4K-9:9

Flexible 1U Rackspace point-to-point HDBaseT Mounting & Extension Solution

User guide

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.

Symbol	Meaning
⚠	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.
CAUTION DO NOT OPEN RISK OF ELECTRIC SHOCK	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.
WiFi	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.
Bluetooth	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.
IR)))	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.
HDBT™	This is a product which conforms to HDbaseT specification.
HD 1080p	This product supports full High Definition 1080p resolution.
4K UHD	This product supports 4K Ultra High Definition resolution.
3D	This product supports 3D definition display.
CE	CE certification means that the product has reached the directive safety requirements defined by the European Union.
SGS	SGS certification means that the product has reached the quality inspection standards proposed by the world's largest quality standards body - SGS.
TÜV CERT ISO9001:2000	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-9:9 is designed to offer the most compact and functional 1U rackmount option for your HDBaseT extension requirements.

The unit is designed to provide 9 transparent paths through the unit, a modular system on the front of the unit provides 9 slots which can each be fitted with a remote transmitter, a remote receiver or a passive HDMI module and each of these has a corresponding HDMI port on the rear of the chassis which is bidirectional dependant on the module being utilized.

The current solutions for point-to-point HDBaseT distribution would require the purchase of a costly HDBaseT matrix or a bespoke solution to mount point-to-point products in to a rack space format. The use of a matrix would be cost ineffective as a premium would be paid for the functionality of a matrix without ever being utilized. The rack mounting of point-to-point products would have one benefit in the cost being reduced but with all of the cabling for power supplies and signal cables being required, access to the IO would need to be maintained. As a consequence, a max of 1 or 2 units could be mounted per 1U shelf. Where rack space is at a premium this is obviously not desirable and the look of cables routing around shelves with external power bricks also visible leaves a very unprofessional looking installation as well as making maintenance challenging.

The 4K-9:9 finds a perfect sweet spot to combine the benefits experienced with cabling of a rack mounted matrix solution but at a reduced cost whilst being able to combine 9 point-to-point solutions in to a 1U space.

With the combination of space saving and cost effectiveness the 4K-9:9 still offers a great feature set. Able to handle resolutions up to 4K (3840x2160) @ 30Hz, when used with transmitter or receiver modules able to provide power to remote units from the compatible 4Konnect family and also able to send bi-directional RS232 and infra-red signally for integration with control systems or to provide control to the end user.
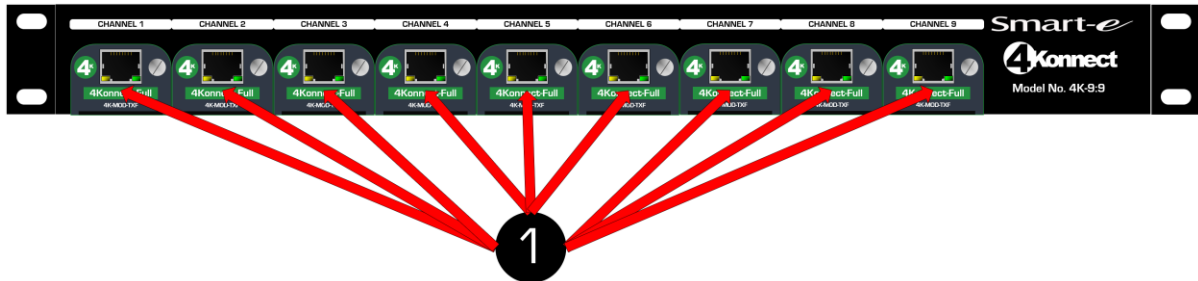
Like all products within the 4Konnect family the 4K-9:9 can be utilized with inexpensive CATx cable to enable the transmission of UHD signals at up to 100m. The remote HDBaseT modules can be set up to operate at up to 150m with a maximum resolution of 1080p, if this is required please notify our sales team upon placement of your order.

2 FEATURES

- **19-inch Rack Mountable Form Factor.**

- **9x independent HDMI connectors, HDMI 1.4 HDCP 2.2**

- **9x independent 4Konnect module slots**

- **DVI 1.0 compliant**

- **Support for HD, Full HD and UHD resolutions**

- **Transparent EDID passthrough**

- **Full duplex RS232 passthrough**

- **Bi-directional Infra-red control**

- **HDCP 2.2 compliant**

- **HDMI CEC compliant**

- **Integrated power supply**
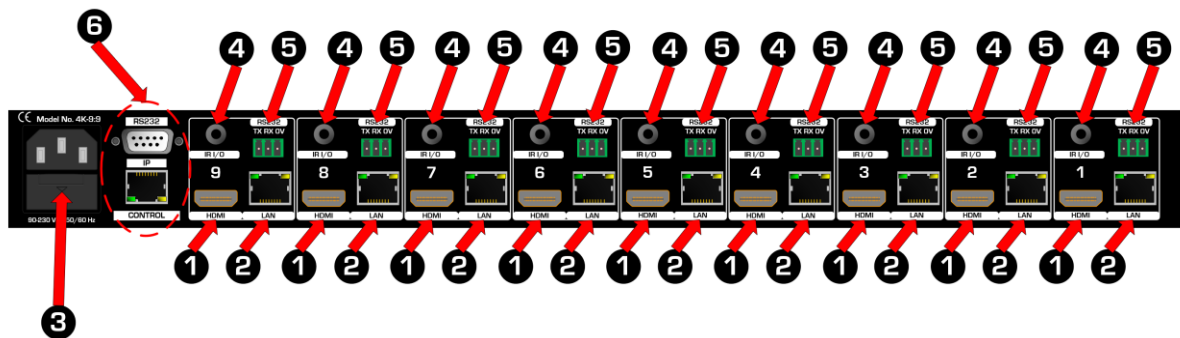
- **24V POC support compatible with 4Konnect family**

3 CHASSIS PANEL DESCRIPTION

Front Panel | 4K-9:9

1. **9x Module Slots**

Rear Panel | 4K-9:9

1. **9x HDMI connectors (bi-directional dependant on module fitted to respective module slot)**
2. **LAN port (for engineering use only)**
3. **C14 IEC Mains Inlet**
4. **9x 3.5mm stereo jacks for Infra red receivers or transmitters**
5. **9x 3-pin phoenix plugs for RS232**
6. **Control sockets (for engineering use only)**

4 MODULE TYPES

4.1 4K-MOD-TXF

HDBaseT output module, capable of outputting a HDBaseT signal up to 100m using CAT6a U/FTP cabling to a 4K-MOD-RXF or a 4K-RX866. When used with a 4K-RX866 the 4K-MOD-TXF can provide 24V POC to power the remote receiver unit.

4.2 4K-MOD-RXF

HDBaseT input module, capable of accepting a HDBaseT signal from 100m away using CAT6a U/FTP cabling from a 4K-MOD-TXF or a 4K-TX866. When used with a 4K-TX866 the 4K-MOD-RXF and provide 24V POC to power the remote transmitter unit.
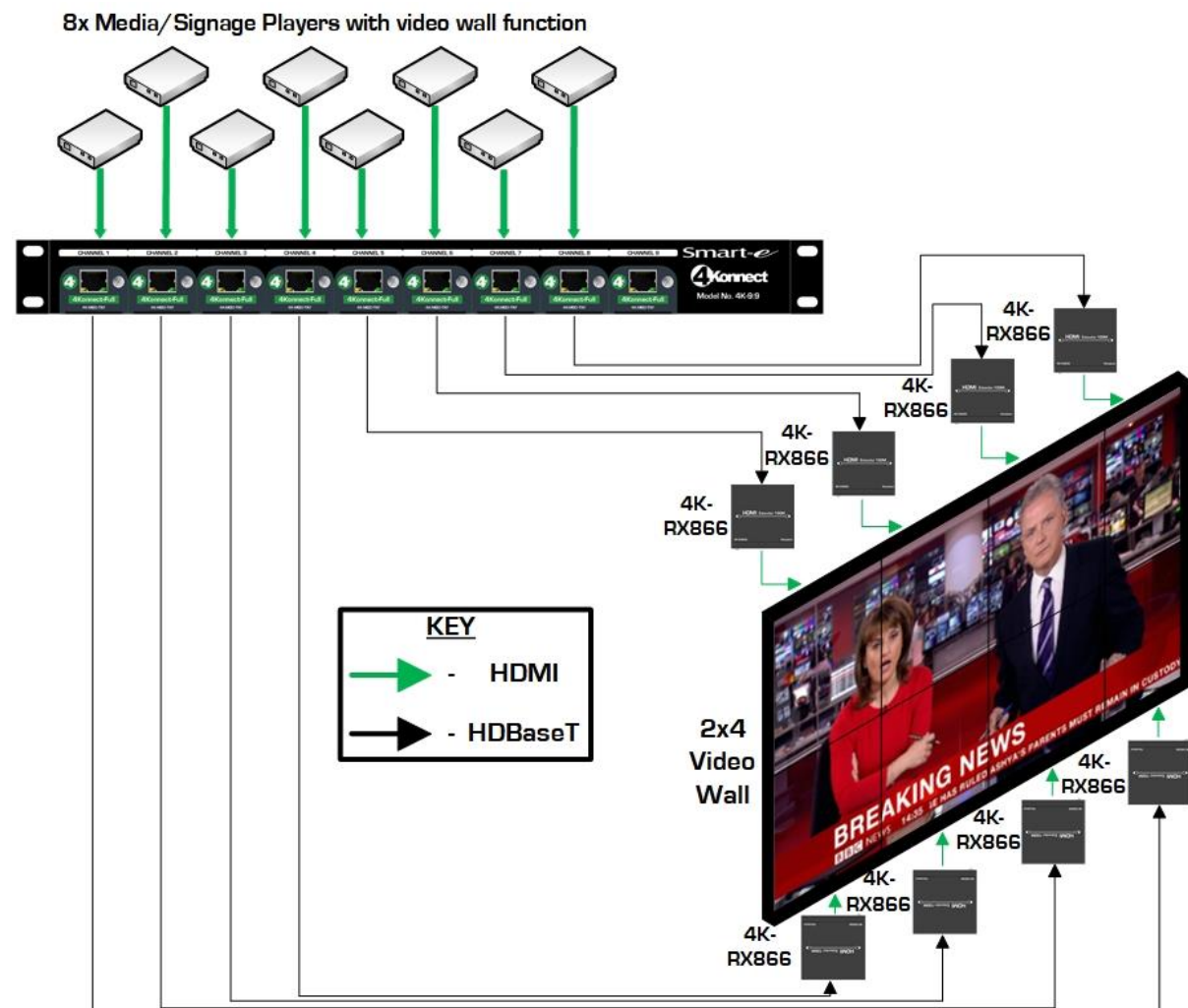
4.3 4K-MOD-IO

Passive HDMI passthrough module. Can be used in the 4K-9:9 to aid with cable management as part of a larger installation. HDMI 1.4 compatible, capable of handling 4K resolutions at 30Hz, within the specification of HDBaseT. Also included is a low profile 3.5mm stereo jack for IR passthrough.
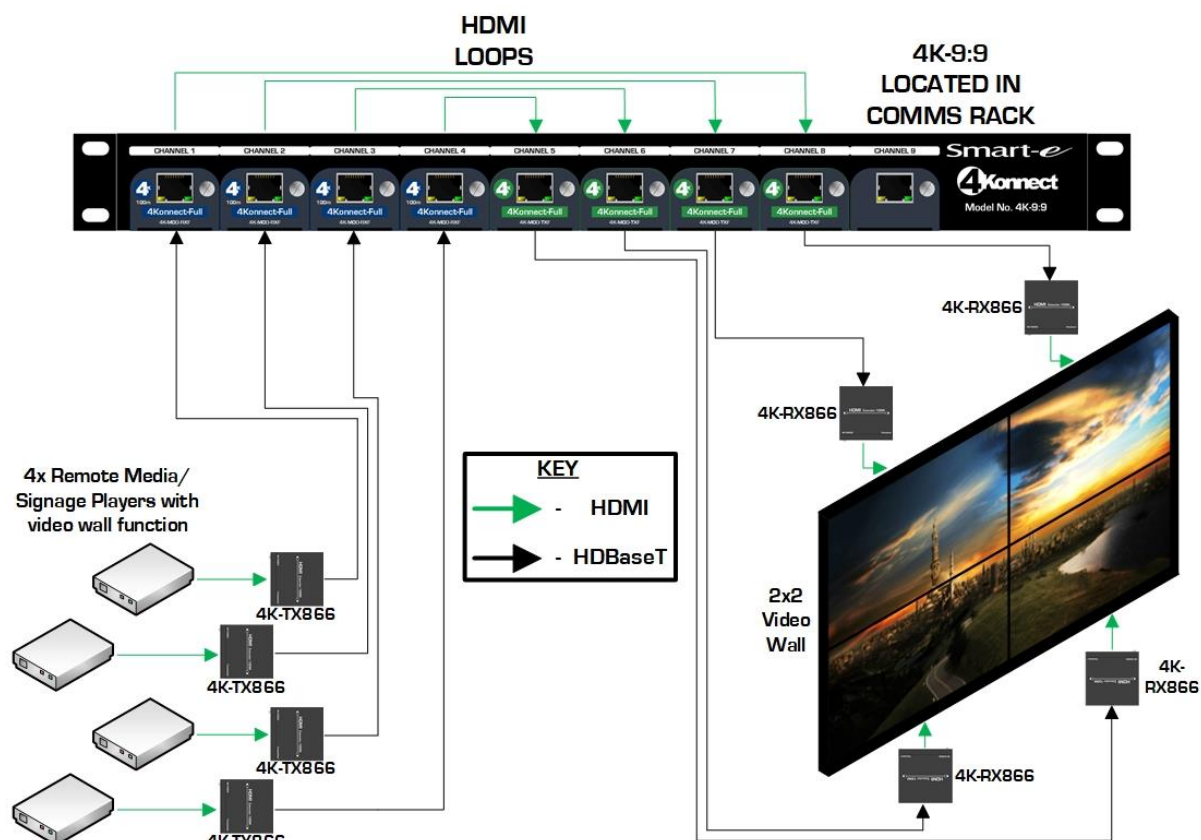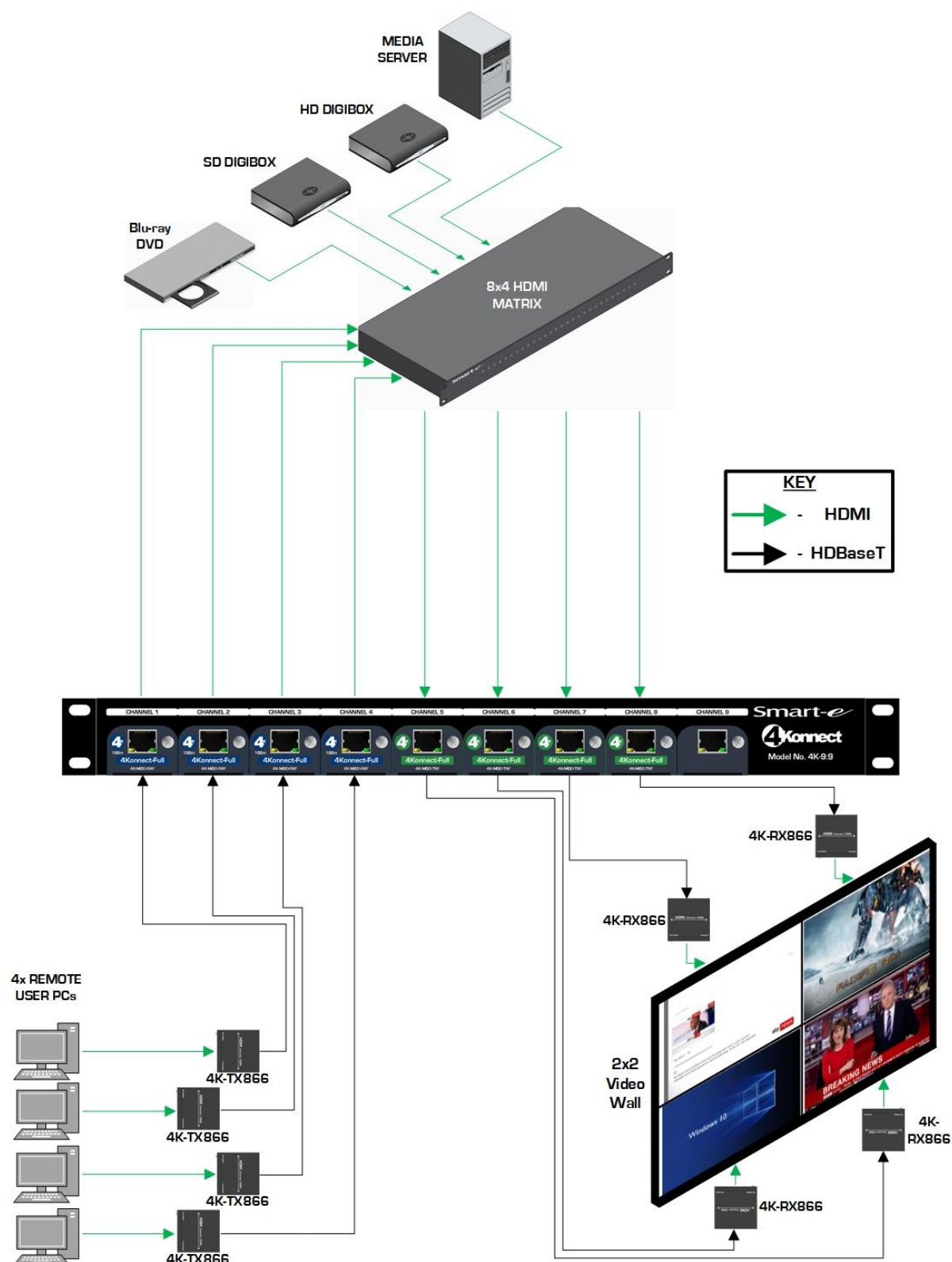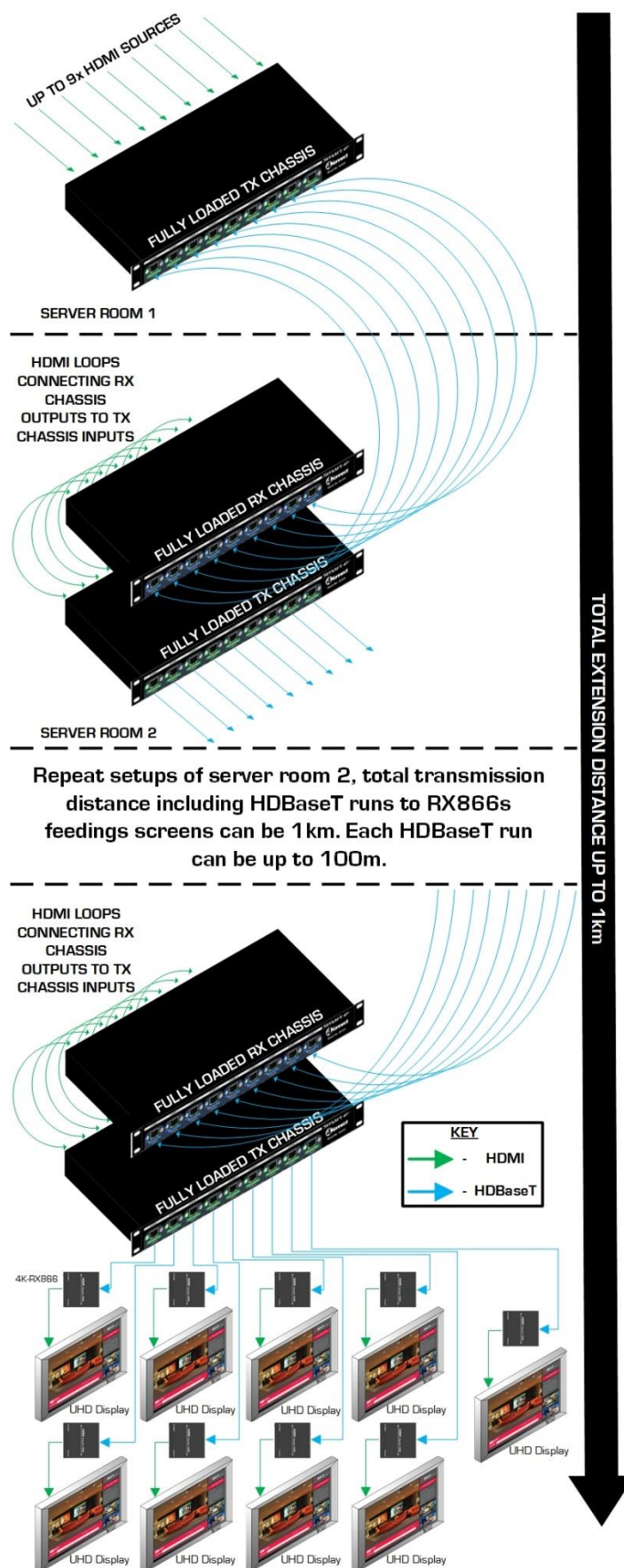
5 APPLICATION DIAGRAMS

5.1 2X4 VIDEO WALL

5.2 REMOTE 2X2 VIDEO WALL

5.3 MIXED LOCAL AND REMOTE AV SOURCES

5.4 LONG RANGE EXTENSION THROUGH DAISY CHAINING

UP TO 9x HDMI SOURCES

FULLY LOADED TX CHASSIS

SERVER ROOM 1

HDMI LOOPS CONNECTING RX CHASSIS OUTPUTS TO TX CHASSIS INPUTS

FULLY LOADED RX CHASSIS

FULLY LOADED TX CHASSIS

SERVER ROOM 2

Repeat setups of server room 2, total transmission distance including HDBaseT runs to RX866s feedings screens can be 1km. Each HDBaseT run can be up to 100m.

HDMI LOOPS CONNECTING RX CHASSIS OUTPUTS TO TX CHASSIS INPUTS

FULLY LOADED RX CHASSIS

FULLY LOADED TX CHASSIS

TOTAL EXTENSION DISTANCE UP TO 1km

KEY

- HDMI
- HDBaseT

4K-RX866

UHD Display | UHD Display | UHD Display | UHD Display | UHD Display

UHD Display | UHD Display | UHD Display | UHD Display

6 WHAT IS INCLUDED

- ➢ 1x 4K-9:9 chassis. If ordered with modules these modules will be fitted to the unit in the module slots agreed with a Smart-e sales representative
- ➢ 2x rack mounting ears and 4x fixing screws
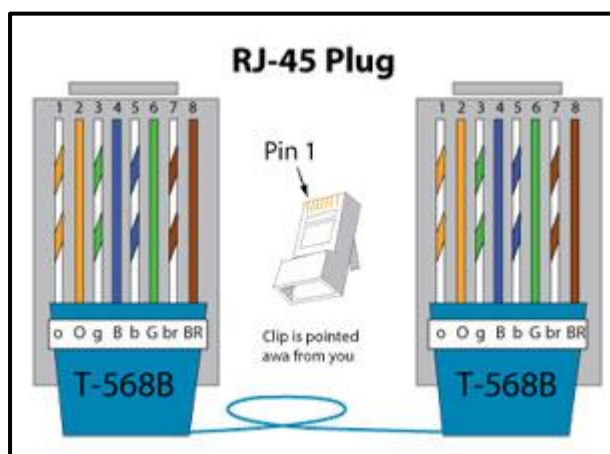- ➢ 1x IEC mains lead (Variant dependant on region unit is shipped to)

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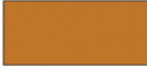
7 BASIC SETUP

1. Attach all input and output connections on the rear of the 4K-9:9 including:
   - ➢ HDMI cables
   - ➢ RS232 connections
   - ➢ Infra-red transmitters (SM-LED)
   - ➢ Infra-red receivers (SM-EYEN)
2. Attach all inputs and outputs on the front of the 4K-9:9 including:
   - ➢ HDMI cables
   - ➢ CAT6a HDBaseT cables
   - ➢ Infra-red peripherals for 4K-MOD-IO modules
3. Ensure any remote HDBaseT transmitters and receivers are connected to the other end of any HDBaseT inputs or outputs of the 4K-9:9. Ensure CATx cable has been tested and terminated to the specification as outlined in the HDBASET CABLING section of this manual.
4. Apply power to the rear of the 4K-9:9 via the C14 IEC inlet. Ensure the outlet used has surge protection to ensure the unit is as isolated as possible from any external electrical failures.
5. When power is applied ensure that the green and amber LEDs on any fitted 4K-MOD-TXF or 4K-MOD-RXF modules are all illuminated. This is the only outward notification of power on the 4K-9:9 as it has no dedicated power LED. If all of the LEDs are not illuminated it would suggest a power issue, check the mains connection by removing from the 4K-9:9 and inserting in to another device such as a PC or monitor to check the mains feed is working.
6. For any further fault finding it is advised to refer to the 4K-866 manual and using the status LEDs on these units in conjunction with the manual to identify where any problems may lie.

8 HDBASET CABLING

It is advised to use T568B termination for all cabling used in conjunction with the 4K-9:9.

NOTE: As the 4K-9:9 utilises power over cable (POC), if the CATx cable is incorrectly terminated there is a danger of damaging the 4K-9:9, the installed modules and any remote transmit or receive devices attached. 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

Audio and Video Ports	
Bidirectional Ports	9x HDMI sockets
Serial ports	
Serial interface	9x RS-232, 3-pin phoenix connectors
Baud rate	Baud rate: 1200 to 230400
Serial interface structure	3-pin phoenix Female connector: 1 = TX, 2 = RX, 3 = GND
Ethernet ports	
Ethernet interface	9x RJ-45 female interface
Ethernet control protocol	Ports for engineering use only
Ethernet speed	Adaptive 10M/ 100M, full-duplex or half-duplex
Infra-red ports	
Port Interface	9x 3.5mm stereo jacks
Infra-red Protocol	Transparent from sink to source
Infra-red interface structure	Adaptive jack plug, compatible with either SM-LED when required as an infra-red transmitter or with SM-EYEN when required as an infra-red receiver
Specifications	
Mains Power to external power supply	100VAC-240VAC, 50/60Hz, international adaptive power
Power Input Connector	3-pin IEC C14
Operating temperature range	-5 to +40 degrees Celsius
Storage temperature range	-10 to +60 degrees Celsius
Relative humidity operational or storage	5 - 90%
Product weight	3.4kg (when fully populated with 9x 4K-MOD-RXF) 2,8kg (when unpopulated)
Power consumption	110.0W max
Chassis dimensions	482.6(l)x397.2(w)x88(d)mm
Mean time between failures	30,000 hours
Quality guarantee	3-year return to base warranty

HDMI port specification	
Protocols	HDMI 2.0, HDCP 2.2/1.4 and DVI 1.0
Interface	1x Independent HDMI (Type-A) Female
Gain	0 dB
Pixel Bandwidth	600MHz full digital
Interface Bandwidth	18Gbps, Full digital (a total of 18Gbps, each colour is 6Gbps)

Maximum Resolution	PC: 1600x1200 @60Hz 48-bit HDPC: 1920x1200p @60Hz 48-bit HDTV: 4096x2160 @60Hz
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	Transparent to sink and source devices
Maximum DC Offset error	15mV
Maximum Input cable length	15 meters (always use high quality cable)
Maximum Output cable length	15 meters (always use high quality cable)

HDBaseT port specification	
Protocols	HDBaseT
Input Ports	1x RJ45 female (4K-MOD-RXF)
Output Ports	1x RJ45 female (4K-MOD-TXF)
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	None
Infrared Control Signal	Pass-through
Maximum DC offset error	15mV
Maximum Input Cable	≤100-meters for 4K-MOD-RXF (CAT 5e – 7a U/UTP – S/FTP)
Maximum Output Cable	≤100-meters for 4K-MOD-TXF (CAT 5e – 7a U/UTP – S/FTP)