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# iTrans E100HC3K

4K HDMI./USB-C over HDBaseT 3.0 Extender (100m) with
USB/1G LAN and HDMI./USB-C Dual Outputs



# User Manual

**VER 1.1**

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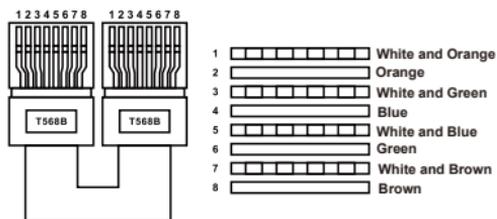
# Thank you for purchasing this product

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

This 4K HDBaseT 3.0 Extender can extend uncompressed HDMI™/USB-C signals, bi-directional IR, RS-232, and USB signals up to 328ft/100m via a single CAT6A/7 cable. Video resolution is up to 4K2K@60Hz YUV 4:4:4. The transmitter features 1x HDMI™ input, 1x USB-C input (A/V+USB 3.2+1G+ 100W charging), 1x USB 3.2 Host and 3x USB 3.2 Device ports. It can switch between HDBT Standard Mode (as factory default) and HDBT Long Reach Mode. It supports EDID management. The receiver features 1x HDMI™ output, 1x USB-C output (DP output + USB 2.0 device port), 3x USB 2.0 Device ports. Transmitter and receiver support analog audio de-embedding, bi-directional IR, RS-232 and 1G LAN 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 a perfect solution for home/commercial applications.

# 2. Features

☆ Compliant with HDCP 2.2 and DisplayPort 1.4a, 18Gbps video bandwidth
☆ HDBaseT 3.0 VS3000 chipset based design
☆ Support video resolution up to 4K2K@60Hz (YUV 4:4:4), as specified in HDMI™ 2.0b
☆ 4K60/4K30/1080P signal transmission distance up to 328ft/100m via a single CAT6A/7 cable (HDBT Standard Mode)
☆ 1080P 8bit signal transmission distance up to 492ft/150m via a single CAT6A/7 cable (HDBT Long Reach Mode)
☆ TX features 1x HDMI™ input, 1x USB-C input, 1x HDMI™/HDBT output, 1x USB 3.2 host and 3x USB 3.2 clients
☆ RX features 1x HDBT input, 1x HDMI™ output, 1x USB-C output, 3x 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
☆ TX USB-C host port supports DP-ALT mode for A/V, USB 3.2 data, 1G Ethernet and power charging up to 100 watts
☆ RX USB-C OUT port supports AV signal output and USB 2.0 signal transfer
☆ 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 on HDMI™ output, no frame rate conversion
☆ Both TX and RX support analog audio de-embedding
☆ RS-232 signal pass-through and API control
☆ RS-232/CEC control external device power on/off
☆ 1G Ethernet and bi-directional IR signal pass-through
☆ Advanced EDID management
☆ Support bi-directional 24V PoC, with PoC switch (USB-C charging only from TX power supply)

# 3. Package Contents

① 1× 4K HDMI™/USB-C over HDBaseT 3.0 Extender (Transmitter)
② 1× 4K HDMI™/USB-C over HDBaseT 3.0 Extender (Receiver)
③ 2× 3pin-3.5mm Phoenix Connector (male)
④ 2× 5pin-3.5mm Phoenix Connector (male)
⑤ 4× Mounting Ear
⑥ 8× Machine Screw (KM3*6)
⑦ 1× IR Blaster Cable (1.5m)
⑧ 1× IR Receiver Cable (1.5m)
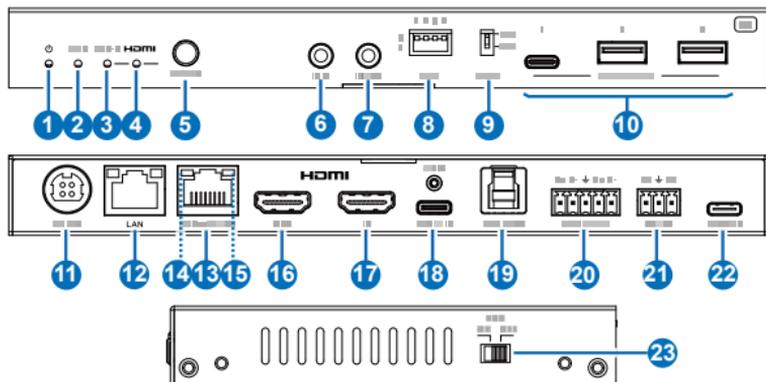⑨ 1× 24V/7.5A Desktop Power Supply
⑩ 1× User Manual

# 4. Specifications

| Technical | |
|---|---|
| HDMI™ Compliance | HDMI™ 2.0b |
| HDCP Compliance | HDCP 2.2 |
| DP Compliance | DisplayPort 1.4a |
| Video Bandwidth | 18Gbps |
| Video Resolution | 640x480p60Hz, 800x600p60Hz, 1024x768p60Hz, 1280x1024p 60Hz, 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), 3840x2160p23.98Hz(2160p23), 3840x2160p24Hz(2160p24), 3840x2160p25Hz(2160p25), 3840x2160p29.97Hz(2160p29), 3840x2160p30Hz(2160p30), 3840x2160p50Hz(2160p50), 3840x2160p59.94Hz(2160p59), 3840x2160p60Hz(2160p60), 3840x2160p100Hz(2160p100), 3840x2160p120Hz(2160p120), 4096x2160p23.98Hz, 4096x2160p24Hz, 4096x2160p25Hz, 4096x2160p29.97Hz, 4096x2160p30Hz, 4096x2160p50Hz, 4096x2160p59.94Hz, 4096x2160p60Hz |

| Color Space | RGB, YCbCr 4:4:4 / 4:2:2, YUV 4:2:0 | |
|---|---|---|
| Color Depth | 8/10/12bit | |
| HDR | HDR, HDR10, HDR10+, Dolby Vision, HLG | |
| IR Level | 12Vp-p | |
| Audio Formats | **HDMI™/USB-C/HDBT :**<br>LPCM 2/5.1/7.1CH, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-EX, DTS-96/24, DTS High Res, DTS-HD Master Audio, DSD<br>**Analog Audio:**<br>LPCM 2CH (sample rate 32~192kHz) | |
| Audio Parameters | Output Impedance | 600 Ohm balanced<br>300 Ohm unbalanced |
| | Output Level (Max) | Max 8.2dBu (2Vrms) balanced audio<br>Max 2.2dBu (1Vrms) unbalanced audio |
| | Frequency Response | 20Hz to 20kHz (-/+0.5dB) |
| | Dynamic Range | > 90dB@0dBu, 1kHzA-weighted |
| | Audio S/N Ratio | > 90dB@0dBu, 1kHzA-weighted |
| | Audio THD+N | < 0.01% at +4dBu, 1KHz |
| | Audio Output Delay | <1ms |
| USB Support | TX: USB 3.2 Gen 1 5Gbps, compatible with USB 2.0 480Mbps<br>RX: USB 2.0 350Mbps | |
| USB Host Ports | TX: 1x USB-C 3.2 Gen 1 + 1 USB-B 3.2 Gen 1<br>RX: None | |
| USB Device Ports | TX: 1x USB-C 3.2 Gen 1 + 2x USB-A 3.2 Gen 1<br>RX: 2x USB-C 2.0 + 2x USB-A 2.0 | |
| USB Power Supply | Host ports:<br>TX: 1x USB-C port (100W charging)<br>Device ports:<br>TX: 1x USB-C port (1A) + 2x USB A port (1.5A)<br>RX: 2x USB-C port (1A) + 2x USB A port (1A) | |
| Transmission Distance | HDMI™/USB-C passive cable: 16.4ft/5m<br>USB 3.2 Gen 1 5Gbps passive cable: 5.9ft/1.8m<br>CAT6A/7 cable: 328ft/100m@4K60 (HDBT Standard Mode)<br>CAT6A/7 cable: 492ft/150m@1080P (HDBT Long Reach Mode) | |
| ESD Protection | IEC 61000-4-2:<br>±8kV (Air-gap discharge) & ±4kV (Contact discharge) | |

| **Connection** | |
|---|---|
| Transmitter | Input:   1x IN [HDMI™ Type A, 19-pin female]<br>         1x USB-C IN [USB Type C, 24-pin female]<br>Output: 1x HDBaseT OUT [RJ45, HDBT output with 24V PoC]<br>         1x OUT [HDMI™ Type A, 19-pin female]<br>         1x AUDIO OUT [5pin-3.5mm phoenix connector]<br>Control: 1x LAN [RJ45 connector, 1G Ethernet pass-through]<br>         1x RS-232 [3pin-3.5mm phoenix connector]<br>         1x SERVICE [USB-C with USB 2.0 only, 12-pin female]<br>         1x USB HOST [USB Type B, 9-pin female]<br>         1x USB DEVICES [USB 3.2 Type C, 24-pin female]<br>         2x USB DEVICES [USB 3.2 Type A, 9-pin female]<br>         1x IR IN [3.5mm audio jack, 12V level]<br>         1x IR OUT [3.5mm audio jack] |
| Receiver | Input:   1x HDBaseT IN [RJ45, HDBT input with 24V PoC]<br>Output: 1x OUT [HDMI™ Type A, 19-pin female]<br>         1x USB-C OUT [USB Type C, 24-pin female]<br>         1x AUDIO OUT [5pin-3.5mm phoenix connector]<br>Control: 1x LAN [RJ45 connector, 1G Ethernet pass-through]<br>         1x RS-232 [3pin-3.5mm phoenix connector]<br>         1x SERVICE [USB-C with USB 2.0 only, 12-pin female]<br>         1x USB DEVICE [USB 2.0 Type C, 12-pin female]<br>         2x USB DEVICES [USB 2.0 Type A, 4-pin female]<br>         1x IR IN [3.5mm audio jack, 12V level]<br>         1x IR OUT [3.5mm audio jack] |

| **Mechanical** | |
|---|---|
| Housing | Metal Enclosure |
| Color | Black |
| Dimensions | Transmitter/Receiver: 208mm [W] x 122mm [D] x 22mm [H] |
| Weight | Transmitter: 687g, Receiver: 636g |
| Power Supply | Input: AC 100 - 240V 50/60Hz<br>Output: DC 24V/7.5A (US/EU standard, CE/FCC/UL certified) |
| Power Consumption (Max) | 173W (Power supply from TX, 100W USB-C charging, PoC to RX)<br>73W (Power supply from TX or RX, without USB-C charging) |
| Operating Temperature | 32°F ~ 104°F / 0°C ~ 40°C |
| Storage Temperature | -4°F ~ 140°F / -20°C ~ 60°C |
| Operating Humidity | 20% ~ 80% (relative humidity, no condensation) |
| Storage Humidity | 10% ~ 90% (relative humidity, no condensation) |

| **Recommended HDMI™ Cable Length** | | | |
|---|---|---|---|
| Video Resolution | **4K60** | **4K24** | **1080P60** |
| HDMI™ IN / OUT | 16.4ft/5m | 33ft/10m | 49ft/15m |
| The use of "Premium High Speed HDMI™" 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.<br>▪ Light flashing: Transmitter and receiver are in poor connection status.<br>▪ 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 | IR IN | IR signal input port, connected to IR Receiver cable. |
| 7 | IR OUT | IR signal output port, connected to IR Blaster cable. |
| 8 | EDID DIP switch | Used for EDID setting. The EDID setting list is shown as follow.<br>Note: Only when the EDID DIP switch is set to 1111, the EDID settings through API commands are valid. |
| 9 | MODE switch | Used to switch HDBT mode.<br>**Switch to "STD":** The HDBT Standard Mode (as factory default) is enabled, it can extend 4K60/4K30/1080P signal between the transmitter and the receiver up to 100m via a single CAT6A/7 cable.<br>**Switch to "LRM":** The HDBT Long Reach Mode is enabled, it can extend 1080P 8bit signal between the transmitter and the receiver up to 150m via a single CAT6A/7 cable. |

| No. | Name | Function Description |
|-----|------|---------------------|
| 10 | USB Device ports | Three USB 3.2 device ports (two USB-A ports and one USB-C port) connected to mouse, keyboard, USB Flash Drive or other USB devices. |
| 11 | DC 24V | DC 24V/7.5A power supply input port. *Note that the extender supports PoC function, it means that either transmitter or receiver is powered on by 24V/7.5A power adapter, the other one doesn't need power supply.* |
| 12 | LAN | 1G Ethernet pass-through port. When it switches to 1000Mbps Ethernet, the yellow indicator flashes; When it switches to 100Mbps Ethernet, the green indicator flashes. |
| 13 | HDBaseT OUT | HDBaseT output port, connected to the HDBaseT IN port of receiver with a CAT6A/7 cable. It is used for HDMI, network and USB signals pass-through. |
| 14 | Data Signal Indicator (Yellow) | ▪ Light on: There is video signal transmission with HDCP encryption.<br>▪ Light flashing: There is video signal transmission without HDCP encryption.<br>▪ Light off: There is no video signal transmission. |
| 15 | Link Signal Indicator (Green) | ▪ Light on: Transmitter and receiver are in good connection status.<br>▪ Light flashing: Transmitter and receiver are in poor connection status.<br>▪ Light off: Transmitter and receiver are not connected. |
| 16 | HDMI OUT | HDMI signal loop output port, connected to HDMI display device. |
| 17 | HDMI IN | HDMI signal input port, connected to HDMI source device. |
| 18 | USB-C IN | USB Type C port with following four functions:<br>(1) USB-C video signal input port, connected to source device.<br>(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 the USB 3.2 Gen 1 signal transmission port simultaneously.<br>(3) USB-C charging port. Only when TX is connected to the 24V/7.5A power supply, the USB-C port can provides 100W 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.<br>(4) 1G Ethernet access port. |
| 19 | USB HOST | USB 3.2 Gen 1 host port, connected to PC. |
| 20 | AUDIO OUT | Analog audio output port, supporting balanced audio output (with a maximum support of 2Vrms) and unbalanced audio output (with a maximum support of 1Vrms).<br>Balanced connection method: L+, L -, GND, R+, R -<br>Unbalanced connection method: L+, GND, R+ |

| No. | Name | Function Description |
|-----|------|----------------------|
| 21 | RS-232 | RS-232 serial port, used for RS-232 signal pass-through and API commands control. |
| 22 | SERVICE | USB 2.0 Type C port, used for firmware upgrade and API commands control. |
| 23 | POC switch | 24V PoC on/off switch.<br>ON: PoC is enabled (as factory default).<br>OFF: PoC is disabled (need local DC/24V power supply). |

*Note: In the HDBT Long Reach Mode, due to bandwidth limitations, USB cannot transmit USB 2.0 devices, but only can transmit USB HID devices (such as mice and keyboards). When using the USB pass-through function, the serial baud rate may also be limited.*

\* EDID Setting List:
[DIP]=0000: EDID Auto (default)
[DIP]=0001: HDMI 1080p@60Hz, Audio 2CH PCM
[DIP]=0010: HDMI 4K@30Hz 4:4:4, 8-bit, Audio 2CH PCM
[DIP]=0011: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 2CH PCM
[DIP]=0100: HDMI 1080p@60Hz, Audio 5.1CH DTS/DOLBY
[DIP]=0101: HDMI 1080p@60Hz, Audio 7.1CH DTS/DOLBY/HD
[DIP]=0110: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 5.1CH DTS/DOLBY
[DIP]=0111: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 7.1CH DTS/DOLBY/HD
[DIP]=1000: HDMI 1920x1200@60Hz, Audio 2CH PCM
[DIP]=1001: DVI 1920x1080@60Hz, Audio None
[DIP]=1010: DVI 1920x1200@60Hz, Audio None
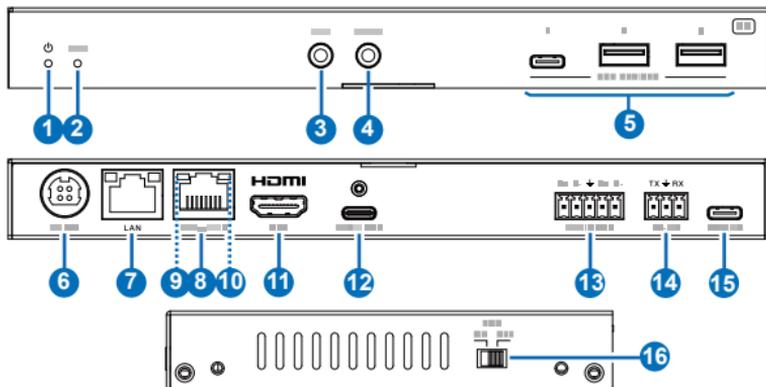[DIP]=1011: EDID pass-through (Copy from TX HDMI OUT)
[DIP]=1100: EDID pass-through (Copy from RX HDMI OUT)
[DIP]=1101: User Defined 1
[DIP]=1110: User Defined 2
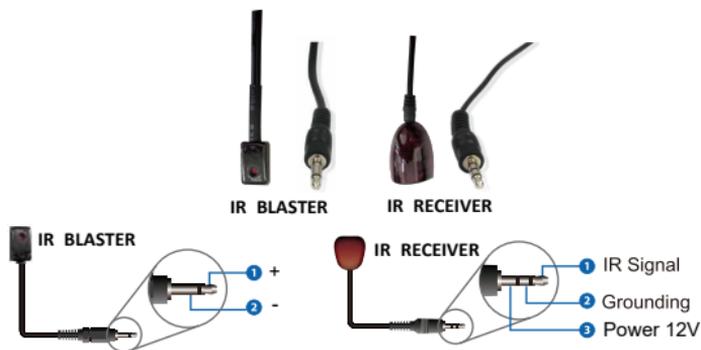[DIP]=1111: Software EDIDs

## 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.<br>▪ Light flashing: Transmitter and receiver are in poor connection status.<br>▪ Light off: Transmitter and receiver are not connected. |
| 3 | IR IN | IR signal input port, connected to IR Receiver cable. |
| 4 | IR OUT | IR signal output port, connected to IR Blaster cable. |
| 5 | USB Device ports | Three USB 2.0 device ports (two USB-A ports and one USB-C port) connected to mouse, keyboard, USB Flash Drive or other USB devices. |
| 6 | DC 24V | DC 24V/7.5A power supply input port.<br>*Note that the extender supports PoC function, it means that either transmitter or receiver is powered on by 24V/7.5A power adapter, the other one doesn't need power supply.* |
| 7 | LAN | 1G Ethernet pass-through port. When it switches to 1000Mbps Ethernet, the yellow indicator flashes; When it switches to 100Mbps Ethernet, the green indicator flashes. |
| 8 | HDBaseT IN | HDBaseT input port, connected to the HDBaseT OUT port of transmitter with a CAT6A/7 cable. It is used for HDMI, network and USB signals pass-through. |
| 9 | Data Signal Indicator (Yellow) | ▪ Light on: There is video signal transmission with HDCP encryption.<br>▪ Light flashing: There is video signal transmission without HDCP encryption.<br>▪ Light off: There is no video signal transmission. |
| 10 | Link Signal Indicator (Green) | ▪ Light on: Transmitter and receiver are in good connection status.<br>▪ Light flashing: Transmitter and receiver are in poor connection status.<br>▪ Light off: Transmitter and receiver are not connected. |
| 11 | HDMI OUT | HDMI signal output port, connected to HDMI display device, such as TV or monitor. |
| 12 | USB-C OUT | USB Type C port with following two functions:<br>(1) AV signal output port, supporting DP signal, connected to the display device with USB-C port.<br>(2) USB 2.0 device port, with 1A power supply, connected to USB devices such as USB Flash Drive and Hard Disk. |
| 13 | AUDIO OUT | Analog audio output port, supporting balanced audio output (with a maximum support of 2Vrms) and unbalanced audio output (with a maximum support of 1Vrms).<br>Balanced connection method: L+, L -, GND, R+, R -<br>Unbalanced connection method: L+, GND, R+ |

| No. | Name | Function Description |
|-----|------|---------------------|
| 14 | RS-232 | RS-232 serial port, used for RS-232 signal pass-through and API commands control. |
| 15 | SERVICE | USB 2.0 Type C port, used for firmware upgrade and API commands control. |
| 16 | POC switch | 24V PoC on/off switch.<br>ON: PoC is enabled (as factory default).<br>OFF: PoC is disabled (need local DC/24V power supply). |

# 6. IR Pin Definition

IR Receiver and Blaster pin's definition as below:



**IR BLASTER**    **IR RECEIVER**

**IR BLASTER**
❶ +
❷ -

**IR RECEIVER**
❶ IR Signal
❷ Grounding
❸ Power 12V

*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.*

# 7. API Commands

The product also supports API commands control. Connect the RS-232 port of 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 USB-C 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 | | | | |
|---|---|---|---|---|
| 1. Service port (USB-C virtual RS-232) communication protocol (Internal debug supports command line operations)<br>   Baud rate: 115200 (Fixed)   Data bit: 8   Stop bit: 1   Parity bit: none<br>2. Phoenix RS-232 port communication protocol (Connect to control system)<br>   Baud rate: 2400~115200 (Configurable)   Data bit: 8   Stop bit: 1   Parity bit: none | | | | |
| Command Code | Function Description | Example | Feedback | Default |
| ? | Get the list of all commands | ? | List all commands | |
| help | Get the list of all commands | help | List all commands | |
| get fw version | Get the firmware version | get fw version | TX FW v1.00.00<br>RX FW v1.00.00 | |
| set reboot | Reboot the device | set reboot | Reboot…<br>System Initializing...<br>Initialization Finished!<br>TX FW v1.00.00<br>RX FW v1.00.00 | |
| set reset | Reset to factory defaults | set reset | Sure to RESET to default settings? Type "Yes" after next prompt to confirm… | |
| get status | Get system status | get status | Please refer to the note at the end of the list. | |
| set tx key on/off | Set TX front panel key on/off | set tx key on<br>set tx key off | Set TX key on<br>Set TX key off | On |
| get tx key | Get TX front panel key on/off status | get tx key | On | |
| set tx Usbc AccessNetwork | Set TX USB-C input port access network on/off | set tx Usbc AccessNetw | Set TX USB-C access network on<br>Set TX USB-C access network off | On |
| get tx Usbc AccessNetwork | Get TX USB-C input port access network on/off status | get tx Usbc AccessNetwork | On | |
| set tx source x | Set TX input source (x=0~4)<br>x=0: OFF<br>x=1: USB-C input<br>x=2: HDMI input<br>x=3: AVMUTE<br>x=4: Internal pattern | set tx source 1<br>set tx source 0 | Set TX source to USB-C<br>Set TX source to off | 1 |
| get tx source | Get TX input source | get tx source | USB-C | |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx pattern x y | Set TX internal signal generator resolution (x=1~6) pattern (y=1~12)<br>x=01: 4K60Hz<br>x=02: 4K50Hz<br>x=03: 4K25Hz<br>x=04: 4K24Hz<br>x=05: 1080P60Hz<br>x=06: 480P60Hz<br>y=01: Black<br>y=02: Checkboard<br>y=03: Strip<br>y=04: Red<br>y=05: Green<br>y=06: Blue<br>y=07: White<br>y=08: Ramp<br>y=09: Red ramp<br>y=10: Green ramp<br>y=11: Blue ramp<br>y=12: PRBS | set tx pattern 1 2 | Set TX pattern 4K60Hz checkboard | |
| get tx pattern | Get TX internal pattern generator output resolution and pattern | get tx pattern | TX pattern 4K60Hz checkboard | |
| set tx input x hdcp y | Set TX input (x=0~2) HDCP to (y=0~2)<br>x=0: All inputs<br>x=1: USB-C input<br>x=2: HDMI input<br>y=0: HDCP OFF<br>y=1: HDCP 1.4<br>y=2: HDCP 2.2 | set tx input 0 hdcp 2<br>set tx input 2 hdcp 0 | Set TX all inputs HDCP 2.2<br>Set TX HDMI input HDCP off | HDCP 2.2 |
| get tx input x hdcp | Get TX input (x=0~2) HDCP status<br>x=0: All inputs<br>x=1: USB-C input<br>x=2: HDMI input | get tx input 0 hdcp | TX USB-C input HDCP 2.2<br>TX HDMI input HDCP 2.2 | |
| set tx output x hdcp y | Set TX output (x=0~2) HDCP mode to (y=0~3)<br>x=0: All outputs<br>x=1: HDBT output<br>x=2: HDMI output<br>y=0: Signal management<br>y=1: Auto (default, Follow sink)<br>y=2: Force HDCP 1.4<br>y=3: Force HDCP 2.2 | set tx output 2 hdcp 1 | Set TX HDMI output HDCP to auto | 1 |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get tx output x hdcp | Get TX output (x=0~2) HDCP mode<br>x=0: All outputs<br>x=1: HDBT output<br>x=2: HDMI output | get tx output 0 hdcp | HDBT output HDCP auto<br>HDMI output HDCP auto | |
| set tx usb x | Set TX USB source (x=0~2)<br>x=0: Follow video<br>x=1: USB-C host<br>x=2: USB-B host | set tx usb 0<br>set tx usb 2 | Set TX USB source follow video<br>Set TX USB source USB-B host | 0 |
| get tx usb | Get TX USB source | get tx usb | Follow video | |
| get tx usbh5v x | Get TX USB host (x=0~2) input 5V status<br>x=0: All USB host inputs<br>x=1: USB-C input<br>x=2: USB-B input | get tx usbh5v x | TX USB-C host 5V on<br>TX USB-B host 5V off | |
| set tx usbd5v x to y | Set TX USB device output (x=0~3) 5V to (y=0~2)<br>x=0: All USB device ports<br>x=1: USB device 1<br>x=2: USB device 2<br>x=3: USB device 3<br>y=0: Disable 5V output<br>y=1: Follow host<br>y=2: Force 5V always output | set tx usbd5v 0 to 1 | Set TX all USB device output 5V follow host | 1 |
| get tx usbd5v x | Get TX USB device output (x=0~3) 5V status<br>x=0: All USB device ports<br>x=1: USB device 1<br>x=2: USB device 2<br>x=3: USB device 3 | get tx usbd5v 0 | TX USB device 1 output 5V follow host<br>TX USB device 2 output 5V follow host<br>TX USB device 3 output 5V follow host | |
| set tx autoswitch on/off | Set TX auto-switching on/off | set tx autoswitch on<br>set tx autoswitch off | Set TX autoswitch on<br>Set TX autoswitch off | on |
| get tx autoswitch | Get TX auto-switching status | get tx autoswitch | On | |
| set tx autoswitch mode x | Set TX auto-switching mode<br>x=0: 5V detection<br>x=1: signal detection | set tx autoswitch mode 1 | Set TX autoswitch mode to signal detection | signal detection |
| get tx autoswitch mode | Get TX auto-switching mode | get tx autoswitch mode | Signal detection | |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx edid x to y | Set TX input ports (x=0~2) EDID to (y=1~19)<br>x=0: All inputs<br>x=1: USB-C input<br>x=2: HDMI input<br>y=01: HDMI 1080p@60Hz, Audio 2CH PCM<br>y=02: HDMI 1080p@60Hz, Audio 5.1CH DTS/DOLBY<br>y=03: HDMI 1080p@60Hz, Audio 7.1CH DTS/DOLBY/HD<br>y=04: HDMI 4K@30Hz 4:4:4, 8-bit, Audio 2CH PCM<br>y=05: HDMI 4K@30Hz 4:4:4, 8-bit, Audio 5.1CH DTS/DOLBY<br>y=06: HDMI 4K@30Hz 4:4:4, 8-bit, Audio 7.1CH DTS/DOLBY/HD<br>y=07: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 2CH PCM<br>y=08: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 5.1CH DTS/DOLBY<br>y=09: HDMI 4K@60Hz 4:4:4, 8-bit, Audio 7.1CH DTS/DOLBY/HD<br>y=10: HDMI 4K@60Hz 4:2:0, 8-bit, Audio 2CH PCM<br>y=11: HDMI 4K@60Hz 4:2:0, 8-bit, Audio 5.1CH DTS/DOLBY<br>y=12: HDMI 4K@60Hz 4:2:0, 8-bit, Audio 7.1CH DTS/DOLBY/HD<br>y=13: HDMI 1920x1200@60Hz, Audio 2CH PCM<br>y=14: DVI 1920x1080@60Hz, Audio None<br>y=15: DVI 1920x1200@60Hz, Audio None<br>y=16: EDID pass-through (Copy from TX HDMI OUT)<br>y=17: EDID pass-through (Copy from RX HDMI OUT)<br>y=18: User Defined 1<br>y=19: User Defined 2 | set tx edid 0 to 1 | Set TX all EDID to 01: HDMI 1080p@60Hz, Audio 2CH PCM | 1 |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get tx edid x | Get TX input ports (x=0~2) EDID<br>x=0: All inputs<br>x=1: USB-C input<br>x=2: HDMI input | get tx edid 0 | TX USB-C EDID 01: HDMI 1080p@60Hz, Audio 2CH PCM<br>TX HDMI EDID 01: HDMI 1080p@60Hz, Audio 2CH PCM | |
| get tx edid data x | Get TX input ports (x=0~2) EDID data<br>x=0: All inputs<br>x=1: USB-C input<br>x=2: HDMI input | get tx edid data 0 | TX USB-C EDID<br><00 FF FF FF….><br>TX HDMI EDID<br><00 FF FF FF….> | |
| set user edid x <y> | Set user defined EDID (x=0~2) to y<br>x=0: User Defined 1 and User Defined 2<br>x=1: User Defined 1<br>x=2: User Defined 2<br>y=00 FF FF FF …..<br>(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=0~2) data<br>x=0: User Defined 1 and User Defined 2<br>x=1: User Defined 1<br>x=2: User Defined 2 | get user edid 1 | <00 FF FF FF….> | |
| set tx downscale auto/on/off | Set TX HDMI output downscale mode<br>auto: Automatically according to display's capability<br>on: Force 1080p<br>off: Bypass | set tx downscale auto | Set TX downscale mode to auto | auto |
| get tx downscale | Get RX downscale mode | get tx downscale | Auto | |
| set tx audio mute on/off | Set TX de-embedding audio mute on/off | set tx audio mute on<br>set tx audio mute off | Set TX de-embedding audio mute on<br>Set TX de-embedding audio mute off | off |
| get tx audio mute | Get TX de-embedding audio mute on/off status | get tx audio mute | Mute on | |
| set rx output display y | Set RX output display mode (y=0~3)<br>y=0: Off (disable TMDS output)<br>y=1: Input video<br>y=2: AVMUTE<br>y=3: Internal pattern | set rx output display 1 | Set RX output display input video | |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get rx output display | Get RX output display mode | get rx output display | Input video | |
| set rx output hdcp y | Set RX output HDCP mode to (y=0~3) y=0: Signal management y=1: Auto (default, Follow sink) y=2: Force HDCP 1.4 y=3: Force HDCP 2.2 | set rx output hdcp 1 | Set RX output HDCP to auto | 1 |
| get rx output hdcp | Get RX output HDCP mode | get rx output hdcp | Auto | |
| set rx pattern x y | Set RX internal signal generator resolution (x=1~6) pattern (y=1~13) x=01: 4K60Hz x=02: 4K50Hz x=03: 4K25Hz x=04: 4K24Hz x=05: 1080P60Hz x=06: 480P60Hz y=01: Black y=02: Checkboard y=03: Strip y=04: Red y=05: Green y=06: Blue y=07: White y=08: Ramp y=09: Red ramp y=10: Green ramp y=11: Blue ramp y=12: PRBS | set rx pattern 1 2 | Set RX pattern 4K60Hz checkboard | |
| get rx pattern | Get RX internal pattern generator output resolution and pattern | get rx pattern | RX pattern 4K60Hz checkboard | |
| set rx downscale auto/on/off | Set RX downscale mode auto: Automatically according to display's capability on: Force 1080p off: Bypass | set rx downscale auto | Set RX downscale mode to auto | auto |
| get rx downscale | Get RX downscale mode | get rx downscale | Auto | |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| set rx audio mute on/off | Set RX de-embedding audio mute on/off | set rx audio mute on<br>set rx audio mute off | Set RX de-embedding audio mute on<br>Set RX de-embedding audio mute off | off |
| get rx audio mute | Get RX de-embedding audio mute on/off status | get rx audio mute | Mute on | |
| set rx usbd5v x to y | Set RX USB device output (x=0~3) 5V to (y=0~2)<br>x=0: All USB device ports<br>x=1: USB device 1<br>x=2: USB device 2<br>x=3: USB device 3<br>y=0: Disable 5V output<br>y=1: Follow host<br>y=2: Force 5V always output | set rx usbd5v 0 to 1 | Set RX all USB device output 5V follow host | 1 |
| get rx usbd5v x | Get RX USB device output (x=0~3) 5V status<br>x=0: All USB device ports<br>x=1: USB device 1<br>x=2: USB device 2<br>x=3: USB device 3 | get rx usbd5v 0 | RX USB device 1 output 5V follow host<br>RX USB device 2 output 5V follow host<br>RX USB device 3 output 5V follow host | |
| set display x auto power function on/off | Set display (x=0~2) auto power function on/off when input signal is on/off<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output | set display 0 auto power function on | Set all outputs auto power function on | off |
| get display x auto power function | Get display (x=0~2) auto power function on/off status<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output | get display 0 auto power function | All outputs auto power function on | |
| set display x auto power on/off time y | Set display (x=0~2) auto power on/off after period time y when input signal is on/off<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output<br>y= 0~1200sec | set display 0 auto power on time 5<br>set display 0 auto power off time 50 | Set all outputs auto power on after 5sec when input signal is on<br>Set all outputs auto power off after 50sec when input signal is off | 5 |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get display x auto power on/ off time | Get display (x=0~2) auto power on/off after period time y when input signal is on/off<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output | get display 0 auto power on time | All outputs auto power on time 5sec | |
| set display x power on/off | Set display (x=0~2) power on/off<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output output | set display 0 power on<br>set display 0 power off | Set all outputs power on<br>Set all outputs power off | off |
| set display x control type y | Set display (x=0~2) power on/off control type (y=1~3)<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output<br>y=1: CEC<br>y=2: RS-232<br>y=3: CEC and RS-232 | set display 0 control type 1 | Set all outputs control type CEC | CEC |
| get display x control type | Get display (x=0~2) power on/off control type<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output | get display 0 control type | All outputs control type CEC | |
| set display x cec y | Set display (x=0~2) CEC command (y=1~5)<br>x=0: All outputs<br>x=1: TX HDMI output<br>x=2: RX HDMI output<br>y=1: Power on<br>y=2: Power off<br>y=3: Volume up<br>y=4: Volume down<br>y=5: Mute | set display 0 cec 1<br>set display 0 cec 2 | Set all outputs CEC power on<br>Set all outputs CEC power off | |
| set serial x setting y | Set serial port (x=0~2) setting to y<br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232<br>y= 115200-8n1<br>Baud rate: 115200/57600/56000/38400/19200/9600/4800/2400<br>Data bits: 9/8<br>Parity: n(None)/ o(Odd) / e(Even)<br>Stop bits: 1/2 | set serial 2 setting 115200-8n1 | Set RX RS-232 115200-8n1 | 115200-8n1 |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get serial x setting | Get serial port (x=0~2) setting<br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232 | get serial 0 setting | TX RS-232 115200-8n1<br>RX RS-232 115200-8n1 | |
| set serial x HEX/ ASCII power on <y1> delay <y2> input <y3> delay <y4> | Set serial port (x=0~2) HEX/ASCII power on <y1> delay <y2> input <y3><br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232<br>Command format is HEX or ASCII<br>y1= RS-232 power on command, support multiple commands using comma separated(,)<br>y2= 0~1200sec<br>y3= RS-232 input port selection, support multiple commands using comma separated(,)<br>y4= 0~1200sec<br>NOTE: delay <y2> input <y3> delay <y4> can be NULL | set serial 1 ASCII power on <PWR ON1> delay <10> input <INPUT2> delay<1><br>set serial 2 ASCII power on <PWR ON><br>set serial 2 hex power on <50 4f 57 45 52,4f 4e,36 36 36> delay <1> input <49 4e 50 55 54 31,49 4e 50 55 54 32> delay <4> | Set TX RS232 ASCII power on <PWRON1> delay <10> input <INPUT2> delay <1><br>Set RX RS-232 ASCII power on <PWRON><br>Set RX RS232 HEX power on <50 4f 57 45 52,4f 4e,36 36 36> delay <1> input <49 4e 50 55 54 31,49 4e 50 55 54 32> delay <4> | |
| get serial x power on command | Get serial port (x=0~2) power on command<br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232 | get serial 0 power on command | TX RS-232 ASCII power on <PWRON> delay <10> input <INPUT1><br>RX RS-232 ASCII power on <PWRON> | |
| set serial x HEX/ ASCII power off <y1> delay <y2> | Set serial port (x=0~2) HEX/ASCII power off <y1> delay <y2><br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232<br>Command format is HEX or ASCII<br>y1= RS-232 power off command, support multiple commands using comma separated(,)<br>y2= 0~1200sec<br>NOTE: delay <y2> can be NULL | set serial 1 ASCII power off <PWROFF><br>set serial 2 HEX power off <66 77, 88 99> | Set TX RS-232 ASCII power off <PWROFF><br>Set RX RS-232 HEX power off <66 77, 88 99> | |

| Command Code | Function Description | Example | Feedback | Default |
|---|---|---|---|---|
| get serial x power off command | Get serial port (x=0~2) power off command<br>x=0: TX/RX RS-232<br>x=1: TX RS-232<br>x=2: RX RS-232 | get serial 0 power off command | TX RS-232 ASCII power off <PWROFF> delay <1><br>RX RS-232 HEX power off <66 77, 88 99> | |
| set hdbt update | Set SERVICE to HDBT UART for FW update | set hdbt update | HDBT update... | |

**Notes:**
(1) The API command "set hdbt update" is for internal use only.
(2) The feedback of the command of "get status" is as following.

```
==========================================================================================
Status Info 4K HDMI/USB-C Extender
TX FW V1.00.01  RX FW V1.00.01

TX_Key   USB-C_5V   USB-B_5V   TX_Baud   RX_Baud   AutoSwitch   AutoSwitch_Mode
On       On         On         115200    115200    On           Signal_detection
USB-C_AccessNetwork
On


TxOutputFrom   RxOutputFrom   USB_Source
USB-C          Input video    Follow video


Input     Cable       Resolution     ColorSpace   ColorDepth   HDCP   EDID
01_USB_C  Connected   3840x2160p60   RGB          8bit         2.2    DIP_0000: EDID Auto
02_HDMI   Connected   3840x2160p60   RGB          8bit         Off    DIP_0000: EDID Auto


Output       Cable       Resolution     ColorSpace   ColorDepth   Downscale   HDCP
TX_HDMI_Out  Connected   3840x2160p60   RGB          8bit         Auto        Off
RX_HDMI_Out  Connected   3840x2160p60   RGB          8bit         Auto        Off


Display_AutoPower   On/Off   Time(s)   Control_Mode
TX_HDMI_Out         On       1         RS232
RX_HDMI_Out         On       1         RS232


USB_Device     USB_5V
TX_Device_1    Follow_host
TX_Device_2    Follow_host
TX_Device_3    Follow_host
RX_Device_1    Follow_host
RX_Device_2    Follow_host
RX_Device_3    Follow_host
==========================================================================================
```

# 8. Application Example