Smart-e

444K-777 & 888

HDBaseT Extenders for 70m and 100m

User manual

444K

Smart-e

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Symbol Meaning

■ Safety instructions

For your safe and correct use of the products, a lot of symbols are printed on the equipment and in the manuals, demonstrating the risk of body hurt or possible damage to property for the user or others. Indications and their meanings are as follow. Please make sure to correctly understand these instructions before reading the manual.

	This is A level product, which may cause radio interference in the living environment. In this case, users may need to take the feasible measures to get around the interference.
	Remind users that the dangerous voltage without insulation occurring within the equipment may cause people suffer from shock.
	CE certification means that the product has reached the directive safety requirements defined by the European Union. Users can be assured about the use of it.
	SGS certification means that the product has reached the quality inspection standards proposed by the world's largest SGS.
	This product passed the ISO9001 international quality certification (certification body: TUV Rheinland, Germany).
	Warning: in order to avoid electrical shock, do not open the machine cover, nor is the useless part allowed to be placed in the box. Please contact the qualified service personnel.
	The ground position of equipment housing can shield interference and protect equipment and personal safety.
	Heavy metal elements, do not put into the trash can, must be professional recycling.

■ General information instructions

	It lists things that could cause an operation or setting to fail, along with some relevant information to be aware of.

Important notes

Warning

To ensure the reliable performance of the equipment and the safety of the user, please observe the following matters during the process of installation, use and maintenance:

Matters needing attention when installing

◆ Please do not use this product in the following places: the place of dust, soot and electric conductivity dust, corrosive gas, combustible gas; the place exposed to high temperature, condensation, wind and rain; the occasion of vibration and impact. Electric shock, fire, wrong operation can lead to damage and deterioration to the product.

◆In processing the screw holes and wiring, make sure that metal scraps and wire head will not fall into the shaft of controller, as it could cause a fire, fault, or incorrect operation.

◆When the installation work is over, it should be assured there is nothing on the ventilated face, including packaging items like dust and paper. Otherwise, this may cause a fire, fault, incorrect operation for the cooling is not free.

◆Should avoid wiring and inserting cable plug in charged state, otherwise it is easy to cause the shock, or electrical damage.

◆The installation and wiring should be strong and reliable, contact undesirable may lead to false action.

◆In applications with interference use shielded cable for the high frequency signal input or output cable, to improve the noise suppression ability of the system.

Attention in the wiring

◆Only after cutting down all external power source, can install, wiring operation begin, or it may cause electric shock or equipment damage.

◆This product grounds by the grounding wires. To avoid electric shocks, grounding wires and the earth must be linked together. Before the connection of input or output terminal, please make sure this product is correctly grounded.

◆Immediately remove all other things after the wiring installation. Please cover the terminals of the products cover before electrification so as to avoid cause electric shock.

Matters needing attention during operation and maintenance

◆Please do not touch terminals in a current state, or it may cause a shock, incorrect operation.

◆Please do cleaning and terminal tighten work after turning off the power supply. These operations can lead to electric shock in a current state.

◆Please do the connection or dismantle work of the communication signal cable, the expansion module cable or control unit cable after turning off the power supply, or it may cause damage to the equipment, incorrect operation.

◆Please do not dismantle the equipment, avoid damaging the internal electrical component.

◆Should be sure to read the manual, fully confirm the safety, only after that can do program changes, commissioning, start and stop operation.

Matters needing attention in discarding product

◆Electrolytic explosion: the burning of electrolytic capacitor on circuit boards may lead to explosion.

Version

This manual describes the performance parameters of the Smart-e 444K-777 & 888 Series HDBaseT Video Extender and how to use and troubleshoot them.

If the technical parameters and system usage in this manual are changed, the manufacturer will update the version of the manual. Please use the latest user manual.

Version	Update	Date
1.0	Released	2024.7.18

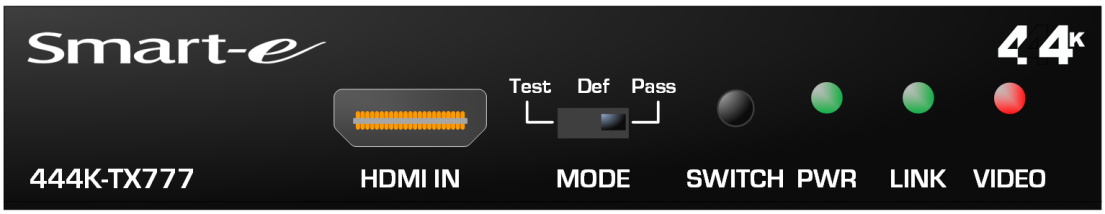
Contents

Chapter 1 Product description

1.1 Overview

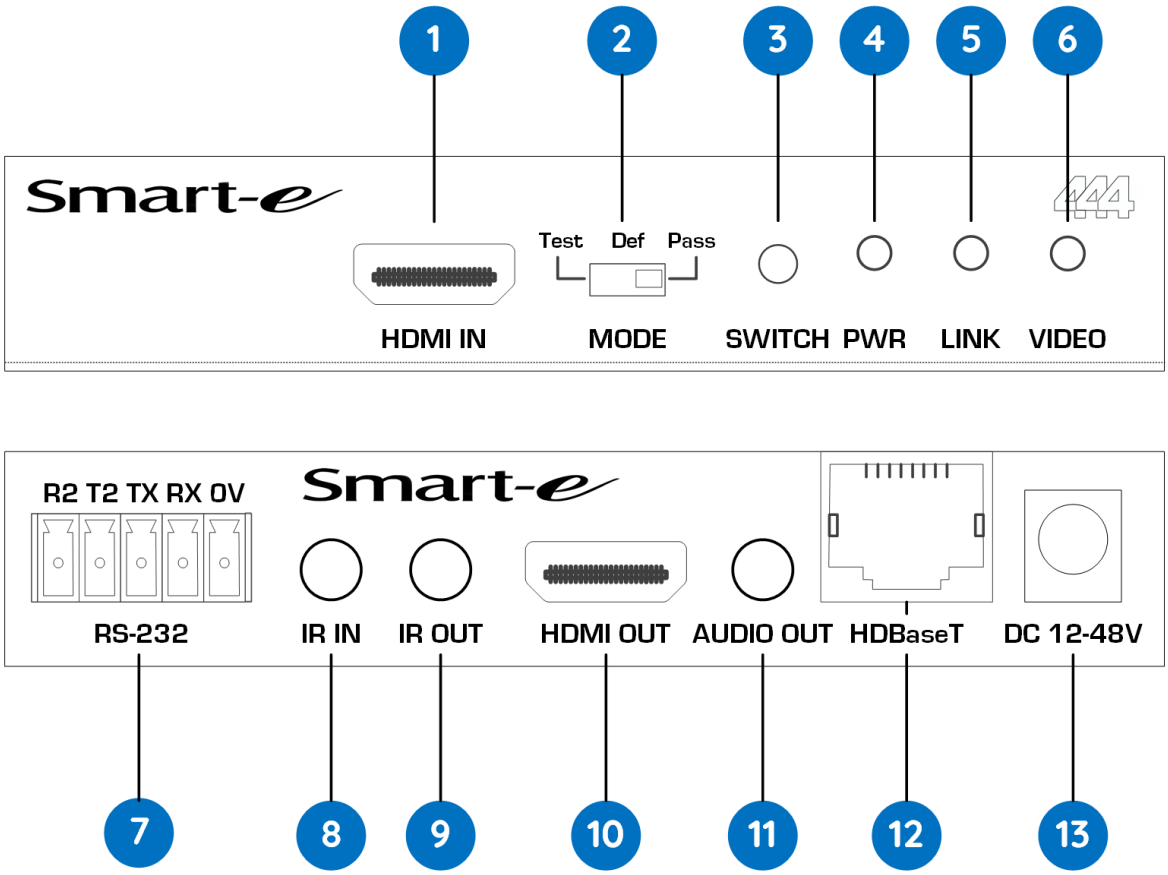
The 444K-777 & 888 series HDBaseT video extender can be integrated with Smart-e video matrix/processor to extend the transmission of HDMI video, audio, bidirectional RS232 and IR signals through shielded CAT6 cables. It is capable of input 4K@60Hz 4:4:4 signal, complies with HDMI 2.0 and HDCP 2.2/2.3, has three application modes, compatible with LDX/MDXE/VDX series matrix/processor twisted pair cards.

The extender including transmitter and receiver.



1.2 Panel functionality

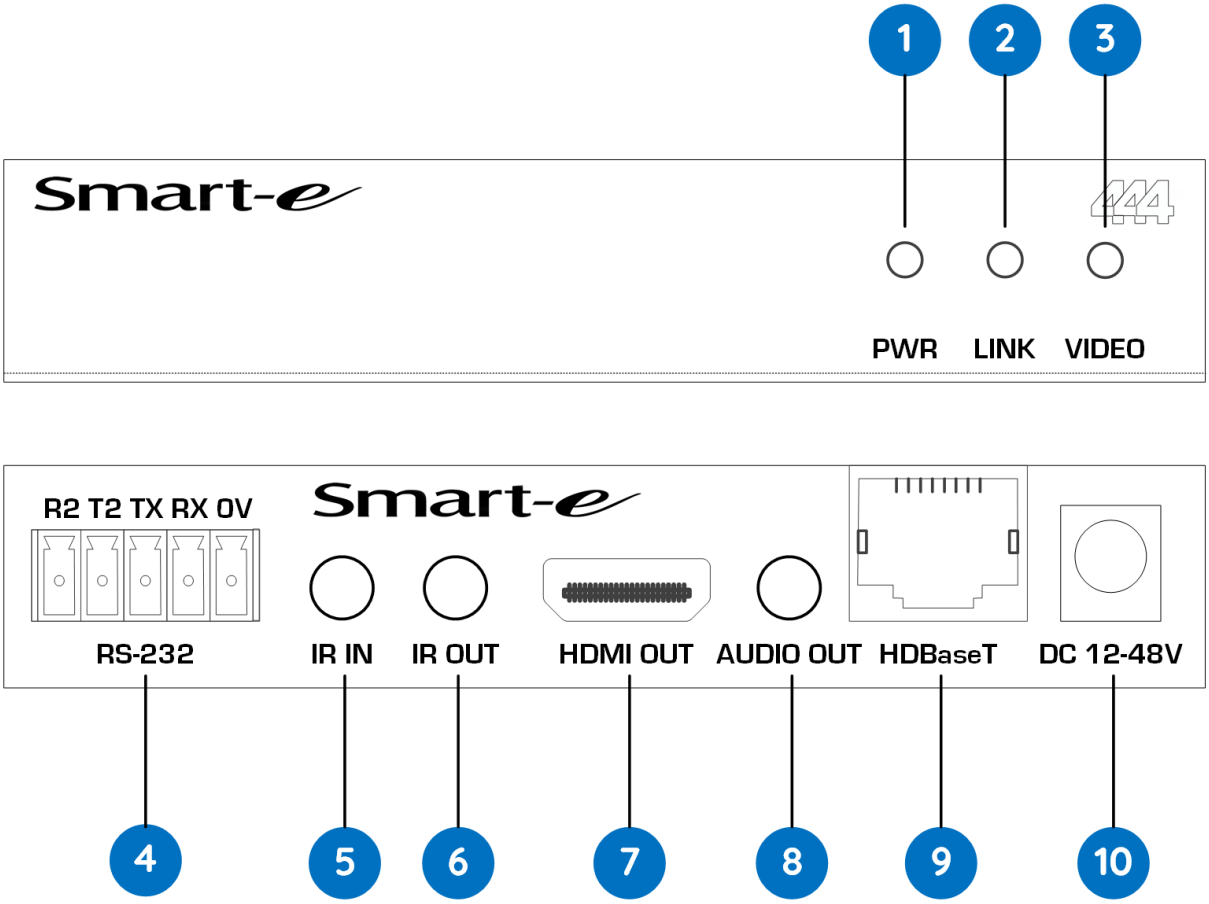
1.2.1 444K-TX777 & TX888 transmitter connectivity



1. HDMI input.
2. Mode selection dial (Test: test image mode; Def: custom mode, using internal EDID, supporting 4K@60 4:4:4 input; Pass: direct mode, using the receiving end EDID).
3. SWITCH button (in Test mode, short press to switch different test images, long press 3s to switch different resolutions, and release the button to output).
4. Power LED indicator.
5. RJ45 link LED indicator.
6. Video input LED indicator.
7. 5 pin phoenix connector: 1× RS232 control, 1×RS232 bidirectional transmission.
8. 3.5mm infrared input.
9. 3.5mm infrared output.

10. HDMI loop-out.
11. 3.5mm audio de-embedding output.
12. RJ45 twisted pair port (support 1080P 70m; 4K60Hz 40m).
13. DC 12-48V power port.

1.2.2 444K-RX777 & RX888 receiver connectivity



1. Power LED indicator.
2. RJ45 link LED indicator.
3. Video input LED indicator.
4. 5 pin phoenix connector: 1× RS232 control, 1×RS232 bidirectional transmission.
5. 3.5mm infrared input.
6. 3.5mm infrared output.
7. HDMI output.

8. 3.5mm audio de-embedding output.
9. RJ45 twisted pair port (support 1080P 70m; 4K60Hz 40m).
10. DC 12-48V power port.

1.3 Product Features

- Transmit HDMI video, audio and control signal through shielded CATX cable, 444K-777 accommodates 1080P transmission up to 70m and 4K60Hz up to 40m whilst 444K-888 allows 1080P transmission up to 100m and 4K60Hz up to 70m.
- 444K-TX777 & TX888 complies with HDMI 2.0b, including data rates up to 18 Gbps, 3D images; 444K-RX777 & RX888 complies with HDMI 1.4b, including data rates up to 10.2 Gbps, 3D images.
- 444K-TX777 & TX888 is compatible with HDCP 2.2/2.3, and earlier such as HDCP 1.4, etc.; 444K-RX777 & RX888 is compatible with HDCP 1.4.
- 444K-TX777 & TX888 has an internal signal generator, which can output various resolutions and test images in Test mode.
- In Def mode, 444K-TX777 & TX888 supports maximum 4K/60 @4:4:4 input; 444K-RX777 & RX888 supports maximum 4K/30 @4:4:4 transmission.
- 444K-TX777 & TX888 has scaler function. In Test mode, the 4K test image can be set to 1080P output; in Def mode, the input 4K@60 4:4:4 is automatically converted to 4K@60 4:2:0.
- In Pass mode, 444K-TX777 & TX888 can output images synchronized with the signal source.
- Provides de-embedding HDMI audio for 3.5mm audio port output.
- Audio output frequency 32KHz–192KHz. Supports all compressed and uncompressed audio formats, such as 2.0/2.1/5.1/7.1 channel LPCM, Dolby, AC3, DTS, etc.
- Through the RS232 interface, 444K-TX777 & TX888 allows version query, work mode setting, resolution setting, EDID management, firmware update, factory reset, etc.; 444K-RX777 & RX888 allows version query, EDID management, update Firmware, factory reset, etc.

- Bidirectional RS232 control and IR signals can be transmitted together with video signals, remote control of AV equipment without additional wiring.
- Compatible with shielded CAT5e/CAT6/CAT6a.
- Power supply can be provided by the transmitter or receiver POC.
- Has LED indicators with video input, power and link status, conveniently real-time feedback and monitor of key performance parameters.
- With a small case, allows to be discreetly installed wherever it is needed.
- Wide voltage power supply permits the use of DC 12V to 48V power adapter.

1.4 Mode selection

The 444K-777/888 series video extender has three application modes (Test/Def/Pass mode), which can be selected through the MODE dial on the transmitter 444K-TX777 & TX888. After selecting mode, the extender needs to be restarted to take effect.

In Test mode, use the SWITCH button on the transmitter 444K-TX777 or TX888 to switch different test images and different resolutions to output.

1.4.1 Test mode

Turn the MODE dial on the transmitter 444K-TX777 or TX888 to "Test", and there are 13 test images available for output.

In Test mode, the SWITCH button on the transmitter 444K-TX777 or TX888, short press to switch different test images, long press 3 seconds to switch different resolutions, and release the button to take effect.

1.4.2 Def mode

Turn the MODE dial on the transmitter 444K-TX777 or TX888 to "Def", which can use the internal EDID. In Def mode, the transmitter supports 4K@60 4:4:4 input which is automatically converted to 4K@60 4:2:0.

1.4.3 Pass mode

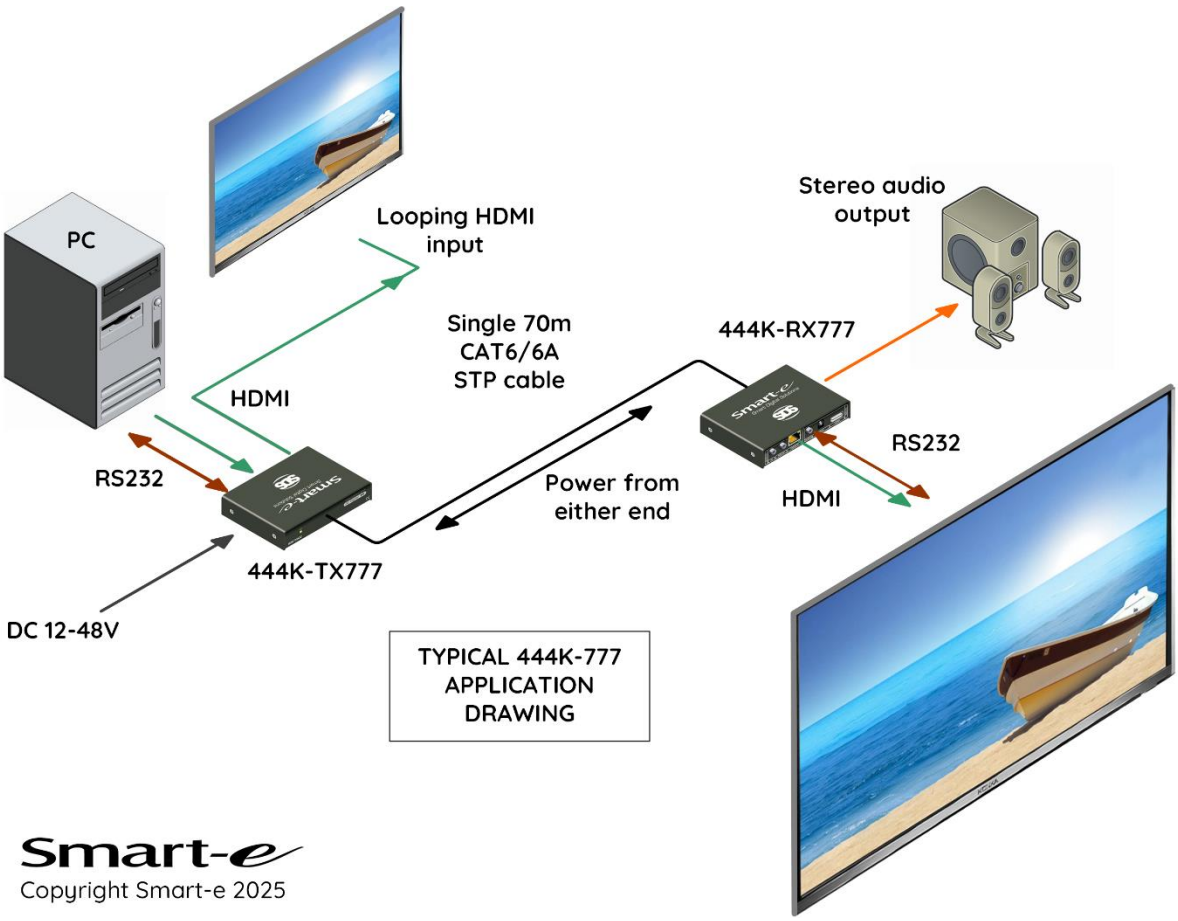
Turn the MODE dial on the transmitter 444K-TX777 or TX888 to "Pass". This mode uses the EDID of the receiving end, and the signal passes through directly.

Chapter 2 Connection and configuration

2.1 Point to point extender application

The classic use of the 444K-777 & 888 is as a HDMI extender as seen below:

As an extender the HDMI video is connected to the transmitter (444K-TX777 or TX888) which also provides for a HDMI loop trough to an additional transmitter unit or local monitor. Other control signals can also be added including bi-directional infrared and RS232. The transmitter unit then combines all the signals into the HDBaseT protocol standard which enables the signal to be transmitter along a Cat6/6A cable.

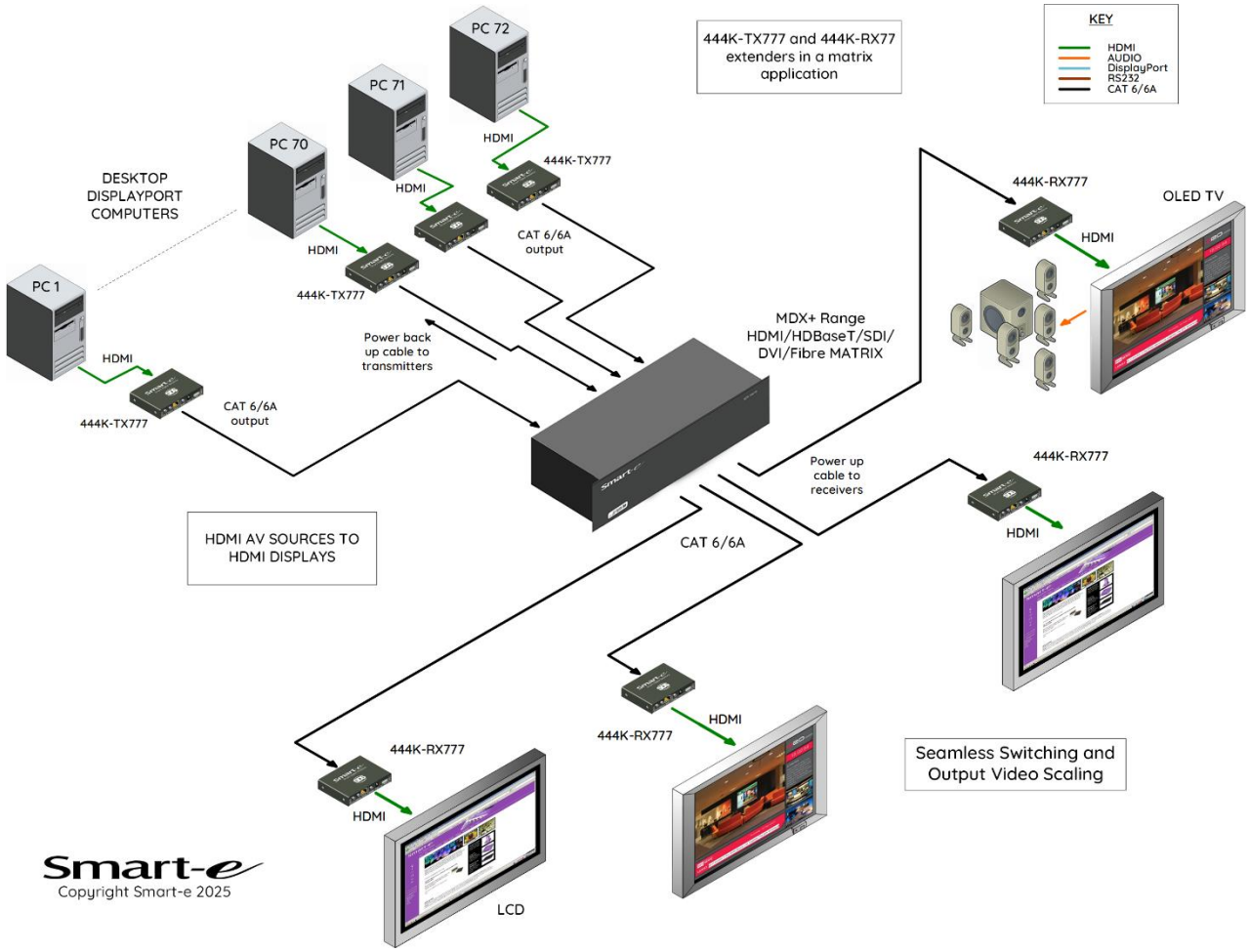


At the remote end of the extending Cat6/6A cable a receiver (444K-RX777 or RX888) reconstructs the signals and separates the combined signals back to their individual connections. Additionally, the receiver provides a de-embedded analogue audio output to feed external speakers.

Other features include the ability to power both the transmitter and receiver from a single end point. This helps cope with installation configurations depending on available space at either location.

2.2 System solution configuration

When a system solution is required, the transmitters and receivers can be used to connect to ta centralise matrix. Both the 444K-777 and 444K-888 extenders are compatible with the Smart-e range of LDX/MDXE and VDX matrices as seen below:



Using a HDBaseT compatible blade in the matrix both the transmitter and receiver units can be used to extend HDMI devices and displays at a distance from the centralised matrix. This application is ideal when high resolution video is required to be distributed around a corporate building., luxury yacht or residential home. All that is required is a standard Cat6/6A cable infrastructure.

Chapter 3 Specifications

3.1 Transmitter parameter

Parameter	444K-TX777	444K-TX888
Maximum data rate	18 Gbps (6 Gbps per colour)	
Maximum pixel clock	600 MHz	
Input resolution range	All VESA resolutions, up to 4096x2160p (18 G); All 3D formats and downward compatibility. All PC resolutions including 3840x2160P and downward compatibility.	
Format	RGB/YCbCr444/YCbCr422/YCbCr420	
Protocol	HDMI 1.4/2.0b; HDCP 1.4/2.2/2.3	
Video input		
Quantity/Signal type	1×HDMI input	
Quantity/Connector	1×Female HDMI Type A	
Horizontal frequency	15 KHz to 150 KHz	
Vertical frequency	24 Hz to 120 Hz, resolution up to 18 Gbps	
Video loop out		
Quantity/Signal type	1×HDMI loop out	
Quantity/Connector	1×Female HDMI Type A	
Horizontal frequency	15 KHz to 150 KHz	
Vertical frequency	24 Hz to 120 Hz, resolution up to 18 Gbps	
Transmitter-Receiver connection		
Connector	One female RJ45 per unit	
Termination standard	TIA/EIA T568B	
Transmission distance	Use shielded CAT5e/CAT6/CAT6a cable, 1080p@60Hz up to 70 m, 2560x1600@60Hz up to 40 m, 4K/UHD@30Hz and 60Hz up to 40 m.	Use shielded CAT5e/CAT6/CAT6a cable, 1080p@60Hz up to 100 m, 2560x1600@60Hz up to 70 m, 4K/UHD@30Hz and 60Hz up to 70 m.
Cable requirement	Solid conductor, 24 AWG or better	
Cable recommendation	400 MHz bandwidth, STP (shielded twisted pair)	

Audio	
Format	All compressed and uncompressed audio formats, such as 2.0/2.1/5.1/7.1 channel LPCM, Dolby, AC3, DTS, etc.
De-embedded output	3.5mm analogue stereo (left/right)
Extender-Peripheral connection	
Serial control port	Via screw of 3.5mm and 5-pin to hold the RS232 connector
RX/TX baud rate	9600 to 115200 baud
R2/T2 baud rate	115200 baud
Infrared control port	A pair of 3.5mm audio jacks
TTL	(0 to 5 V) Modulation infrared control, from 25 KHz to 60 KHz
Universal features	
External power supply (supplied)	Input: AC 100–240 V, 50–60 Hz; Output: DC 12 V, 3 A, 36 W.
Power consumption	Maximum 12 W (Tx 4 W, Rx 8 W), remote power budget 20 W.
Temperature/Humidity	Storage: -40 to +158 °F (-40 to +70 °C)/10% to 90%, non-condensing. Operating: +32 to +104 °F (0 to +40 °C)/10% to 90%, non-condensing.
Heat dissipation	Cooling, Air convection through vents
Installation	
Furniture bracket	With optional under-table mounting kit
Shell type	Metal
Dimensions (H×W×D)	20×108×67 mm (excluding connector)
Weight	TX 0.185 kg
Compliance	CE, ROHS
Rated ventilation space	Conform to UL standards of heat and smoke release, excluding power supply.
Product quality assurance	3 years

3.2 Receiver parameter

Parameter	444K-RX777	444K-RX888
Maximum data rate	10.2 Gbps (3.4 Gbps per colour)	
Maximum pixel clock	300 MHz	
Output resolution range	Maximum 4K@30 Hz 4:4:4 and downward compatibility	
Format	RGB digital video	
Protocol	HDMI 1.4b, HDCP 1.4	
Video output		
Quantity/Signal type	1×HDMI output	
Quantity/Connector	1×Female HDMI Type A	
Transmitter-Receiver connection		
Connector	One female RJ45 per unit	
Termination standard	TIA/EIA T568B	
Transmission distance	Use shielded CAT5e/CAT6/CAT6a cable, 1080p@60Hz up to 70 m, 2560x1600@60Hz up to 40 m,	Use shielded CAT5e/CAT6/CAT6a cable, 1080p@60Hz up to 100 m, 2560x1600@60Hz up to 70 m,
	4K/UHD@30Hz and 60Hz up to 40 m.	4K/UHD@30Hz and 60Hz up to 70 m.
Cable requirement	Solid conductor, 24 AWG or better	
Cable recommendation	400 MHz bandwidth, STP (shielded twisted pair)	
Audio		
Format	All compressed and uncompressed audio formats, such as 2.0/2.1/5.1/7.1 channel LPCM, Dolby, AC3, DTS, etc.	
De-embedded output	3.5mm analogue stereo (left/right)	
Extender-Peripheral connection		
Serial control port	Via screw of 3.5mm and 5-pin to hold the RS232 connector	
RX/TX baud rate	9600 to 115200 baud	
R2/T2 baud rate	115200 baud	
Infrared control port	A pair of 3.5mm audio jacks	
TTL	(0 to 5 V) Modulation infrared control, from 25 KHz to 60 KHz	
Universal features		
External power supply (supplied)	Input: AC 100–240 V, 50–60 Hz; Output: DC 12 V, 3 A, 36 W.	
Power consumption	Maximum 12 W (Tx 4 W, Rx 8 W), remote power budget 20 W.	

Temperature/Humidity	Storage: -40 to +158 °F (-40 to +70 °C)/10% to 90%, non-condensing. Operating: +32 to +104 °F (0 to +40 °C)/10% to 90%, non-condensing.
Heat dissipation	Cooling, Air convection through vents
Installation	
Furniture bracket	With optional under-table mounting kit
Shell type	Metal
Dimensions (H×W×D)	20×108×67 mm (excluding connector)
Weight	RX 0.185 kg
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