LINK

EXT70-4KeARC

100m HDBT 3.0 eARC Extender with Optical Audio Return

User Manual

Version: V1.0.0

CE

Contents

Introduction

Overview

This is an HDBT 3.0 eARC extender featured with rich video functions to help product install and troubleshooting. It offers low bandwidth and high bandwidth transmission of 4K@60Hz along with other signals up to 330ft/100m via HDBT 3.0 technology. It allows to use both Cat 6A and lower spec Cat 5e and Cat 6 cable if necessary.

The extender is featured with rich audio features, including eARC, ARC, Optical audio return and de-embedded audio. The extender also supports upgrading firmware via USB-C ports on the transmitter and receiver. All audio and bandwidth modes and firmware upgrade can be configured via DIP switches of the transmitter and receiver.

The extender also supports bi-directional IR, RS232, CEC and Ethernet pass-through. With bi-directional PoC, only one power adapter is needed to power up the extender kit.

Features

- HDMI 2.0b compliant.
- HDCP 2.3 and backward compatible.
- Additional HDMI loop-out on the transmitter with simple 4K-to-1080P downscaler.
- HDBT 3.0 technology built-in. It supports to transmit 4K@60Hz 4:4:4 8bit along with other signals, such as IR, RS232, ethernet, optical audio and eARC/ARC audio up to 100m/330ft.
- Support HDR formats up to 4K@60Hz, including HLG, HDR10, HDR10+, and Dolby Vision.
- Support two video transmission modes according to cable specification differences. It can be configured via front panel:

- High-bandwidth mode. It allows to use Cat 6A F/FTP or U/FTP cable up to 330ft/100m in this mode.
- Low-bandwidth mode. It allows to use both Cat 5e or Cat 6 cable up to 230ft/70m in this mode.
- Supports eARC and ARC audio return.
  - If both source and sink TV support eARC, it would transmit eARC audio.
  - If both source and sink TV support ARC, or one supports ARC and the other supports eARC, it would transmit ARC audio.
  - If either of source or sink TV doesn't support ARC, it would not transmit returned audio.
- Supports optional OPTICAL audio return up to 5.1ch.
- Supports optional audio de-embedded from the HDMI IN, via both 3.5mm analog output and Toslink output.
- Supports bi-directional control, incl., IR, RS232, CEC and network pass-through.
- Supports bi-directional PoC, only one power adapter is needed.
- Firmware upgradable, unit is plug and play.

Package Contents

- 1 x Transmitter
- 1 x Receiver
- 1 x DC 12V 2A Power Adapter with US Pins
- 1 x IR Emitter
- 1 x IR Receiver
- 2 x 3.5mm 3-Pin Phoenix Connector
- 8 x Mounting Brackets (with Screws)

Specifications

Technical	
Input/Output Port	**Transmitter:** 1 x HDMI IN, 1 x HDMI OUT, 1 x HDBT OUT, 1 x OPTICAL OUT, 1 x AUDIO OUT, 1 x IR IN, 1 x IR OUT, 1 x RS232, 1 x 1GbE, 1 x FW (USB-C), 1 x DC 12V IN **Receiver:** 1 x HDMI OUT, 1 x HDBT IN, 1 x OPTICAL IN, 1 x IR IN, 1 x IR OUT, 1 x RS232 , 1 x 1GbE, 1 x FW (USB-C), 1 x DC 12V IN
Input/Output Signal Type	HDMI with 4K@60Hz 4:4:4 8bit, HDCP 2.2 compatibility
Input/Output Resolution Supported	**VESA:** 800×600^8, 1024×768^8, 1280×768^8, 1280×800^8, 1280×960^8, 1280×1024^8, 1360×768^8, 1366×768^8, 1440×900^8, 1600×900^8, 1600×1200^8, 1680×1050^8, 1920×1200^8, 2048×1152^8 **SMPTE:** $1280 \times 720P^{6,7,8}$, $1920 \times 1080P^{6,7,8}$, $3840 \times 2160^{2,3,5,6,8}$, $4096 \times 2160^{2,3,5,6,8}$ 1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz
HDR	HDR 10, HDR 10+, HLG, and Dolby Vision (low-latency mode)
Maximum Data Rate	18 Gbps
Maximum Pixel Clock	600 MHz
Audio Format Supported	**HDMI:** Supports all HDMI 2.0 formats including multi-channel PCM, Dolby True-HD and DTS-HD master audio; **ARC Mode:** Supports 5.1-ch compressed audio (such as Dolby Digital, DTS 5.1, and Dolby Digital Plus), and 2.0-ch uncompressed PCM audio; **eARC Mode:** Up to 8-ch L-PCM of 24 bit, 192kHz audio; Supports encoded audio formats, such as Dolby Atmos and DTS-X; **OPTICAL Audio Return Mode:** Supports 5.1-ch compressed audio, such as Dolby Digital, DTS 5.1, and Dolby Digital Plus, and 2.0-ch uncompressed PCM audio; **OPTICAL De-embed Mode:** Supports 2.0-ch

Technical	
	uncompressed PCM audio;
	AUDIO OUT: PCM 2.0

General	
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±8kV (Air-gap discharge)/ ±4kV (Contact discharge)
Power Supply	DC 12V 2A
Power Consumption (Max)	20.04W
Device Dimension (W x H x D)	Transmitter/Receiver: 190mm x 23mm x 115mm/7.48" x 0.91'' x 4.53"
Product Weight	Transmitter/Receiver:0.59kg/1.30lbs

Transmission Distance

Note:

- Straight-through category cable wired to T568B standard is recommended.
- For max HDMI 2.0 resolution recommended cable is: Cat 6A U/FTP or F/FTP.
- The extender supports two working modes: High-bandwidth and Low-bandwidth.

When the extender is set to High-bandwidth mode (set the pin3 of the DIP switch on the transmitter to "Up" position):

Cable Type	Range	Supported Video
Cat 5e/6 (UTP)	40m/131ft (straight)	4K@60Hz 4:4:4 24bpp
Cat 6A (F/FTP or U/FTP)	100m/330ft (straight)	

Use Patches

Note:

Patches may be used in the installation, and the patches will obviously affect the transmission distance. Limits and distances are as follows:

• Support up to 2 patch cables, each not exceeding 5m.

• Patches must be installed on both ends of the device, refer to the following pictures:
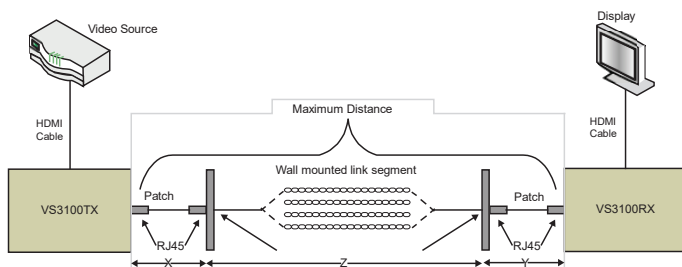
The standard specifies the following lengths for the three-segment cable installation:

• X = Left-side patch cable length ≤ 5 [meter]

• Y = Right-side patch cable length ≤ 5 [meter]

• Z = Wall segment ≤ Maximum Distance – X – Y [meter]

When the extender is set to High-bandwidth mode (set the pin3 of the DIP switch on the transmitter to "Up" position):

Cable Type	Range	Supported Video
Cat 5e/6 (UTP)	70m/230ft (with Patches)	4K@60Hz 4:2:0 36bpp with HDR
	30m/100ft (with Patches)	4K@60Hz 4:4:4 24bpp
Cat 6A (F/FTP or U/FTP)	100m/330ft (with Patches)	4K@60Hz 4:2:0 36bpp with HDR
	70m/230ft (with Patches)	4K@60Hz 4:4:4 24bpp

When the extender is set to Low-bandwidth mode (set the pin3 of the DIP switch on the transmitter to "Down" position):
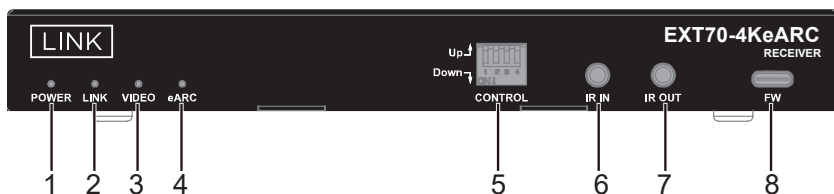
Cable Type	Range	Supported Video
Cat 5e/6 (UTP)	70m/230ft (with Patches)	4K@60Hz 4:4:4 24bpp

Cable Type	Range	Supported Video
Cat 6A (F/FTP or U/FTP)	100m/330ft (with Patches)	4K@60Hz 4:2:0 36bpp with HDR

Panel Descriptions

Front Panel

Transmitter & Receiver

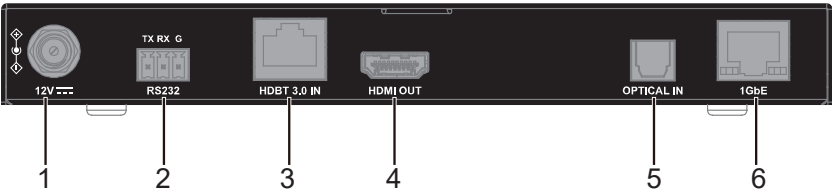| No.	Name	Description
1	POWER LED	**On/Off:** The device is powered on/off.
2	LINK LED	**On:** HDBT link is normal. **Off:** No HDBT link or link error.
3	VIDEO LED	**On:** Video is being transmitted. **Off:** No video is being transmitted.
4	eARC/ARC LED	**On:** The eARC audio is being transmitted. **Off:** No eARC audio is being transmitted.
5	DIP Switch	Four pins DIP switch. For video, audio mode configurations and firmware upgrade configurations. See " DIP Switch Settings" section to get detail information.
6	IR IN	Connect to the IR receiver provided.
7	IR OUT	Connect to the IR emitter provided.
8	FW	USB Type-C port. Connect to a PC for firmware upgrade.

Rear Panel

No.	Name	Description
1	DC 12V	Connect to the power adapter provided. With bi-directional PoC, whether the power adapter is connected to the transmitter or receiver, it can power both the units.
2	RS232	Connect to RS232 enabled devices, for RS232 pass-through.
3	HDBT 3.0 OUT	Connect to the HDBT IN port of the receiver.
4	HDMI IN	Connect to an HDMI source device.
5	HDMI OUT	Connect to an HDMI display for video looping out.
6	AUDIO OUT	Connect to an audio receiver. When set the extender to OPTICAL audio return mode, this port will output the audio comes from OPTICAL IN. When set the extender to OPTICAL de-embedded mode, this port will output the de-embedded audio from HDMI IN.
7	OPTICAL OUT	Connect to the optical in port of an audio receiver.
8	1GbE	Connect to a PC/local area network for Ethernet pass-through.

Receiver

| No.	Name	Description
1	DC 12V	Connect to the power adapter provided. With bi-directional PoC, whether the power adapter is connected to the transmitter or receiver, it can power both the units.
2	RS232	Connect to RS232 enabled devices, for RS232 pass-through.
3	HDBT IN	Connect to the HDBT OUT port of the transmitter.
4	HDMI OUT	Connect to an HDMI display.
5	OPTICAL IN	Connect to an optical out port of a display.
6	1GbE	Connect to a PC/local area network for Ethernet pass-through.

Installation and Wiring

Installation

Warnings:

• Before wiring, disconnect the power from the device.

• During wiring, connect and disconnect the cables gently.

Steps to install the device:

1. Attach the installation bracket to the enclosure using the screws provided in the package separately.

2. The bracket is attached to the enclosure as shown.
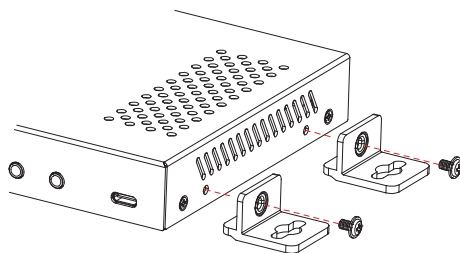
3. Repeat the steps from 1 to 2 for the other side of the unit.

4. Attach the brackets to the surface you want to hold the unit against using the screws (provided by others).

5. Repeat the steps from 1 to 4 to install the receiver.

Wiring

Warnings:

• Before wiring, disconnect the power from all devices.

• During wiring, connect and disconnect the cables gently.

• The Cat x cable should not exceed the maximum cable length, refer to the specifications section for details.

The extender supports four audio transmission modes: eARC mode, ARC mode, OPTICAL audio return mode, and OPTICAL de-embedded audio mode.

eARC/ARC mode:

Note: When you want to configure eARC/ARC channel feed by TV:

Ensure AV System and TV support eARC/ARC function and the function is set to enable, and CEC should be set to enable.

1. Switch the DIP switches of transmitter and receiver to eARC/ARC mode (See "DIP Switch Settings" section).
2. Connect AV System and TV through eARC/ARC- enabled HDMI Ports of transmitter and receiver respectively.
3. Connect the transmitter and receiver.
4. Set CEC function of TV to on.
5. Switch the AV System to eARC/ARC channel.
6. The audio signal of TV through HDMI OUT port will be transmitted to the AV System connected to HDMI IN Port of transmitter (See Figure 1).

OPTICAL audio return mode:

1. Set the DIP switches of transmitter and receiver to OPTICAL audio return mode (See "DIP Switch Settings" section).
2. Connect an audio receiver to the OPTICAL OUT port of transmitter.
3. Connect an audio source to OPTICAL IN port of receiver.
4. Connect the transmitter and the receiver.
5. Connect the provided power adapter to the transmitter or receiver.
6. Power on all attached devices. Audio signal from OPTICAL IN port will be transmitted to OPTICAL OUT port (See Figure 2).

Note: In this mode, audio signal from OPTICAL IN port will also be transmitted to AUDIO OUT port, and output analog audio signal. If audio signal is compressed audio, AUDIO OUT port will be muted.

OPTICAL audio de-embedded mode:

When set the DIP Switches to OPTICAL audio de-embedding mode, the audio receiver connected to OPTICAL OUT port and AUDIO OUT port will output the de-embedding audio from HDMI IN (See Figure 3).

Note: In this mode, the extender will automatically filter EDID and only supports PCM 2.0CH.

Additional control connection selection:

- RS232 Pass-through: Connect a RS232 control system/controlled device to the transmitter/receiver, and connect a RS232 controlled/control system device to the receiver/transmitter for serial communication. See "RS232 Pass-Through" section to get detail information.

- Ethernet Pass-through: Connect 1GbE port of the transmitter/receiver to a PC/local area network, and connect 1GbE port of the receiver/transmitter to a local area network/PC, the PC can be connected to the local area network (See Figure 1).

- IR Pass-through: Connect the IR emitter cable provided to IR OUT port of the transmitter/receiver. Connect the IR receiver cable provided to IR IN port of the receiver/transmitter. Users can control the source at the receiver side using source remote or control the display at the transmitter side using display remote ((See Figure 2).
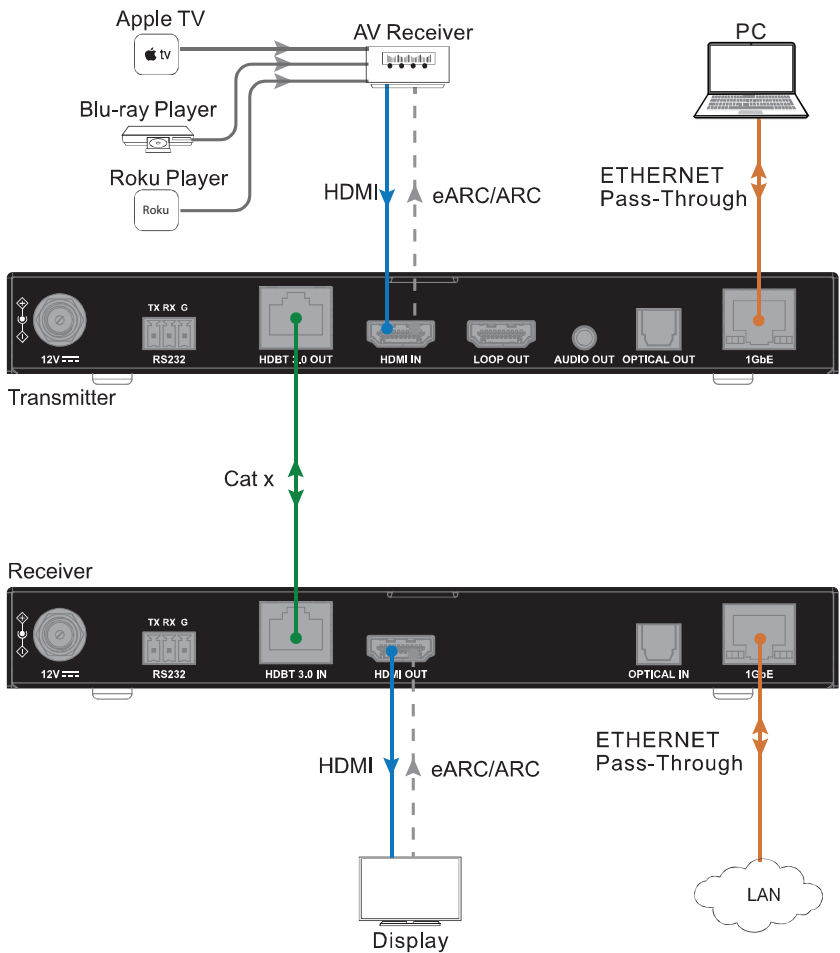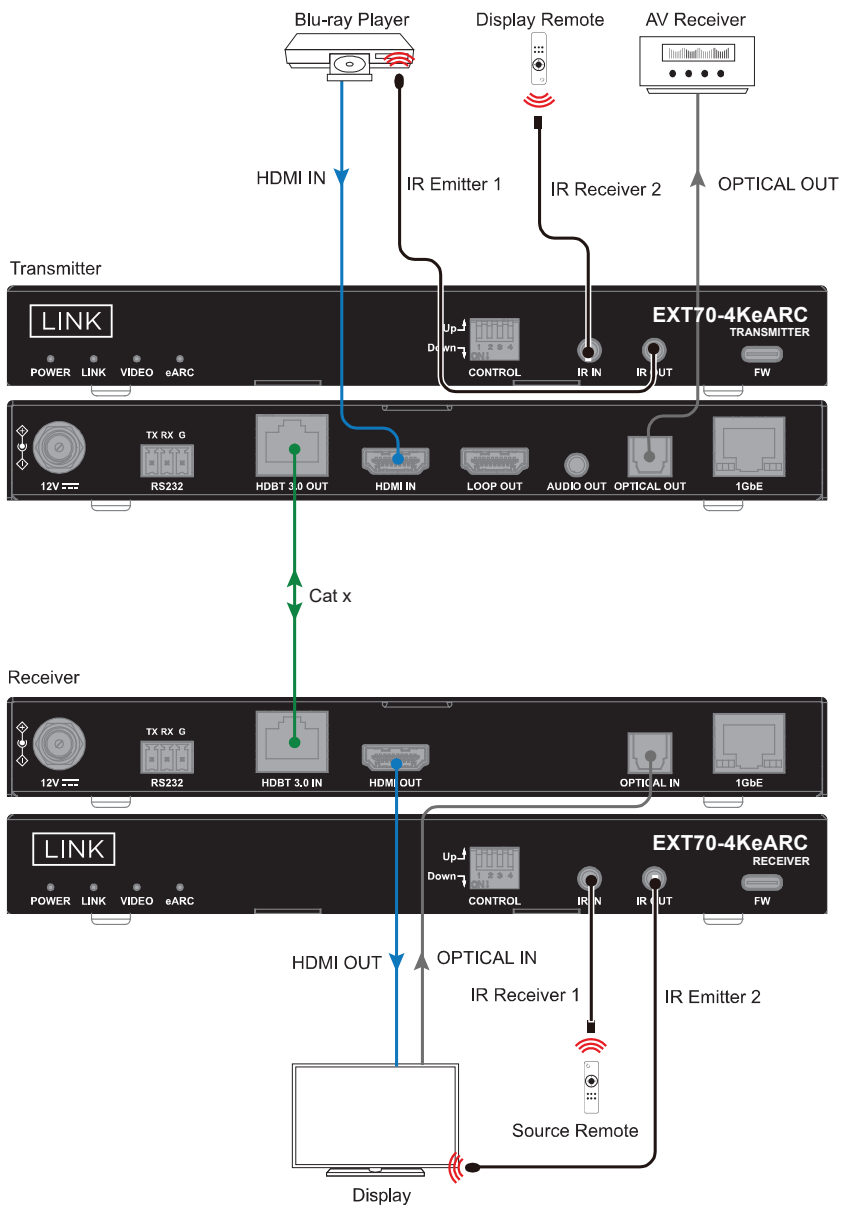
Figure 1. eARC/ARC Audio Return

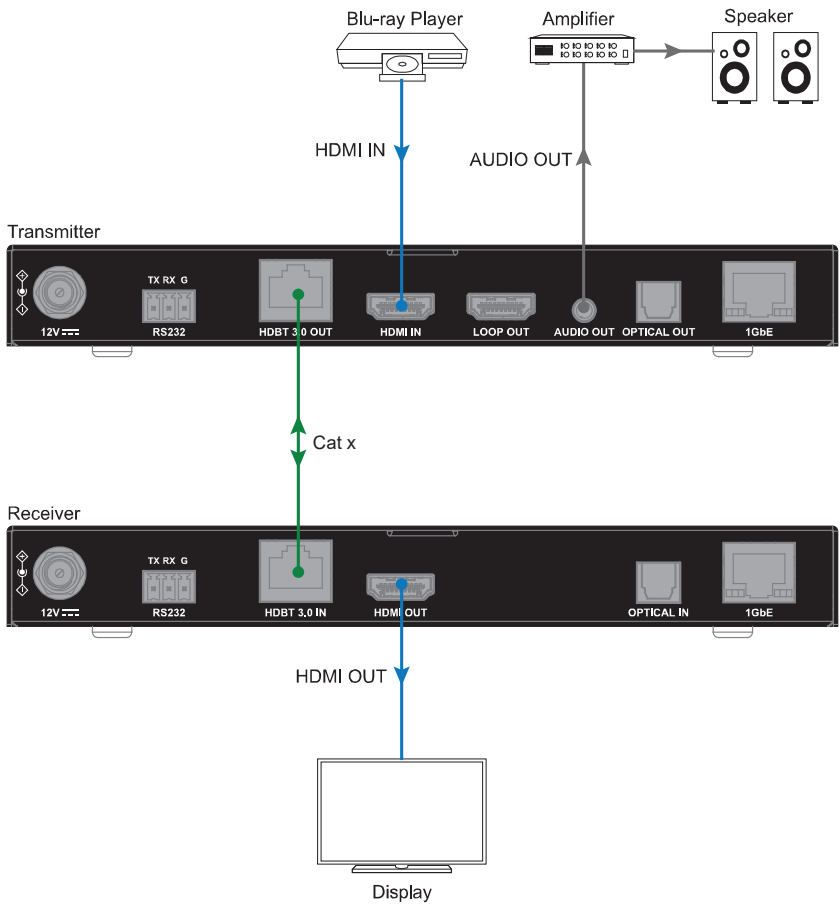Figure 2. OPTICAL Audio Return

Figure 3. OPTICAL De-embedded Audio

DIP Switch Settings

Using DIP Switches on front panel of the transmitter and receiver to set audio mode, set upgrade function and bandwidth rate.

Please refer to the following table to set:

Transmitter:

1	2	3	4	Function
Up	Up	-	-	eARC/ARC audio return
Down	Up	-	-	OPTICAL audio return
Down	Down	-	-	OPTICAL audio de-embed
-	-	Up	-	Upgrade Valens
-	-	Down	-	Upgrade MCU
-	-	-	Up	High-bandwidth mode
-	-	-	Down	Low-bandwidth mode

Receiver:

1	2	3	4	Function
Up	Up	-	-	eARC/ARC audio return
Down	Up	-	-	OPTICAL audio return
Down	Down	-	-	OPTICAL audio de-embed
-	-	Up	-	Upgrade Valens
-	-	Down	-	Upgrade MCU

Note:

- "-" indicates the position of this pin doesn't affect the current function.

- Both Valens firmware of the transmitter and receiver can be upgraded through FW port of the transmitter/receiver. Set the DIP switch of the transmitter/receiver to "x, x, Up, x". Connect a PC to FW port of the transmitter/receiver, and connect the transmitter and receiver, users can upgrade Valens firmware of transmitter and receiver through the FW port of the transmitter/receiver.

- Set the DIP switch of the transmitter/receiver to "x, x, Down, x" position, and connect a PC to FW port of the transmitter/receiver to upgrade the MCU firmware of the transmitter/receiver.

RS232 Pass-Through

RS232 ports can be used for bi-directional RS232 signal pass-through between the transmitter and receiver.

1. Connect a RS232 master/slave Device to RS232 port of transmitter /receiver and connect a slave/master device to RS232 port of receiver/transmitter.
2. Connect HDBT OUT of the transmitter to HDBT IN of the receiver.
3. When all is set, RS232 signal can be passed through bi-directionally between two RS232 devices.