4K-866

5 Play HDBaseT 100m HDMI Extender

User guide

For more information visit our website, or talk to one of our technical team
tel: +44 (0) 1306 628264 www.smart-e.co.uk

SYMBOLS

To ensure the safe and correct use of equipment, we use a range of symbols on the equipment and in the manuals. These symbols demonstrate the risk of physical harm or possible damage to property for the user or others and provide guidance on standards and disposal. Symbol indications and their meanings are as follows. Please ensure that you correctly understand these instructions before reading the manual and operating the equipment.

	WARNING. This symbol is used to indicate where important instructions are provided to ensure the correct operation of the equipment and user safety.
	To prevent fire or shock hazards, do not expose this equipment to rain or moisture. Also, do not use this equipment's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. Refrain from opening the cabinet as there are high voltage components inside. Please refer all servicing to qualified service personnel.
	This symbol warns user that uninsulated voltage within the unit may have sufficient magnitude to cause an electric shock. Therefore, it is dangerous to make any kind of contact with any part inside this unit.
	This is a WiFi product, which may cause or be susceptible to radio interference. Users may need to take additional measures to mitigate the interference.
	This is a Bluetooth product, which may cause or be susceptible to radio interference. Users may need to take additional measures to mitigate the interference.
	This is an RF Radio product, which may cause or be susceptible to radio interference. Users may need to take additional measures to mitigate the interference.
	This is an Infrared product, which may cause or be susceptible to frequency interference. Users may need to take additional measures to mitigate the interference.
	This is a product which conforms to HDbaseT specification.
	This product supports full High Definition 1080p resolution.
	This product supports 4K Ultra High Definition resolution.
	This product supports 3D definition display.
	CE certification means that the product has reached the directive safety requirements defined by the European Union.
	SGS certification means that the product has reached the quality inspection standards proposed by the world's largest quality standards body - SGS.
	This product has passed the ISO9001:2000 international quality certification
	EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your equipment, please follow the guidance of your local authority, or ask the agent where you purchased the product. If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.

WARNING

In order 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. :

INSTALLATION

- Please do not use this product in the following places: places with high levels of dust or soot; places with high electric conductivity; places with corrosive or combustible gas; places exposed to high temperature, condensation, wind or rain; places subject to the occasion of vibration or impact.
- When installing screw or wiring, make sure that metal scraps and wire heads will not fall into the screw shaft of the equipment, as it could cause a fire, fault, or incorrect operation.
- When the installation work is completed, ensure there is nothing left on the ventilated vents of the equipment, including packaging items. Blocked vents may cause a fire, fault, incorrect operation.
- Avoid wiring and inserting cable plugs in a charged state, otherwise it is easy to cause shock, or electrical damage.
- The installation wiring should be strong reliable and earthed.
- For installations in areas of high interference, the installer should choose shielded cable as the high frequency signal input or output cable, so as to improve the anti-interference ability of the system.
- Switch off and disconnect the equipment from all power sources prior to handling, installation or wiring, otherwise it may cause electric shock or equipment damage.
- This product grounds to earth by the grounding wires. To avoid electric shocks, grounding wires and the earth must be linked together. Before the connection of input or output terminals, please make sure this product is correctly grounded.
- All terminals and wiring should be fully sheathed or otherwise covered before connecting the equipment to a power supply so as to avoid cause electric shock.

OPERATION AND MAINTENANCE

- Be sure to read this manual, and fully comply with the safety recommendations, before undertaking maintenance or operation.
- Do not touch terminals whilst the equipment is in a powered state, or it may cause a shock, incorrect operation.
- Switch off and disconnect the equipment from all power sources prior to cleaning or tightening terminals or connections. These operations can lead to electric shock in a live current state.
- Switch off and disconnect the equipment from all power sources prior to the connection or disconnection of communication signal cables, expansion modules, or other adapters, or it may cause damage to the equipment, incorrect operation, or lead to electric shock in a live current state.
- Do not dismantle the equipment and avoid damaging the internal electrical components. Please refer all servicing to qualified service personnel.

DISPOSAL

- Be sure to dispose of the equipment in accordance with local regulations.

CONTENTS

1 FUNCTION

The 4K-866 is a 100m HDBaseT extender, capable of extending all 5 the 5 Play feature set:

- UHD Video + embedded audio
- Remote Power (PoC – Power Over Cable)
- 10/100 BaseT Ethernet
- Control Signals (including RS232 and Infra-Red)

All of these signals can be transmitted between a transmitter (4K-TX866) and a receiver (4K-RX866) at a distance of up to 100m over Cat5e-8 cabling.

The 4K-866 can extend resolutions up to 4K @30Hz 24bpp (8-bit colour depth) or 4K @24Hz 30bpp (10-bit colour depth) over 100m of Cat5e-8 cable. This makes the 4K-866 the ideal extension solution for a Sky Q or 4K-UHD Blu-ray player. The 4K-866 is compliant with the HDMI 1.4 standard meaning it can transmit any HDMI signal up to a total TMDS clock of 340MHz. The 4K-866 is also compliant with the HDCP 2.2 standard making it suitable for the extension of UHD signals with copy protection such as movies or encrypted content from satellite and cable receivers.

Within the HDBaseT protocol it is also possible to transmit surround sound up to 7.1 channels. This makes the 4K-866 ideal for feeding your surround sound system or AV receiver. The audio through the 4K-866 is carried embedded within the HDMI signal, to extract you can use the optical output on the rear of your screen, commonplace in most modern screens or use an inline audio de-embedder.

The 4K-866 requires a single 24V power supply (power supply included with purchase of a single item or pair). Whichever end the power is supplied to, the 24V power will be sent remotely to the other unit. This enables the user to place the power supply in the most convenient location, for example to keep unsightly cables away from the screen location the power supply could be attached to the transmitter in your AV source cupboard and power supplied remotely to the receiver at the screen location.

The 4K-866 also offers the ability to extend ethernet at speeds up to 100BaseT (100 Mbps) otherwise known as Fast Ethernet. This makes it ideal for use with laptops at remote stations where wireless is not available or to provide a wired Ethernet connection to your Smart TV providing download speeds that would not be possible via a wireless connection. This increased speed will enable your Smart TV to take advantage of 4K streaming utilities from apps such as BBC iPlayer, Netflix or Amazon Prime which may have struggled to maintain a 4K stream via a wireless connection.

Another feature of the 4K-866 is the ability to send bi-directional infra-red signals. Each unit, TX and RX, are supplied with an infra-red receiver and an infra-red transmitter. These devices make it possible to send infra-red signals to and from each unit's location. For example, with the use of a Sky Q box, the user can watch the content on the screen and send infra-red signals back to the Sky Q box located up to 100m away with the use of the Sky Q handset or a suitably programmed 3rd party handset.

The 4K-866 can handle bi-directional RS232. With a baud rate of up to 115200, control signals can be sent from either the transmit or receiver device and receive back the appropriate responses generated. This means the 4K-866 can be used to integrate in to a wider control system or be used to send commands directly to a screen or a projector from a serial control device.

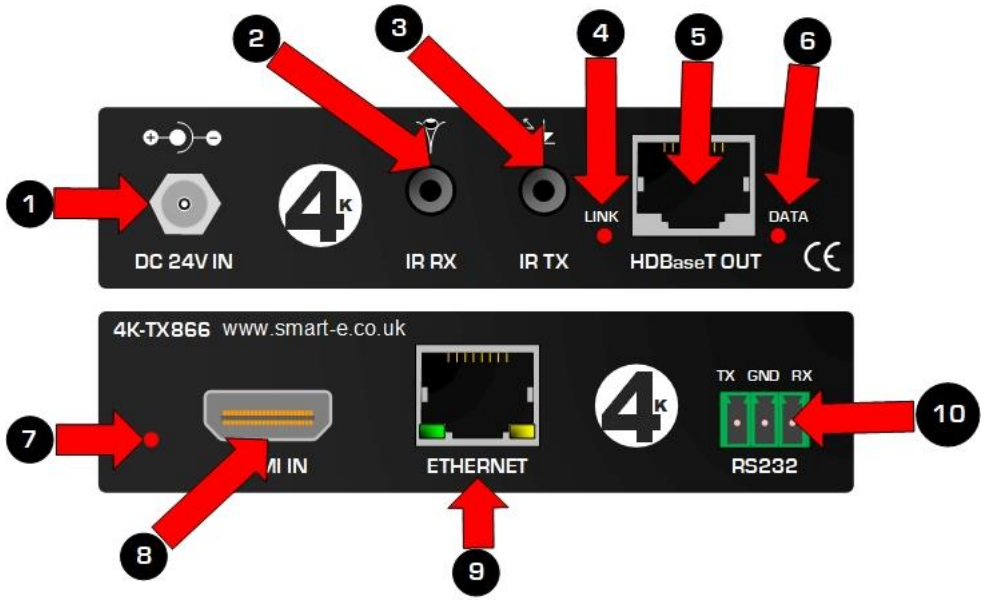
Finally, the 4K-866 provides a transparent EDID path from source to sink (screen) device. EDID is the method by which a screen tells a source what resolution, refresh rate, colour depth and many other factors it is capable of. By presenting a transparent path the 4K-866 allows the optimal image and sound quality to pass through the HDBaseT link.

FEATURES

- Small form factor – Only 25mm high
- Utilizes easy to install and relatively inexpensive CAT 5e-8 cabling
- Support HDMI up to 340MHz TMDS clock
- HDCP/EDID/DCC transparent link
- HDMI resolutions 4K, 2K & 1080p
- HDCP 2.2 compatible
- Full duplex RS232 passthrough
- Bi-directional infra-red passthrough
- 100BaseT Ethernet passthrough
- 1x CAT5e U/FTP or S/FTP cable required
- Supplies 24V remote power (PoC) to either end
- Uses HDBaseT technology
- Status LEDs
- Lockable DC jack connection
- Vented and robust housing

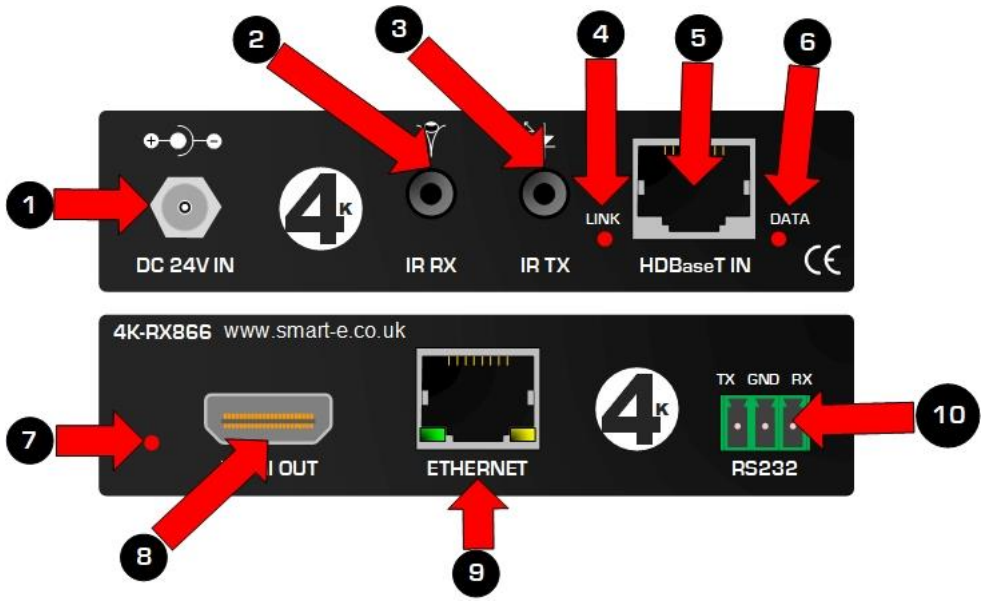
2 CHASSIS PANEL DESCRIPTION

2.1 4K-TX866



1. 24V lockable DC jack input
2. Infra-red input port
3. Infra-red output port
4. HDBaseT link indicator LED
5. HDBaseT output port
6. HDMI data indicator LED
7. HDMI hot-plug detect indicator LED
8. HDMI input port
9. Ethernet port
10. RS232 connection

2.2 4K-RX866



1. 24V lockable DC jack input
2. Infra-red input port
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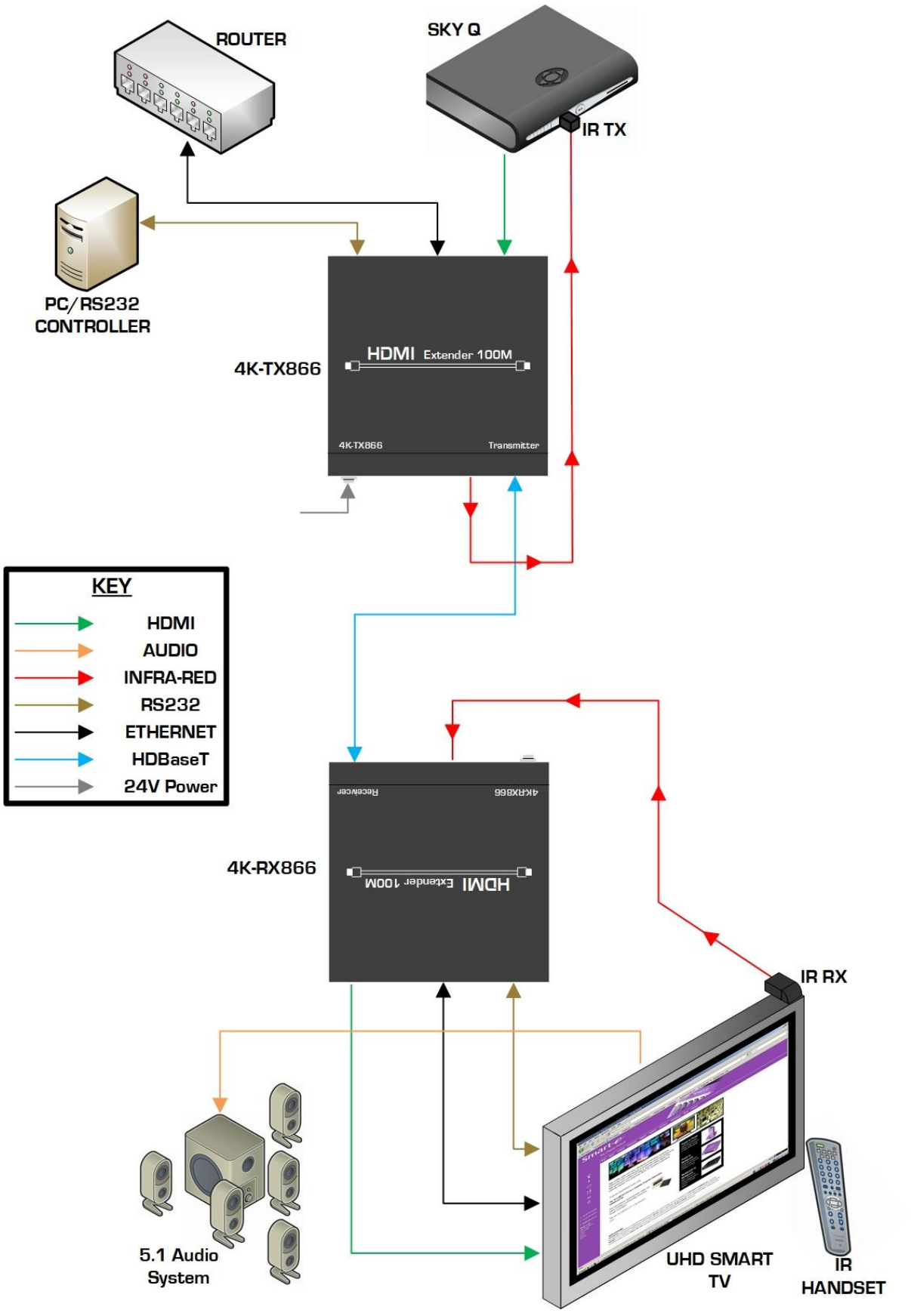
4. HDBaseT link indicator LED
5. HDBaseT input port
6. HDMI data indicator LED
7. HDMI hot-plug detect indicator LED
8. HDMI output port
9. Ethernet port
10. RS232 connection

3 APPLICATION DIAGRAM



4 WHAT IS INCLUDED

4K-866

- 1x 4K-TX866
- 1x 4K-RX866
- 1x 24V power supply
- 1x Mains adapter (regional variation)
- 2x IR receivers
- 2x IR transmitters
- 2x RS232 3-pin plugs

4K-TX866

- 1x 4K-TX866
- 1x 24V power supply
- 1x Mains adapter (regional variation)
- 2x IR receivers
- 2x IR transmitters
- 2x RS232 3-pin plugs

4K-RX866

- 1x 4K-RX866
- 1x 24V power supply
- 1x Mains adapter (regional variation)
- 2x IR receivers
- 2x IR transmitters
- 2x RS232 3-pin plugs

Please ensure you have all parts listed above prior to installation, if any components are missing or damaged please contact Smart-e support immediately.

5 ACCESSORIES

5.1 INFRA-RED RECEIVERS (IR RX)

The infra-red receiver for the 866 range consists of a photo diode at one end and a 3.5mm stereo jack on the other. The photo diode accepts infra-red signals from an infra-red emitting handset and the 3.5mm jack takes this signal to the TX or RX866 to the 3.5mm socket as indicated below.

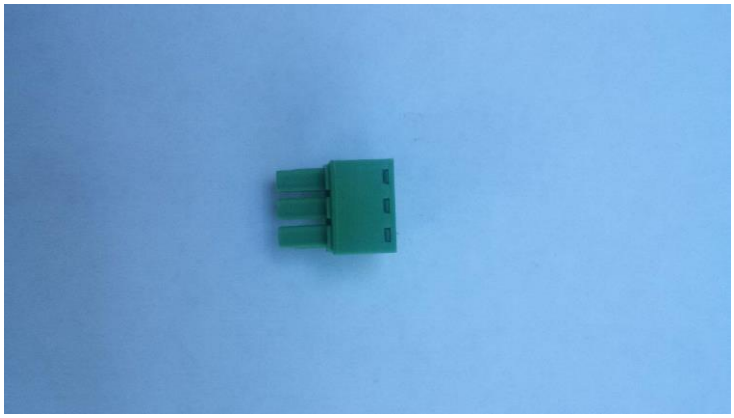
NOTE: Only IR RX units supplied with the 866 unit are compatible, use of other IR RX devices may result in no infra-red functionality.

5.2 INFRA-RED TRANSMITTERS (IR TX)

The infra-red transmitter for the 866 range consists of an infra-red emitting diode at one end and a 3.5mm stereo jack at the other. The 3.5mm stereo jacks takes infra-red signals from the 866 device and send them to the IR emitting diode, the IR emitting diode should then be attached in close proximity of the IR receiver of the device you wish to control. A small adhesive pad is included to attach to your device, please check with the manufacturer of the device you wish to control where the IR receiver is located to ensure reliable functionality. The 3.5mm jack of the IR TX should be inserted in to the 3.5mm socket as shown below.

NOTE: Only IR TX units supplied with the 866 unit are compatible, use of other IR TX devices may result in no infra-red functionality.

5.3 RS232 PLUGS

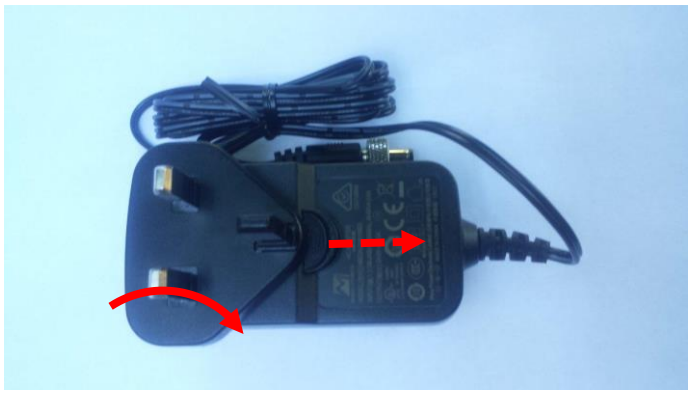


Each 866 device is supplied with a 3-pin phoenix screw lock plug to insert in to the receptacle on the 866 as indicated below. The pin out is indicated on the silk screen of the 866 device, you should strip back approximately 10mm of cable and then secure by screwing in to the appropriate space of the screw lock plug. Make sure cable is not attached to your RS232 controller whilst stripping or attaching to the terminal block.

5.4 POWER SUPPLY AND MAINS ADAPTER PLUG

Above is a picture of the 24V power supply sent with each individual TX or RX 866 unit when purchased individually, if items are purchased as a pair (4K-866) then one unit will be sent to power both units through PoC. Below is an example image of one of the mains plug adapters, this example is of a UK plug but the variant supplied will depend on the region to which the 866 is supplied.

To attach the mains plug adapter to the power supply, first pull up the insertion tab on the power supply and then rotate the mains plug adapter in to position. Once in place release the tab and the mains plug adapter will be held in place.



6 BASIC SETUP

1. Test the CATx cables to be used for HDBaseT link and if required Ethernet. This can be achieved with a cable tester, optionally you could purchase a 4K-9000 HDBaseT tester from Smart-e which is purpose built to test for HDBaseT installations. Ensure cables are terminated correctly and preferably to the specification as outlined in section 9 of this manual.
2. Attach all general input and output cables to your 866 units:
    - HDMI cables
    - Ethernet cables
    - IR TX and IR RX devices
    - RS232 connections
3. Attach the screw lock output of the power supply to the DC input jack of either the TX or RX 866 unit
4. Connect the HDBaseT CATx cable between the 866 units
5. Plug the power supply in to a mains outlet
6. There is no power specific indication on the 866 units, to check functionality a number of status LEDs are supplied on each unit, to show their meaning and how they can aid in fault locating refer to section 8 of this manual.

7 STATUS LEDS

7.1 HDBASET LINK LED

A HDBaseT indicator LED is located next to the RJ45 HDBaseT connector on both the TX and RX variants of the 866. This is the primary indication to show the CATx cable used is suitable to enable the TX and RX devices to communicate with one another. When working this LED should be lit solid red. If not lit or blinking it means, there is a problem with either the transmission medium (CATx cable) or with either the TX or RX unit.

If the LED is not lit it would first be advisable to check that the cabling recommendations of section 9 of this manual have been adhered to. Test the cable using a cable tester or preferably with the use of a 4K-9000, the units of the 4K-9000 can then be utilized, through a process of elimination, to identify if there may be a problem with the TX or RX 866 units.

7.2 HDMI DATA LED

The HDMI data LED is located next to the HDBaseT RJ45 connector as indicated above. This LED shows the flow of HDMI data and the type of HDMI data.

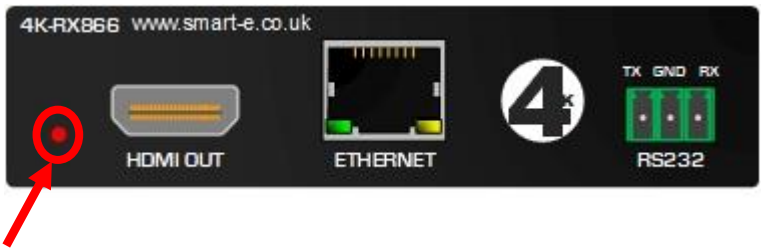
LED Status	HDMI Data
Not Illuminated	No HDMI data
Blinking	Non-HDCP HDMI data
Solidly Illuminated	HDCP HDMI data

The DATA LED will only blink or be solidly lit when a complete throughput of HDMI data is possible from the source to the screen. If the LED is not lit firstly ensure that both the source and screen are powered on and that the screen is set to the right output.

Ensure the source is outputting a resolution the screen is capable of displaying, this may mean taking the source and attaching directly to the screen using a HDMI cable. Whilst performing this step it would be worth checking both HDMI cables being used to see if they are both working.

If these tests are both completed successfully it suggests the problem lies with the TX866, RX866 or the HDBaseT CATx cable. The easiest way to determine this would be with the use of a 4K-9000 HDBaseT tester pair.

7.3 HDMI HOT-PLUG DETECT LED



The HDMI hot-plug detect LED is located next to the HDMI socket on both the TX and RX variants of the 866 and is located as indicated above. This LED shows that the 5V, Hot-Plug Detect mechanism of the HDMI is working correctly. A HDMI compliant source outputs a +5V signal, this signal is detected by a HDMI compliant screen and it responds with a Hot-Plug Detect +5V signal to tell the source a screen is attached. The 4K-866 can handle this mechanism at both the TX and RX end.

The RX866 outputs a +5V signal replicating a source, when the screen detects this signal it responds with the Hot-Plug Detect +5V and this then illuminates the LED.

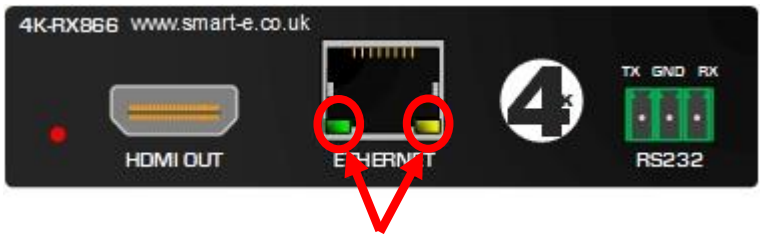
The TX866 waits to detect an incoming +5V from a source and when detected this will light the LED and respond with the +5V Hot-Plug Detect signal, telling the source a screen is attached.

If either LED is not lit it could be because of a faulty HDMI cable, try swapping this cable or test in a known setup to determine it's working state.

The source and screen will need to be in at least standby mode for this mechanism to work, check both devices are at least in standby power mode as sources and screens can often power off completely dependant on the power management plans of the hardware.

If the above methods do not determine the source of the problem the use of the 4K-9000 would be helpful as this can accurately determine the point where the 5V, Hot-Plug Detect mechanism is breaking down.

7.4 ETHERNET STATUS LEDS



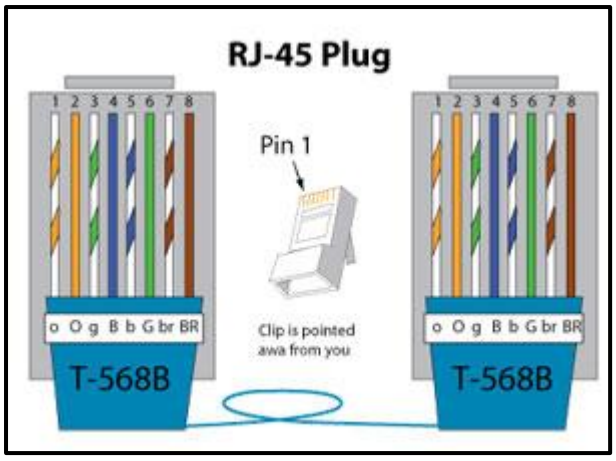
Two LEDs are located on the RJ45 Ethernet socket on both the TX866 and RX866 units, these LEDs are often reciprocated on the Ethernet sockets of routers, network switches and a multitude of other devices with Ethernet ports. Their location is as indicated above.

The green LED, when connected, should be solidly lit. If this is not solidly lit it would suggest a connection issue due to a hardware issue or a cabling issue. If this LED is not lit once connected and powered, it is advised to first check the CATx cabling.

The amber LED will only light once a connection is established so hence if the green LED is not lit the amber LED will not illuminate. When the green LED is lit the amber LED will have two working states, solidly lit or blinking. When solidly lit it indicates that no Ethernet activity is occurring on this port, when blinking it indicates there is activity. If the LED remains solidly lit, even when you think activity should be occurring, it may suggest an IP addressing issue with the device you are trying to control. Consult your network administrator for assistance.

8 HDBASET CABLING

It is advised to use T568B termination at the 4K-866 transmitter and receiver termination points.



NOTE: As the 4K-866 utilises power over cable (POC), if the CATx cable is incorrectly terminated there is a danger of damaging both the 4K-886 transmitter and receiver. If you suspect an incorrectly terminated cable may have been applied, please contact Smart-e support immediately.

HDBaseT signals can be susceptible to noise, causing image loss or snowy effects on output screens. The best way to mitigate against these problems is by using a high quality CATx cable. Smart-e specify cable as below.

RECOMMENDED CATx CABLE

Connectix CAT6a U/FTP Solid core cable

9 TECHNICAL SPECIFICATION

9.1 4K-TX866

Audio and Video Ports	
Input Ports	1x HDMI
Output Ports	None
Serial port	
Serial control interface	RS-232, 3 pin female phoenix connector
Baud rate and protocol	Baud rate: 115200, data bits: 8 bits, stop bits: 1 bit, no parity check bit
Serial control interface structure	3 pin female phoenix interface: 1 = TX, 2 = GND, 3 = RX
Ethernet port	
Ethernet Interface	RJ45 female interface with activity indicators
Ethernet Speed	Adaptive 10M/ 100M, full-duplex or half-duplex
Specifications	
Mains Power to external power supply	100VAC-240VAC, 50/60Hz, international adaptive power
Power Adapter Output	5VDC, 3A, 2.1mm centre positive 11mm barrel with locking function
Power Input Connector	2.1mm x 5.5mm centre positive DC connector with locking function
Operating temperature range	0 - +40 degrees Celsius
Storage temperature range	-20 - +60 degrees Celsius
Relative humidity operational or storage	20 - 90% (non-condensing)
Product weight	320g
Power consumption	4.5W (max)/0.8W (standby)
Chassis dimensions	100(l)x100(w)x25(d)mm
Mean time between failures	30,000 hours
Quality guarantee	3-year return to base warranty

HDMI port specification	
Protocols	HDMI 1.4b, HDCP 2.2 and DVI 1.0
Interface	1x Independent HDMI (Type-A) Female
Gain	0 dB
Pixel Bandwidth	340MHz full digital
Interface Bandwidth	3.4Gbps, Full digital (a total of 10.2Gbps, each colour is 3.4Gbps)
Maximum Resolution	PC: 1600x1200 @60Hz 48-bit HDPC: 1920x1200p @60Hz 36-bit HDTV: 3840x2160 @30Hz 4:2:0
Clock Jitter	<0.15T bit
Rise Time	<0.3T bit (20-80%)

Fall Time	<0.3T bit (20-80%)
Maximum Transmission Delay	5ns (+/- 1ns)
Signal Strength	T.M.D.S +/- 0.4V p-p
Minimum/Maximum Level	T.M.D.S 2.9V/3.3V
Impedance	50Ω
EDID	Pass-through
Maximum DC Offset error	15mV
Maximum Input cable length	15 meters (always use high quality cable)
Maximum Output cable length	N/A

HDBaseT port specification	
Protocols	HDBaseT
Input Ports	None
Output Ports	1x RJ45 female
Gain	0 dB
Pixel Bandwidth	340MHz Full Digital
Interface Bandwidth	3.40Gbps, Full digital (a total of 10.2Gbps, each colour is 3.40Gbps)
Maximum Resolution	PC: 1600x1200 @ 60Hz 48-bit HDPC: 1920x1200p @ 60Hz 36-bit HDTV: 3840x2160 @ 30Hz 4:2:0
Clock Jitter	<0.15T bit
Rise Time	<0.3T bit (20%~80%)
Fall Time	<0.3T bit (20%~80%)
Signal Type	High speed differential signal defined in HDBaseT protocol
PoC	24V
EDID	Pass-through
RS232 Serial Control Signal	Pass-through
Infrared Control Signal	Pass-through
Maximum DC offset error	15mV
Maximum Input Cable	N/A
Maximum Output Cable	≤100-meters (CAT 5e – 7a U/UTP – S/FTP)

9.2 4K-RX866

Audio and Video Ports	
Input Ports	None
Output Ports	1x HDMI
Serial port	
Serial control interface	RS-232, 3 pin female phoenix connector
Baud rate and protocol	Baud rate: 115200, data bits: 8 bits, stop bits: 1 bit, no parity check bit
Serial control interface structure	3 pin female phoenix interface: 1 = TX, 2 = GND, 3 = RX
Ethernet port	
Ethernet Interface	RJ45 female interface with activity indicators
Ethernet Speed	Adaptive 10M/ 100M, full-duplex or half-duplex
Specifications	
Mains Power to external power supply	100VAC-240VAC, 50/60Hz, international adaptive power
Power Adapter Output	5VDC, 3A, 2.1mm centre positive 11mm barrel with locking function
Power Input Connector	2.1mmx5.5mm centre positive DC connector with locking function
Operating temperature range	0 - +40 degrees Celsius
Storage temperature range	-20 - +60 degrees Celsius
Relative humidity operational or storage	20 - 90% (non-condensing)
Product weight	320g
Power consumption	5.5W (max)/0.9W (standby)
Chassis dimensions	100(l)x100(w)x25(d)mm
Mean time between failures	30,000 hours
Quality guarantee	3-year return to base warranty

HDMI port specification	
Protocols	HDMI 1.4b, HDCP 2.2 and DVI 1.0
Interface	1x Independent HDMI (Type-A) Female
Gain	0 dB
Pixel Bandwidth	340MHz full digital
Interface Bandwidth	3.4Gbps, Full digital (a total of 10.2Gbps, each colour is 3.4Gbps)
Maximum Resolution	PC: 1600x1200 @60Hz 48-bit HDPC: 1920x1200p @60Hz 36-bit HDTV: 3840x2160 @30Hz 4:2:0
Clock Jitter	<0.15T bit
Rise Time	<0.3T bit (20-80%)
Fall Time	<0.3T bit (20-80%)
Maximum Transmission Delay	5ns (+/- 1ns)

Signal Strength	T.M.D.S +/- 0.4V p-p
Minimum/Maximum Level	T.M.D.S 2.9V/3.3V
Impedance	50Ω
EDID	Pass-through
Maximum DC Offset error	15mV
Maximum Input cable length	N/A
Maximum Output cable length	15 meters (always use high quality cable)

HDBaseT port specification	
Protocols	HDBaseT
Input Ports	1x RJ45 female
Output Ports	None
Gain	0 dB
Pixel Bandwidth	340MHz Full Digital
Interface Bandwidth	3.40Gbps, Full digital (a total of 10.2Gbps, each colour is 3.40Gbps)
Maximum Resolution	PC: 1600x1200 @ 60Hz 48-bit HDPC: 1920x1200p @ 60Hz 36-bit HDTV: 3840x2160 @ 30Hz 4:2:0
Clock Jitter	<0.15T bit
Rise Time	<0.3T bit (20%~80%)
Fall Time	<0.3T bit (20%~80%)
Signal Type	High speed differential signal defined in HDBaseT protocol
PoE	None
EDID	Pass-through
RS232 Serial Control Signal	Pass-through
Infrared Control Signal	Pass-through
Maximum DC offset error	15mV
Maximum Input Cable	≤100-meters (CAT 5e – 7a U/UTP – S/FTP)
Maximum Output Cable	N/A

10 TROUBLESHOOTING

Smart-e manufacture the 4K-9000 HDBaseT tester, this product can prove very effective in identifying issues within a HDBaseT installation. It is particularly useful for installers performing multiple HDBaseT installations. Smart-e would recommend that all CATx cables intended for use with HDBaseT are first verified with the 4K-9000 built in test function. The 4K-9000 can also be purchased with test generator and test monitor making it the ideal pre-installation verification test kit and equally as adept at diagnosing faults within an existing installation.

For more info visit the 4K-9000 product page: http://www.smart-e.co.uk/product-range/4k-9000

10.1 POWER

Verify the power supply, check the mains outlet and then if possible swap the power supply with a known working unit. If an alternate unit is not available, try the power supply in to another Smart-e 24V device or test the power supply output with a voltmeter.

10.2 HDBASET LINK

1. Ensure the HDBaseT link LED on both the TX and RX units are solidly lit, for more detailed guide on link LED states refer to section 8.1 of this manual
2. Ensure the CATx cable for HDBaseT is connected between the HDBaseT in port of the RX866 and the HDBaseT out port of the TX866, this cable should not connect to the Ethernet ports on either unit
3. Test the CATx HDBaseT cable using a cable tester with reference to section 9 of this manual
4. An unstable link can be caused by excess noise ingress to the CATx HDBaseT cable, to protect against noise always follow Smart-e recommended cable choice as set out in section 9 of this manual. Shielding should be from TX866 continuously through to RX866 to protect against noise

10.3 VIDEO

1. Verify HDMI cables by trying them between a known working source and screen combination
2. Use the video source directly in to the intended output screen
3. Check that the bitrate being sent does not exceed the 10.2 Gbps limit, max resolution is 3840x2160 @30Hz YUV 4:2:0
4. If experiencing intermittent video or noisy video (white sparkles on screen), this is likely to be due to the HDBaseT CATx cable and noise being induced on to it. Ensure high quality shielded cabling is used in these instances. Smart-e recommends CAT6A U/FTP, patch cables from TX866 and RX866 with a solid core cable for the majority of the cable run

10.4 INFRA-RED

1. Ensure the IR TX and IR RX devices are the correct version, those that were supplied with the TX866 and RX866, other versions may look similar but may not function correctly
2. With reference to sections 6.1 and 6.2 of this manual, ensure the IR TX and IR RX devices are connected to the correct ports of the 866 units
3. Try the handset directly with the device to be controlled

4. Check the placement of IR TX devices on unit to be controlled. The IR TX will need to be in close proximity to the devices infra-red receiver. Check with the manufacturer of the device to be controlled to obtain the accurate position of this receiver
5. Ensure interference is kept to a minimum. Secure IR TX in place with black electrical insulating tape and place IR RX in a visible but protected location, usually along the bottom edge of a screen set back slightly is a good location

10.5 RS232 (SERIAL)

1. Check the baud rate and other port settings of the transmission port of RS232 controller match those of the device to be controlled. These details should be specified by the manufacturer in the products manual
2. Verify pinout of cabling. Pins on the 866 units for TX and RX will need to be connected to the correct pins from the control device and to the device to be controlled. The ground connection should be obvious but if unsure of pinout use trial and error to swap the TX and RX connections on both the TX866 and RX866 until communications pass through correctly
3. Rule out any issues with 3rd party controllers or programming by using a PC/Laptop running a terminal application to send RS232 commands directly to the device to be controlled

10.6 ETHERNET

1. Verify the CATx cables being utilized for Ethernet connection by way of a cable tester, Smart-e recommend both ends of any Ethernet cable be terminated to the T568B standard as shown in section 9 of this manual
2. Try the devices via a direct connection, if trying to extend Ethernet to a laptop from a network switch/router, take the laptop and connect directly to the network switch/router
3. If you cannot complete step 2 verify the network settings of each end, for example if connecting to a smart TV, ensure the smart TV does not have a default IP address which is out of range of the network it is to be connected to. Where possible leave any device to automatically obtain IP address as this should then negate any IP address issues
4. Ensure the length of cables at either end adhere to the Ethernet standard, maximum of 100m, 5m patch leads at each end and a solid core cable run connecting the two patch leads of 90m
5. Status LEDs are provided on the Ethernet RJ45 plugs of the TX866 and RX866 as these can provide an easy point of reference when diagnosing Ethernet issues (more detailed explanation in section 8.4 of this manual)