	
s rx downscale x	Set RX downscaling mode, x= AUTO: automatically according to display's capability ON: force 4K to 1080p OFF: bypass video	s rx downscale AUTO	Set rx downscale AUTO	AUTO
r rx downscale	Get RX downscaling mode	r rx downscale	AUTO	
s tx audio mute x	Set TX de-embedding audio mute on/off x = ON, OFF	s tx audio mute ON	Set tx audio mute ON	OFF
r tx audio mute	Get TX de-embedding audio mute status	r tx audio mute	OFF	
s rx audio mute x	Set RX de-embedding audio mute on/off x = ON, OFF	s rx audio mute ON	Set rx audio mute ON	OFF
r rx audio mute	Get RX de-embedding audio mute status	r rx audio mute	OFF	

Commands	Function Description	Example	Feedback	Default
s edid x to y	Set input ports EDID x = USBC, HDMI, ALL y = 00 - EDID dip switch (default) 01 - 1920x1080@60 8bit Stereo 02 - WUXGA 1920x1200 03 - 1920x1080@60 8bit High Definition Audio 04 - 3840x2160@60Hz 4:2:0 Deep Color Stereo Audio 05 - 3840x2160@60Hz Deep Color Stereo Audio 06 - 3840x2160@30Hz 8bit Stereo Audio 07 - 3840x2160@60Hz Deep Color High Definition Audio 08 - 3840x2160@60Hz Deep Color HDR LPCM 6CH 09 - copy EDID from RX HDMI output 10 - User Defined 1 11 - User Defined 2	s edid USBC to 00	Set edid USBC to 00 - EDID dipswitch (default)	00
r edid x	Get input ports EDID x = USBC, HDMI	r edid USBC	00 - EDID dipswitch (default)	
r edid data x	Get input ports EDID data x = USBC, HDMI	r edid data USBC	USBC EDID <00 FF FF FF….>	
s user edid x <y>	Set user defined EDID x = 1 (User Defined 1) x = 2 (User Defined 2) y = 00 FF FF FF ….. (y is 256 bytes EDID data)	s user edid 1 <00 FF FF FF….>	User edid 1 is loaded	
r user edid x	Get user defined EDID x = 1 (User Defined 1) x = 2 (User Defined 2)	r user edid 1	User edid 1 <00 FF FF FF….>	
s hdbt update	Set Micro USB (UART) to HDBT UART for FW update	s hdbt update	Hdbt update	

Note: The API command “s hdbt update” is for internal use only .

7. Application Example



The terms HDMI and HDMI High-Definition Multimedia interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

8. Customer Service

The return of a product to our Customer Service implies the full agreement of the terms and conditions hereinafter. There terms and conditions may be changed without prior notice.

1) Warranty

The limited warranty period of the product is fixed three years.

2) Scope

These terms and conditions of Customer Service apply to the customer service provided for the products or any other items sold by authorized distributor only.

3) Warranty Exclusion:

- 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.
- Shipping fees, installation or labor charges for installation or setup of the product.

4) Documentation:

Customer Service will accept defective product(s) in the scope of warranty coverage at the sole condition that the defeat has been clearly defined, and upon reception of the documents or copy of invoice, indicating the date of purchase, the type of product, the serial number, and the name of distributor.

Remarks: Please contact your local distributor for further assistance or solutions.